

An Institutional Analysis of Sasi Laut in Maluku, Indonesia



- Irene Novaczek
- Ingvild H.T. Harkes
- Juliaty Sopacua
- Marcus D.D. Tatuhey

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Foreword

Increasing environmental degradation in much of the developing world is often linked with rapid economic development and the loss of indigenous knowledge systems and traditional resource management institutions. There are however very few detailed studies on enduring indigenous or traditional resource management institutions. In response to this gap in knowledge the International Center for Living Aquatic Resource Management ICLARM-The World Fish Center embarked on a study of the SASI Laut (an indigenous fisheries resource conservation and management tradition) in Maluku, Indonesia. The study was part of a larger global project on fisheries co-management funded by the Danish International Development Assistance (DANIDA). The International Development Research Centre of Canada provided a grant to undertake this specific study in Indonesia. Indonesia has the largest number of and longest enduring traditional community-based coastal resource management systems in Southeast Asia. Although many of these systems are disappearing, the basis of these systems and resource management approaches used in these systems hold some promise of providing directions for crafting new institutions for managing natural resources. Such knowledge could be a basis for improved policy choices resulting in sustainable economic growth, poverty reduction and environmental sustainability. These are important goals of ICLARM. ICLARM as a member of the Consultative Group for International Agricultural Research (CGIAR) works toward generating the knowledge base for improved management of aquatic resources leading to improved socio-economic conditions for the millions of poor who depend on these resources.

This study provides a better understanding of the extent and functioning of community based coastal resource management systems in Maluku province, Indonesia and suggests recommendations for national, provincial and village government to support, maintain and develop effective traditional and indigenous resource management institutions. The study has shown that the SASI Laut has benefits that can be used as a basis for building local level management institutions.

Although large-scale changes have taken place in Maluku since the time this study was completed, the changes provide new opportunities for the development of innovative arrangements for state and community cooperation for managing aquatic resources. It is hoped the detailed study of the SASI Laut system provided in this report will form an important benchmark for future studies on indigenous resource management systems in different parts of the world.

Meryl J. Williams
Director General
ICLARM-The World Fish Center

Dedication

We dedicate this work to the memory of Om Bertie Ririmasse, respected former *Raja* of Haruku, whose visionary leadership has helped to preserve and transform community-based resource management institutions in central Maluku.

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This research was made possible through a research grant that was arranged by Dr. Robert Pomeroy of the International Center for Living Aquatic Resources Management (ICLARM), the co-project leader of this research. We are very grateful to Dr. John Graham of IDRC for granting us the funds to carry out the research. The Netherlands Government, through NEDA, has supported the research through its provision of an associate expert, the co-author of this report, Ingvild Harkes.

In order to carry out a multi-component research like this, a large number of people was involved. Only through their commitment was it possible to produce this report.

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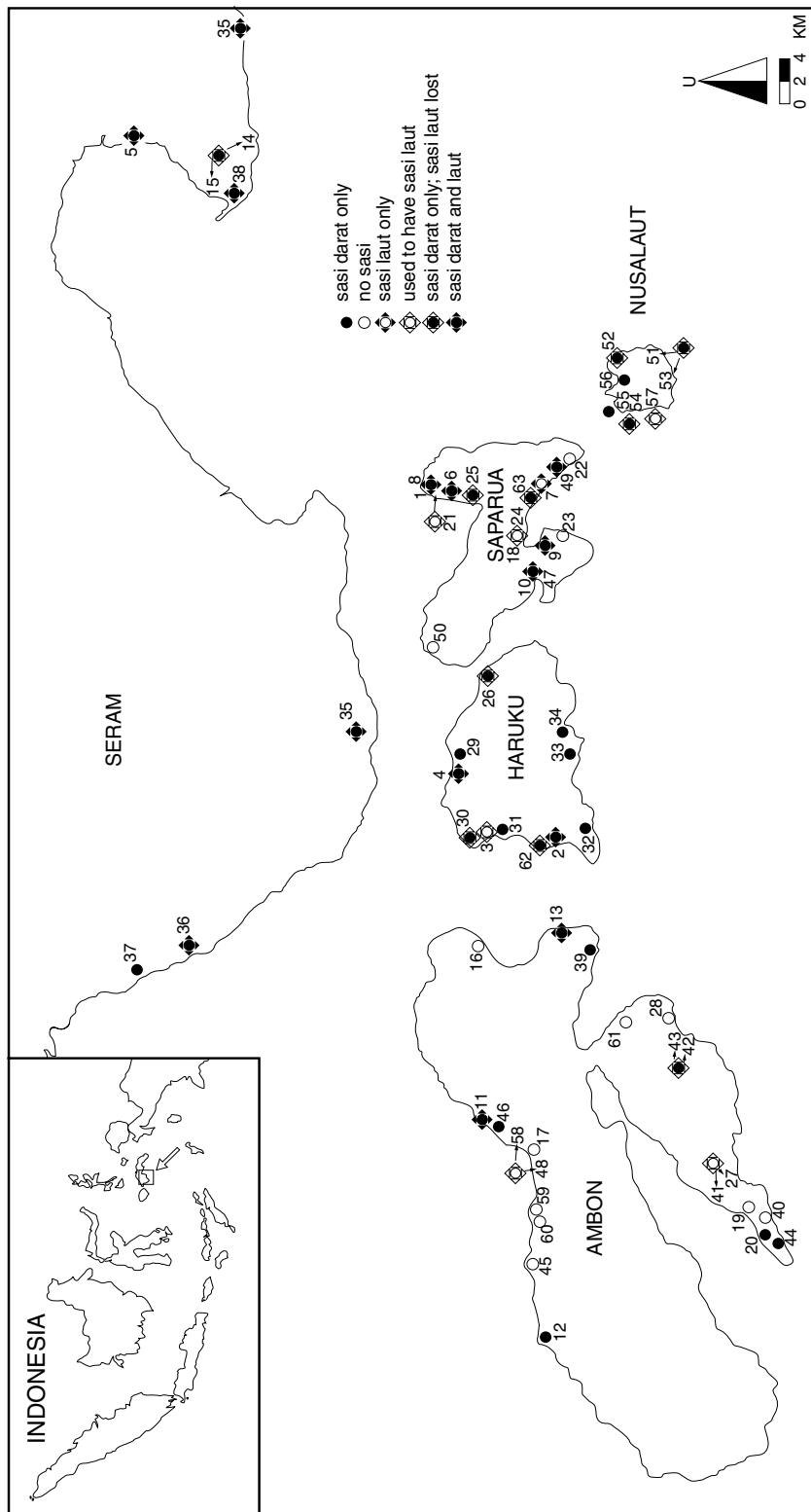


Figure 1. Map of central Maluku.

Foreword

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We dedicate this work to the memory of Om Bertie Ririmasse, respected former *Raja* of Haruku, whose visionary leadership has helped to preserve and transform community-based resource management institutions in central Maluku.

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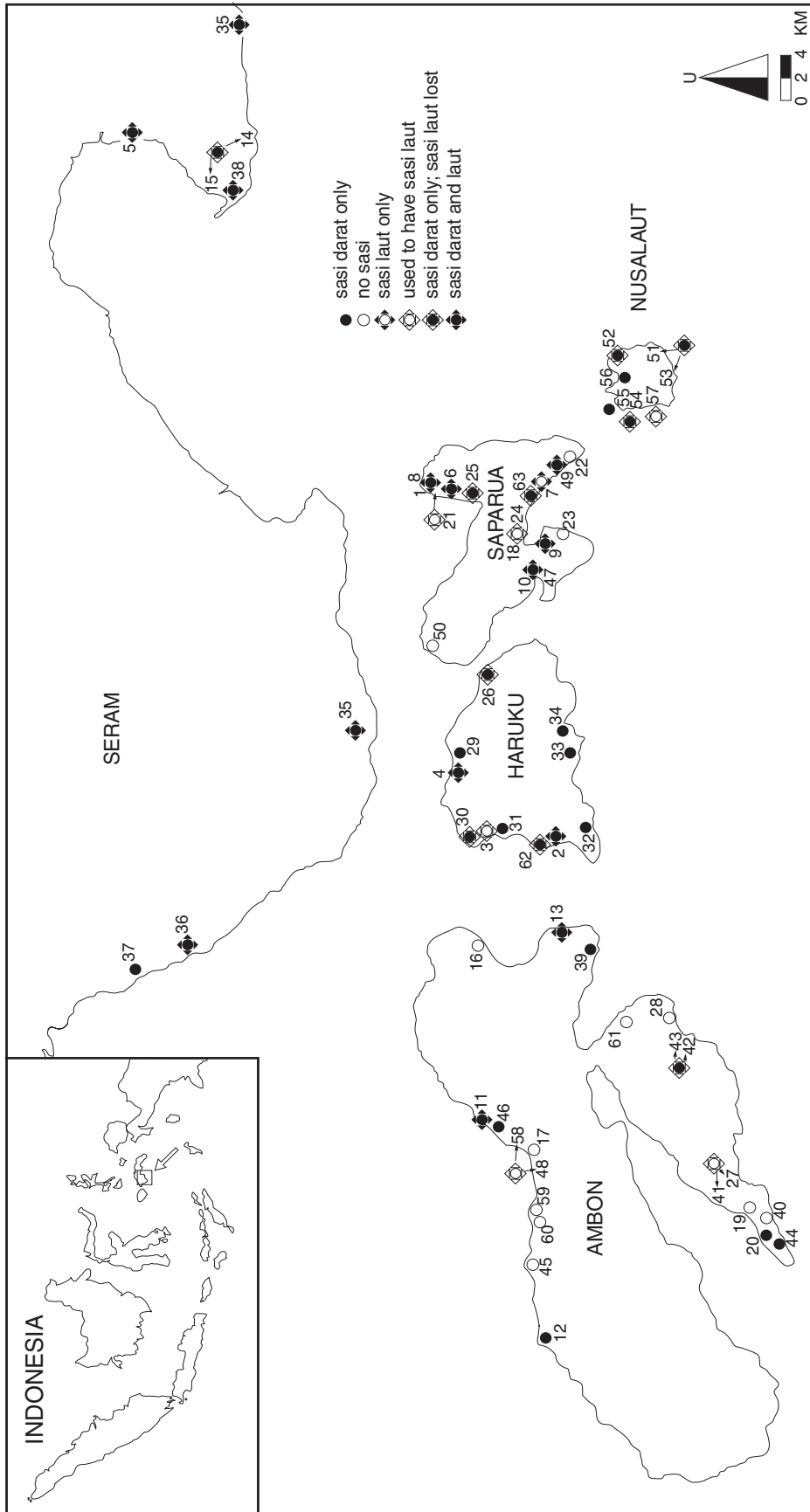


Figure 1. Map of central Maluku.

Chapter 1

Introduction

1.1 Project Overview and Objectives

With funding from the Danish International Development Agency (DANIDA), a five-year collaborative research project involving the International Center for Living Aquatic Resources Management (ICLARM), Philippines, the Institute of Fisheries Management (IFM) at the North Sea Center, Denmark, and the National Aquatic Research Systems (NARS), was initiated in 1994. The collaboration between ICLARM, IFM and NARS is based on a mutual interest to gain practical experience in research in fisheries co-management, to demonstrate its applicability as a sustainable, equitable and efficient management strategy, and to develop models for use and adoption by governments, fishing communities, non-governmental organizations (NGOs) and others. The overall purpose of the Fisheries Co-management Research Project is to determine the prospects for successful implementation of fisheries co-management strategies.

As part of the Fisheries Co-management Research Project, ICLARM staff, with funding assistance from IDRC (the International Development Research Centre of Canada) and the Netherlands government (NEDA) have collaborated with researchers in Indonesia to study the community-based institution called *sasi* in the province of Maluku (Figure 1). Although this project focuses on a long-standing institution rather than a time-limited project, the overall objective is the same as for other projects, that is, to evaluate community level management in order to develop better models for the future (Pomeroy and Simanjuntak 1997).

Sasi encompasses fishery-related rights and rules, and is, therefore, commonly referred to as a traditional resource management institution, even though it also has other functions and its focus has changed through time (Zerner 1994a). As a village level, community-based resource management (CBRM) system, *sasi* varies from locality to locality while maintaining the same intention of managing resource utilization. While land *sasi* controls and manages agro-forestry, marine *sasi* deals mostly with elements of the fishery, i.e., sedentary marine organisms and pelagic fish found in the waters close to shore. *Sasi* regulations usually apply to coastal waters facing a village, a bay, a coral reef ecosystem, or other areas having easily recognized boundaries. In some parts of Maluku, *sasi* regulates estuary fisheries.

The government of Maluku realizes that in some parts of the province, village people are more likely to comply with this traditional management system than with formal (national or provincial) regulations. However, while in some areas of Maluku, *sasi* is still functioning, in others, *sasi* is said to be growing weaker or has disappeared entirely. As has been pointed out by Zerner (1994b), the current extent of *sasi*, and how quickly, where and why weakening of the institution is taking place, are not clear. To allow discussion of the future of *sasi*, we need to first understand its current condition, rate of change, and the forces behind that change. Zerner (1994b) also identified the need for an objective evaluation of *sasi*, especially in terms of biological sustainability and social equity. In his view, the institution has historically served to protect the interests of elites. Recent re-invention of the *sasi* institution has, he argues,

moved in two essential directions. Some practitioners are re-inventing *sasi* as an institution for resource conservation while others see it as a tool for collecting resource rents which, in some cases, may be controlled for the benefit of social elites. To gain an overall picture of the range and variety of *sasi* systems is the initial step in understanding the institution. Based on this inventory, and on an understanding of the social and biological impacts of the institution, we can develop strategies for maintaining and revitalizing the system or, where *sasi* no longer exists, for establishing a new community-based resource management (CBRM) system.

Sasi offers an important research opportunity because it is one of the few (if not the only) long-enduring CBRM systems in Asia. From the perspective of an analyst seeking insights into the elements of a successful CBRM system, *sasi* has additional value because, unlike CBRM projects (or more recently, co-management projects), *sasi* has a long history and has undergone transformation through time. Thus, *sasi* provides us with not one case study site, but a rich array of outcomes in villages that differ from one another in many ways. We can perform a comparative analysis of these outcomes and ask: What different forms does *sasi* take today and which are the most common? What contributes to *sasi*'s resilience, i.e., why has *sasi* become extinct in some villages but survived in others? Why is it being revitalized in some villages? Are there documentable benefits from *sasi* in terms of equity, efficiency and sustainability? This project will go beyond the descriptive studies that have already been carried out on *sasi*, to undertake a quantitative performance analysis. We hope to discover principles or elements that can contribute to culturally appropriate and effective forms of community-level management.

In Indonesia, one obstacle to the maintenance and development of effective community-based resource management institutions is that the government does not fully recognize or support such institutions. Local institutions and customs are not reflected in national and provincial resource management laws and policies. Without government support, fishing communities are not able to defend their institutional arrangements (rights and rules), or hold off the slow demise of their traditional management systems. While government policy makers know that CBRM systems exist, they lack information on how well these systems perform. Before they are willing to reshape government policy away from centralized management and towards CBRM, they want to know that CBRM systems perform more equitably, efficiently and sustainably than centralized management systems. Quantitative information on CBRM is needed to support decision-making to change policy.

Sasi, being a village level institution, is not, by itself, a co-management structure. Co-management requires at least two parties: a local institution working together with one or more higher levels of government. In this report, we focus on the function and impact of *sasi* as a local institution but also look at linkages with the government in order to gauge whether or not *sasi* is a good model or basis for a local institution in some future co-management structure.

Research on *sasi* will help us to understand how CBRM systems change and adapt over time, providing insight that is critical for the design of new CBRM systems. The results should be of use to both the government and fishers of Indonesia. Information about the performance of *sasi* can form the basis for changes in policy to support, maintain and develop CBRM systems. The results should also be useful to a worldwide audience interested in the design and implementation of CBRM systems, particularly regarding the resilience, equity, efficiency and sustainability of these systems.

The goals of the project are:

1. To better understand the extent and functioning of traditional community-based coastal resource management systems in Indonesia, specifically the *sasi* system in the Maluku

- province.
- To develop policy recommendations for national, provincial and village governments to support, maintain and develop effective community-based coastal resource management institutions in the Maluku province and throughout Indonesia.

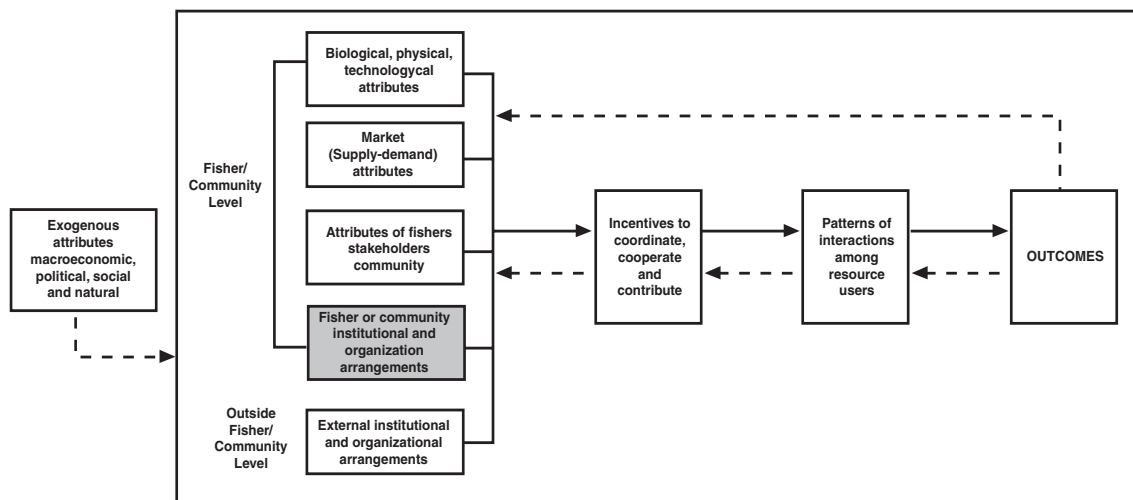
The specific objectives of the project are:

- To identify the extent of operating *sasi* systems and practices in the central Maluku province.
- To measure the performance (i.e., impacts in terms of equity, efficiency, social and biological sustainabilities) and investigate the resilience of the *sasi* system.
- To undertake descriptive and comparative case study analyses of the *sasi* system and its resilience in the Maluku province using the institutional analysis research framework.
- To make policy recommendations to the government to support, maintain, and develop community-based coastal resource management institutions.

1.2 Research Framework

The Fisheries Co-management Research Project has developed an analytical framework which, when applied in various research projects, will enable comparisons to be made among case studies, country research and pilot-tested co-management models (ICLARM-NSC 1996). The model allows data to be analyzed in a systematic way so that conditions that facilitate successful co-management may be discovered. In conducting research on fisheries co-management, we are essentially interested in understanding how rules affect the behavior of fishers, and what outcomes fishers achieve when using fisheries resources.

Institutional analysis focuses on the rights and rules that make up the management institution. These rights and rules may be formal (written down) or informal (unwritten code of conduct). The purpose of institutional analysis is to separate these rules from the incentives and strategies of the various players (individuals and organizations) involved in the institution. Once there is a clear appreciation of what is cause and what is effect, we can start to understand how different management structures affect behavior of resource users and subsequent outcomes (Figure 1.1).



Adapted from Oakerson 1992

Figure 1.1. Institutional Analysis Framework.

The institutional analysis framework acknowledges that the success of a management institution does not depend only on structure (i.e., the sum of constitutional, collective choice and operational rules governing resource access and withdrawal) but is also affected by the wide range of local, regional, national and even international contextual variables.

There are three interrelated parts to institutional analysis: analysis of institutional arrangements, analysis of performance and identification of the key factors affecting performance. The first aspect – institutional arrangement analysis – describes what is occurring in real life and uncovers the relationships between the institution and related organizations. Links that exist between the local management system and the sets of contextual variables are also explored. Contextual variables include the biological, physical and technological attributes, the market attributes, stakeholder and community characteristics, community institutional and decision-making arrangements, the external institutional and organizational arrangements, and exogenous attributes. Contextual variables provide incentives and disincentives which in turn affect patterns of interaction among stakeholders, i.e., how resource users participate in, support or comply with management institutions.

The second level of institutional analysis – institutional and organizational performance – evaluates the outcomes of the co-management institutional arrangements according to the measures of sustainability, efficiency and equity. The measuring instruments are applied to the impact of co-management arrangements on human as well as ecological systems that operate and affect the resource.

The final level of analysis determines the characteristics of, and underlying factors for, successful co-management.

The degree and type of interactions among resource users and managers both at local and higher levels determine where an institution lies along the continuum of potential co-management arrangements (Figure 1.2 adapted from McCay 1993 and Berkes 1994).

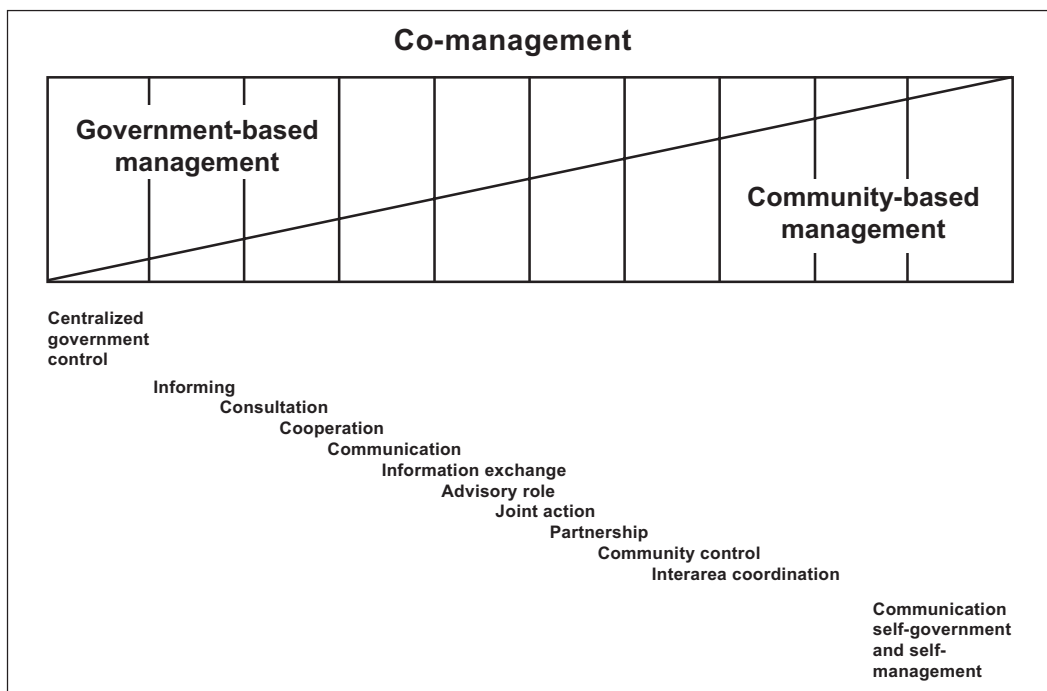


Figure 1.2. The continuum of possible co-management arrangements.

1.3 Overview of Methodological Approach

To complete an institutional analysis of *sasi* that fulfilled the objectives stated above, the research team developed a data-gathering program that comprised a number of component studies. Details on the objectives of each component and the methods used to gather and analyze data can be found in Chapter 2.

1) *Inventory of sasi*

In 63 villages in central Maluku, key informants were interviewed to record the present and past occurrence and type of *sasi* present in the region. The results were also used to study institutional resilience. Results can be found in Chapters 7 and 17.

2) *Performance analysis of sasi at the district level*

Over 500 fishers from 28 villages were interviewed to document and compare outcomes in *sasi* and non-*sasi* villages. In addition, limited marine surveys were conducted on coral reef habitats, including open-access sites as well as areas managed under *sasi*. Results are presented in Chapters 8 and 9.

3a) *Institutional analysis case studies*

Six villages were selected for case studies: two with *sasi*, two without *sasi*, and two that are in the process of revitalizing the institution. For each case study site, we collected information on the local context (technological, biological, social and economic) and institutional and organizational arrangements, following the institutional analysis framework (see Section 1.2). Results are provided in Chapters 10-16.

3b) *Resilience of marine sasi institutions*

In the six villages, 157 interviews were taken with key respondents to study changes in the institution, the process of decline and revival where *sasi* was lost, and to identify the mechanisms behind a well-functioning management institution (see Chapter 17).

3c) *Data gathering to characterize contextual variables for institutional analysis*

Data on the history and regional level context for fisheries management in Maluku were obtained through the analysis of existing literature. More detailed first-hand information on the political and social context of Maluku coastal villages came from case study sites. In addition, fish traders and government staff at regional and provincial levels were interviewed to discover the market forces and the structure of formal fisheries management that could affect local management. This regional and village-level contextual information is presented in Chapters 3-6.

4) *Policy recommendations*

Results of the performance and resilience studies, together with the information on government structures and functioning gathered in component 3c, were used to develop policy recommendations for the government of Indonesia (Sopacua et al. 1998).

1.4 Outputs

The research has produced the following results:

- This project report, documenting the various components of the institutional analysis i.e., contextual information, inventory, performance study, case studies, resilience study and lessons learned.
- A number of academic publications on *sasi* and the inshore fishery.
- A report provided to all villages where the inventory was carried out.
- A report for each case study village.
- A policy document that will be sent to the national government of Indonesia. In it, we provide our findings together with recommendations from the village/district government, academic and NGO colleagues regarding steps that could be taken in support of co-management of marine resources in Indonesia.

1.5 Report Summary

The marine resources of central Maluku are very rich but are under severe pressure, particularly from destructive fishing techniques. After a period of rapid increase in fishing pressure and catches, there is now a need for more cautious management. Nevertheless, economic pressures provide a strong incentive for further expansion of fisheries.

The central Maluku fishery is numerically dominated by artisanal fisher-farmers having low-technology boats, fishing gears and limited formal education. Younger fishers include increasing numbers of Muslims and they are more focused on deep-water pelagic resources. Fishers are also moving from the artisanal to the small-scale sector and onto larger commercial vessels as crew. Both artisanal fishers and commercial crew earn marginal incomes, have no control over fish prices, and are unorganized. Profit-sharing systems that are in place provide incentives to fishers to maximize catch, if necessary, through use of destructive gears such as very fine mesh nets. At the same time, enforcement of national fisheries regulations is lax and there are serious deficiencies in government management agencies in terms of motivation, coordination, knowledge, infrastructure, and funding support. Local village institutions (*sasi*), while generally well respected, have less credence with the younger, commercially-oriented fishers.

The majority of rural, coastal villagers are still directly or indirectly dependent on fishery. Fishers clearly recognize that inshore and pelagic fisheries resources in Maluku are in decline. Few encourage their children to enter the fishery even though they themselves find it to be a fulfilling occupation. In the study area, there is an overall decline in social interaction, cooperation, and compliance with fisheries rules. Collapsing inshore fish catches have driven subsistence fishers ever farther out to sea and future conflict with commercial sectors is inevitable if management and conflict resolution arrangements are not set in place. However, fishers in general do not perceive that management options are available to redress the situation. They also still consider ocean resources to be unlimited, even though local resources may be depleted. They see the solution to declining catches as being an increase in their fishing power (bigger boats and motors). NGO and academic researchers, noting these trends, have begun to push the government to look for ways to revive or establish local management with *sasi*, the traditional resource management institution, as the basis.

Coastal villages typically claim *de facto* rights of access and withdrawal over fairly extensive areas of both land and sea. *Sasi*, the local institution under which some fishing activities are regulated, is nested in traditional culture, called *adat*, which lays down the basic ethics and codes of conduct.

The constitutional rules of *sasi* thus form an intrinsic part of the Maluku culture. As an institution, *sasi* has never been static but has changed with the times. *Sasi*, and the underlying *adat* culture, have waxed and waned, absorbing and reflecting the impacts of colonialism, war, economic development and social change. Despite past predictions of imminent demise, both *sasi* and *adat* persist and in 1998, *sasi* was still widely supported and believed to be a good thing, even in villages where the institution no longer functioned. The spiritual aspects of *sasi*, its cultural legitimacy, ceremonies, and the relationship to indigenous tenure rights, all encourage support by the community. Modern village leaders are attracted to *sasi* as a culturally acceptable basis for collection of resource rents to support the local government.

Social and political structures in the villages of central Maluku are a reflection of centralized and hierarchical national structures. Decision-making processes involving higher government levels are not open for local input, nor are local decision-making processes participatory. The leaders have little confidence in the abilities of common villagers. Environmental groups, which are outside of the government and church hierarchies, are rare. Indonesian citizens are trained to identify with the state rather than with local groups. Although organizational structures in the villages are very similar, they vary in terms of the relative role of traditional (*adat*) leaders in village society and government. Villages in the study area range from relatively isolated, highly traditional rural communities where *adat* leadership is paramount, to more modern urban satellite villages where *adat* leaders lack significant influence.

The spread and functionality of village organizations, whether church, government or *adat*, are dependent on

- 1) the provision of economic benefits,
- 2) the broad support by the villagers,
- 3) stable leadership, and
- 4) the ability to stay at arm's length from political turmoil.

Church organizations are most stable but as their spiritual aim is more important than economic benefits, membership is limited. Government groups are often dominated by upper classes and are most vulnerable to political instability. *Adat* organizations may either be supported or outcompeted by church and government powers, depending on the situation. The function of government and *adat* groups is highly dependent on the presence of a culturally legitimate and strong village leader. Because village government leaders are used to taking orders from above rather than initiating action, future local management institutions must be supported at higher government levels. Village leaders will need assistance and incentives to be proactive and creative in developing new, local level, management arrangements. The organization must be meaningful to ordinary villagers, provide economic benefits (preferably direct), and for stability should be linked to the *Tiga Tungku* (three hearthstones, i.e., church, state and *adat*) but at the same time buffered from direct impacts of political strife and changing village leadership.

The majority of central Maluku villages still retain some form of the local *sasi* institution but only a quarter have rules pertaining to marine management. *Sasi* practices vary from village to village. The governing and enforcing authorities may be *adat*, church, local government and / or private individuals holding harvest rights. The character and legitimacy of the village head (*kepala desa*) are the key to the successful function of the institution. *Kewang*, an *adat* organization, plays a central role in village resource management in the more traditional villages with an active *sasi* institution. The *kewang* members patrol *sasi* areas and enforce the rules. In villages where *sasi* has evolved into an almost purely commercial transaction, these *kewang* members are no longer traditional leaders. Collective choice rules, a mixture of tradition

and modern innovation, define how the players in *sasi* work together. The operational rules of marine *sasi* regulate day-to-day activities in the marine territory and/or *sasi* area. These operational rules may be indigenous or may mimic national legislation, and are subject to revision. This adaptivity is important to the resilience of the institution but has also led to the development of a patchwork of marine management efforts lacking a unified purpose and also lacking a set of minimum standards.

Marine *sasi* is most prevalent in mid-sized villages distant from the urban center of Ambon. In no case is management under *sasi* comprehensive. Only small areas of shallow waters and few species are regulated. Nevertheless, the existence of *sasi* means that certain important management concepts are widely known and valued as part of local culture. Using *sasi* as the basis for the development of a modern management institution can, therefore, be considered to be efficient as it reduces potential costs of public education and enforcement.

Many government staff agreed that local institutions are useful and hold a strategic position close to the resource and to fishers. Also, younger fishers especially tend to see the community as having responsibility for management. However, *sasi* and *kewang* lack formal legal status and they are effectively isolated from regional, provincial and national management structures. The *kewang*, as a group, has no role in the process of planning for fisheries development nor in the process of developing provincial fisheries policy and regulations.

Resource users are motivated to comply or cooperate with the *sasi* institution according to the incentives and options inherent in their situation. The outcome of the interaction between the management institution and resource users was assessed in terms of social and biological sustainability, and the efficiency and equitability of management.

Equity in terms of access to resources is not a major issue because *sasi* covers few species and small areas. *Sasi* has also no effect on the distribution of fishing gears or on economic disparities. However, fishers are not neutral about equity issues in cases where harvest rights in a *sasi*-controlled area are sold or auctioned. If benefits are distributed unfairly or if they accrue to outsiders, this can lead to non-compliance with *sasi* rules. In contrast, where the decision-makers are respected and use proceeds for community development, this arrangement can be very efficient and also reasonably equitable. Where marine resources under *sasi* are harvested as a communal crop and distributed equitably among the population, fishers do not complain.

Control over resource management is perceived by fishers to be tighter in *sasi* villages, and compliance to fisheries rules is greater. A communal decision-making process is also stronger and more stable. Although decisions are said to be made "by the community", this often means "by a person acceptable to the community". The voices of fishers may or may not be heeded, and women are excluded. *Sasi* is, therefore, not equitable in this sense. Common fishers in *sasi* villages feel no more involved in decision-making than fishers in non-*sasi* villages. However, the hierarchical structure is very efficient and culturally acceptable as long as leadership is strong and legitimate.

Sasi has no impact on the economic status of individual artisanal fishers, probably because the resources managed under *sasi* constitute a relatively small proportion of family income. The major difference between *sasi* and non-*sasi* villages is in terms of social sustainability. Generally, there are lesser trends of deterioration through time in *sasi* villages. *Sasi* fishers feel that there is a strong tradition of collective action, greater discussion of village issues and greater harmony. Social sustainability, especially family well-being and income, is positively influenced by whether

fishers are members of village organizations and satisfied with their jobs.

There is no evidence that *sasi* has any impact on the health of the fishery in general, doubtless because *sasi* pertains only to small, inshore areas and most fish are caught in the deep sea. Both *sasi* and non-*sasi* villages suffer from blast fishing. *Sasi* areas are also vulnerable to damage caused by external forces such as mining exploration. At a local level, guarded *sasi* areas suffer less damage than adjacent unguarded areas. On a regional level, however, the coral reef condition is more closely related to population density and fishing pressure than to the presence or absence of the *sasi* institution. More research into the condition of a larger number of guarded *sasi* areas would be useful.

The practice of *sasi* has demonstrable benefits in protecting the valuable top shells (*Trochus niloticus*) and sea cucumbers. Although there are suitable habitats and a history of exploitation in non-*sasi* villages, the presence of top shells and sea cucumbers has been extremely rare. This suggests that these species may now be largely confined to *sasi* areas that are subject to harvest restrictions and guarded.

Socio-economic variables correlated with performance of *sasi* (see Table 2.6) included the style of village decision-making, job satisfaction of fishers, belief in the importance of *sasi*, attitudes towards changing and bending rules and selling harvest rights, the type of gears owned, external sources of income, economic score, and whether fishers are part of village groups and/or are involved in communal fishing. Interestingly, perceptions of resource health are not correlated with a desire to change fisheries rules. Fishers with more expensive gears feel they have more say in decision-making.

For optimal collaboration between the *kewang* and the police in enforcement, a clear definition of rights and mandates should be developed. In many villages, *sasi* regulations are considered more legitimate than “government rules”. Compliance also increases if the villagers profit directly from the management of the resource.

Fishers, in general, find it important that all stakeholders are represented in decision-making. When fishers feel that village decision-making is based on consensus or majority agreement, they have more positive scores on all performance indicators. For a management system, it is thus important that the decision-making process is perceived to be inclusive. Insulation of the management institution from political turmoil is also important. Where formal and traditional leaders collaborate closely, and where leadership is highly legitimate, *sasi* thrives. What makes the *sasi* institution strong (and thus resilient) is it links the various players and components i.e., legitimacy, trust, collaboration, and transparency. A shared notion of the relevance of the institution is also needed to stimulate a common objective to maintain *sasi* in spite of external influences.

The practice of *sasi* in central Maluku proves that rules pertaining to gear types, access, closed areas and seasons can be successfully developed and applied at the local level by villagers who have relatively low levels of formal education as well as only a hazy concept of resource management. In the place of a science-based rationale for management, we find an ethic of working together for the benefit of the community, attachment to a cultural tradition and the tendency to comply with sanctions based on religious beliefs. These have combined to form the basis of a resilient and, within its narrow scope of application, demonstrably effective institution. *Sasi* also provides an alternative to the western idea that local management must be highly democratic. The paternalistic model is potentially very efficient and cost-effective, putting little demand on the time of busy fishers, farmers and women, and is also culturally

acceptable. What is important is not to further entrench current elites by allowing the system to become inflexible, non-transparent and corrupt. Should democratic ideals one day become the norm, the management institution must be able to evolve to accommodate increased need for direct participation.

Various contextual realities are at work toward the revitalization of *sasi* as a management institution. The national ethic of non-questioning obedience to central authority prompts village leaders to do nothing, but the potential to collect resource rents through *sasi* makes reviving the institution very attractive. For fishers themselves, the incentives are more linked to culture than to a consciousness of the need for management. Strong market demand coupled with high dependence on the fishery make villagers wary of management that might restrict access or impose catch limits. On the other hand, competition among sectors may push artisanal fishers to organize themselves and demand clear access and withdrawal rights on pelagic fishing grounds.

Factors that contribute positively to the resilience of *sasi* as a local institution should be considered during the process of modernizing local management. For instance, the legitimacy of a village head who descends from the *raja* line contributes positively to the execution of his authority with regard to *sasi*. A large overlap between the traditional and formal authorities in the village government is also beneficial. Acknowledgment of the traditional village authorities within the formal government is vital to the revitalization of *sasi*. Where traditional institutions are acknowledged, enforcement of *sasi* regulations is more effective. Formal and traditional institutions should also collaborate closely with religious authorities. Where there are strong bonds among these institutions, *sasi* is highly resilient. On the other hand, political instability and weak leadership seriously hamper *sasi* as well as any revitalization process.

The perpetuation of *sasi* – as opposed to the introduction of a totally new institution, especially if it includes religious leaders – would be an asset in that compliance would be encouraged. With the existence of a local institution involving respected traditional and religious leaders, resource users would feel secure. While revamping the institution to increase functionality in resource management, it will be useful to retain traditional titles and structures, as well as elements of ceremony, to provide a strong spiritual and cultural basis. Collaboration requires a shared value system, in this case, *adat*. However, where through modernization the younger generation develops new values, the institution must adapt. The loss of interest among the younger generations and the subsequent loss of *sasi* knowledge linked to *adat* are a threat to *sasi* as a cultural institution and can, therefore, undermine its effectiveness as a resource management structure. It is important to ascertain how important traditional language and ritual are, and how much needs to be incorporated into a revitalized institution so that the cultural strength of the traditional institution can benefit all without alienating younger fishers.

Collaboration, trust and legitimacy that support *sasi* are a function of a village size and homogeneity. In larger, more heterogeneous villages, traditional *sasi* does not appear to be a viable option. A logical alternative would be a modern village institution that provides a transparent, inclusive decision-making process, mechanisms to change rules, mechanisms to enforce rules and direct benefits for the fisher-managers. Also needed are a funding base (part of which could be generated by village organizations) and a stable management structure that includes, but is not dependent upon, the village government. Whether or not the institution is modeled on *sasi*, the needs and aspirations of the various proponents (fishers, local governments, fisheries managers, *adat* leaders, and environmentalists) must be successfully accommodated. Local institutions need to be involved not only in local monitoring and enforcement but also as partners in development planning and implementation, stock assessment and allocation,

licensing etc. In addition, to ensure a place in negotiating access and withdrawal rights for artisanal fishers in offshore waters, local institutions will need to engage or be nested in a larger institution operating on regional, provincial and higher levels. Presently, there is no identifiable lead agency dedicated to coastal and fisheries management in Maluku. It is necessary to define the *sasi* structures, powers and responsibilities within the framework of provincial and national legislation, to provide local institutions with more capacity to deal with external threats and become involved in development planning, execution and evaluation.

According to the pattern of loss of the institution, the 1990s appear to be a critical decade, i.e., *sasi* must adapt to modern society and gain formal legal status or it may, at the operational level, cease to function. There are various options for providing a legal basis for local management bodies, including decrees by the provincial governor, the district head or the sub-district head, and promulgation of a provincial law. Another option, previously discussed by Bailey and Zerner (1992), is through the amendment of the national Fisheries Act No. 9, 1985, together with amendment of Law No. 5, 1979 on the local government.

Fisheries co-management can be defined as a partnership arrangement in which the government, the community of local resource users, external change agents, and other fisheries and coastal resource stakeholders share the responsibility and authority for the management of the fishery. Co-management involves various degrees of delegation of management responsibility and authority between the local level (resource user/ community) and the state level (national, provincial and municipal governments). It can serve as a mechanism for both fisheries management and for community economic development by promoting the participation of fishers and community members in solving management problems and in addressing other needs. In Maluku, the *sasi* institution provides a useful model and basis for the development of modern institutions that could be integrated with provincial and national agencies in fisheries co-management.

The report is divided into five sections. After the introduction and the methodology chapters (Section A), Section B describes the general regional context of Maluku, e.g., the socio-political background, biological aspects, and the development of *sasi* through time. Market structures and the role of the government in fisheries management are also discussed in this section. Section C presents the research results of the inventory and the performance study. Section D goes more in-depth with a presentation of the six case study villages and a comparative analysis. Finally, Section E answers the question – what makes *sasi* a resilient management institution? The last chapter in this section summarizes the results and concludes with policy recommendations for the acknowledgment or revitalization of *sasi* and the development of co-management systems in central Maluku.

Chapter 2

Methods

The following chapter describes the methods used to collect the data for the research components described in Chapter 1. First, it will be explained how the study sites were selected and the informants chosen. Then the methods used to gather and analyze the data will be discussed for each component, i.e., the inventory of *sasi* in central Maluku, the performance analysis of *sasi*, the institutional analysis of the case study villages, institutional resilience and contextual information including market and government structures.

2.1 Study Site Selection and Sampling

The Maluku province in eastern Indonesia is known as the province of a thousand islands. In fact, there are 1,027 islands, covering about 10% of the entire area of the province and occupied by about 1.8 million people (1990 census). Many of these islands are very small and surrounded by productive coral reefs. The majority of families living in the small Maluku coastal communities gain at least a portion of their living from exploitation of marine resources such as reef fish, pelagic fish, shellfish and sea cucumbers.

Research was focused on central Maluku because *sasi* is known to occur here. In the provincial capital, Ambon, appropriate working facilities and university-trained field staff were available, and there was easy access to government offices and major fish markets. In Ambon, we were also able to confer with other academic and NGO researchers knowledgeable about the institution and involved in coastal management.

The research area, central Maluku, includes two administrative districts, Kabupaten Maluku Tengah and Kotamadya Ambon. It is located at 2°50'-3°50' South Latitude and 126°55'-128°45' East Longitude. The total area of central Maluku is 284,308 km², consisting of 255,090 km² of sea and 29,218 km² of land. The major islands of the area are Seram, Buru, Ambon, the Lease Islands (Haruku, Saparua and Nusa Laut) and the Bandas. Research was focused primarily on the Lease Islands of Haruku, Saparua and Nusa Laut. To determine the extent and activity of *sasi*, every village on these three islands has been included in the inventory (Figure 1).

The official administrative unit equivalent to a village in Maluku may be either a *desa* or a *dusun*. A *dusun* is part of a *desa* but may be geographically distant from the larger village where the local government resides. Ambon Island has a total of 61 *desas* (Anonymous 1992, 1995). Of these, 23 are suburbs of the city of Ambon, where the *sasi* institution has virtually disappeared (Evans et al. 1996). Excluding the urban satellite villages around Ambon's inner harbor, there are 38 coastal *desas* on the island, of which we have documented 50%. The large island of Seram has 136 rural coastal villages. On this island, seven villages, i.e., those who are closest to Ambon (5% of the total), were surveyed.

Villages in Ambon and Seram were not selected randomly. They were selected using the following criteria:

- Local information from Ambonese researchers strongly suggested that either there was marine *sasi* or a complete absence of *sasi*.
- The village was within easy access of Ambon.

The reason a number of villages on Ambon Island and Seram was selected is that for the performance analysis, we wanted to sample at least 10 villages having *sasi* on marine resources, and 10 villages with no *sasi* at all. The inventory, however, revealed that most villages on the Lease Islands lie along a continuum, with relatively few having either fully functional *sasi* or none at all. In order to get the required number of villages, we extended the inventory survey to selected coastal villages on Ambon Island and southern Seram. Based on the results of this extended inventory, two groups of 11 villages could be identified as performance study sites.

From the inventory, six case study villages were selected for the institutional analysis. First, all villages were ranked with respect to the degree of activity of *sasi*. Then, two *sasi* villages were identified that appeared to have strong marine management components, and two villages that either never had marine *sasi* or had lost all memory of it. These two non-*sasi* villages could be found only on Ambon Island. Finally, in order to study the process of breakdown and renewal, two villages were selected where *sasi* had been recently lost and was being revived. The six case study sites (Table 2.8) were on the islands of Ambon, Haruku and Saparua.

To collect contextual information on fish markets, the main fish markets and landing areas were selected as sampling sites. These included those in the city of Ambon, Masohi and Tulehu. Smaller markets investigated were in Saparua town and Passo. Local traders and commercial fishers were interviewed in each of the six case study sites as well as at Hitu and Waai on Ambon Island. Several large fish storage and export companies on Ambon and Seram were also approached.

Interviews at the various government bureaus involved in fisheries control, management and enforcement, took place in Ambon (provincial capital), Masohi (district capital), and on Haruku and Saparua (sub-district offices).

2.2 Inventory of the *Sasi* Institution

2.2.1 Objectives

The inventory was designed to document the *sasi* institution in every village of the Lease Islands. It was extended to a number of other villages on Ambon and Seram to provide information to facilitate site selection for the performance analysis (see Section 2.3). Specific objectives of the inventory were:

- To determine the frequency of occurrence of various forms of *sasi* and, in particular, of *sasi* applied to marine resources.
- To measure the strength of the *sasi* institution using quantitative indicators.
- To test the hypotheses that attributes of *sasi* vary with religion, geographic location and village population.
- To document the types of marine management rules developed under *sasi*.
- To document non-*sasi* marine management rules at the village level and determine the degree of impact *sasi* has on marine management in general.

2.2.2 Inventory method

Structured interviews on the presence and activity of *sasi* were conducted with key informants in 63 villages. In all cases, at least one of the informants was a local government official (preferably the village head or *kepala desa*) or traditional (*adat*) authority figure because they are expected to have detailed knowledge on village-related issues. Church leaders, women active in village affairs, elders and fishers were also sought out as informants (Table 2.1).

Table 2.1. Informants interviewed in each phase of the institutional analysis of sasi.

Project objective and research component	Methods	Geographic area	Type of informant	Number
1. Inventory of <i>sasi</i> institution in central Maluku	Structured interviews	63 villages on Nusa Laut, Saparua, Haruku, Ambon and Seram Islands	Village official <i>Adat</i> leader Church minister Fisher, elder Teacher, researcher Total	83 24 6 48 2 165 (7 women)
2a. Performance analysis of <i>sasi</i> at the district level	Structured interviews and ladder survey	22 villages on Saparua, Haruku, Ambon, and Seram	Fishers Total	332 332 (73 women)
2b. Performance analysis of <i>sasi</i> : biological aspects	Biological survey (direct survey, informal interviews)	Saparua (Nolloth, Itawaka, Ihamahu), Haruku (Haruku) and Ambon (Toisapu, Hutumuri, Seri, Airlow)	Village officials Fishers <i>Adat</i> leaders Women Total	5 2 1 1 9 (1 woman)
3a. Institutional analysis of six villages: contextual variables and outcomes	Structured interviews and ladder survey	Nolloth, Haruku, Tuhaha, Hulaliu, Seri, Hutumuri-Toisapu	Fishers Total	176 176 (8 women)
3b. Institutional analysis: resilience of local institutions	Semi-structured interviews	Nolloth, Haruku, Tuhaha, Hulaliu, Seri, Hutumuri-Toisapu	Village officials <i>Adat</i> leaders KUD staff Elders Youths Fish traders Women leaders Male fishers Female others Male others Total	25 7 7 21 18 22 14 10 9 23 157 (45 women)
3c. Fisheries and market study	Structured and semi-structured interviews	Major and minor fish landing areas and markets on Ambon, Seram, Saparua, Haruku	Pole and line fishery Bait fishery Small-scale fishers Fish retailers Fish traders Fish factory staff KUD managers Total	1 9 9 16 4 2 1 42 (16 women)
3d. Government management structure at provincial, district and sub-district levels	Semi-structured interviews	The city of Ambon (provincial capital), Masohi (district capital), Saparua Island, Haruku Island (sub-district offices)	BAPPEDA (Planning) Dept. of Forestry Dept. of Fisheries Provincial (district /sub-district) Dept. of Transport Law Bureau Environment Bureau Police Navy Total	4 2 1 8 4 1 1 3 2 26 (0 women)
			Total number of interviews	907 (150 women)

The interview consisted of a standard list of inventory questions. We documented the different types of *sasi* currently operating for both land and marine resource management. First, we asked whether or not there was *sasi* of any kind, and then asked respondents to say whether *sasi* rules applied to the village (*sasi negeri*), land (*sasi darat*), river or sea (*sasi laut*). The existence of *sasi* ceremonies, written rules and sanctions, the level and consistency of activity over time, reasons for the loss of *sasi* where it was no longer present, and types of other fisheries management rules were also documented.

It was known from the literature that *sasi* may be characterized as church or *adat sasi*, according to the dominant power in the institution. We asked respondents to tell us whether they considered their *sasi* to be *adat sasi*, church *sasi*, mosque *sasi* or some other form of *sasi* (also see Imron 1995). This question identifies the individuals who are seen as the authority figures: traditional (*adat*) leaders, the minister (church), the *imam* (mosque) or other group (e.g., commercial harvesters). The various categories are not mutually exclusive. In theory, all of the above categories of *sasi* could co-exist in a village. We quantified the frequency and distribution of different *sasi* arrangements and determined whether the dominant power could influence the attributes of the institution as well.

2.2.3 Analysis of inventory data

It was expected that the villages surveyed would not be homogeneous. Because of the role of religious leaders in *sasi*, we wanted to test whether differences might be evident between predominantly Christian and Muslim villages. Also, it was hypothesized that as villages grew past a certain size, local management institutions might break down (Berkes and Folke 1998). Finally, contextual variables could vary from island to island and this might have an impact on the structure and functioning of the *sasi* institution. Therefore, to display the information, the villages have been grouped by three different features: dominant religion, population size and island. The limits of four population size classes were chosen in such a way that each of the four groups would contain about a quarter of the villages sampled (Table 2.2).

Table 2.2. Villages included in the study broken down by island, religion and size of population.

Island	No. of sites	Religion (M=Muslim C=Christian)		Population Size Class 1= \leq 1,000; 2=1,001-2,000; 3=2,001-3,000; 4= $>$ 3,000				Avg. no. people/ village
		M	C	1	2	3	4	
Ambon	22	12	10	4	2	4	12	3,451
Haruku	11	4	7	1	4	5	1	2,252
Saparua	16	3	13	2	7	4	3	2,116
Seram	8	1	6	0	2	4	1	2,231
Nusa Laut	7	0	7	5	2	0	0	864
Total	63	20	43	12	17	18	17	
				(2 M 10 C)	(2 M 15 C)	(9 M 8 C)	(7 M 10 C)	

A breakdown of the 63 villages included in the study by island, religion and population (Table 2.2) shows that two-thirds were predominantly Christian. Muslim villages tended to be larger and half of these were located on Ambon Island. Roughly a quarter of the villages fell into each of four size classes.

The activity of the sasi institution (as applied to both land and marine resources) was quantified by adding the number of positive indicators for presence, closed seasons, consistency of application and local effort (Table 2.3). Initially, a score was also given if sanctions were imposed on offenders. However, it became clear that whereas physical sanctions were always imposed in Muslim villages, Christian villages with strong and active church sasi often used not fines but the threat of punishment by God as a deterrent. As it could not be quantified for all villages, the presence or absence of sanctions was dropped as an indicator.

The activity of marine sasi was quantified by combining indicators for the presence of sasi fisheries rules, periodic closure of a marine sasi area to local harvesters that affected one or more species, and the existence of written rules and active enforcement of access restrictions (Table 2.4).

Table 2.3. Attributes considered in assigning a score for presence and activity of sasi in a village. Attributes are weighted so as to be equal in value.

Attribute	Indicator	Response	Score
<i>Presence</i> Score 0-3	Is there <i>sasi</i> in the village?	no	0
		village <i>sasi</i> only	1
		two or more types	3
<i>Closure</i> Score 0-3	Does <i>sasi</i> involve the opening and closing of harvest seasons?	no	0
		yes	3
<i>Consistency</i> Score 0-3	Was there a ceremony to open/close <i>sasi</i> this year?	no	0
		yes	1
	Did <i>sasi</i> open/close last year?	no	0
		yes	1
	Did <i>sasi</i> open/close in years before that?	no	0
		yes	1
<i>Local effort</i> Score 0-3	When <i>sasi</i> is closed, are special signs hand-made and installed?	no	0
		yes	3
	Maximum possible score		12

Table 2.4. Attributes used in assigning a score for activity of marine sasi in each village. Attributes are weighted so as to be equal in value.

Attribute	Indicator	Response	Score
<i>Presence</i> Score 0-3	Is there <i>marine sasi</i> ?	no	0
		yes	3
<i>Closure</i> Score 0-3	Is the <i>sasi</i> area ever closed to village residents ?	no	0
		yes	3
<i>Written rules</i> Score 0-3	Are there written <i>sasi</i> rules that apply to the fishery ?	no	0
		yes	3
<i>Enforcement</i> Score 0-3	Does a <i>kewang</i> or other group of villagers guard the <i>sasi</i> area and/or village territory ?	no	0
		yes	3
	Maximum possible score		12

In both sasi and non-sasi villages, rules that seek to restrict or control fisheries access and withdrawal can be found outside the institution of sasi. The strength of marine management in both sasi and non-sasi villages was quantified by combining indicators for gear restrictions, local fisheries rules other than the national restriction on blast fishing and the use of poisons, area closures, the number of species affected by management rules, and active enforcement (Table 2.5).

The differences in average marine management score for villages, grouped by presence or absence of *sasi*, geographical location, population size and religion were determined statistically using analysis of variance (SPSS 1997).

Table 2.5. Attributes used to quantify the level of marine resource management rules existing (but not necessarily effectively enforced) in both *sasi* and non-*sasi* villages.

Attribute	Indicator	Reply	Score	Notes
<i>Gear restriction</i>	Is there any type of fishing gear that is forbidden in the village territory?	No	0	Usually a local rule (written or unwritten) supporting the national ban on blast fishing and the use of poisons existed.
		Yes	1	
<i>Other fisheries rule</i>	Is there any other restriction on where, when and how people can fish?	No	0	
		Yes	1	
<i>Access restrictions</i>	Is there an area where access is formally restricted for local residents?	No	0	
		Yes	1	
<i>Species affected</i>	How many types of resources are managed or conserved by <i>sasi</i> and non- <i>sasi</i> fisheries rules?	None	0	corals=1 holothurians=1 mangroves=1 pelagic fish=1 shellfish=1 reef (food) fish=1 ornamental fish=1
		Yes	1-7	
<i>Enforcement</i>	Is restricted access area guarded by a <i>kewang</i> or group?	No	0	
		Yes	1	
Maximum score possible score			11	

2.3 Performance Analysis of *Sasi*

2.3.1 Objectives

The purpose of this survey was to evaluate performance of the *sasi* institution over the entire research area in terms of four standard criteria: equity, efficiency, social sustainability and biological sustainability. Some socio-economic data were recorded to assess the average economic status of each fishing community.

Part of the survey questionnaire dealt with the ethnic background of respondents. Cultural homogeneity may be important to the success of traditional management systems. Therefore the material was useful to test the hypothesis that *sasi* would be more effective in relatively homogeneous villages.

The objective of direct biological surveys was to determine whether there were quantifiable differences in the coral reef cover and the incidence of selected species between areas managed *sasi* and areas with no access restriction. Biological surveys were carried out in and beside the marine territories of four of the case study villages.

2.3.2 *Methods*

a) Performance analysis survey at the district level

The villages studied were on the islands of Seram, Ambon, Haruku and Saparua. Interviews took place in the period of July-September 1997. In each of the 22 villages in the performance study, 15 heads of fishing households were interviewed. The data collected from 30 heads of fishing households in each of the six case study villages were also included. Questions in the performance study were designed to elicit numerical values for indicators of efficiency, equity and sustainability (Table 2.6).

The values for each indicator are based on the perceptions of fishers using a self-anchored ladder scale (Pomeroy et al. 1996). This standard tool provides ordinal data, which allows statistical analysis. Fishers were asked to answer questions using a picture of a ladder with ten rungs as a visual aid. The lowest rung represented the worst possible condition; the tenth rung represented the best. Fishers pointed to the rung that in their opinion represented past (15 years ago), present and future (15 years ahead) conditions. The aim was to record fishers' perceptions of current conditions, change through time and the degree of optimism for the future. There were 15 questions in all. In addition, base-line data were gathered from each respondent, i.e., name, age, religion, etc. Also, the people's economic status was recorded by noting what type of boat, fishing gear and house he or she owned.

Assessment of equity and efficiency of marine resource management

In terms of fisheries management, equity may be equated with the democratic process, i.e., the level of involvement of fishers in decision-making. Equity is also a matter of fair access to marine resources and the means of production (capital, fishing gear, etc.). We therefore measured the perceptions of fishers towards their role in decision-making, their access to fisheries resources, distribution of the means of production as well as economic equality in their village.

Partnership in designing fisheries rules, i.e., the degree to which people are able to make a decision together, is one indicator for an efficient fisheries management system. The degree of control over the fishery, either directly, or indirectly through the village government, is another. It is difficult to discuss equity in management without also dealing with efficiency. This is because efficiency is in some ways the opposite of equity. Highly inclusive, democratic processes can be very inefficient in terms of time and money.

The ease of access to resources in terms of costs and compliance to fisheries rules are indicators that define efficiency from the resource user's point of view. In an efficient management system, there is a high level of compliance without exorbitant costs either to fishers or managers. Compliance may result from active participation in management or may be related to the legitimacy or actual power of authority figures.

Access control and an effort to share resource benefits can support production systems that are less efficient in terms of profitability (although arguably more sustainable) than centralized, large-scale systems. In modern management circles, the balance between maximizing short-term profits and maximizing employment (fair access) in a fishery is a classic example of the tension between efficiency and equity. In seeking a balance, the legitimacy of decision-makers in the eyes of the stakeholders is a key factor.

Table 2.6. Performance indicators.

Equity	1.	Role of fishers in management	⇒	The degree of influence that fishers have in decision-making processes regarding fisheries management
	2.	Access to marine resources	⇒	The individual access that fishers have to marine resources
	3.	Fair distribution of fishing gears	⇒	The division of (expensive) fishing gears among the fishers in the villages
	4.	Economic equality	⇒	The distribution of income (disparities) among the villagers
Efficiency	5.	Communal decision-making	⇒	The degree to which villagers are able to make decisions (on the fishery) communally
	6.	Ease of entry into the fishery	⇒	The costs and/or fees that need to be paid before people can start fishing
	7.	Control over access to fishery	⇒	The ability of people to define who is entering the water and which resources are used
	8.	Compliance with fisheries rules	⇒	The degree to which people adhere to the fisheries rules
Social Sustainability	9.	Family well-being	⇒	Degree of well-being in terms of housing, food, and health
	10.	Income	⇒	The rise or decline in income
	11.	Tradition of collective action	⇒	The occurrence of communal activities in the village (e.g., construction of roads and houses)
	12.	Discussion of village issues	⇒	The degree to which village issues are openly discussed in the village
	13.	Community harmony	⇒	The lack or occurrence of conflicts in the village
Biological Sustainability	14.	Marine resource health	⇒	The state of resources in terms of coral health, numbers of fish, water clarity, etc.
	15.	Fish catch	⇒	The amount and size of fish caught

Assessment of social sustainability

Social sustainability refers to the level of stability and cohesion in the village in political, social, and economic terms. When the village economy or political structure is under stress, it may affect local management institutions. On the other hand, the existence of a healthy and legitimate local institution may minimize negative social impacts of economic and political stress. Indicators of social cohesion e.g., community harmony and the level of collective action, were used as indicators for social sustainability. Family well-being and income of villagers were measured as indicators of economy-related well-being or stress. The level of public

participation in discussing village issues was also measured. This indicator is also related to equity because it indicates the level of awareness of, and transparency in, village government.

Assessment of biological sustainability

The indicators measured were the level of fish catches and the fisher's perceptions of the health of the marine environment. The questions related both to village territories and the wider fishing grounds, thus not specifically confined to the sasi area. The perceptions of fishers were compared with the results of actual biological surveys conducted in sasi and non-sasi areas (see below).

b) Performance analysis survey of biological aspects

The coral reef habitats in the case study villages of Nolloth, Haruku, Seri and Hutumuri were surveyed as these represented sasi and non-sasi sites. In addition, more limited data were collected from immediately adjacent marine areas (Ihamahu, Itawaka, Lapaut, Airlow). Ihamahu and Itawaka are sasi villages; Airlow and Lapaut are non-sasi. Data were collected separately inside the specific coral reef areas protected under sasi (Table 2.7).

In each sampling site, one or all of the following indicators were measured (Table 2.7):

1. The percentage cover of live coral on the coral reef habitat (% living coral/total area) was measured by an observer during 2-minute manta tows along the reef crest (also see English et al. 1994). In each case, the entire length of the village's marine territory was surveyed. Any visible bomb damage or bleaching of corals was documented for each sample.
2. The number of species of butterfly fish present on any reef flat, crest and slope as counted within 30-minute inspections using a standard photographic fish identification guide.
3. The number of top shells (*Trochus niloticus*) within random, 50 m x 1 m belt quadrates at 3-5 m depth on reef flats measured with a 50 m fiberglass tape measure.
4. The number of sea cucumbers (all species) found within random, 50 m x 1 m belt quadrates at 3-5 m depth on reef flats measured with a 50 m fiberglass tape measure.
5. The number of top shells and sea cucumbers collected by experienced local harvesters within 5-minute searches in 3-5 m deep reef flat areas.

In every case, the same researcher, either I. Novaczek or P. Manihin SP, collected each specific data type.

The average percentage cover of living corals and number of blasting scars per tow were calculated for each site. The species of butterfly fish were tabulated and total numbers compared. Average numbers of sea cucumbers and top shells in the coral reef habitats were calculated and compared in sasi and non-sasi areas.

2.3.3 Analysis of performance study

All data analysis was performed using the SPSS statistical package (1997 version). Data were divided into two groups: from sasi villages and from non-sasi villages. Within each group, the average values for current conditions for each of the indicators were calculated. The results were compared between groups using chi square tests.

Table 2.7. Surveys conducted in marine territories of villages in study area.

Village	Km surveyed	Indicator # (n samples)	Notes
Nolloth, Saparua Island (guarded <i>sasi</i> area)	2.5 km	1 (17) 2 (1) 3 (8) 4 (8) 5 (18)	Wave-exposed rocky shore. Southern part of large village territory on the northeast coast of Saparua Island.
Nolloth, Saparua Island (non- <i>sasi</i>)	1 km	1 (4)	Wave-exposed rocky shore. Immediately north of Nolloth's <i>sasi</i> area.
Nolloth, Saparua Island (non- <i>sasi</i>)	0.2 km	1 (1)	In front of Nolloth village inside Tuhaha Bay.
Itawaka, Saparua Island (<i>sasi</i> area)	1.5 km	1 (2)	Exposed rocky shore north and west of the large Nolloth village territory.
Ihamahu and Iha (non- <i>sasi</i>)	1.5 km	1 (2)	In front of villages, inside Tuhaha Bay.
Ihamahu, Saparua Island (unguarded <i>sasi</i> area)	0.2 km	1 (3) 2 (1) 3 (2) 4 (2) 5 (4)	Wave-exposed rocky shore. Immediately south of Nolloth <i>sasi</i> area.
Haruku, Haruku Island (non- <i>sasi</i> area)	5 km	1 (13) 2 (1)	Moderately wave-exposed shore, rocky and sandy. <i>Sasi</i> area is sea grass bed, not coral reef.
Toisapu, Ambon Island (non- <i>sasi</i>) <i>dusun</i> of Hutumuri	3 km	1 (4) 2 (1) 3 (2) 4 (2)	Wave-exposed rocky shore south of the village.
Lapaut, Ambon Island (non- <i>sasi</i>), <i>dusun</i> of Hutumuri	3 km	1 (4)	Wave-exposed rocky shore. In between Toisapu and Hutumuri.
Hutumuri, Ambon Island (non- <i>sasi</i>)	4 km	1 (8) 2 (1) 3 (3) 4 (3)	Wave-exposed rocky shore.
Seri, Ambon Island (non- <i>sasi</i>) <i>dusun</i> of Urimessing	5 km	1 (13) 2 (1) 3 (3) 4 (3)	Wave-exposed rocky shore.
Airlow, Ambon Island (non- <i>sasi</i>) <i>dusun</i> of Nusaniwe	3 km	1 (6) 2 (1)	Wave-exposed rocky shore in front of Wemi, a hamlet of fishers southwest of Seri.

The within-group differences between past and present, and present and future scores were calculated and the statistical significance of each change through time was determined using paired t-tests.

The homogeneity of variances in changes through time was examined using the Levene Statistic. To test whether there were differences between *sasi* and non-*sasi* villages in terms of the changes through time, we used the analysis of variance and Duncan's multiple range test (homogeneous variances) or Tamhane's statistic (non-homogeneous variances). For all analyses, p values less than 0.05 were considered statistically significant.

2.4 Institutional Analysis of *Sasi*: Village Case Studies, Resilience, and Contextual Attributes

2.4.1 Objectives

A central component of our study was an institutional analysis of case studies in six villages (Table 2.8). Following the institutional analysis framework (see Section 1.2), data from each village were gathered on contextual variables and the structure and function of institutional arrangements and management outcomes.

The key objective of this component was to analyze how local institutional arrangements, interacting with the contextual variables, affect the actions of the resource users by shaping the incentives and disincentives they face or comply with, resulting in the adaptation to, and enforcement of, local management rules. The patterns of interaction result in outcomes (i.e., equity, efficiency, social and biological sustainability) that we measured through the performance study, but also by using direct observations of biological indicators (see Section 2.3).

Table 2.8. Status of case study villages in 1997.

Village	Island	Status of sasi institution	Dominant Religion	Population
Haruku	Haruku	Active	Christian	2132
Nolloth	Saparua	Active	Christian	2426
Tuhaha	Saparua	Lost, but being revitalized	Christian	1470
Hulaliu	Haruku	Lost, but being revitalized	Christian	1600
Seri	Ambon	No sasi	Christian	1991
Hutumuri-Toisapu	Ambon	No sasi	Christian	3254

A second objective of the case studies was to test a hypothesis concerning the resilience of the sasi institution. Resilience is the ability of the system to absorb and deal with changes and shocks. The study was designed to provide data on changes in institutional arrangements and patterns of change of the sasi system as a whole through time, i.e., objectives, boundaries, rules and regulations, enforcement, etc. By examining why sasi has endured or why it has been being lost, mechanisms that enhance institutional resilience can be identified. This knowledge will help in maintaining existing or in developing new fisheries management systems.

A third objective was to supply contextual information on market mechanisms and external political attributes related to fisheries management.

The market structures (demand, supply, fish prices, marketing options, relations between buyers and sellers etc.) are important contextual variables that influence incentives and institutional arrangements. Players on different levels, i.e., large-scale fish traders operating on the international market, wholesalers, traders on local and island levels and their inter-relationships were investigated.

External political factors include relationships among government agencies on provincial, district, sub-district and local levels. We sought to elucidate their division of tasks and responsibilities, and how the resulting structure and function shape the incentives and disincentives to cooperate in resource governance, management and use. Acknowledgment of local management structures, enforcement, law distribution, and support to fishers on the local level are some of the aspects that need to be taken into account when studying possibilities for co-management arrangements.

2.4.2 *Methods*

a) **Institutional analysis of case study villages**

The general method used is the institutional analysis research framework (IAF) developed in the ICLARM-IFM Fisheries Co-management Project. A socio-economic survey, in combination with a performance study and semi-structured interviews, was performed in each of the six case study villages. Structured interviews (surveys) were used to gather information on the attributes of the community and stakeholders. The socio-economic survey contained questions on types of employment, family history, ethnicity, and sources of income. Respondents were also asked their opinions on, among other things, job satisfaction, *sasi*, village decision-making, the need to change fisheries rules, the position of women in society and the sale of resource harvesting rights. Additional semi-structured interviews were used to gather information on the contextual attributes (i.e., biological, physical and technological attributes, economic attributes, market structures), exogenous factors, the institutional and organizational arrangements, and the attributes of the *sasi* institution and process of institutional decline.

Just as in the other villages where performance was measured, the present outcomes of the management system were measured using the ladder survey (see Section 2.3.2). These surveys were applied to 30 heads of fishing households in each village. The objective of combining the performance survey with in-depth socio-economic assessment was to examine the relationships between socio-economic factors and perceptions regarding resource health, community harmony, equity, etc.

Data were collected from a variety of informants (Table 2.1) over two periods: July-August 1997 and December 1997-February 1998.

b) **Institutional resilience of *sasi***

The resilience study is based on information from the inventory and the comparative case study including demographic information and the contextual attributes (political, economic and socio-cultural). In addition, key informant interviews in case study villages covered questions on 1) the objective of *sasi*, 2) the rules and regulations, 3) the role of the village government and traditional authorities, 4) leadership, 5) boundaries, 6) compliance and enforcement, and 7) external factors having an impact on the management institution (based on Ostrom 1990; Lubis 1992; Ruddle 1993; von Benda-Beckmann et al. 1995). Detailed information on each of these aspects is described in the individual case studies. The data from the inventory show the process of decline. The additional information was used to explain the mechanism behind this process.

c) **Market structures and government role in fisheries management**

Available government statistics and research documents were reviewed to develop the account of the historical context for Maluku that is presented in Chapter 3. Market structures and government management studies were carried out using structured and semi-structured interviews of key informants (Table 2.1). For the market study, personal observations were made during field visits to local and regional markets (February 1998).

For both studies, interview notes were compiled and analyzed, results written and conclusions checked with knowledgeable persons during a workshop serving this purpose (February 1998). Subsequently, the government management material was presented to local government

officials at a second workshop (July 1998). The conclusions were included in a policy brief that defines the favorable political context for strengthening or revitalization of local fisheries management institutions in the context of co-management in Indonesia (Sopacua et al. 1998).

2.4.3 IAF data analysis

The results of the structured interviews were put in a database and analyzed using SPSS. Some of the attributes were grouped in order to construct comparable indicators for the six villages. For example, responses to questions on ownership of land and material goods were coded so that the lowest value represented the poorest condition and the highest value the richest. An economic indicator for each respondent was then calculated by adding together the coded responses for boat, gear and land ownership and type of housing (Table 2.9). For case study sites, information on television ownership was collected and this was added to the score for analysis of the six-village database only.

Averages (with standard error) and frequencies for socio-economic data were calculated separately for each village. The significance of differences among villages was determined using one-way analysis of variance and Duncan's Multiple Range tests.

Table 2.9. Indicators used to quantify economic status of survey respondents.

Attribute	Indicator	Reply	Score	Notes
<i>Land owner</i>	Do you own land?	no yes	0 1	
<i>Fishing gear</i>	What type of fishing gear do you own?	none hand line or spear fish trap set net FAD or lift net	0 1 2 3 4	
<i>Fishing boat</i>	Do you own a boat and motor?	neither <i>perahu</i> motorboat	0 1 2	<i>Perahu</i> is a small canoe with paddle or sail.
<i>Housing</i>	What type of housing?	non-permanent simple semi-permanent permanent	1 2 3 4	1=sago walls, thatch roof 2=plank walls and thatch 3=cement and plank walls 4=full cement walls and tin roof
<i>Television</i>	Do you own a TV?	no yes	0 1	
	Maximum possible score		12	

The data from the performance survey were analyzed separately for each village using the same procedure as that used on the larger data set of sasi and non-sasi villages (see Section 2.3). To examine the relationships between ladder survey responses and socio-economic characteristics, the two sets of variables were entered into correlation analysis using the SPSS Pearson's Correlation Procedure.

The results of the semi-structured interviews conducted in each village were analyzed according to the methods used in social science for qualitative data and compared with the results of the performance study. The material was used to show and explain the similarities and differences among study sites. The material was also used to explore the (social)

mechanisms behind the process of decline of sasi: What makes sasi strong or weak, and why do some villages want to revitalize sasi? For all the villages, every aspect of sasi is described, to a large extent, in the respondents' terms.

2.5 Comments on the Methods: Gaps and Limitations

The inventory provides 100% coverage of villages on the three Lease Islands (Saparua, Haruku, Nusa Laut). However, villages in Seram and Ambon were not randomly selected; therefore the data from these islands cannot be assumed to reflect the average condition of the sasi institution there. In fact, we know that, because we sought out villages with marine sasi on Ambon, the percentage of villages in the Ambon data having sasi over-represents the actual occurrence of sasi on this island. The number of villages sampled on Seram (5% of all coastal desas) is too small to provide a picture of sasi on that large island.

Because knowledge about sasi varies greatly among village respondents, we tried to interview at least three key informants in each village when doing the inventory. In a few cases, the desired key informants were not available and information came from only one or two persons. Also, information from different respondents was sometimes contradictory or incomplete. In developing the database, a weight of evidence approach was used to assign variable values in such cases. Sources of additional information included Ambon-based researchers and NGO field workers as well as the surveys and interviews conducted in 28 of the villages in the course of this project.

Since each village institution is different, the "institution" being evaluated is really a broad range of institutional arrangements. This makes the results more variable and difficult to interpret than results from one single project site.

In order to reduce some of the complexity we found in the field, all case studies were performed in Christian villages. The subsequent analysis of sasi is, therefore, most relevant to those forms of sasi practiced in Christian-dominated areas. We have noted certain differences between Christian and Muslim institutional arrangements in the course of our inventory. The analysis of Muslim-style sasi is a topic for future research.

Interviews of fishers as well as interviews in the case study sites were conducted with the consent and under the guidance of the village head of each village. Because of this, the samples were not random, although, for the case study sites, efforts were made to engage people in the street in informal discussions and interviews. For performance survey interviews in particular, the village head selected fishing families to participate in the survey. It is, therefore, possible that respondents represented a middle-class range of fishing families rather than the entire spectrum available in each village.

The ladder survey instrument was adapted from the methodology used to evaluate CBRM projects in the Philippines. When used to evaluate the impact of a project, time lines are short and distinct. Respondents indicate their perception of conditions before and after a project is carried out. However, with sasi, there is no "before" or "after". We used 15 years as a time boundary because it was roughly 15 years ago that village governments were re-organized, leaving traditional management institutions without legal status. With such a long time line, perceptions of trends through time can be expected to vary, depending on the age of the respondent.

Interviewers found that the ladder as a visual aid was effective. However, the questions, especially those pertaining to access to resources, the concept of resource management and participation in decision-making, were difficult for some fishers to understand. Interviewers sometimes spent up to several hours with a respondent as each question was explained and discussed.

Sasi as an institution applies only to inshore resources, whereas most fishers gain their living from the offshore pelagic fishery. Answers to questions were, therefore, often relevant to the larger fishery but not to resources managed under sasi.

Marine survey methods were “quick and dirty”, gathering limited data on a few indicators. They were also carried out only in a few areas; therefore conclusions drawn from the marine survey data must be viewed as preliminary.

Finally, all interviews were performed and recorded in Bahasa Indonesia, partially analyzed by Indonesian staff, then translated into English before final analysis. Where interpretation of translated information was unclear, the information was not used unless it could be verified from other sources.

Chapter 3

Regional and Village Level Context

The islands of central Maluku came into being over a million years ago. The oldest of the islands in geological terms is Seram, called *Nusa Ina*, or the Mother Island. The Lease Islands are rich in biodiversity. Mangroves, coral reefs, and vast sea grass beds support an array of marine biota including dugongs and turtles (Hualopu 1996). The productive base on the islands is limited by geomorphologic factors (steep slopes) and most settlements and farming activities are concentrated along the strip of relatively flat coastal land. The communities have easy access to marine resources, and fisheries contribute significantly to the village economy (Hualopu 1996). Fisheries resources are exploited throughout the islands, but exploitation may be regulated through *sasi*, a traditional resource management system.

3.1 Socio-Political History of Central Maluku

The first trace of human occupation dates back to the Holocene period (4,000-10,000 years ago). Cave dwellers from this time were of mixed Caucasoid, Mongoloid and Papuan ancestry. Villages organized under the local government are believed to have formed in the Neolithic Age (1,500-3,000 years ago). From this period, anthropologists have determined that canoes, gardening tools and simple stone axes were in use. Evidence of the building of a *Baileo*, the traditional community house, familiar in *adat* culture, dates back to the first century A.D. (Figure 3.1) (also see Cooley 1962). At this time there was already trade between central Maluku and China and other areas of Southeast Asia. The local religion was animist (Holleman 1923).



Figure 3.1. (Photo) Baileo in Nolloth.

The political structure of central Maluku over the period of 1000-1500 A.D. has been characterized as “patrician republican” with an aristocratic ruling class. The original

inhabitants generally referred to as Alifuru lived in mountain villages (*hena* or *aman*). Organized in tribal groups (*uku*) consisting of clans (*lumah tau* or *soa*), the most important leaders were the chieftain or king (*latu*), the heads of the *uku*, and the *mauwain*, shaman, a magical religious expert mediating between the people, nature and the world of ancestors and spirits (von Benda-Beckmann et al. 1995). Each village was occupied by a number of clans. The descent system was patrilineal. The village-based clusters of clans (*rumahtua*) related by geographical proximity or kinship, were grouped together as *soa* under a leader called the *kepala soa* (also see Holleman 1923). The *soa* were in turn organized into small kingdoms (*negeri lama*) led by a great leader (*tamaela umi haha*).

In Maluku, the periods between the 15th and 17th century was full of turmoil and dramatic political, economic and religious change (von Benda-Beckmann et al. 1995). Around 1500, the traditional economy of Maluku was based on subsistence agriculture and fishing. Sago was important both as food and as a trade item (Knaap 1981). The clove trade in Maluku was mainly in hands of the Javanese Majapahit kingdom, but soon, Maluku was to be the battlefield where foreign powers struggled for control over the region's natural resources, particularly spices (Knaap 1981).

At this time, Muslim Arab traders arrived in north Maluku. Their influence led to the establishment of Islamic kingdoms in the 15th century. Islamic laws were incorporated into *adat* law and Arabic words were incorporated into the local language. As the Majapahit hegemony declined, four powerful Islamic kingdoms emerged in north Maluku. Islam moved south into central Maluku, in particular to Hitu, a seaport on the north of Ambon Island. On Ambon, a union of nine *negeri* (*patasiwa*) dominated the Letimur peninsula, while a union of five *negeri* (*patalima*) was established in the Leihitu section of the island. On Haruku Island, Saparua and Nusa Laut, powerful *negeri* also emerged to dominate island life and establish kingdoms that competed with one another.



Figure 3.2. Cloves drying on the streets of Haruku.

In the course of the expansion of clove production from Ternate, via Hoamoal on Seram to the central Maluku islands in the early 16th century, immigrant groups, coming from the northern Maluku islands and Java settled along the coast (von Benda-Beckmann et al. 1995), (Figure 3.2). The 16th century saw Portuguese traders entering Maluku and engaging in the political rivalries of the native kingdoms. They built a fortress at Hitu on Ambon in 1515. During this period, Catholic missionaries made Ambon the center of Catholic evangelical activity. The Portuguese were followed by the Dutch, who dominated and eventually defeated the Ambonese kingdoms.

By the 17th century, the Dutch were firmly established as a trading power in Maluku, with their Dutch East Indies Company (VOC) backed by naval fleets. After the Dutch defeated the Portuguese, a period followed of warfare among Dutch, British and the Maluku population, wherein the Dutch ultimately prevailed. Yet, the "spice wars" punctuated by local uprisings continued off and on into the 20th century. With the defeat of the Portuguese, Roman Catholicism disappeared and the settlements and villages in the central Moluccas eventually became either Islamic or Protestant (von Benda-Beckmann et al. 1995).

The Dutch colonial rule led to poverty and social disruption, and when in 1796 the British reappeared, complete lack of local support forced the Dutch to give up their ruling power (Riedel 1886). The early 1800s was a period of relative isolation for Maluku, and inter-island contact was mostly via Buginese and Makassar traders from Sulawesi and Java (Fox 1996). At this time, the Chinese also began to play a major role in local trade. However, in 1817 the British were again defeated and the Dutch re-established their capital in Ambon.

The creation of an economic monopoly on clove production in Maluku entailed enforced production quotas, the imposition of population relocations, and radical interventions into existing patterns of the social and political structures. Villagers were forcibly relocated on the coast and settled within newly created territorial units managed by individuals occupying Dutch-created administrative roles, the *bapak raja* and *kepala soa* (Chauvel 1990 in Zerner 1994b). There was serious local resistance led by Thomas Matualesi, better known as Pattimura, of Saparua Island, in 1817, which ended in defeat for the local troops in 1823. Under subsequent Dutch rule, Maluku children were schooled in the Dutch language and advances were made in converting the local population to Protestantism. The Christians then came to be favored by the Dutch, rising to occupy administrative positions in the government.

It was not until 1920 that “Sarekat Ambon”, the first indigenous political party, was formed to advance the welfare of Ambonese people. Its leader, A.J. Patty, promoted independence. Although he himself was subsequently exiled from Maluku, his work resulted in the opening up of the government to include traditional leaders in the governmental council, the “Ambonraad”. The Sarekat Ambon party was finally banned by the Dutch in 1939.

During World War II (1942-1945), Maluku was occupied by Japanese forces and ruled by a military governor based in Ambon. People lived in fear of the brutality of Japanese occupying forces. All political parties were banned and the function of traditional (*adat*) government discouraged. Maluku was cut off from the outside world and the period is remembered as one of extreme hardship.

On 17 August 1945, the Republic of Indonesia proclaimed its independence from the Dutch colonial rule. The Dutch, with a degree of local support, attempted to retain control over Maluku but this uprising was finally defeated by Indonesia’s military, after a period of struggle that lasted until 1952. In 1952, central Maluku was granted official status as an autonomous administrative reGENCY of Indonesia, and in 1957, Maluku gained the status of a province with its own parliament. 1955-65 were years of political unrest at the national level that involved a number of prominent Maluku politicians. It was also a period of rapid development and poverty alleviation as the First Long-Term Development Plan, covering 25 years, was implemented.

The coup d’état of 1965 resulted in the takeover by Major General Suharto, whose leadership remained intact until 1998. The Suharto era was characterized by tight control over politics and a highly centralized form of administration, both of which had a powerful influence on the political life and economic development in Maluku. The influence and power of the governing party came to be felt at all levels, right down to the smallest villages (Dauvergne 1997).

Law No. 5, 1974 was passed defining the regional government structure. This was followed by Law No. 5, 1979 which decreed that all village governments had to be redesigned to follow a defined structure which did not accommodate traditional (*adat*) institutions such as *sasi* and the *kewang* (traditional law enforcers). The indigenous people of Maluku were thrown into confusion over whether to uphold their traditional laws and institutions, conform to the new edict or seek some compromise between the two. That confusion, and the wide array of responses at the village level, are still evident in Maluku today.

The 1970s were a time of particularly rapid economic change. Maluku experienced an average economic growth of 12.8% a year, compared to an average of 8.94% in 1983-88 and 6.67% in 1988-93 (Anonymous 1994). Per capita annual incomes rose from Rp24,383 in 1970 to Rp1,050,176 in 1993. Much of this economic progress was the result of direct government assistance. Also, from a predominantly agricultural economy, Maluku gradually shifted to an economy where industry was important. In 1970, 71% of the gross domestic production (GDP) were from agriculture and fisheries, 1.6% from industry. In 1993, agriculture and fisheries provided 32% of the gross domestic production (GDP) and industry, 19%.

3.2 History of *Sasi* in Maluku

In some Maluku communities, control over the land and marine territories (*petuanan*) and their resources is vested in a social institution that has a code of conduct, rules and regulations. This institution is known as *sasi* (Volker 1925, Ellen 1978, Kriekhoff 1991). *Sasi* is not simply an institution designed to regulate resource use; *sasi* also has a significant cultural role. "It is an encompassing body of meaningful relations between people, the natural environment and gods, ancestors and spirits" (von Benda-Beckmann et al. 1995). Although the origins of *sasi* are lost in the mists of time, local legend speaks of *sasi* being in practice in the 14th century and perhaps earlier (Topatimasang 1997). Others maintain that *sasi* developed in the 16th century in response to the needs of clove traders (Kissya 1994), but it was almost certainly based on older *adat* tradition that aimed to protect and control exploitation of natural resources (von Benda-Beckmann et al. 1995).

The "spice wars" of the 1600-1900s had the effect of stimulating militancy as well as mobility in the Maluku people, and fostered fierce attachment of the people to their territories (Chauvel 1981). This could have been positive in terms of reinforcing *adat*. On the other hand, however, the battles were ultimately lost, many of the bravest killed, and the sovereignty of local leaders abolished. In some cases, wholesale slaughter (as happened in Banda) and forced removals alienated people from their territories. In general, *adat* culture is believed to have reached its zenith in the mid-1600s and the pattern since then has been one of decline, although with periods of resurgence (Cooley 1962).

The introduction of Islam and Christianity and the establishment of a trade monopoly in cloves were of decisive influence for the further development of *sasi*. During the occupation and Christianization of Maluku by the Dutch, *sasi* was at first discouraged along with other "pagan superstitions and rituals" (von Benda-Beckmann et al. 1995). However, the institution was subsequently revived and revised by the Dutch to control and maximize harvests of valuable spice crops, regulate land tenure and provide a means of social control (von Benda-Beckmann et al. 1995). In the revised form, the emphasis on spiritual aspects declined, while the economic aspects of *sasi* came to the fore. During this period and into the 1900s, native Mollucans were often resentful rather than supportive of the Dutch style of *sasi*, as it represented the imposition of Dutch ethics and was often a burden on poorer members of society (Zerner 1994a). Under Dutch influence, what had been purely an *adat* institution became integrated to some extent with the village leadership supported by the colonial government. At a later point, the church also came to have a role in *sasi*, changing the institution further into one in which religious, government and *adat* leaders worked together.

In the period 1880-1893, Dutch Resident J.G.F.Riedel attempted to abolish *sasi*. He wanted to break the power of *kewang* leaders over the spice trade and abolish the *kewang*'s rights to enforce *sasi* rules, which he considered exploitative of the local producers. In spite of his

efforts, the *sasi* institution continued to survive and evolve in many villages, and in 1921, the Dutch actually supported *sasi* once more by formalizing the institution with the decree called “Het recht van *Sasi* in de Molukken” (the rights of *sasi* in Maluku).

During World War II, the period of occupation by the Japanese represented an extreme threat to all *adat* institutions. Lack of appropriate ceremonial cloth and other goods meant that *adat* rituals could not be performed according to tradition, so that in this period, many substitutions were made (Cooley 1962). Indonesian independence involved civil war in Maluku, a time when many leaders were lost and clans scattered. Integration into the new nation of Indonesia meant a further blow to the local indigenous language and culture because Indonesian Malay became the language of compulsory schooling. Subsequent decades of civil strife and political turmoil at local and national levels doubtless continued to challenge the strength of local culture. In more recent decades, cultural change has intensified as economic development proceeded. By the 1960s, there was a confident prediction (Cooley 1962) that *sasi* was doomed to disappear “in the very near future”. But although weakened over time, *sasi* never disappeared. *Sasi* rules, developed at the community level, are still used by communities to control and maximize harvests as well as to regulate aspects of social behavior.

The aim of *sasi* and its function in resource management and conservation have been debated. Zerner (1994a) argues that, although there may be spin-off benefits in terms of resource sustainability, *sasi* is essentially an institution for managing social interactions, mediating tenure disputes and maximizing economic returns, rather than a resource conservation and management institution *per se*. On the other hand, *sasi* clearly was performing a conservation function in the 1920s, when the use of poisons in the fishery was banned under *sasi* rules (Volker 1925). Today, *sasi* is again undergoing change, with a renewed emphasis on conservation aspects (Zerner 1994a).

The application of *sasi* to marine resources may have never been as widespread as *sasi* on land crops. Zerner and Thorburn (*forthcoming*) have speculated that in its original form, marine *sasi* was applied only to pelagic fish, with the objective of protecting migratory fish from disturbance so as to maximize harvests for local consumption. In the decades following the 1930s, the emerging international markets for top shells and sea cucumbers appeared to have prompted the development of additional types of marine access prohibitions and related ceremonies in places such as the Kei Islands in southern Maluku (Zerner and Thorburn, *forthcoming*). Similar rules are evident in central Maluku today and appear to date back at least to the 1960s.

There is another *adat* institution linked to *sasi*, the *Latupati*, which is a venue for meetings of traditional leaders at the island-wide level. The *Latupati* in the Lease Islands (i.e., Saparua, Nusa Laut and Haruku) has been effectively dormant since the passage of the legislation on village governments in 1979. However, a revitalized *Latupati* may have potential as a regional resource management body. In 1996, the first Haruku Island *Latupati* meeting in 20 years was held as a consequence of the efforts of NGOs interested in developing the marine resource management capacity at the island and regional levels. Subsequently, NGO interventions have also led to the revival of the *Latupati* on Nusa Laut Island in 1998. On Saparua, there is also a *Latupati* but it is currently used only as a venue for the planning of annual social events.

3.3 Historical and Current State of Inshore Fisheries Habitat

Sir Alfred Wallace, on his expedition to Ambon Bay in the 1850s, marveled at the incredible diversity of corals and fishes. Eastern Indonesia, including central Maluku, is part of the

global center for coral reef biodiversity. Endangered species inhabiting this area include dolphins and whales, turtles, giant clams (*Tridacna* spp.), other types of molluscs such as the Triton's trumpet (*Charonsa tritonis*), giant helmet shells (*Cassis cornuta*), chambered nautilus (*Nautilus pompilius*), top shells (*Trochus niloticus*) and the green snail (*Turbo marmoratus*). A recent marine resources potential survey (PSL Unpatti in LIPI 1996) revealed diverse biological communities in the intertidal, inshore reef flats and reef slopes. Among others, mangrove, sea grass and coral reef habitats have been found.

Except for some sheltered estuaries where mangrove forests are quite extensive, mangroves are mostly confined to narrow coastal strips. Saparua Island mangrove areas boast up to 22 different species. On Haruku, mangroves are much more limited in extent (Wouthuyzen et al. in LIPI 1994a, 1994b). Conversion of coastal land, including mangroves for shrimp pond development, is just beginning in central Maluku (northern Seram) but conversion for housing development is already widespread.

Extensive sea grass beds are common in central Maluku (Wouthuyzen in LIPI 1996; PSL Unpatti in LIPI 1994). Fishes sighted in sea grass beds around Saparua Island number 62 species (Wouthuyzen et al. in LIPI 1994). Surveyors in 1991 (de Iongh et al. 1994) found dugong-feeding tracks in sea grass beds in the Lease Island villages of Ameth, Nalahia, Ihamahu, Paperu, Rohumoni, Kabau, and Haruku. These sea grass beds are also a feeding ground for the hawksbill turtle (*Eretmochelys imbricata*) and green turtle (*Chelonia mydas*).

Coral species diversity in the Lease Island region is described as high; researchers found 110 species at Pulau Pombo (PSL-UNPATTI 1994) and 85 at Ihamahu (Antariksa et al. 1993). Surveys documenting the hard coral cover (LIPI 1996) in central Maluku locations on Seram, Ambon and the Lease Islands show that healthy corals are already rare. The survey further indicates that the absence of good coral reefs is closely related to the use of bombs and other destructive fishing methods. The details are as follows:

- An average cover of live corals greater than 76% was not found on any reef surveyed.
- A cover of live corals in the range of 51-75% was found on 16% of the reef area.
- A cover of live corals in the range of 26-50% was found on 32% of the reef area.
- A live coral cover in the range of 0-25% was most common, being present on 47% of the reef area surveyed.

Leonardo (1996) reported on the condition of coral communities in the coastal waters of Saparua Island and described four areas of the island, all of which had suffered damage from blast fishing as well as from infestation by crowns of thorn starfish.

- The north coast had a 23.8% live hard coral cover and 36.6% soft coral cover.
- The east coast had a 42% live hard coral cover and 26.1% soft coral cover.
- The south coast had a 27.3% live hard coral cover and 32.4% soft coral cover.
- The west coast had a 31.4% live hard coral cover and 33.2% soft coral cover.

3.4 Characteristics of the Fishery

In central Maluku, agricultural capacity is limited and the fisheries sector is regarded as the opportunity for economic development. Over recent years, fishing efforts have been escalating. The prediction is that fishing efforts will increase by 50% in the next five years. At the same time, stock assessments and data on catches are inadequate. If this continues, over-exploitation of commercially harvested resources is likely (Nikijuluw 1995).

3.4.1 The artisanal finfishery

The fishery of Maluku mirrors that of Indonesia as a whole in that the labor force is dominated numerically by the artisanal sector. In 1991, for example, it was estimated that out of 142,510 fishing units (boats) operating in Indonesia, 132,884 or 93.2% were tiny canoes powered by paddle and/or sail. Another 6% of boats employed outboard motors and the rest were large, motorized ships (Agriculture Statistics 1993, Dept. of Agriculture, Jakarta). In the Maluku province, with a population of about two million people, 104,600 are considered to be fishers (CBS 1995). Many more are fisher-farmers who are actually listed in the government statistics as farmers.

Artisanal fishers using fishing lines, spears, traps, hand nets and set nets target a mixture of reef and pelagic species (Appendix 3). Women in fishing families supplement catches by harvesting octopus and shellfish from intertidal and upper subtidal areas. Utilization of coastal resources in the nearshore areas is intensive. For instance in Ameth on Nusa Laut, fishers using 21 types of fishing gears collect 73 different species of fish and shellfish from the reef flat, reef slope and inshore waters. An additional 19 species are harvested from the intertidal zone (Yayasan Hualopu 1996).

The tiny Lease Islands hold 12.5% of the population of Maluku province and are 9-10 times more densely populated than the rest of Maluku. In general, the settlements and farming activities are concentrated along the narrow strip of relatively flat coastal land. Artisanal and small-scale commercial fisheries contribute significantly to village economies in terms of employment and income but villagers are also active in the agriculture sector. Because good farmland is limited and the population relatively dense, the fisheries sector is seen as an opportunity for economic development. The sea is a source of income as well as a source of family food (Ruhunlela et al. 1994a, 1994b; PSL Unpatti in LIPI 1996). On an average, income from fisheries in a typical village ranges from about 12-28% of the total income.

3.4.2 The commercial finfishery in central Maluku

Upwelling in the Banda Sea, which occurs in the months of June, July and August, makes the central Maluku fishery a highly productive one. The resources of central Maluku are exploited not only by the local population, but also by boats based in the city of Ambon as well as boats from Sulawesi and Java and foreign fishing vessels. Key commercial species include tuna, skipjack and a variety of small pelagic fish (anchovies, mackerel, sardines). The commercial lift nets (bagan) and seiners target the small pelagic fish, especially anchovies (puri), sardines (make and lomp) and mackerel (momar and komu) whereas pole and line boats typically harvest skipjack (cakalang). Other commercial operators employ long liners and various sizes of gill nets and drift nets. Live reef fish harvesters commonly employ divers who use potassium cyanide.

In terms of potential economic growth supporting the national development, the fishery is ranked second after tourism in Maluku. Following the 1997-98 monetary crisis in Indonesia, the national government looked to the fishery of eastern Indonesia to absorb displaced Javanese workers and perhaps another thousand large-scale commercial fishing vessels (V. Nikijuluw, pers. comm. 1998).

Fisheries production figures over the past decades show a steadily increasing level of exploitation. In 1974, the fisheries production of Maluku province was only 59,485 tonnes. By 1993, 35,000 fishing units (32,000 of which were small, non-motorized crafts) were landing 189,081 tonnes of fish, a level 5% higher than the 1992 landings and still, according to federal government statisticians, only a fraction of the potential MSY for the province. In 1997, total recorded landings had reached 329,147 tonnes (Book of Annual Fisheries Statistics, Anonymous

1993, 1994, and 1995). In addition, a great deal of fish catch goes unrecorded because it is trans-shipped at sea and taken directly to distant markets.

Actual records of landings and local research results are at odds with the official federal optimism regarding potential for further development. Coral reef fish are believed to be already over-fished throughout Indonesia (Anonymous 1993, 1994, 1995). Also, landings of shrimp in Maluku are in decline, and landings of small pelagic fish are uncertain. A 1995 assessment estimated that small pelagic (baitfish) catches in central Maluku were already at 80-90% of MSY (Pulitbangkan 1995). The most recent information from the government research facility (LIPI) is that both shrimp and baitfish are now over-fished throughout the Maluku province (M.S. Latukonsina, Governor of Maluku, pers. comm. November 1998). The estimated potential yield of small pelagic fish was recently reduced from 816,200 tonnes to 682,000 tonnes per year. Because of a shortage of baitfish, pole and line catches of larger pelagic fish, such as skipjack, have been static or declining in recent years (Nikijuluw 1995). Even at the reduced catch rates, skipjack are now considered to have been over-fished as well (M.S. Latukonsina, Governor of Maluku, pers. comm. November 1998). Policy-makers are looking to expand fish and shellfish aquaculture in an attempt to compensate for declining wild stocks.

Despite warning signs, expansion and modernization of the fishing fleet continue. The new fishing units have unprecedented fishing power. In the district of central Maluku, a 2% increase in the number of fishing units over the years 1993-95 resulted in an increase in catches of almost 30% (Table 3.1). At the same time, fishing units increased by 3% in the district of Kotamadya Ambon, and production increased by 55%.

Table 3.1. Increase in fishing units and fisheries production in the districts of central Maluku and Kotamadya Ambon in 1993-1995. Source: Buku Tahunan Statistik Perikanan Tahun 1993, 1994 dan 1995 (Book of Annual Fisheries Statistics, Anonymous 1993, 1994, and 1995).

Region	Fishing Units			Catch (Tonnes)		
	1993	1994	1995	1993	1994	1995
Central Maluku District	21,887	22,085	22,250	40,892	49,982	52,978
Kotamadya Ambon	3,773	3,779	3,885	56,973	84,910	88,241

3.4.3 Top shell fishery

The commercial trade in top shells (*Trochus niloticus*) has been carried on since at least the 1960s (Zerner and Thorburn, *forthcoming*) and is a trade that expanded rapidly. For example, recorded shell exports from the Maluku province increased from under 80,000 kg in 1987 to over 256,000 kg in 1988. Because rapid exploitation led to a crash in wild stocks, this species has subsequently been declared protected and it is, therefore, illegal to harvest the shells outside aquaculture areas. However, harvesting and trade in wild shells continue.

3.4.4 Sea cucumber fishery

Sea cucumbers have been a trade commodity for centuries, ever since Chinese, Makassar, Buginese and other wandering traders first came to Maluku (Fox 1996). Older fishers can remember when inshore sandy bottoms were thick with sea cucumbers. Today, however, the traders rarely bother to visit many of their traditional harvesting areas because the stocks have been largely exhausted.

3.4.5 Other commercial species

Most lucrative of the other species fished in Maluku are shrimp and pearl oysters, both of which are mostly caught in southern, not central Maluku. Various other shellfish, seaweeds, sharks, octopus and squid, and ornamental fish, are also caught for commercial markets. Ornamental fish harvesters commonly employ divers who use potassium cyanide.

3.5 Impact of Destructive Fishing Methods

Decreasing catches of baitfish in the Saparua waters (Siahainenia and Tubalawony 1993) have been blamed on both increased fishing activity and the use of non-selective fishing methods. For instance, very small mesh (under 5 mm) is used in lift nets (*bagan*) and beach seines. Where lift net fishers report increasing catches, it is often because of the use of smaller and smaller mesh sizes. Conflict over access to pelagic fish is common between the lift net fishers with their fine mesh nets and the hand line sector on Ambon Island (J. Sohouwatt, Hutumuri village, *pers. comm.* 1996).

The high price offered for grouper (*Ephinephelus spp.*), ornamental fish and lobster have encouraged the use of potassium cyanide as a fishing method. The use of potassium cyanide is very common in central Maluku waters (Abrahamsz and Hetarie 1994; Geser, Gorom and Watubela 1997). Blast fishing is also common, both for reef and pelagic fish, and causes widespread damage to coral habitats (I. Novaczek *pers. obs.*).

The trap net is a simple fishing gear designed by local communities that is often destructive because people use hard corals as an anchor for the net. Traditional woven fish traps called *bubu* are also destructive if set out on top of living corals or if coral branches are used to camouflage the trap. A third artisanal activity that destroys corals is *bameti* – the practice of walking out over the living reef at low tide to harvest shellfish and octopus. During *bameti*, iron bars are often used to break up coral heads or dig large clams out of the reef. Even more destructive is the technique called *muro-ami*, in which fishers use rocks to smash corals and chase the reef fish out into a net.

3.6 Seasonality

Fishing activity and catch rates vary seasonally. In central Maluku, there are two distinct seasonal monsoons. The westerly monsoon blows from the east and southeast from around November through April. Strong winds from the west and northwest and carrying rain prevail during June-September. October and May are transitional and unpredictable. Because of the risk of loss, lift nets either get pulled to shore during the height of the windy season or are moved to the leeward side of an island. Although some larger operators have the ability to move their boats and lift nets about, or have vessels capable of weathering high waves, the artisanal sector is much more vulnerable to seasonal change. Typically, smaller fishers are literally “blown off the water” for almost half of the year. The season of limited catches varies, depending on when local fishing grounds are subject to onshore winds.

In addition to seasonal cycles, fishers are also affected by lunar cycles. For instance, hand liners targeting reef fish report that their catches are large during full moon high tides. In contrast, fishers working on floating lift nets or beside fish aggregating devices, as well as beach seiners that work at night and attract fish with lights, find the full moon to be the worst

time for fishing. Modern lights are brighter than the older kerosene lamps, allowing the wealthier light fishers to continue operating throughout the month. Artisanal fishers believe that this change contributes to stock depletion. Fishers interviewed also sketched out monthly calendars that suggest that there are monthly cycles in tides and waves that affect catches. Artisanal fishers use this traditional knowledge to plan their work schedules.

Because weather has such a strong influence on catches, fish traders in smaller centers sometimes use sea conditions as a guide for predicting prices in the central markets. If the sea is calm and oily, fish are likely to be scarce and the price high. When the tide is very high (hitting the foundation of houses along the shore), i.e., at full moon, prices for pelagic fish are very high. If there are (moderate) wind and waves, fish are usually more abundant and prices low (Cali Kiat, fish trader at Tulehu, *pers. comm.* February 1998).

3.7 Control over the Commercial Fishery

Although there is a small minority of commercial gears in the hands of village fishers, the majority of capital-intensive gears, i.e., lift nets, FADs, pole and line vessels, long liners and seiners, are in the hands of urban businessmen and large companies. For example, the fish processing company, P.T. Sumber Aneka Tata Bahari, owns a fleet of 12 pole and line boats and three long liners, as well as five deep-sea FADs. They export 250-700 tonnes of fish a month (M. Siahay, boat captain, *pers. comm.* 1998). Owners of these industrial enterprises are rarely native Mollucans. Most are urban Chinese Indonesians, some are from the western islands of Sulawesi or Java, and a few are foreign (e.g., Filipino, Japanese etc.). More information on large-scale fisheries and market structures can be found in Chapter 5.

3.8 Conclusions

The marine resources of central Maluku are very rich but not unlimited. Coral reefs, for example, are under severe pressure, particularly from destructive fishing techniques employed by both commercial and artisanal fishers. After a period of rapid increase in fishing pressure and catches, even the optimistic government resource assessments now indicate a need for more cautious management because several key stocks appear to be over-fished and harvest potential is declining. Nevertheless, economic pressures mean that there is still a strong push for further expansion of fisheries.

Sasi, the local resource management institution, has a long history. The application of *sasi* to marine resources, however, has always been limited in scope and some modern forms of marine management date back only a few decades. As an institution, *sasi* has never been static but has changed with the times and been used by different proponents for different economic and social reasons, not simply for resource management. *Sasi* and the underlying *adat* culture have waxed and waned over time, absorbing and reflecting the impacts of colonialism, war, economic development and social change. However, despite past predictions of imminent demise, *sasi* and *adat* persist and are, therefore, resilient. In the following chapters, we will explore how these regional contextual factors, as well as local conditions, influence present-day fisheries management at the village level.

Chapter 4

Village Level Socio-Political Context

4.1 Introduction

The following general overview of the socio-political context in rural, coastal villages of central Maluku is based on the results of six case studies carried out on Saparua, Haruku and Ambon Islands. All study sites are Christian villages. Therefore some of the findings, especially the role of the church in society, do not pertain to the social structure in Muslim villages.

Although a dominant force, the formal village government is only one of three key elements generally recognized in Maluku villages. These three key institutions are called the *Tiga Tungku*, or three hearthstones: the government, the church (or in Muslim villages, the mosque) and *adat* or traditional authorities. In some villages, teachers are also important and may displace *adat* leaders in the *Tiga Tungku*.

4.2 Traditional Village Government Structure

Prior to the enactment of the local government law (Law No. 5, 1979), villages in Maluku were led by a hereditary chief or *raja*. Although now considered part of the “traditional” structure, the position of *raja* was in fact not part of the indigenous *adat* social structure, but a construction of the Dutch colonial leaders. When the Dutch consolidated their power in Maluku and forced the hill-dwelling people to settle in coastal villages, they appointed the village leader, i.e., the *raja*. Previous to this, the clan groups living in the hills were led by warrior chiefs (*kapitan*).

The *raja* governed together with administrative and legislative councils (*saniri*) whose members were the clan leaders. The *raja*'s powers under this system were not absolute. He (or occasionally, she) was obliged to consult with the village council. Other hereditary functionaries included a war leader (*kapitan*), persons responsible for communicating government decisions to the people (*marinyo*), keepers of sacred knowledge (*tuan negeri*) and the major land owners (*tuan tanah*). There were also the hereditary leaders (*kepala kewang*) of groups responsible for enforcing social and resource management regulations. These enforcers, or traditional forest police, were called the *kewang* and the management institution was, and still is, called *sasi*. The *kewang* applied *sasi* rules on both land and sea, within the village territory. Some villages had separate *kewangs* for land and sea resources.

4.3 Modern Village Government Structure

The Indonesian national government is situated in Jakarta, on Java Island, over 2,250 km west of Maluku. Each of Indonesia's 27 provinces is administered by a provincial government, which in turn is divided into districts either called *Kabupaten* or, if urban, *Kotamadya*. Below the districts are the sub-district government offices or *Kecamatan*. Government decrees, guidelines and programs are passed down through this structure to the local administrative units which are called *desa* or, for larger land units attached to urban centers, *kelurahan*. Each *desa* is governed by a *kepala desa* or village head, together with his staff, and may comprise one or several villages. Villages that are smaller than 2,000 inhabitants are usually not independent but have the status of *dusun* under the larger unit (*desa*). The village head and

his government office may, therefore, be many kilometers away. *Dusuns* are represented in the *desa* government through their local leaders (*kepala dusun*).

Through the issuing of Law No. 5, 1974, provincial government structures throughout Indonesia were redesigned following the above national model. The same was done for village governments under Law No. 5, 1979. In the implementation of the latter law, traditional political structures in the villages were abolished. The country was thereby divided into uniform hierarchical units which, at a local level, reflected social structures in Java, but did not accommodate the traditional structures in other parts of the country. The new, uniform structures would, in theory, encourage similar development of the outer regions of Indonesia.

Through the 1979 law, the hereditary *raja* was replaced by an elected village head, the *kepala desa*. Smaller villages lost their independent status and became *dusuns* of larger *desas*. The village councils were replaced by bodies known as the LMD and LKMD (see below). There was no place in the new structure for the *kewang*, nor was any replacement developed to take over the function of resource management. The clan system also became dysfunctional when, instead of being divided along clan lines, the village territory was geographically divided into *dusuns* (hamlets). *Dusuns* were further divided into RWs (*rukun warga*: *rukun* is a harmonious unit, *warga* is a society member), and subsequently into RTs (*rukun tetangga*: *tetangga* is neighbor). The RT is the smallest political unit in the village (see Figure 4.1). A small village like Nolloth, for example, with approximately 2,500 inhabitants, has 16 RTs.

The LMD (*Lembaga Masyarakat Desa*) is the formal village legislative body occupied with decision-making and the development of regulations. It has 10 to 15 members presided over by the village head and the village secretary and is divided into sections, i.e., village development, government administration and community affairs, each of which has a chief. The LMD reports to the sub-district government level. The decisions and regulations of the LMD are executed by the LKMD, which is the administrative body of the village government. At village meetings, the LKMD members and other government officials make the decisions. The women sit behind the men and are not involved.

Officially, the villagers elect the LMD members, but as we found out from our interviews, in many cases LMD members are selected from among traditional authorities (i.e., *adat* and clan leaders). Only in a few villages are “commoners” allowed into the LMD. Thus, membership is more likely to be defined by descent and traditional authority than by local elections. The extent to which the current government overlaps with the previous, traditional village council varies, but there was no village where traditional authorities were not represented at all.

Heads of the *dusun* are usually appointed by the village head (*kepala desa*) and are acknowledged through a decree from the sub-district office. The *dusun* level has no LMD of its own, but *dusun* representatives hold positions in the LMD of the *desa*. The *dusun* head supervises and coordinates social organizations and carries out the development programs for the *dusun*. People are not formally consulted about these programs, so the *dusun* head has to know the village priorities very well.

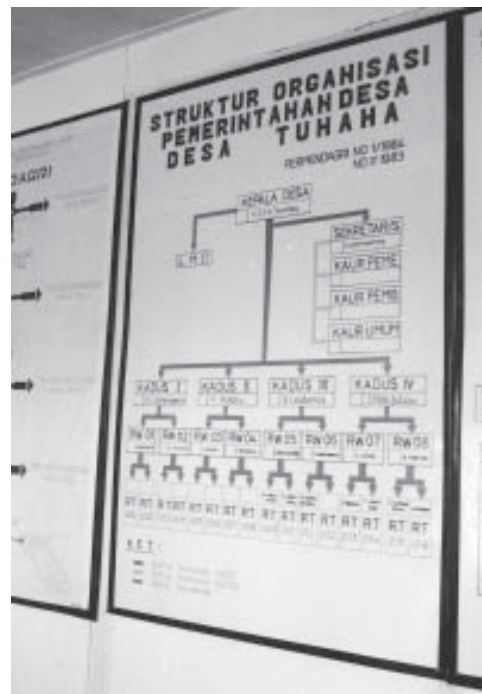


Figure 4.1. (Photo) The village government structure at Tuhaha.

An RT group, the lowest level in the government structure, consists of a cluster of neighboring households. The head of an RT is a non-governmental official. His duty is to take care of his group, organize government-sponsored activities and act as the mediator between the government and the people. In Toisapu, for example, the RTs comprise 43 households. There is an RT level savings program and the leaders also motivate people to cultivate animals or productive plants (e.g., bananas) in their yards. Another activity is to clean up public facilities. According to law, a head of an RT holds the position for three years.

Fishery problems, such as blast fishing, are usually reported by the RT leader to the police (in particular, the Water Police Squad), either directly or via the village head. Extension programs from the Fisheries Agency (*Dinas Perikanan*) are provided through village and *dusun* governments, but may be carried out at the RT level.

The village income, as well as the subsidies meant for the various government organizations, is allocated through the national, district and sub-district levels. Every village carries out development programs, working within guidelines set at the national level. Village programs are controlled and have to be approved by higher government levels. The village government arranges the program, chooses the leaders and presents a list of potential members for approval to the district government. After approval, the participants are informed of their membership and tasks. This paternalistic approach is accepted as normal in the current state structure. Many programs aim to improve the livelihoods of the village population. Other programs aim to unite village groups and carry out activities that underline the principles of the state ideology, *Pancasila*, such as care for the less able and poor in the village. There is little room for local initiatives or creativity in development programming.

4.4 Government-Related Organizations

4.4.1 PKK

The PKK is a women's organization initiated in the 1980s to complement the new government structure. The PKK is an abbreviation for *Pendidikan Kesejahteraan Keluarga* which means literally "Education for the Prosperity of the Household". It is a vehicle for the wives of the village (government) leaders to improve the welfare of Indonesian families. The group operates under the leadership of the wife of the village head. A vice-chairlady, a secretary and a treasurer assist her. The village head selects all these officials. Each village PKK is divided into *dusun*-level groups. The aim is to improve family life in the spheres of economy and peace. Membership is open but generally includes mainly teachers and civil servants; common village women often have no time, or feel inferior to the wealthy women in the village, and are not welcome.

The PKK is subsidized by the sub-district via the village government. The aim of PKK is to build prosperous families through 1) saving money (ARISAN), 2) skills training (baking, cooking, sewing), 3) growing medicinal plants, 4) chicken breeding, 5) cultivation of vegetables, 6) dried fish and fruit trade, 7) child care, and 8) the promotion of the state ideology (*Pancasila*). The national government dictates programs that are then passed down through provincial, district and sub-district levels to the villages. The villages can select activities from the program and submit a proposal (Figure 4.2). After approval, a budget will be allocated and if necessary, an expert will be sent to assist with the activities. There is no room for local initiatives and decision-making is highly centralized.



Figure 4.2. (Photo) PKK village program in Tuhaha.

4.4.2 TAKESRA

The TAKESRA groups are small savings groups (± 10 people) that particularly target low income women. It is an initiative of the National Coordinating Agency for Family Planning (BKKBN) and is usually carried out by the village head. He draws up a list of participants and sends it to the district office in Masohi for approval. Each TAKESRA has a chair, a secretary and a treasurer. The members have to save a weekly amount of Rp250 (Toisapu) to Rp1,000 (Nolloth). The money is put in a bank until a certain amount is reached. Then the group can get an additional government loan (Rp200,000 to Rp2 million in a later phase¹) to start small businesses (chicken breeding, restaurant, etc.). Decisions are made in membership meetings.

4.4.3 ARISAN

ARISAN is an informal savings program initiated by villagers from the lower social classes. It started in the 1990s as a government program but now many groups function separately. In Nolloth, for instance, the ARISAN group claimed to be independent and informal. They feel disconnected from the mainstream and do not expect the government to take care of their problems. Therefore they use a revolving fund system to provide the members with some capital. Everyday, they deposit Rp1,000, and on Sundays, one of the members is given the total of Rp49,000 to use for small-scale enterprises such as sago processing or bread baking.

4.4.4 Social Service Department groups

The Social Service Department of the government has set up various economic development groups including IDT and KEP. Farmers, fishers and other small business people may be assisted through the IDT, which is a national program aimed at alleviating poverty. Each qualifying village receives a Rp20 million loan from the government to subsidize small-scale development. The money is divided among four groups. They again divide it amongst their

¹ The rate of the Rupiah to the US dollar has changed as a result of the economic crisis in Indonesia. Rates used in this report are: USD1 to Rp2,300 in 1996; USD1 to Rp2,500 in the first half of 1997; USD1 to Rp2,800 over 1997; and USD1 to Rp10,000 in early 1998. For a complete overview see Appendix 8.

members. Each member has to pay back the amount borrowed to the government or to the group's treasury within a year. In some villages, the money is then made available to another group, while in others (e.g., Toisapu), the money is put in the bank to serve as capital for larger enterprises. Decisions are made in membership meetings.

The objective of the KEP is to improve the productivity of fishermen. In Hulaliu, for example, a Rp3 million fund was divided amongst the members to buy boats or fishing gears. Some was saved for operating capital. There are three officials and seven members who each received Rp200,000 and training. Participants are the poor fishermen who cannot afford fishing gears. The government chooses the members. The fishermen can decide among themselves how to spend their money. Many people have not as yet participated in the fund. This was a pilot program in 1997 with the prospect of involving more groups over the years to come.

Individual villages may have additional programs. For instance, Seri has an organization called Young Rock (*Karang Taruna*) that was initiated by the *dusun* head as part of a program of the Department of Social Services. Members, both Moslems and Christians, are involved in a local program that includes sports, voluntary service, and apprenticeships in fisheries, agriculture and animal husbandry. The group reports back to the provincial Social Service office through the head of the *dusun*, village and district levels.

4.5 KUD

KUD stands for *Kooperasi Unit Desa* or village cooperative (see Figure 4.3). Village KUDs are established according to a uniform structure designed by an Ambonese branch in the 1970s. The KUD operates independently from the village government, but is under the supervision of a head office in Ambon, which in turn operates below a national government department. There are three types of KUD depending on their activities and level of autonomy, ranging from those that are externally controlled to some that are totally self-supporting. The KUD's executive consists of a manager, a chair, a vice-chair, one or two secretaries and a treasurer.



Figure 4.3. (Photo) KUD at Haruku.

Although separate from the local government, the KUD is influenced by village politics. The general objective of the KUD is to improve the prosperity of its members and the village. The main trade products of many KUDs are cloves, and to a lesser extent, nutmegs. Other enterprises such as the operation of speedboats, minibuses and small shops are also often in the hands of the KUD. The shops are open to all villagers and provide primary goods, such as rice, sugar and cooking oil, at reduced prices. In some villages, the KUD takes care of the billing for the Electricity Company or is involved in gasoline retail. For its members, the KUD has a savings and credit system and may provide access to machinery such as coconut grinders. The income derived from the activities is used for salaries, production costs, village development, and the development of the KUD itself.

Occasionally, the KUD is involved in fisheries-related activities. In Nolloth, for example, the KUD plays an important role in organizing top shell harvests and selling the yields. In Hutumuri, the KUD is developing a fisheries unit.

Membership in the KUD is high compared to that of other village organizations. In Nolloth, for instance, there are 500 members. To become a member, one has to be an Indonesian national, have an ID card, and pay a monthly fee of Rp500-Rp1,000. There is also an initial membership fee of Rp5,000-Rp25,000 (depending on the village). After deducting costs from revenues, the members get an annual (percentage) share of the profit depending on their activities. For instance, the earnings are higher for people who shop consistently at the KUD store. An annual meeting is held in December. Members are recruited through general announcements. KUD officials are selected and elected every five years. There are two possible electoral systems. In the direct system, the members choose and elect their officials. In the indirect system, the members compile a list of candidates from which the head office in Ambon makes the selection.

Ideas from members can be dropped into a suggestion box or put forth during the annual meeting. Suggestions sent through the suggestion box are discussed in monthly executive meetings. If a suggestion supports the annual program as decided in the annual meeting and the field conditions are right, the suggestion will be accepted and implemented directly. Ideas deemed to be important for the future development of enterprises will be put forward in the next annual meeting. Members thus have a voice and the structure appears more democratic and decentralized than most village organizations.

4.6 Church Organizations

4.6.1 Church hierarchy

Protestant Christianity was introduced to Maluku during the Dutch colonial time. The role of the Protestant Church of Maluku (GPM) is still prominent. Executives who control programs and funding form the *Synod* in Ambon. Below this is the *Klasis* office in Saparua, which covers the Lease Islands. The *Klasis* instructs at the congregation level and they communicate with the local church branches. Communication from one level to the other is through meetings. To obtain funding, the village church submits a yearly program proposal to the *Synod*. The time required to get a proposal approved is approximately one year.

In predominantly Christian villages, the GPM has a strong influence on the people. The relationship between the church and village government is often very tight. Announcements on village activities, e.g., cleaning up the village, fence building etc., are made through the church by church elders.

The church generally has representatives in the LMD and can thus influence decision-making. In some cases, the church motivates people to support government economic programs. The GPM also may have its own economic and social programs, as in Hutumuri. There are church groups for men, women and youths (see below).

4.6.2 *Pelwata*

The *Pelwata* is the church organization for women. The aim is to serve and motivate Christian women. The central committee consists of a chair (always the wife of the church minister), a vice-chair, a secretary and a treasurer. There are sections, led by chairladies, dealing with issues of faith, communications, fundraising, economic development, and the household. Besides drafting programs, the central committee presents implementation proposals and financial reports that are taken back to members in each section to be studied. The members can express feedback during a subsequent service.

Membership varies, but rarely covers more than 30% of the village women. Social pressure to join the meetings is high. Time constraints, lack of child care and irrelevance of the activities to the women's daily lives, however, dampen the enthusiasm of women to join. Women that do join generally prefer the bible services. Programs may be passed down from the *Synod* or formulated by the local members. The local programs include: 1) spiritual activities, e.g., bible services and discussions, 2) pastoral services, e.g., visiting the sick and elderly, 3) family-based economic activities and skills training, e.g., vegetable gardens, and 4) sports. The external programs, formulated at the *Synod* level by the women's section, are sent to the *Klasis* and forwarded to the local groups for discussion by selected representatives of each section. In this meeting, ideas from members may be included in the final programs or the whole program can be rejected if it is unsuitable. For example, *Pelwata* in Seri did not apply a program named "comparative study" in which women were to visit groups in other churches. In other villages, a program may be accepted but in most cases, it is only partly realized. The local officials have an obligation to present a yearly report to the *Klasis* through a *Pelwata* conference.

4.6.3 *Youth wing*

The youth wing (*Angkatan Muda*) has a chair, and a number of deputies, secretaries, and treasurers, depending on the size of the group. The average number of officials is approximately 12 men and women. The aim is to train youth in useful skills, build good attitudes, and strengthen their faith in God. It is hoped that members who have been trained will become leaders in other social groups in the future. Membership is usually around a third of eligible youngsters in the village. Lack of time, marriage, and shyness after a long period of absence, or a feeling of inferiority (low education), are commonly expressed reasons for the inactivity of potential members.

As with the women's groups, youth activity programs may be developed locally or externally. Activities include weekly spiritual services and social works, e.g., cleaning-up of public facilities (in collaboration with the congregation and village government), visits to groups in other villages, sports, economic activities (growing animals and vegetables), and a pastoral program to recruit new members. In Seri, the economic program is done in conjunction with a group of new university graduates. The youth wing is functionally independent of the local church but is accountable to other levels of the youth organization in the church hierarchy (i.e., sub-branch, branch, region, province). In addition, the sub-branch has to report its activities to its members in an annual general meeting.

At the annual meeting, the local program is drafted. The meeting is attended by members and other invitees, e.g., the minister, government officials, village elders, etc. The executive presents a proposal and the members can express their ideas. As long as the ideas are constructive, they will be considered further. If not, the idea will be rejected and the member who proposes it will be told the reason. When members do not agree with a proposed program from the higher level, it is discussed in an open forum without the presence of the section heads responsible for that program. Through this mechanism, it is assumed that members can freely discuss any program. When a decision cannot be reached by consensus, a vote is conducted.

Every two years, the local executive has to report to the members regarding the implementation of the programs and use of funds. When members reject a report, the board has to defend itself. In theory, the board or sections that are responsible for a program in question may have to resign in order to restore the members' confidence in the organization. This, however, has never occurred.

4.6.4 *Pelpri*

No information is available on this men's group of the church.

4.7 Adat Organizations

The remaining *adat* organization found in some villages is the *kewang*, which enforces *sasi* regulations. In only one case (Haruku) has a *kewang* spun off a youth organization (mini-*kewang*). The *kewang* structure and function are discussed together with the description of the *sasi* institution of individual villages (see Chapters 9-14).

In resource management under *adat sasi*, there is close collaboration among the *Tiga Tungku* i.e., *adat* leaders, village government and religious leaders.

4.8 Social Organizations

4.8.1 *Muhabet*

The *Muhabet* groups in the villages coordinate communal action for house construction and funerals². For instance, on every last Friday of the month, the members of the *Muhabet* in Hutumuri help to build or repair five houses. The house owners provide tea for the workers but construction materials are provided by the other members of the group. The amount of money needed is determined beforehand and the costs are divided evenly. Members who do not work are fined Rp1,000-Rp2,500. Any member who is consistently delinquent is excluded from the organization.

During a funeral ceremony, the church elders perform the ritual, the church organizations design the service and the *Muhabet* groups take care of the rest. Several groups in the village take turns (on a monthly basis), and are responsible, for instance, for arranging the coffin and grave, transportation to the burial site, food and beverages at the ceremony etc. Each group has a coordinator and four workers. Work schedules are drawn up during the membership meetings. Through this rotation system, the *Muhabet* group is always ready to act.

² Holleman (1923) describes a similar custom of mutual help in the construction of houses and processing of sago called Masohi.

4.8.2 Women's meetings

Apart from the above-mentioned organizations, there are no informal meetings where women can discuss problems and/or other village-related issues. The reason is, according to our informants in Tuhaha, that there is very little trust amongst women. Women are afraid of gossip and informal meetings would be an opportunity for women to talk about other women in the village. As a consequence, the women are family oriented. They would not ask their neighbor to take care of their child for a while, or discuss family issues like alcohol abuse. Problems are discussed and, if possible, resolved within the family. As a result, women are not united outside the family structure and are not critically aware of political issues in the village.

4.9 Relative Distribution and Activity of Village Organizations

Among villages, there are some differences in terms of presence and activity of village organizations (Table 4.1). These differences shed some light on the characteristics of successful local organizations. Village organizations depend largely on the stability of the parent institution. The Protestant church of Maluku, for example, is a stable institution because it is independent from the village government. Continuity in leadership keeps the *Pelwata* and other church organizations active. In contrast, political instability affects the functioning of government-related organizations since these are often instigated, supervised or ruled by the village government or its kin. The PKK, for example, is always chaired by the wife of the village head, and if his position is under stress (Haruku, Hulaliu, Hutumuri) or if the wife is absent (Nolloth), the PKK suffers. Tuhaha has a more active PKK and this is related to the fact that it has more support from the common village women because they get direct economic benefits.

Economic rewards are an important factor for the success of organizations set up to carry out government programs. Savings programs (ARISAN) are widely implemented, as are the direct aid groups (IDT and KEP). Another village organization that provides economic benefits and also is at an arm's length from the village government is the village cooperative or KUD. Where

Table 4.1. Presence of village organizations (and activity) in case study villages (1997-1998). *=only four traditional representatives in Urimesing village, **=for government officials only, not for common villagers, *=informally organized, ****=including women's trade group.**

	Nolloth	Haruku	Tuhaha	Hulaliu	Seri	Hutumuri
LMD	active	partly functional	partly functional	active	active	not functional
Saniri Negeri	included	partly included	partly included	partly included	partly included*	not included
Kewang	present	present	no	to be established (1997)	no	no
PKK	not active	not active	active	not active	active ****	not active
TAKESRA	active	active	active	active	active	active
IDT	active (4)	active (5)	active (2)	active (4)	no	active (3)
KEP	present	no	no	present	present	present
Pelwata	active	active	active	active	active	active
Youth wing	active	present	present	active	active	active
KUD	active	active	no	active	no	active
ARISAN	active	active**	active***	active	active	not active
Muhabet	active	active	active	active	active	active
Others	<i>tolong-menolong</i>	Learisa / mini- kewang	no	health centre / non-active Young Rock / farming group	Young Rock / women's trade group farming group	no

it exists, it has active membership. In Seri, the role that the KUD plays in trading of local products is filled by independent traders and the PKK women's trade group.

4.10 Conclusions

As a result of Indonesia's attempt to build a strong national state, the social and political structures in the villages of central Maluku are a reflection of centralized and hierarchical nationally-defined structures. This is true for both government and church-sponsored organizations. Organizations such as environmental groups, which are outside of the government and church hierarchies, are rare. Indonesian citizens are trained to identify with the state rather than with local groups. This is accomplished through promotion of the national ideology (*Pancasila*) in schools as well as through various compulsory service and training programs. As a result, the organizational structures in the villages are largely identical.

Decision-making processes involving higher government levels are not open for local contribution. Within government organizations, decision-making processes are not participatory. The leaders in the village and in the organizations have little or no confidence in the abilities of common villagers. The organizations do not function in the absence of a leader and they depend on the government for support for their programs.

The Christian Protestant church, like the government, has local organizations nested in a centralized, hierarchical structure. We have less information about the role of Muslim leaders in village life because our case study villages were all Christian. Muslim leaders appear to play only a minor role in local resource management institutions.

Kewang, a traditional *adat* organization, plays a central role in village resource management. This organization is only present in villages with an active *sasi* institution.

Besides the government, *adat* and church organizations, most villages have a village cooperative or KUD that may be a player in local politics. The KUD is also part of a national hierarchy and is overseen by a government department.

The spread and functionality of village organizations is dependent on 1) economic benefits, 2) broad support by the villagers, 3) stable leadership, and 4) the ability to stay at arm's length from political turmoil. Organizations that have clear economic motives and direct benefits are small but active, and supported by the members. Church organizations are most stable but, in most cases, their spiritual aim is more important than economic benefits, so membership is limited. Government groups are often dominated by the upper classes and are most vulnerable to political instability. Their function is highly dependent on the presence of a legitimate, strong village leader. An overview of the presence and functionality of the various village organizations is presented in Table 4.1.

In trying to design local resource management institutions and organizations, therefore, certain contextual realities must be kept in mind. Village government leaders are used to taking orders from above rather than initiating local actions independently. Any move to establish local management institutions and organizations must be seen to be supported by higher government levels. Village leaders will need assistance and incentives to be proactive and creative in developing suitable management arrangements. The organization or institution must be meaningful to ordinary villagers, provide economic benefits (preferably direct), and for stability, should be linked to the *Tiga Tungku* power structure but, at the same time, be buffered from direct impacts of political strife and changing village leadership.

Chapter 5

The Fisheries and Fish Markets of Central Maluku

5.1 Profile of Fishers in Villages of Central Maluku

The profile of 508 fishers interviewed in central Maluku in 1997 shows them to be predominantly 45-52 years old (average 47 years, see Table 5.1). Most have only elementary education and only 11% have finished high school or proceeded to higher education. Most own land and live in semi-permanent or permanent housing made either partly or entirely of cement. About three-quarters have their own fishing boats, but very few own motors. This is very similar to the demography of the Indonesian fishery in general. Almost a third of the fishers we surveyed do not own their own gears but fish for someone else. Of those who have gears, a third have only hand lines while the rest use nets (gill net, seine, etc.) and traps. A very small proportion own or have shares in commercial gears such as lift nets (*bagans*; see Figure 5.1) or FADs (*rumpons*).

From the data, we see that the central Maluku fishery can be divided into two basic groups: artisanal and commercial. A harvester who fishes from the shore or from a small *perahu* without a motor and uses a hand line, spear, trap or simple net, is considered artisanal. Operators of large pole and line vessels, seiners using deep-water fish aggregating devices (FADs) and floating lift nets, together with their crew, are clearly in the commercial sector. In the middle are the gill netters and seiners using small, motorized craft: the small-scale commercial fishers. The majority of central Maluku fishers falls into the artisanal category and are, in fact, fisher-farmers.

According to the Fisheries Agency (*Dinas Perikanan*) statistics, in 1997, fisher-farmers earned an average of Rp1,124,000 per year (\pm USD450, early 1997 exchange rate). Our results suggest that their livelihoods are currently in danger. Overall, fishers interviewed considered fish catches and environmental health to be declining. We found that the oldest fishers, especially those over 60 years of age, report a dramatic decline in marine environmental health over the past 15 years (i.e., -41%) and a severe drop in fish catches (-33%). The younger fishers also perceive serious declines: 27-31% in environmental health and 25-27% in catches compared to 15 years ago.



Figure 5.1. (Photo) Lift net in Tuhaha Bay, with a local outrigger boat (*perahu*) in the foreground.

The majority of rural coastal villages are either predominantly Christian or predominantly Muslim. In general, fish harvesters belong to the dominant faith. However, in seven cases (Soahuku, Tiow, Eri, Seilale, Hutumuri, Seri, Tuhaha), we found a substantial proportion of Muslim fishers at work in Christian villages. There is a significant difference between younger and older fishers in terms of religion (ANOVA, $p=0.005$). Whereas only one-third of fishers over 45 are Muslims, almost half of the younger fishers are so. This reflects the demographic shift in Maluku. A predominantly Christian province since the Dutch colonial period, Maluku has in the past decades become increasingly mixed, to the point where Muslims now outnumber Christians.

Socio-economic data were collected from a sub-sample of 178 heads of fishing families in the six case study villages (Appendix 3). For data from these villages, the analysis of variance shows there is a significant difference ($p<0.01$) in the perceptions of Muslims and Christians in terms of their access to, or role in, the fisheries decision-making processes. Most Muslims rate their level of participation as low compared to the Christians. Muslims are also significantly more likely to want their children to enter the fishery (ANOVA, $p=0.07$) and are much less likely to consider *sasi* to be an important or useful institution (ANOVA, $p=0.002$). None of the Muslim fishers are related to any *soa besar*, the traditional ruling elite in their villages.

Fishing families derive, on average, two-thirds of their income from fishing (Table 5.1). The majority (80%) are able to cover daily expenses from fishing alone. On average, 22% of the fish caught are eaten at home. Fishers who do not own their own gears but act as crew for a commercial enterprise consume on average only 14% of their catch, whereas hand liners consume the largest proportion: 27%. The percentage of catch consumed is not correlated with economic status.

Table 5.1. Profile of fishers sampled in central Maluku in 1997-98.

Demography	(n=508)	Economic status (n=508)	Fishing activities (n=178)		
Age:		Boat:	Target species:		
Average	47	None	16%	Reef	41%
Minimum	20	<i>Perahu</i> (canoe)	72%	Pelagic	20%
Maximum	85	Boat + motor	6%	Both	39%
Sex:		Gear:	% income from fishing:		
Male	88%	None	30%	Average	68%
Female	12%	Hand line / spear	21%	Minimum	5%
Religion:		Fish trap / hand net	0.4%	Maximum	100%
Muslim	42%	Larger net	38%	% fish catch eaten:	
Christian	58%	Lift net / FAD	3.9%	Average	22%
Education:		House:		Minimum	0%
None	1.4%	<i>Gaba</i> + thatch roof	9%	Maximum	100%
Elementary level	71%	Boards + thatch	16%		
Jr. high school	15%	Cement + boards	15%		
Sr. high school	10%	Full cement + zinc roof	59%		
Diploma	0.8%	Land:			
University	0.2%	Land owner	81%		
		Not land owner	19%		

The sub-sample of 178 fishers was divided into age classes (<45, 45-60, 60>) to investigate age-related differences. We found that those under the age of 45 have a diverse array of primary and secondary sources of income, whereas those over 60 are more exclusively fisher-farmers. Very few fishers are members of organized fisheries groups, and when they are, this is usually as part of a government-sponsored fisheries development program. Older fishers

are more likely than the younger ones to belong to a village level, church or government organization. There is no grassroot fishers' union in Maluku. The government-sponsored HNSI (All Indonesia Fishermen's Organization) claims to represent artisanal and small-scale harvesters as well as large commercial enterprises but in fact, its presence and level of credibility at the village level are very low.

Changing trends in the fishery can be seen from the fact that whereas 19% of the youngest fishers said they fished in collaboration with outsiders, only 11% of the mid-age group and none of the elders fished with outsiders. Target species also change with the generations, with over half of the youngest fishers being exclusively dependent on pelagic fisheries, while a third of the elders fish exclusively on inshore reefs. Younger fishers also have a more positive perception of the role of women in society. Twenty percent believe that women are always involved in community decision-making, whereas only two out of 33 fishers over 60 share this perception.

The middle age group (45-60 years) is significantly (ANOVA, $p=0.002$) more likely to want change in fisheries rules. Although most of them say they enjoy fishing, men in this age group are also the most likely to change their employment provided they could find something more profitable or less physically demanding. They are only half as likely to recommend the fishery as a career for their children, compared to older or younger fishers.

There are also significant differences (chi square test, $p=0.03$) among the three age classes in terms of their perception of the role of the community in fisheries management. More than half of the people in every age group think that the government has most or all responsibility for fisheries management. However, of the remainder, the fishers under 45 years of age are much more likely to consider communities as having management responsibility. Younger fishers do not appear to be always thinking of *sasi* as the institution of their choice for local level management. Overall, the majority of fishers (87%) of all ages and in every village consider *sasi* to be an important or useful institution. But, whereas the oldest fishers are unanimous in this opinion, most of those who rate *sasi* as not very useful or not important are under 45 years old (Figure 5.2).

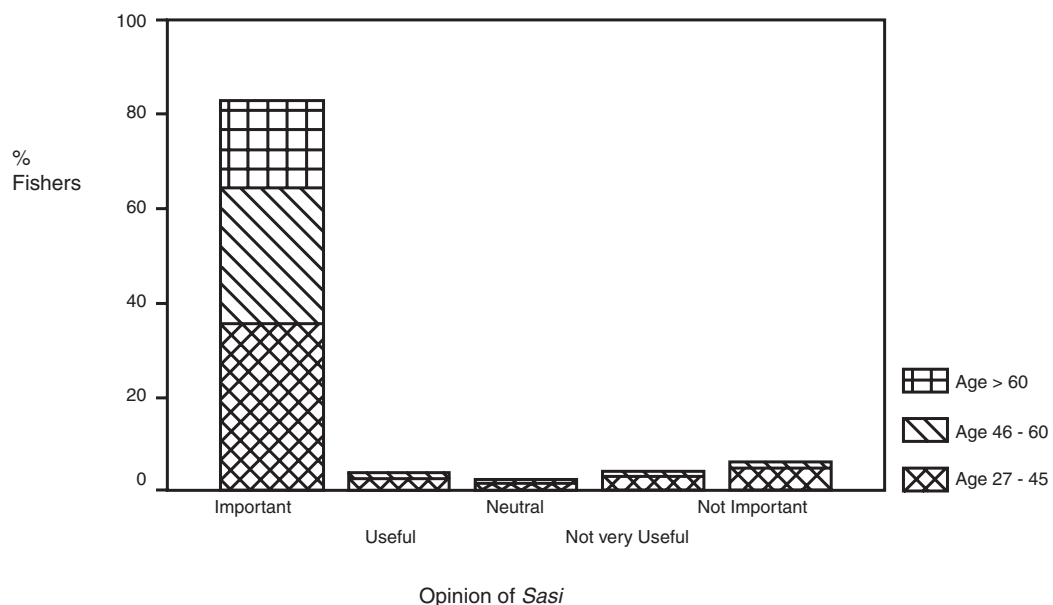


Figure 5.2. Opinion of *sasi* provided by fishers of three different age groups (<46, 46-60 and 60>).

5.2 Cost of Entry, Income Levels and Profit Sharing

5.2.1 Artisanal sector

The cost of entry to the fishery largely depends on gear type. The cheapest option is a hand line or home-made spear costing less than Rp10,000 (USD4, early1997 exchange rate). To use this gear, a fisher does not even need a boat, although most do have a dugout outrigger canoe (*perahu*) costing Rp100,000-Rp150,000 (USD40-USD60). Home-made fish traps (*bubu*) woven from local materials are the next least expensive option. With these simple gears, fishers may catch 2-60 fish a day, depending on the fishing area, season and phase of the moon. Typical incomes (1997) range from Rp2,000-Rp50,000 per fishing trip.

5.2.2 Small-scale commercial

Nylon nets are more costly and to fish with larger gears, a fisher needs to invest in a long boat (Rp4-5 million) and outboard motor (Rp12 million or more, approximately USD4,800) and take on a crew. For the smaller boats in this sector, a crew may be made up of fewer than 10 men, whereas the larger boats carry 20-40 crew. A 70m *giob* net, one of the most commonly used in the small-scale fishery, cost Rp263,000 in 1997. In general, the cost of all sorts of nylon nets increased by 100-200% in 1998³. Nets must be replaced or repaired regularly, sometimes after only a few months. Small-scale net fishers bring in from 2-4 (small boat) or 2-20 (larger boat) baskets of fish per trip with perhaps 50-200 fish per basket depending on the species. This catch is shared among the boat and gear owners and the crew (see below). The smallest commercial net/boat owners estimated their average gross incomes to be in the range of Rp20,000-Rp50,000 per fishing trip (USD8-USD20, early 1997 rate) with expenses ranging up to Rp10,000. With larger boats, owners may make Rp0.5-1 million and expend up to Rp100,000 per trip, depending on the distance to the fishing ground.

Some artisanal fishers have been upgraded to the small-scale sector through government programs. Recently, the fishing companies have also become involved. For instance, P. T. Sumber Aneka Tata Bahari (a fish processing company) has provided loans to fishers in three villages for the purchase of motorized small boats. To repay the loans, fishers give the company half their catch.

In each village, there are traditional arrangements for sharing catches on small-scale boats employing crew. In a typical example from Tuhaha, the catch from a fishing trip is divided into nine shares as follows: three shares for the captain (i.e., the boat owner), two shares for the net owner (also usually the boat owner), two shares for the helpers who fish and two shares for the boat drivers. The boat owner pays running costs i.e., gas and, if there is no fish, food for the crew. For an afternoon net haul in near shore waters, the catch is split in two: half for the net owner, half for the crew (20-40 men).

For night fishing, the catch may be split into three portions: one share for the lamp tenders, one for the net owner and one-third to be divided among the net crew (20-40 men). Before making this division, everyone gets to take some fish for food. Usually five baskets are set aside as food fish. The rest of the catch is then sold and the money divided up according to the share agreement. In some villages, the crew give part of their catch (fish or money) to the minister and/or the church and also some to the *kepala desa*.

³In 1998, the volatile Rupiah ranged between 5,400-14,800 per USD.

5.2.3 Fish aggregating devices (rumpons)

Of the large gears, FADs require the least capital and those deployed in shallow waters are most likely to be locally owned. In 1997-98, it cost Rp1-2 million to construct a FAD compared to Rp0.5-1 million in previous years. The major cost involved is for the anchor and rope. FAD owners often own a number of FADs as well as one or more fishing boats. Boats fishing around a FAD may be large seiners but may also be small artisanal *perahus*. FAD owners pay several types of taxes: a FAD permit every six months (Rp7,500), a license to fish in a particular area (Rp89,000 per year) and a harbor fee for the fishing boat (e.g., in Masohi, Rp15,000 every three months). In addition there are marketing fees.

5.2.4 Seiners

Commercial purse seine operators face the costs of buying and maintaining a boat and motor as well as a purse seine (*jaring bobo*). If they sell their catch to *Aneka Tata Bahari*, the processor in Tulehu, ice is provided free. In some cases, the boat owners also own the FADs where their nets are deployed (see above). A boat cost about Rp17 million in 1998, while two 40 HP motors cost another Rp23 million (up from Rp13 million in 1997). Between 1997 and 1998, the cost of a purse seine rose 100% to Rp14 million. A full set of a boat and gears bought second-hand could cost a total of Rp40 million. Seiners also have to pay for permits for their gears, harborage and fishing area. There were common complaints from boat owners that as of 1997, they could no longer get fishing area permits from the province for boats with motors over 90 HP. Now they must apply to Jakarta, which is more difficult and costly. One seiner operator estimated that his boat generated Rp36 million in gross income over two years, of which Rp27 million accrued to him as boat owner (Sam Kalahatu, Seri, *pers. comm.* 1998).

Each night, the seiner will operate next to a FAD where fish are attracted using lamps. In many cases, the boat owners also own up to four FADs for each boat. The watchman on each FAD sets up a sign if fish have aggregated. Any boat can then come to that FAD to fish. Except when there is a special agreement with a fish trader to provide night transportation, fishing goes on in the early morning hours so that the catch can be made at daybreak when transportation is readily available. This way, the fish reach the market in the freshest condition. A record of the catch goes into the books of the boat owner, which can be freely inspected by the crew. The fish caught are divided into two portions. The larger portion will be sold and the smaller portion goes directly to the crew (food fish).

Before 1992, seiner catches were split 60:40 with 60% going to the boat owner and 40% to the crew. However, this system was changed. Now, the crew gets 25-30% of the value of fish sold, whereas the owner of the boat and FAD retain the other 70-75%. If the FAD owner is a different person than the boat owner, the owner's portion is split between them after they cover their expenses i.e., daily outlay for oil, gas, food etc., taxes and maintenance. The crew's portion is divided into shares according to the number of crew. Where there are 20 crewmen, for example, the money will be divided into 24 shares: one for each of the regular crew, two for the captain and two for the man operating the FAD and lamps. If the boat is owned by a processing company, two additional shares may be allocated to a bookkeeper who records the names of the crew on each trip and calculates and records all expenses and share values. Other men with particular skills may also merit an extra share.

On some boats, the crew get their share of the money as soon as the fish are sold. On other boats, earnings are paid out at six-monthly intervals. As the crewmembers may change on each trip, this requires good record-keeping and a large degree of trust. Crew with urgent needs can ask for advance pay, for instance, at Christmas and New Year. In one case we recorded, each crewmember received only Rp240,000 from six months work (Seri seine fishery, 1997). If a boat catches more than a tonne in one trip, there may be a daily bonus of Rp50,000 divided among the crew. There is no annual bonus for the crew, but there may be for the captain. With incomes so marginal and directly dependent on catch rates, there is clearly a strong incentive for fishers to work hard to maximize the catch.

The *ikan makan* (food fish), usually 1-4 baskets of fish depending on the season, are divided equally among the crew. Our informants estimated that food fish for one crew member could be sold for Rp15,000-Rp60,000 (USD6-USD24, early 1997 rate), depending on the season. This is the daily income to support the fisher's family. As well as the *ikan makan*, there are also *ikan tacucu*. These are the fish that are not enclosed by the purse seine or that jump out, and may be caught and kept by any crew member.

5.2.5 Pole and line

Pole and line boat owners face capital costs and fees similar to those of seiner operators, but they must also pay for bait. Baitfish suppliers bill boat owners on a weekly basis. The cost in 1997 was Rp2,000 (USD0.8) per pail as well as 10% of the catch. The pole and line boats often find it difficult to get sufficient baitfish. Boats operating out of Nolloth in 1997 were reputed to catch over 100 tonnes of skipjack per month, with catches of 3-4 tonnes per day not being unusual. Export quality fish sold for Rp2400 per kg in February 1998.

The pole and line boats typically go out twice a week on three-day trips, unloading fish at the Tulehu or Masohi cold storage facilities. Fishing takes place throughout central and northern Maluku. The profit (i.e., after paying for bait etc.) obtained from the catch is divided into two portions: 70% for the boat owner and 30% for the captain and crew. The crew's share is divided as follows: two shares each to the captain, bait throwers and motor tenders and one share each for the other crew. Additional shares may be set aside for the village government, church and charities in the home port.

There are often extra incentives to catch as many fish as possible. One respondent explained a current system wherein pole and line fishers in 1997 earned a bonus of Rp50,000 a tonne if the boat's daily catch was above three tonnes. Each year, the crewmen also receive a Christmas bonus of cookies, butter, milk, sugar and flour. If the boat harvests over 200 tonnes in the year, the captain gets a bonus of Rp2 million, which he shares with his best workers and helpers.

5.2.6 Lift nets (*bagans*)

Lift nets consist of an anchored floating platform equipped with lamps and fine mesh lift nets (see Figure 5.1). The capital investment in 1997 was in the order of Rp3.5 million for a small lift net, sized 11 m x 11 m. Larger commercial lift nets, which cost up to Rp5 million prior to the currency collapse, cost Rp10 million in 1998 (Muhammad Saleh, *pers. comm.* 1998). According to one owner in Tuhaha, gross income from his share of the catch on one lift net ranges from Rp100,000-Rp1.5 million per month, while costs (kerosene, lampwicks, matches, maintenance etc.) usually total Rp400,000 a month.

Pelagic fish are attracted to the lift net lights at night. Catches are shared between the owner and the lift net crew and helpers (perhaps 10-20 persons in total depending on the size of the lift net). One-third or one-half goes to the lift net owner; the rest is divided among the lamp crew and the net crew. The net crew portion is divided evenly among the workers (sometimes including the owner). The owner keeps everyone's money and hands it out periodically. Therefore, just as in the seiner fishery, crew income from the lift net fishery is proportional to catch rate and this promotes intensive effort.

Lift nets and to a lesser extent, seiners, are the primary sources of baitfish for the pole and line boats. Usually, baitfish are sold by the bucket for a fixed price (Rp2,000 in 1997) plus 10% of the catch realized from that bait. The price of baitfish sold to pole and line vessels by lift net operators rose during the study period, from Rp2,000-Rp3,500 per bucket. The relationship between suppliers and buyers is based on trust that the pole and line captain will report the catch accurately and the boat owner will remit the payment (in cash or fish) to the lift net or seine owner. Cash payments may be made weekly or monthly. In peak fishing seasons, when pole and line boats are catching tonnes of skipjack everyday, payments to the bait fishers can be substantial. The general shortage of baitfish in certain seasons no doubt helps to keep the pole and line operators honest, as they dare not risk losing their bait suppliers. The one known exception to the above system is the company called Usaha Mina, which pays a flat rate of Rp5,000 per bucket for baitfish without handing over any percentage of the catch.

5.3 Market Systems for Artisanal, Small-Scale and Commercial Fisheries

5.3.1 Fish landing sites and flow to markets in the study area

Fishers in the study area sell their catch in either their village marketplace or in a regional center. Officially recorded landings indicate that about 40% of fish caught goes to markets outside Maluku. However, because of trans-shipment and illegal fishing, the actual percentage is higher. Caught fish that are destined for regional, national or international markets mostly flow through the following centers:

- Tulehu on Ambon Island, the site of a fish processing and export factory, which receives fish from the entire region.
- Toisapu on Ambon Island, close to several other fish processing factories.
- Seri and Eri on Ambon Island, where fish are landed from the rich pelagic purse seine and lift net fishery off southeastern Ambon Island.
- Masohi, the largest town on Seram Island, which receives fish caught around Seram as well as from artisanal and commercial boats operating around the Lease Islands.
- Amahai on Seram, close to Masohi, where there is a processing factory.
- Ambon city, which is the provincial capital and main regional marketplace and is fed by Tulehu, Seri, and other smaller ports as well as Ambon Harbor landings.

Other smaller landing sites, such as Hitu on Ambon's north shore and Saparua town on Saparua Island, generally service local and other village markets. Artisanal and small-scale fishers may use either local or regional landing sites depending on the volume of fish caught, access to affordable transportation and market price. Commercial operators offloading larger volumes of fish are more likely to be attached to a particular landing site and market.

5.3.2 Fish market structure

The process of selling fish may involve one or more of a number of participants at different levels of the market chain, i.e.,

- Fishers or commercial boat crew.
- Retailers / vendors (*papalele* or *jibu-jibu*).
- Fish brokers (*tuan lelang* or *borok*).
- Wholesalers.
- Fish export and processing companies.

Artisanal fishers and boat crew who receive part of their pay in the form of fish may sell their fish directly to the consumer. Fishers act independently; there are no existing organizations to assist with marketing, management or distribution of information. Therefore, their position in the marketplace is weak and they have no control over the price they receive for their catch.

In most cases, fish are sold through an intermediary. For small-scale and artisanal fishers, this is most likely to be a *papalele* (in Christian villages) or *jibu-jibu* (Muslim). These retailers are almost always female (except for those in the market in the city of Ambon). Often they are the wives of artisanal fishers or boat crew or, if not, they are full-time fish traders. In smaller ports, the women gather on the shore early in the morning to meet incoming fishing boats and compete for baskets of fish being landed. Each retailer generally handles one or a few particular types of fish. As a group, these women are also unorganized, with each one acting as an independent in competition with the rest. With the exception of family ties, there are no contractual or other agreements between the retailers and fishers. They do not, for example, advance loans to artisanal fishers; all transactions are cash.

Over the past ten years, the numbers of these female fish vendors have increased rapidly. This is particularly true in Seri, where the pelagic fishery has also undergone rapid expansion and access to the Ambon market has improved due to newly developed roads.

Each retailer usually has the ability to market 1-2 *loyang* daily. A *loyang* is equivalent to two 10 kg baskets of fish. Fish prices vary according to the species, size of the fish, their freshness and the season (i.e., whether fish are scarce or abundant). Each retailer tries to buy the amount of fish she is sure of being able to sell immediately. They are most successful if they sell early in the morning, and especially when there is a shortage of food in the market. There are two selling styles: from market stalls and door-to-door. It is the latter group which is responsible for the majority of fish sales to both city and village consumers. The bulk of the fish trade is in pelagic species. Reef fish are hard to find in the central markets. Other species traded include squid, cuttlefish and octopus.

When a fish vendor fails to sell all her fresh fish in the morning, the remainder may be taken home and smoked, then taken door-to-door for sale in the afternoon. When fish are abundant, a vendor from a small village may smoke several hundreds in order to have enough to make a trip to a larger market such as Masohi or Ambon. They will also make a special run to the city to sell large, highly priced fish such as tuna.

Commercial fishers (seiners, lift nets) may sell part or all of their catch to pole and line fishers as bait. If they choose to sell at the Ambon market, they usually send their catch through a broker / auctioneer called the *tuan lelang* or *borok*. These relationships are not defined by written contract but are based on mutual trust. Fish brokers are usually male, although there are several female fish brokers working in Tulehu. At the markets in Masohi and Saparua town,

there are no fish brokers. In Ambon, all 23 of the fish brokers and their helpers are male, ethnic Butonese but in smaller ports, the traders may be Ambonese. Each *borok* has a set of clients (a “fishing family”) from whom he or she receives fish. In a typical day, he may handle 10-20 or up to 40-50 baskets of fish. The broker is responsible for selling all fish received each day, for whatever price the market will bear. For this service, he receives 10% of the net sale price (i.e., after subtracting expenses for transportation, market taxes etc.). In 1997, one *borok* estimated that he cleared Rp700,000-Rp1 million per month (La Jafar Lim, Ambon, *pers. comm.* 1998). Prices are set according to the experience of the broker, the season and the abundance of fish. A 10 kg basket of *momar*, which sold for as little as Rp2,000 in the early 1980s, fetched between Rp40,000-Rp75,000 in 1997, depending on the season.

Fish brokers in Ambon handle fish that come in from Hutumuri, Seri, Tulehu, Hitu, Waai and other small ports as well as fish caught in Ambon. Fish that get to market first thing in the morning typically fetch the best price. Market price information flowing out of Ambon influences fish prices in the outlying ports. Whether the news is carried by telephone to Tulehu or by speedboat drivers to smaller ports, this information is gathered by retailers (*papaleles* and *jibu-jibus*) throughout central Maluku and helps them to decide whether to sell their fish locally or risk taking the fish to the larger market.

Each fish broker has a number of helpers called *anak buah* (a term that connotes dependency and mutual relations) whose job is to unload fish from incoming vehicles, sort and guard the fish, report on price fluctuations in the market place and assist with sales. The broker does not buy the fish; he simply transfers them from the fisher to the purchaser, usually a fish vendor. Each morning, several hundred retailers wait in the Ambon market to bargain with the brokers as the fish arrive. Bargaining occurs only within limits established by the broker. A female fish vendor may bargain for a basket of fish but not pay until later in the morning after the fish have been sold. By that time the price may have changed, but she will pay the price agreed upon. Between fish vendors and fish brokers exist important trade relations based on trust.

Occasionally a fish broker will take the risk of purchasing fish for resale, acting as a wholesaler. This requires fish holding capacity and access to ice, as well as significant capital. This strategy is most often employed by brokers who buy fish for a low price in an outlying port at a time when fish shortages in Ambon ensure a high resale price.

The last market option is to sell to fish processing companies or transport ships. Fish brokers will keep fish on ice and take them to the factories if market sales are slow. At the factories, prices are fixed and depend on species, size and quality. For example, at P.T. Latoka in Masohi, skipjack was purchased for Rp900-Rp1,700 per kg in 1997, with large fish of over 10 kg fetching the best price. During the study period, two major price increases were noted, in January and February of 1998. This was in response to the monetary crisis that pushed up prices of fishing gears.

Prices at the processing factories are substantially lower than in the Ambon market, so this is not the first choice for small-scale fishers. However, larger commercial boats needing to move significant tonnage usually have a steady relationship with the processing companies. In the study area, there are several major companies, including Latoka Indonesia in Amahai on Seram Island, P. T. Sumber Aneka Tata Bahari in Tulehu, Ambon Island and two newer factories in Leahari and in Toisapu, Ambon Island. In addition, there are ships such as the Mina Raya that purchase fish and move them directly to markets in western Indonesia. These companies handle pelagic fish: skipjack (*cakalang*), tuna and several smaller species (*komu*, *momar*, see Table 3.1). They obtain the bulk of their fish from pole and line boats and seiners, for whom they provide docking facilities, storage bins, ice and fish aggregating devices (*rumpon*).

Whereas pole and line vessels normally take all their catch to the nearest processor, seiners often hold back a portion for the Ambon market where prices are better. The highest quality fish are sold fresh or frozen into export markets, or processed into specialties for the Japanese market (*katsuobushi*). Other grades may be released into regional and national markets, canned, or turned into fishmeal. The major export market of the processors is Japan, with some fish also going to America and Europe.

5.3.3 Role of government in fish market management

Government involvement in the fish market is minimal in terms of providing infrastructure, imposing fees or influencing prices. Ice, where available, is provided by private enterprise. The government Fisheries Agency (sub-district level) gathers market stall fees from fish brokers and retailers in the Ambon area. However, management of the market flow is in the hands of the fish brokers. They set prices and decide where and when fish are to be sold. The government has, however, set up a cooperative (KUD *Siwalima*) for Ambon fishers and this cooperative receives half of the Ambon market fees collected by the Fisheries Agency. The cooperative in turn makes half of this money available to fishers for boat repairs and other costs. Large traders are supposed to pay 10% of their profits as market taxes. Because of evasive efforts by traders, the taxes actually gathered are in fact much less.

5.3.4 Marketing *sasi* products

The commercial products managed under the *sasi* system include pelagic *lompa* fish (*Thryssa baelama*), top shells (*Trochus niloticus*), sea cucumbers (*Holothuria* and various other spp.) and a variety of ornamental fish. The ornamental fish are collected by specialized fish brokers, for direct export. *Lompa* fish and other pelagic varieties affected by *sasi* regulations are either divided among community members for local consumption, as in Haruku, or enter the market in the same way as other pelagic fish, via fish traders and retailers.

The village of Nolloth in Saparua provides one example of the sales route for top shells in central Maluku. After the 1998 harvest conducted by the Nolloth cooperative (KUD), the shells were sold to CV Naga Sakti Ambon and Toko Rinjani, two shell collectors based in the city of Ambon. The price varied from Rp9,000-Rp19,000 per kg in 1998 according to the shell quality. It had resale value in the Surabaya market of Rp24,000 per kg. Because top shells are a protected species and are illegal to harvest, fishers have no direct access to more lucrative international markets but must sell to the few Chinese-Indonesian traders who have licenses to purchase "farmed" top shells (also see Zerner and Thorburn, *forthcoming*). Chinese-Indonesian traders also handle the bulk of sea cucumber sales, directing the harvest into international markets in Southeast Asia. Price depends on the species and, in 1997, ranged up to Rp35,000 per kg for dried animals of the species called *teripang durian*.

5.4 Conclusions

The marine resources of central Maluku are very rich but not unlimited. After a period of rapid increase in fishing pressure and catches, even the optimistic government resource assessments now indicate a need for more cautious management because several key stocks appear to be over-fished and harvest potential is declining. Small-scale and artisanal fishers clearly recognize the trends of falling catches and the decline in marine environmental health. Nevertheless, economic pressures mean that there is still a strong incentive for the further expansion of fisheries.

The bulk of the fish are caught by large commercial vessels employing relatively few crew. The workforce of the central Maluku fishery is numerically dominated by artisanal fisher-farmers having low technology boats, fishing gears and limited formal education. The fishing community is changing, as is the demography of Maluku. Younger fishers are increasingly Muslim and increasingly focused on targeting deep-water pelagic resources. The local management institution, *sasi*, has less credence with these younger, commercially oriented fishers. However, younger fishers especially do tend to see the community as having responsibility for management whereas the majority of fishers still view management as a government affair.

Fish harvesters are moving from the artisanal to the small-scale sector, assisted by both government and private sector development aid. They are also increasingly employed as crew on commercial vessels. Both artisanal fishers and commercial crew earn marginal incomes and have no control over fish prices in the marketplace. Fisheries earnings mostly accrue to the owners of larger boats and gears, to fish brokers and to the factory owners. Profit sharing systems that are operating provide incentives to fishers to maximize catch, if necessary through use of destructive gears such as very fine mesh nets. It is important to keep all these factors in mind while analyzing the functionality of current fisheries management systems. These factors must also be recognized when attempting to design a model for future co-management arrangements. The willingness and ability of fish harvesters to cooperate in, and comply with, fisheries management depends largely on the daily realities of survival in the fishery and its market place.

Chapter 6

Fisheries Management in Central Maluku

6.1 Jurisdiction

Under national law, the sea and all its resources are the property of the national government of Indonesia. National fisheries and coastal management consist of rules and regulations administered by more than 20 largely uncoordinated ministries (Nikijuluw 1996; Soetaryono 1996; Kusuma-Atmadja and Purwaka 1996). The consequences of poorly organized management structures at the national level can be seen in terms of confusion, lack of information, and poor motivation at provincial and regional levels. Efforts to redress the problems include the recent establishment of a national, multi-ministerial body (DKN) charged with coordinating marine development and conservation policy. There have been moves towards decentralization and the national government is encouraging provinces to back up national law by developing more detailed and locally appropriate provincial legislation. Most recently, Act No. 24, 1992, on spatial planning, gives regional governments the mandate to zone coastal areas and to establish management plans in consultation with village level governments. Policy makers are currently attempting to clarify whether the zoning of territory can be extended into the sea, giving the province powers to zone marine waters for various commercial and conservation purposes. As of 1998, consultation with the village level on coastal zoning and planning has barely begun. Also, comprehensive operational rules at the provincial level are still lacking for most national laws pertinent to coastal management. The Maluku province has, however, developed some regulations, for instance, those prohibiting the mining of corals, the cutting of mangroves and the capture of dolphins.

6.2 National Laws Affecting Artisanal and Small-Scale Fisheries

National level laws that, if enforced, would directly affect Maluku's artisanal fishers stem largely from Law No. 9, 1985 on Fisheries and the Agriculture Minister Decree No. 607, 1976, concerning fishing zoning. Consequent to these laws, the use of gear types destructive to fisheries such as explosives and poisons, are prohibited. There is also an inshore fishing zone designated for use by small-scale and artisanal fishers, and mesh sizes are regulated. All mesh must be over 25 mm; seine nets for tuna and skipjack must exceed 60 mm. Fish habitats including coral reefs, mangroves and sea grass beds are specifically protected under the Biological Resource Conservation Act No. 5, 1990. Forty-eight marine mammals, birds, crabs, shellfish and coral species have been declared protected species, including some that are commonly harvested in Maluku, i.e., turtles, dugongs, coconut crabs, top shells, giant clams and a number of other edible shellfish. A few marine protected areas have also been set up, including Pombo Island in the Haruku Strait in the Lease Islands.

6.3 Key Management Issues

In spite of its huge marine territory, Indonesia has no separate Department of Fisheries. Fisheries come under the Department of Agriculture. The country is divided into nine fisheries resource management areas, two of which lie within the Maluku province. For each area, there is an annual exercise of setting Total Allowable Catches linked to the standard fisheries management concept of Maximum Sustainable Yield (MSY). Currently, there is a move to attempt to determine what are known as MEY (Maximum Economic Yield) and MSOY (Maximum Social Yield).

Officially, the Fisheries Agency is in favor of responsible fisheries but, on the other hand, there is tremendous pressure to increase fishery-based income and employment as rapidly as possible, especially through increasing the industrial fleet targeting pelagic fish in the deep-water EEZ (V. Nikijuluw, *pers. comm.* 1998). The 1997 MSY estimate for the nation is 6.1 million tonnes, and government statistics suggest that catches amount to only 40% of this potential yield. According to government statistics, the Maluku province alone should have a standing stock of fish and shrimp totaling 2.74 million tonnes. MSY, calculated as 50% of stock, is, therefore, estimated to be 1.37 million tonnes. The total catch in 1997 was only 24.4% of the theoretical MSY, leading the national government to promote expansion of the industrial fishery. However, there are questions with regard to the government figures (see below and Section 3.4.2).

One major problem with the national expansionist policy and with the process of setting catch limits is that calculations of potential yield are extrapolations from stock assessments conducted in the early 1980s. These old data are augmented with catch statistics that are limited in their coverage and often of unknown or suspect quality (Proceedings of the National Conference on the Role of Communities in Coastal Resource Management in Indonesia, 1996). As of 1998, Maluku still has no coherent, comprehensive and reliable system for collecting catch data (Purnomo 1996), although LIPI, a national research institution, has plans to develop and introduce a system at some future time. It is widely acknowledged that fishing boats from other provinces and countries frequently fail to land their catches in Maluku, or they trans-ship at sea. Thus such catches go unrecorded. Hence, despite there being in theory a large available fish biomass, several important commercial stocks are, in fact, already over-fished and declining in Maluku (Governor Latukonsina, *pers. comm.* 1998).

A second key issue is the lack of enforcement power to defend Indonesia's vast EEZ from illegal fishing by foreign and domestic boats, including live fish traders using potassium cyanide. Illegal fishing contributes to the total of unrecorded fish catches (Fox 1996).

The third key issue is one of allocation: the need to balance industrial-scale fisheries serving export markets with the need for local food security and employment for coastal communities. In the Agriculture Ministry Decree No. 607, 1976, Indonesian waters were divided into zones in an attempt to reserve inshore waters for the artisanal and small-scale sectors. Under this law, vessels over 5 gross tonnage (GT) are prohibited from fishing within three miles of shore, vessels over 25 GT must operate over four miles from shore, and vessels over 100 GT must stay five miles from shore. Small boats are free to enter the offshore fishing grounds at will. This is one of the laws that is not effectively enforced, with the result that clashes between the industrial sector and coastal communities are increasingly common (Galanggajir 1996). Those behind the drive for further expansion of industrial fleets fail to acknowledge this problem.

6.4 Agencies Involved in Fisheries Management and Development in Maluku

The planning board, BAPPEDA, is a coordination institution below the national planning board, BAPPENAS. BAPPEDA holds a strategic position for coordinating the development of various sectors in the region, including fisheries, and has offices at both provincial and district levels. The provincial office of BAPPEDA is also the governor's office. The provincial governor holds two positions; he is head of the provincial government as well as the provincial representative of the Minister of Internal Affairs. BAPPEDA has a close working relationship with the Department of Internal Affairs.

BAPPEDA has to date largely concerned itself with the expansion of fisheries rather than with management or conservation. This department is also in charge of environmental impact assessment. However, assessments that do occur are typically very narrow, not cross-sectoral.

In Maluku, attempts to rationalize the fisheries development policy have led BAPPEDA to develop the concept called “*Gugus Pulau and Laut Pulau*”. Under this scheme, the province is divided up into eight clusters of islands (the *Gugus Pulau*), with the *Laut Pulau* being the areas of open sea between these clusters. To date, these divisions are only poorly defined areas on paper, not operational management units. One problem facing provincial planners is that administrative boundaries of districts and sub-districts do not coincide with ecological boundaries.

Among its many tasks, BAPPEDA oversees fisheries development project planning. However, much of BAPPEDA’s energy tends to be directed to large development projects such as the World Bank-funded COREMAP rather than to smaller programs such as fisheries development and project evaluation. Once the planning of a fisheries project has been completed by BAPPEDA, it goes to the Fisheries Agency for implementation. This agency also considers economic development as its first priority. In practice, there is no coordinating body focused on coastal and marine resource management and protection.

The various agencies and institutions involved in the fishery resource management system in Maluku can be classified into two major groups and both groups are coordinated through BAPPEDA (Table 6.1). Group I is the group of institutions directly involved in fisheries activities and deals with supplying skilled human resources in the marine and maritime areas; supplying maritime facilities such as ships, harbors, and other equipment; facilitating training; and providing necessary funding, according to formal regulations. Group II is a group of institutions that deals with marine and fishery problems as a subset of their duties. In addition to these is the national research institute, LIPI, which provides information to policy makers. LIPI has a regional research center in Ambon.

Table 6.1. Government bodies involved in fisheries management at the provincial level.

BAPPEDA	
Group I	Group II
Fisheries Agency (<i>Dinas Perikanan</i>)	Dept. of Internal Affairs (<i>Dep. Dalam Negeri</i>)
Dept. of Transport (<i>Dep. Perhubungan & Dirgen Perhubungan Laut</i>)	Dept. of Forestry (<i>Dep. Kehutanan & Dirgen PHPA</i>)
Navy (<i>TNI Angkatan Laut</i>)	Environment Bureau (<i>Biro Lingkungan Hidup</i>)
Police (<i>Polisi Republik Indonesia</i>)	Law Bureau (<i>Biro Hukum</i>)

Twenty-six key respondents from various governmental institutions involved directly and indirectly in the process of fisheries development and management at provincial and lower levels were interviewed to identify the roles, strengths and weaknesses of each agency. The results are presented in Appendix 5. Roles were tabulated under the following management functions: 1) information gathering and provision, 2) project planning, 3) project implementation, 4) evaluation of projects (physical and legal aspects), 5) enforcement of fisheries law, 6) funding of projects, 7) routine fisheries policy implementation, and 8) issuing permits and licenses and collection of taxes and fees.

Information gathering and dissemination are performed by all agencies with the exception of the police. The planning of fisheries development projects involves BAPPEDA, all levels of the Fisheries Agency, the Law Bureau, and village government heads. The process is described below (Section 6.5.1). Depending on the type of project, provincial and district levels of the Department of Transport and the resource conservation section of the Department of Forestry may also be involved. What is interesting is that the Environment Bureau has not identified this as one of its areas of activity. In general, the Environment Bureau is a very weak player, not least because its area of jurisdiction relative to the environment section of BAPPEDA is unclear. However, the Environment Bureau does become involved during the implementation of a project, along with BAPPEDA, the Department of Forestry, the Department of Transport, the Fisheries Agency, and regional, district, and village government heads. Most agencies (except for the Environment Bureau and Law Bureau) have responsibility for evaluating the physical and legal implications of projects, but evaluation and feedback into new project planning forms an area of extreme weakness in the system.

Enforcement is formally a shared responsibility of the police, navy and Fisheries Agency. The Department of Transport plays a role in enforcing licensing regulations, whereas various government offices may facilitate reporting of offenses or, in the case of village chiefs, apply sanctions available under the local government or *adat* law.

Funding for fisheries development comes from BAPPEDA, the Fisheries Agency and Department of Forestry and may also be supported from local government coffers. Routine management tasks are performed by most agencies, with licensing and collection of fees and taxes being the special purview of the Fisheries Agency and Department of Transport. Only the Environment Bureau, Department of Forestry and provincial and district government offices are not directly involved in day-to-day fisheries management tasks. There is, therefore, a clear need for communication and coordination among agencies.

The key findings from the interviews of government staff were as follows:

- There is no special institution to manage coastal and fisheries resources. The management aspects are divided among a range of institutions. This causes difficulties in coordination.
- Authority seems to be an important factor in the management process. Because of the “top-down” approach, the determination of limits of authority must precede any decision and often, nothing will be done without explicit approval from a higher level.
- Limited human resources and poor motivation very much affect all levels of the management system.
- Staff personnel in every agency and at every level reveal a lack of knowledge of fisheries law and management principles.
- Limited equipment, facilities and funding hinder management and enforcement functions. Budgetary problems are most critical at the lower (sub-district) levels, and greatly hinder both enforcement and the transfer of training and information to the village level.
- Sustainability of resources and habitats is still a low priority compared to the expansion and development of fisheries.
- Better scientific data and greater cooperation with research institutions and universities are essential in order to support the management system.
- Technical guidelines from the national level are inadequate. For example, national instructions to collect taxes on shellfish are not accompanied by instructions on the implementation of such a tax.
- Since the village may carry out many fisheries resource management functions, it means that, in theory, the village holds an important role in the management process.

However, a legal basis for the village role, and in particular for the *adat* institution, *sasi*, is not explicitly provided. Government staff personnel acknowledge the strategic position of local governments as implementing agents but also tend to see village chiefs as being incompetent in resource management.

- Fisheries management issues are not of central concern to village chiefs, who have heavy work loads and are mostly concerned with economic development.
- Control by the navy is difficult because its personnel are found only at the provincial level and tend to focus on international piracy and deep-water fisheries infringements.
- Cooperation between the navy and the police as well as with the army (*Babinsa*, who may be present in villages) is not optimal.
- The enforcers (police and navy) are important players. In many cases, infractions which were not dealt with properly have caused other problems to arise (for instance, bad relations with community leaders) which will hamper future management.

6.5 Operationalizing Fisheries Policy

In operationalizing fisheries policies, there are two central activities: 1) the process of establishing a plan for a development project, and 2) the process of producing a fisheries law.

6.5.1 *The process of establishing a development project plan*

As stated in the Governmental Decree on coordination of development planning in the regions (PP No. 6, 1988), BAPPEDA has to integrate all the development planning within a region so as to minimize environmental impacts and ensure sustainability of resources. In the planning process called P5D, BAPPEDA coordinates the macro planning, whereas technical institutions establish the micro plans. A proposed project that may bring disadvantage to a community and offers no appropriate compensation can be rejected by the provincial or district government.

The establishment of the Regional Development Management and Planning Orientation (P5D) starts with the collection of ideas from village governments and proceeds as follows:

1. Village level. Through the Village Development Deliberation (*Musbangdes*), various village stakeholders have the chance to suggest their ideas, which may include those for the development of fisheries.
2. Sub-district level. Ideas from the village are introduced to the Permanent Work Region Unit (UDKP). This forum begins selecting ideas for project development.
3. District level. At a Development Coordination Meeting (*Rakorbang I*), representatives from relevant sectoral institutions (such as the Fisheries Agency) contribute their planning suggestions, including suggestions on coastal development.
4. Provincial level. At the Development Coordination Meeting (*Rakorbang II*), proposals from all the districts and from the province are reviewed to make sure that provincial and district level projects can support one another.
5. The final work programs are reviewed by the Regional House of Representatives (DPRD) and, if approved, will then be announced as development projects.

Because it starts at the village level, this looks like a “bottom-up approach”. In reality, what is finally approved after the lengthy rounds of selection and project development may be far from the original ideas proposed or ideas from a village may be dropped entirely. Another problem is that only formal government structures are involved. At the *Musbangdes* level, input from local stakeholders is coordinated by the LKMD assisted by a representative from the sub-district level. The *kewang*, being part of an *adat* institution, is not acknowledged in

the official governmental structure. *Kewang* members may be invited by the village government to discuss and participate in the planning process as individuals. However, they cannot formally represent their position as an institution, even though the *kewang* specifically deals with the village resources.

6.5.2 *The process of producing a fisheries law*

The process starts with an academic draft put forward by the appropriate technical institution, which in this case is the Fisheries Agency (at the provincial or district level). In establishing the draft, the Fisheries Agency will consult other government institutions as required. Again, because the traditional law enforcers in the *kewang* institution have no standing in the government, there is no place here for the *kewang* to initiate the process or draft its ideas.

Once the academic draft is completed, the Fisheries Agency will send it as a proposal to the Governor, routed through the Head of the Law Bureau (Department *Dalam Negeri*) for legal examination. In the process of reviewing the proposal, the Law Bureau considers higher-level regulations related to the proposal, reviews the advantages and disadvantages, and then invites the Fisheries Agency to cooperatively present the proposal. In the next stage, the Law Bureau would ask the Regional Regulations Pre-planning Reviewing Team¹ (*Tim Pembahasan Pra Rancangan Perda*) for a meeting and discuss the proposal.

After going through several rounds of examination, the team will decree the proposal as a Regional Regulation Plan (*Rancangan Perda*), which is then sent to the regional House of Representatives (DPRD) for approval. The proposal is sent to the DPRD with a Letter of Introduction from the Governor. The DPRD will then form a Special Committee (*Pansus*) to process the *Rancangan Perda* further and at the end, it becomes a decreed Regional Regulation (*Perda*)².

6.6 Licensing

Fishing licenses allow access to particular fishing grounds. Foreign and domestic industrial vessels over 30 GT which are deployed in eastern Indonesia, obtain fishing licenses directly from the national government in Jakarta. Vessels of 10-30 GT are licensed by the Fisheries Agency at the provincial level whereas smaller boats (under 10 GT) are dealt with at the district level. Artisanal fishers require no license to fish with hand lines, spears, traps or simple nets.

Commercial operators must obtain permits from the Department of Transport, which regulates the placement of floating lift nets (*bagans*) and fish aggregating devices (*rumpons*) and issues permits for boats to operate from particular harbors. Interviews with staff in the Department of Transport revealed that, in general, they simply stamp forms and collect fees. There is little attempt to consciously manage or control where and how commercial boats operate.

¹ The Team is led by the Regional Secretary (Sekwilda) and consist of the following members: Sekwilda assistants, BAPPEDA, the Social Politic Directorate, Finance Bureau, Economy Bureau, Environment Bureau, Government Bureau, Fisheries Agency (Dinas Perikanan) and other related institutions as required.

² If the Fisheries Agency is in urgent need of a Law, they can ask the Governor (for Level I purposes) or the District Head/Bupati (for Level II purposes) to issue a decree/statement that can be used as a law in principal for their urgent need.

The Decree of the Agriculture Minister No. 51, 1997 defines responsibilities for permitting the deployment of fish aggregating devices (referring to both *rumpons* and lift nets). FADs within three nautical miles from the shore are regulated by the district government. Devices between three and 12 miles offshore are regulated by the province and deep water FADs by the national Directorate of Fisheries.

6.7 Enforcement

Because of the immensity of the coastline, the national laws as well as provincial regulations are often effectively unenforceable. Lack of enforcement is a major problem in Maluku with its multitude of small islands. Fish and turtle traders exploiting endangered species or using prohibited gear types bribe enforcement officials or operate in places where the patrol boats never go.

Enforcement is officially in the hands of the navy, which operate at a provincial level, and the police, who have a “water police” section to deal with fisheries offences. However, the boundaries of jurisdiction and responsibility are not clear to the staff in district offices, and the level of awareness and concern of police to fisheries issues are minimal. Infrastructure and funding are extremely limited and any action taken is reactive, not proactive. In theory, the police can rely on the navy for assistance with infrastructure (e.g., speedboats) but in practice, our interviewers were told that the agencies do not work together.

6.8 Communication and Collaboration Between Village and Higher Levels of Management

Although there appears to be, at least in a *de facto* sense, a degree of co-management of marine resources, in reality the government departments and village level institutions (village government, *sasi* authorities) operate in isolation one from the another. Information may, in some cases, trickle down from the national level to the village but there is no mechanism for feedback from the village to the national level. National prohibitions against blast fishing and the use of poisons are reasonably well known at the village level but other regulations, including the identity of endangered and prohibited species and the boundaries of marine parks and protected areas, are virtually unheard of.

Relationships among village, district and provincial levels are also not close when it comes to fisheries issues. The Fisheries Agency has extension staff (three on Haruku, two on Saparua, and one on Nusa Laut) whose job it is to convey information to the village level. However, they usually act in response to a request rather than proactively. They do assist commercial operators to renew their licenses but, in our interviews with artisanal fishers, we found that they are virtually invisible to this sector. There has been an attempt by extension staff to influence fishers to stop using destructive fishing gears but in their own estimation, this program has failed to make any difference. Instead, they feel that providing gears and motors to groups of fishermen and promoting aquaculture are the ways to effect change. Their ability to deliver such assistance is, however, very limited. This extension service is short of funds and finds it difficult even to cover transportation costs for field visits.

According to our respondents, village governments and, in particular, the village heads (*kepala desas*) have, in theory, a legal role in most management functions (Appendix 5). In many cases, however, they lack the means, time and motivation to attempt management at the local level. In a political climate of “top-down” decision-making, many local leaders are also reluctant to be proactive, preferring to act only when directed by a higher authority. In the

opinion of Fisheries Agency staff interviewed, the competence of the average village head in terms of education level and experience is very limited. No doubt, the apparent degree of condescension and lack of appreciation for local knowledge hinder any move towards power sharing and decentralization of decision-making.

Fisheries Agency personnel interviewed have positive opinions regarding *sasi* as an institution and would like to see some move towards formalizing the rights and responsibilities of local management bodies through the development of a provincial law (*Perda*). They also attested that in their dealings with commercial operators, they insist that these fishers respect local *sasi* rules and pay whatever access fees are imposed by local governments.

The importance of communities in resource management was acknowledged by the national government in 1982 and 1984, when environmental awards were presented to the villages of Ihamahu and Haruku in recognition of their local *sasi* institutions. However, this was not followed up by concrete action to formalize a role for community traditional institutions in resource management.

6.9 Conclusions

Indonesian fisheries management is complex, multi-agency, and “top-down” and, at the same time, is faced with the huge task of controlling a vast marine area and multitudes of islands and offshore reefs. Ultimate power is retained at the national level and provincial and lower levels have insufficient power to control regional marine resource exploitation and conserve resources. At the same time, as fisheries exploitation and marketing systems encourage over-fishing and use of destructive gears, the enforcement of national fisheries regulations is lax and there are serious deficiencies in government management agencies in terms of motivation, coordination, knowledge, infrastructure, and funding support. There is no one provincial body specifically focused on marine resource management and conservation which has power to coordinate the many agencies bearing management responsibility. BAPPEDA, which could play this role, has many other sectoral responsibilities, is focused on development rather than management and conservation, is weak in areas of evaluation and inter-sectoral coordination, and has no presence below the district level. Also, the limits of power and jurisdiction among the other agencies are often unclear.

From evidence of over-fishing of several key stocks and drastically declining artisanal catches (see Chapters 5 and 8), it is clear that the current management system needs to be overhauled to avert the collapse of Maluku’s potentially rich fisheries.

Government staff generally agree that the role of the local community is essential to fisheries management because the local leaders hold a very strategic position close to the resource and fishers. Even though informally supported in some ways by the police and the Fisheries Agency, *sasi* and therewith the *kewang* are effectively isolated from regional and provincial management structures because of the general lack of effective communication and coordination. Also, local village institutions, while generally well respected, have no legal standing and are in a weak position in the process of planning for fisheries development as well as in the process of developing fisheries policy and regulations.

Chapter 7

Results of the Inventory of *Sasi*

7.1 Presence of *Sasi* in Central Maluku

This chapter shows the occurrence and activity of the *sasi* institution in the villages of central Maluku. *Sasi* institutions can be classified in two ways (see Table 7.3): where the rules are applied (on the village, on the land, in a river or at sea), and who is responsible for governing *sasi*. Rules may apply to activities and resources within a village (village *sasi*), to land crops (land *sasi*), and to resources in a river or the sea (marine *sasi*) (Imron 1995). The governing authorities may be *adat* leaders (*adat sasi*), the church (church *sasi*) or other secular agents (we call this “other” *sasi* as it has no special Indonesian name). In this chapter, the general occurrence of *sasi* will be reported, followed by the breakdown of occurrence by each category. Finally, the levels of the activity of *sasi*, the types of resources to which it is applied, and how it is enforced, are described.

7.1.1 Overall occurrence

Out of 63 central Maluku villages surveyed, 47 (75%) had some form of *sasi* institution (Table 7.3). *Sasi* occurred on all islands, in all village size classes and in both Muslim and Christian villages (Table 7.1). Comparing the distribution of the *sasi* and non-*sasi* villages (Table 7.1 and 7.2), we see that only on the island of Haruku do all villages have some form of *sasi*. On an average, non-*sasi* villages are larger than *sasi* villages but when each island is considered by itself, this trend holds true only for Ambon and Nusa Laut. When villages were grouped by religion, island and population size class, no factor had a statistically significant impact on the distribution of the *sasi* institution in general (Table 7.4), although there are significant relationships with specific types of *sasi*.

Table 7.1. Demographic breakdown of villages having any form of *sasi*, including four having only village *sasi*. Class 1=population£1,000; Class 2=1,001-2,000; Class 3=2,001-3,000; Class 4=>3,000.

Island	Total #	Muslim	Christian	Class 1	Class 2	Class 3	Class 4	Avg. pop'n
Saparua	10	1	9	0	4	4	2	2,437
Nusalaut	6	0	6	5	1	0	0	720
Seram	6	0	6	0	2	3	1	2,241
Ambon	14	9	5	4	0	4	6	2,967
Haruku	11	4	7	1	4	5	1	2,252
Total	47	14	33	10	11	16	10	2,246

Table 7.2. Demography of non-*sasi* villages. Class 1=population£1,000; Class 2= 1,001-2,000; Class 3=2,001-3,000; Class 4=>3,000.

Island	Total #	Muslim	Christian	Class 1	Class 2	Class 3	Class 4	Avg. pop'n
Saparua	6	2	4	2	3	0	1	1,582
Nusalaut	1	0	1	0	1	0	0	1,725
Seram	1	1	0	0	0	1	0	2,149
Ambon	8	3	5	0	2	0	6	4,528
Haruku	0	0	0	0	0	0	0	-
Total	16	6	10	2	6	1	7	3,100

Village, land and marine *sasi* occurred in every possible combination. In 11 villages, *sasi* covered all three areas i.e., the village, land crops and marine resources. In 16 cases, *sasi* rules were operating in two of the three locations. Marine *sasi* occurred by itself in one village, whereas land *sasi* occurred by itself in 15 villages. In four Ambonese Muslim villages, there was only village *sasi*. Village *sasi* involves rules that mostly regulate social conduct and are applied within the village. It is significantly more common in Muslim villages and on the island of Haruku (Table 7.4), but is absent from Nusa Laut Island. We will not discuss this form of *sasi* in any detail. Rather, we will focus on the 43 villages where the institution included rules related to land and/or marine resources.

7.1.2 Distribution of *sasi* on land crops and marine resources

Sasi applied to land crops occurred in 41 villages (Table 7.4). Occurrence varied with religion and island, being most common in Christian villages and on Haruku and Nusa Laut.

Only 17 villages had marine *sasi*. In two other villages, one or more fishermen claimed that there was *sasi* on certain species, but this was not confirmed by village leaders. The institution occurred equally in Muslim and Christian communities but its distribution varied significantly with population, being most common in Class 3 villages (2,001-3,000 persons) and absent from Class 1 (1,000) (Figure 7.1). The occurrence of marine *sasi* also varied significantly from island to island, being most common on Seram and Saparua (over 50% of villages sampled on each of these islands had marine *sasi*) and least common on Ambon (9%). The small sample on Seram is not necessarily representative of the whole island. The sample on Ambon is certainly an over-estimate, as the sample excluded suburban and urban satellite villages. On Nusa Laut, there was no marine *sasi* at all, but until recently, the villagers there still maintained a practice of communal fish harvesting called *sousoki*.

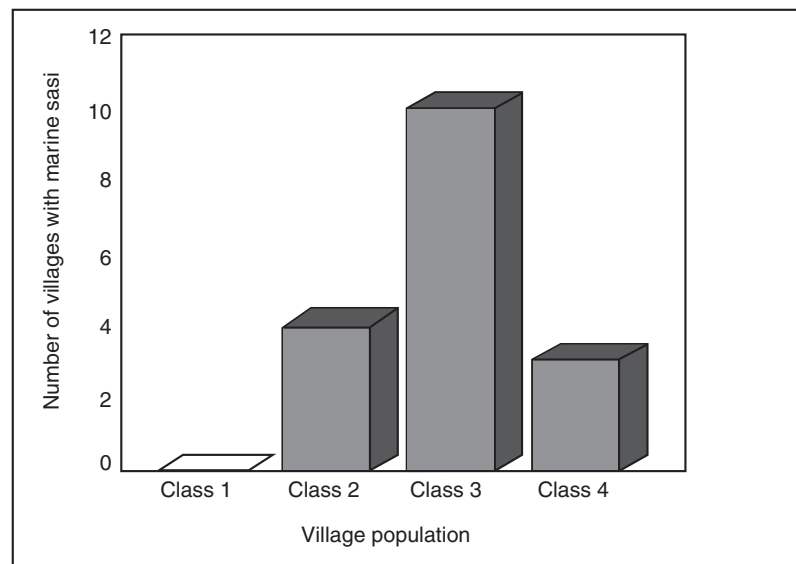


Figure 7.1. Distribution of marine *sasi* in villages of various sizes. Class 1= population $\leq 1,000$; Class 2= 1,001-2,000; Class 3= 2,001-3,000; Class 4= >3,000.

Table 7.3. Inventory of 63 central Maluku villages, 1997. Presence of sasi is indicated by +. Each institution is categorized by the area where rules are applied and the type of governing authority. Sasi area: V=village, L=land, S=sea, R=river. Type of sasi: A=adat, C=church, O=others. Sasi score indicates the activity of the institution as measured by the indicators in Tables 2.3 (land) and 2.4 (marine). Where information on what species were managed was unclear or contradictory, this is shown by a question mark.

#	Village Name	Island	Dominant religion	Size class	Sasi Area			Sasi Type			Species managed		Sasi score		
					V	L	S	R	A	C	O	Land	Sea/river	Land	Marine
1	Nolloth	Saparua	Christian	3	+	+	-	-	+	-	-	coconuts, pineapples, sugar palm, jackfruit, bananas, sago, cloves, firewood, nutmegs, palm leaves, durian, mangosteen, areca	top shells, sea cucumbers, gill net fishery on reef	12	12
2	Haruku	Haruku	Christian	3	+	+	+	+	+	-	-	pelagic fish (<i>lompa, make</i>)	pelagic fish, sea cucumbers, ornamental fish	11	12
3	Kabau	Haruku	Muslim	3	+	-	+	-	-	+	+	none	none	n/a	9
4	Pelau	Haruku	Muslim	4	+	+	+	-	-	-	+	coconuts, nutmegs	inshore net fishery	12	12
5	Makariki	Seram	Christian	2	+	+	+	-	-	+	-	sago, palm leaves, bamboo,	inshore net fishery forest all young fruits from	12	3
6	Ihamahu	Saparua	Christian	2	+	+	+	+	+	-	-	coconuts, sago, young fruits (pineapples, bananas, langsa), nutmegs, palm leaves	inshore net fishery, corals, ornamental fish, sea cucumbers, top shells, giant clams	12	9
7	Siri Sori	Saparua	Muslim	3	-	-	+	-	+	-	-	none	top shells, (sea cucumbers?)	n/a	12
8	Itawaka	Saparua	Christian	3	+	+	+	-	+	-	-	coconuts, young fruits, palm leaves	mangroves, top shells, sea cucumbers, <i>caping-caping</i>	11	10
9	Paperu	Saparua	Christian	3	+	+	+	-	+	+	-	coconuts	sea cucumbers	9	6
10	Porto	Saparua	Christian	4	+	+	+	-	+	+	-	coconuts, cloves, young fruits, pineapples, pinang, palm leaves, <i>tuhai/tuba</i> root	top shells, sea cucumbers, <i>piring</i> shells, giant clams, <i>batu laga</i>	10	7
11	Morela	Ambon	Muslim	3	+	+	+	-	-	-	+	coconuts, nutmegs	top shells, sea cucumbers	11	12
12	Seith	Ambon	Muslim	4	+	+	+	-	-	-	+	coconuts, nutmegs	all species in <i>sasi</i> area	12	n/a
13	Tengah-Tengah	Ambon	Muslim	3	-	+	+	-	+	-	-	coconuts, nutmegs	inshore net fishery, sea cucumbers	12	9
14	Rutah	Seram	Muslim	3	-	-	-	-	-	-	-	none (used to be on coconuts, cloves)	none	n/a	n/a
15	Soahuku	Seram	Christian	4	-	+	-	-	-	+	-	coconuts, bamboo, cocoa	none	11	n/a
16	Batu Dua	Ambon	Muslim	4	-	-	-	-	-	-	-	none	none	n/a	n/a
17	Hitulama	Ambon	Muslim	4	-	-	-	-	-	-	-	none	none	n/a	n/a
18	Tiouw	Saparua	Christian	2	-	-	-	-	-	-	-	none	none	n/a	n/a
19	Eri	Ambon	Christian	4	-	-	-	-	-	-	-	none	none	n/a	n/a
20	Seilale	Ambon	Christian	4	-	+	-	-	-	+	-	coconuts	none	7	n/a

#	Village Name	Island	Dominant religion	Size class	Sasi Area					Sasi Type			Species managed		Sasi score	
					V	L	S	R	A	C	O	Land	Sea/river	Land	Marine	
21	Iha	Saparua	Muslim	1	-	-	-	-	-	-	-	-	none (used to be on coconuts, cloves, nutmegs)	none	n/a	n/a
22	Ouw	Saparua	Christian	1	-	-	-	-	-	-	-	-	none	none	n/a	n/a
23	Booi	Saparua	Christian	2	-	-	-	-	-	-	-	-	none	none	n/a	n/a
24	Saparua Kota	Saparua	Christian	4	-	-	-	-	-	-	-	-	none (used to be on cloves, coconuts, nutmegs and fruits)	none (lost)	n/a	n/a
25	Tuhaha	Saparua	Christian	2	-	+	-	-	-	-	+	-	coconuts	none (lost)	8	n/a
26	Hulaliu	Haruku	Christian	2	-	+	-	-	-	-	+	-	coconuts, young fruits	none (lost)	7	n/a
27	Seri	Ambon	Christian	2	-	-	-	-	-	-	-	-	coconuts (non-functional)	none (lost)	2	n/a
28	Hutumuri	Ambon	Christian	4	-	-	-	-	-	-	-	-	none	none	n/a	n/a
29	Kariu	Haruku	Christian	2	-	+	-	-	-	-	+	-	coconuts	none	8	n/a
30	Kailolo	Haruku	Muslim	3	+	+	-	-	-	-	+	-	coconuts, nutmegs, Maleo bird eggs	none	11	n/a
31	Rohmoni	Haruku	Muslim	3	+	+	-	-	-	-	-	+	coconuts, nutmegs	none	8	n/a
32	Oma	Haruku	Christian	2	+	+	-	-	-	-	+	-	coconuts	none	9	n/a
33	Wassu	Haruku	Christian	2	+	+	-	-	-	-	-	+	coconuts	none	9	n/a
34	Aboru	Haruku	Christian	3	+	+	-	-	-	-	-	+	coconuts	none	9	n/a
35	Sepa	Seram	Christian	3	+	+	+	-	-	-	+	+	coconuts, sago, wild game (pigs, deer, <i>kuisu</i>)	top shells, sea cucumbers, reef fish, shellfish, corals	12	3
36	Hatusua	Seram	Christian	2	-	+	+	-	-	-	+	-	coconuts, fruits, bamboo,	inshore fishery (inactive)	9	9
37	Waisamu	Seram	Christian	3	+	+	-	-	-	-	+	-	sago, coconuts, sago, lemons	none	13	n/a
38	Amahai	Seram	Christian	3	+	+	+	-	-	-	+	+	bamboo, firewood, fruits, coconuts	mangroves, corals, inshore pelagic fish, sea cucumbers, top shells	12	10
39	Tial	Ambon	Muslim	3	+	+	-	-	-	-	+	-	coconuts, nutmegs	none	12	n/a
40	Airlouw	Ambon	Christian	4	-	+	-	-	-	-	+	-	coconuts	none	8	n/a
41	Amahusu	Ambon	Christian	4	-	-	-	-	-	-	-	-	none	none	n/a	n/a
42	Rutong	Ambon	Christian	1	-	+	-	-	-	-	-	+	coconuts	none	9	n/a
43	Leahari	Ambon	Christian	1	-	+	-	-	-	-	-	+	coconuts	none	8	n/a
44	Latuhalat	Ambon	Christian	4	+	+	-	-	-	-	-	+	coconuts	none	12	n/a
45	Hila	Ambon	Muslim	4	+	-	-	-	-	-	-	-	none (used to be on coconuts)	none	n/a	n/a
46	Mamala	Ambon	Muslim	3	+	+	-	-	-	-	-	-	coconuts, nutmegs	none	12	n/a
47	Haria	Saparua	Christian	4	-	+	+	-	-	-	-	+	coconuts	mangroves, top shells, sea cucumbers, ornamental fish, corals	8	3
48	Wakal	Ambon	Muslim	4	+	-	-	-	-	-	-	-	none (used to be on coconuts, nutmegs)	none	n/a	n/a
49	Ulath	Saparua	Christian	2	-	+	+	-	-	-	+	-	coconuts	top shells, sea cucumbers	6	6
50	Kulur	Saparua	Muslim	2	-	-	-	-	-	-	-	-	none	none	n/a	n/a

#	Village Name	Island	Dominant religion	Size class	Sasi Area					Sasi Type			Species managed		Sasi score	
					V	L	S	R	A	C	O	Land	Sea/river	Land	Marine	
51	Akoon	Nusa Laut	Christian	1	-	+	-	-	-	-	+	-	coconuts	none	8	n/a
52	Ameth	Nusa Laut	Christian	2	-	+	-	-	-	-	+	-	coconuts, cloves	none	8	n/a
53	Abubu	Nusa Laut	Christian	1	-	+	-	-	-	+	+	-	coconuts, cloves	none	6	n/a
54	Leimitu	Nusa Laut	Christian	1	-	+	-	-	-	-	+	-	coconuts	none	11	n/a
55	Sila	Nusa Laut	Christian	1	-	+	-	-	-	-	+	-	coconuts	none	11	n/a
56	Nalahia	Nusa Laut	Christian	1	-	+	-	-	-	-	+	-	coconuts	none	11	n/a
57	Titawai	Nusa Laut	Christian	2	-	-	-	-	-	-	-	-	none (used to be on coconuts)	none (used to be on sea cucumbers, top shells, other shells)	n/a	n/a
58	Hitu messing	Ambon	Muslim	4	-	-	-	-	-	-	-	-	none	none	n/a	n/a
59	Mamoa	Ambon	Muslim	1	+	-	-	-	-	-	-	-	none (used to be on coconuts, nutmegs)	none	n/a	n/a
60	Waitomu	Ambon	Muslim	1	+	-	-	-	-	-	-	-	none (used to be on coconuts, cloves)	none	n/a	n/a
61	Toisapu	Ambon	Christian	2	-	-	-	-	-	-	-	-	none	none	n/a	n/a
62	Sameth	Haruku	Christian	1	+	+	-	-	-	+	+	-	coconuts, cloves	none	9	n/a
63	Sirisori Amalatu	Saparua	Christian	2	+	+	-	-	-	-	+	-	coconuts	none	9	n/a

Table 7.4. Presence of *sasi* in the survey area, and factors significantly affecting the pattern of occurrence. Where differences among factor categories (two religions: Muslim and Christian, four population size classes, five islands) are significant according to chi square tests, probabilities are indicated as follows: *= $p < 0.05$, **= $p < 0.01$, *= $p < 0.001$. ns=no significant difference in the occurrence of *sasi* among the categories within each factor.**

Type of <i>sasi</i> present	Total # (%)	Factor(s) affecting pattern of occurrence (chi sq test)			Notes
		Religion (M or C)	Population size class (1-4)	Island (1-5)	
Any form of <i>sasi</i>	47 (75%)	ns	ns	ns	
Village <i>sasi</i>	27 (43%)	*	ns	*	Village <i>sasi</i> is more common in Muslim villages and on Haruku; there is none on Nusa Laut.
Land <i>sasi</i>	41 (65%)	**	ns	*	Land <i>sasi</i> is more common in Christian villages and on Haruku and Nusa Laut, least on Ambon.
Marine <i>sasi</i>	17 (27%)	ns	**	*	Mostly in Class 3 villages and on Saparua and Seram. Least in Class 1 villages and on Nusa Laut and Ambon.

In 18 cases, villagers indicated that marine *sasi* used to be practiced but had died out in living memory. Therefore, historically, over half of the villages in the study area practiced some form of marine management. Marine *sasi* was historically most common on Saparua and Nusa Laut.

7.2 Function and Scope of *Sasi* in Resource Management

7.2.1 Land *sasi*

In this study, we focused on *sasi* applied to marine resources. However, as will be seen, marine *sasi* is intimately related to, and influenced by, land *sasi*. *Sasi* as applied to land crops is generally in the form of a harvest prohibition on fruits that are unripe. For instance, *sasi* applied to coconuts usually involves closed seasons lasting three to four months. When *sasi* is declared open, often for just a few days at a time, harvests can proceed. *Sasi* is most frequently applied to just one or two crops (Table 7.5), especially in smaller villages that have only church *sasi*. Coconuts are the most common crop regulated, followed by nutmegs. In some places, there may be day-to-day rules concerning the cutting of trees and firewood, gathering thatch for roofing, and entering forest garden areas on Sundays. There is often a village *kewang* to keep an eye on the crops under *sasi* and protect them from theft, but this depends on the type of *sasi* institution that is practiced (*adat* or church) and its level of activity.

The division of the harvest is also governed by *sasi*. How this is done depends on the type of *sasi* implemented. In some cases, individuals have *sasi* placed on their own crop (e.g., the village of Kariu). When it is harvested, they donate a portion to the church (often 10%), and sometimes they also donate to the *kewang* and/or village government. More usually, *sasi* is applied generally to village lands so that all people harvest at the same time (e.g., Nolloth) or groups harvest in rotation (e.g., Tengah-Tengah). In some villages, this communal harvest is placed under the control of a *tuan sasi* who, after paying a fee to the village government, then organizes the harvest and sale of the crop and takes a proportion of the sales value (e.g., Pelauw, Kailolo). This is called *sasi lelang*. *Lelang* means auction, and the harvest rights are

auctioned to the *tuan sasi*. In some villages, a similar system has developed for harvest of selected marine resources, either within or outside of the *sasi* institution.

Table 7.5. Number of land crops under sasi in each village where there is land sasi.

Number of crops	% of land <i>sasi</i> villages	Notes
1	46%	With two exceptions, size Class 1 villages have <i>sasi</i> only on coconuts.
2	27%	
3 or more	27%	

7.2.2 Marine sasi

What villagers call marine *sasi* covers a number of different types of marine management arrangements. A full listing of rules documented can be seen in Appendix 7. The *sasi* rules may or may not be written down and the *kewang*, usually responsible for monitoring and enforcement, may be active or dormant. There are always rules restricting access to the village territory. There may or may not be closed seasons or closed areas; however, 15 out of 17 cases had a defined area that in theory could be closed to harvesting (Table 7.6). Almost all village institutions had bans on destructive gear types. In most cases, this supported the national ban on blast fishing and use of poisons. In several cases, other gears (lift nets, fine mesh nets, certain fish traps destructive to corals) were also regulated. In none of the above cases of community-controlled fishing areas was there any limit on total catch. Instead, *sasi* rules controlled harvest intensity by regulating the number of persons having access to the village territory and *sasi* area, the length of the harvest period, the size of individual fish or shellfish that could be caught, and the gear type.

Different species are regulated in different villages. In many cases, *sasi* applies to only one or two species (Table 7.7). The most common species managed under *sasi* are top shells (*Trochus niloticus*), sea cucumbers and small pelagic fish (Table 7.8). On an average, a *sasi* village had rules affecting four different groups of marine organisms (i.e., corals, mangroves, pelagic fish, ornamental fish, reef (food) fish, holothurians or shellfish). Over half of the *sasi* villages sold or auctioned harvesting rights for one or more species.

When there is an access restriction, and the time comes when *sasi* is declared open, the resources may be harvested in a number of ways. The resource may be harvested by individual fishers

Table 7.6. Attributes of marine sasi in central Maluku.

Attribute/activity	Number and % of marine <i>sasi</i> villages (total n=17)
Restricted access to specific <i>sasi</i> area	15 88%
Fishing gear ban	16 94%
Local fisheries rules other than ban on explosives and poisons	17 100%
Average number of marine species groups under management (by periodic harvest restriction or other rule)	4.3 35%
Sale or auction of resource harvesting rights	9 53%

living in the community (e.g., Ihamahu), or by the whole community in a single communal harvest (e.g., Haruku), or by individuals from within or outside the community who have paid for the privilege of access and withdrawal (e.g., Nolloth, Itawaka, Kabau, Pelauw). In Seram (Rohua, Amahai), we found villages that had a nominal form of marine *sasi* under which the closed season or area applied only to outsiders, while local residents had unlimited access to the resources.

Table 7.7. Number of marine species groups directly affected by marine *sasi* rules and/or closures. Species groups include shellfish, holothurians, pelagic fish, reef fish (for food), ornamental fish, mangroves and corals.

Number of species groups	Number of marine <i>sasi</i> villages
1-2	9 (53%)
3-4	4 (23.5%)
5-6	4 (23.5%)

Table 7.8. Most common marine resources protected or managed (i.e., *sasi* rule or closed season) through marine *sasi*.

	Number of the 17 villages that have marine <i>sasi</i>	Majority type of village (religion, location and size)
Sea cucumbers	14	10 Christian, 8 on Saparua and 9 in size Class 3. Never in size Class 1.
Top shells	11	9 Christian, 7 on Saparua, 6 in size Class 3 villages.
Pelagic or ornamental fish	12	9 Christian, mostly on Seram and Haruku, 7 in size Class3.
Corals	5	All Christian, on Seram, Haruku and Saparua.
Mangroves	4	All Christian, on Seram, Haruku and Saparua.

7.2.3 Village leaders' opinions on *sasi* as a resource management institution

People interviewed for the inventory – predominantly male authority figures (see Table 2.2) – were unflinching positive about *sasi*, even if it was no longer functional in their village. Some volunteered their opinion on the usefulness of the institution. Typical comments were:

“It is good if *sasi* continues because there are benefits for the people and the village; however the management must be good”. (Morela village)

“The benefit is that harvests are more abundant and this improves the village economy. Without *sasi*, coconuts are harvested and sold before they are ripe by people wanting to process the copra. Then it is hard to find dry coconuts in the village to eat”. (Rutah village)

“*Sasi* is good. The coconuts get a chance to ripen. Little fishes are not harvested and they are used better”. (Hitu Lama village)

“*Sasi* has three advantages: income for the village, a better quality of life and control of theft”. (Mamala village)

Less typically, people mentioned ethics and environmental values:

“*Sasi* is good and needs to be preserved because it has high ideals for protecting the environment”. (Waitomu village)

“*Sasi* has to be preserved because it is a positive force. The population is rising and people want to take everything. This will ruin the resources”. (Amahai village)

7.3 The Governing Authorities: *Adat*, Church and Local Government

In each village, the *sasi* rules and structure of the institution vary (see Appendix 6 for translations of some sets of *sasi* rules). *Sasi* can be characterized as fundamentally *adat*, church or “others”. In the past, the distinction of church from *adat sasi* referred to the dominant governing authority in the local institution but in modern times, the partnership of the local government with these authorities is implicit. In many cases, it is in fact the unnamed partner – the local village head (*kepala desa*) – who is the ultimate decision-maker.

In cases where respect for *adat* is very strong, *adat* leaders play a prominent role in developing and enforcing *sasi* rules (*sasi adat*). In church *sasi*, it is the church that plays the most visible role. Church and *adat sasi* occurred together in 10 villages (Table 7.3). We have also heard of a Muslim village in Seram where *adat sasi* is presided over by the Christian minister from a neighboring village (L. Wenno *pers. comm.* 1998). In general, a movement of authority from *adat* to church leaders and to newly defined (since 1979) village governments characterizes the recent history of the *sasi* institution in central Maluku. In one case (Itawaka), this has led to the formal inclusion of the *kewang* in the LMD, through a village law passed in 1995.

In six Muslim villages, people did not describe their *sasi* institution as *adat sasi*. These are tabulated under the name “others”. The role played by *adat* leaders, if any, is not clear. In these villages, where *sasi* is applied to marine resources, it is a commercial agreement between the local government and a harvester who pays a fee for harvesting rights (*sasi lelang*). The owner of the harvest rights (*tuan sasi*) and his assistants (called the *kewang*) adopt *adat* titles but have no hereditary *adat* position. Enforcement involves monetary sanctions (Table 7.11). The local religious leader is not involved either as a decision-maker or enforcer.

The type of *sasi* does not vary significantly with island or village size class (chi square test, $p > 0.05$) but, of course, is correlated with religion, as both church and “other” *sasi* are specific to one religious group.

Church, *adat* and the “other” type of *sasi* may each apply to land or sea. *Sasi* on land crops is most commonly in the form of church *sasi* (Table 7.9). Marine *sasi* is most often *adat sasi*. However, marine *sasi* frequently occurs in villages that have both *adat* and church *sasi* and there are four marine *sasi* villages that have only church *sasi*.

Table 7.9 Combinations of types of *sasi* that occur in the study area.

Type of <i>sasi</i>	Land <i>sasi</i> (n=39)	Marine <i>sasi</i> (n=17)
<i>Adat</i>	4 10%	3 18%
<i>Adat and church</i>	10 24%	7 41%
Church only	22 54%	4 23%
Others (Muslim type)	5 12%	3 18%

7.4 Written Rules, Sanctions and Ceremonies

The *sasi* institution can be seen as what North (1990 cited in Berkes et al. 1998) calls “humanly devised constraints that structure human interaction. They are made up of formal constraints (rules, laws, constitutions), informal constraints (norms of behavior, conventions and self-imposed codes of conduct), and their enforcement characteristics.” The rules and regulations operate on three levels (Ostrom 1990). The *operational rules* govern and regulate the resource and affect the day-to-day decisions made by the fishers. Operational rules concern boundaries, allocation decisions, the scope of fishing etc. The *collective-choice rules* are the institutional arrangements to adjudicate conflicts, enforce decisions, formulate and change operational rules etc. Essentially these rules define how the fishery should be managed. Finally, *constitutional-choice rules* affect the rules on the lower level by determining who is eligible to participate in the system and by establishing the process to design the rules. Constitutional-choice rules define the sea as belonging to the state and thus place the fishery under the national law. In Maluku, however, constitutional rules also connote to *adat*, i.e., the traditional village structure including a belief system and practices. It is *adat* that defines the resource management system.

7.4.1 *Sasi* rules and regulations

Written rules are found in all types of *sasi* villages regardless of population size, island or religion (Table 7.10). However, the distribution of rules does vary significantly (chi square test, $p=0.04$) with the type of *sasi* (Table 7.11). Written rules are most commonly found where *adat* and church *sasi* co-exist and in Muslim villages with “other” *sasi*, and are least prevalent in villages having only church *sasi*. Written rules, the application of sanctions and performance of ceremonies tend to go together (i.e., all correlation coefficients are highly significant).

People who break *sasi* rules are punished, but the punishment may be divine, psychological, physical or financial. Physical punishment and financial fines are used most often in Muslim villages, in size Class 3 communities (population 2,001-3,000) and on the islands of Haruku and Seram (Table 7.10). Physical sanctions include labor such as moving rocks and sand and cleaning streets. Offenders may be detected by *kewang* members or reported by ordinary villagers. Sanctions are imposed by *kewang* or the village head man unless the crime is such that the offender can be turned over to the police.

Table 7.10. Occurrence of various attributes in 43 *sasi* villages, and relationship to village religion (Muslim or Christian), population size class (n=4) and island (n=5). Where occurrence of an attribute is shown by a chi square test to vary significantly among categories of a factor, the probability is indicated (= $p<0.01$; ***= $p<0.001$); ns=no significant difference among categories.**

Attribute of institution	Number (%) of <i>sasi</i> villages (total n=43)	Factor			Notes
		Religion	Population size class	Island	
Written <i>sasi</i> rules	18 (42%)	ns	ns	ns	
Monetary or physical sanctions	20 (47%)	***	***	**	More common in Muslim villages and size Class 3; never in size Class 1. Most common on Haruku and Seram, never on Nusa Laut.
Ceremony performed	15 (35%)	ns	ns	ns	

The use of sanctions varies with the type of *sasi* (Table 7.11). Where a village has church *sasi* only and no *adat sasi*, physical or financial sanctions are rare (9% of cases). This is the typical scenario in small (size Class 1) villages. In church *sasi*, participants make a common commitment through prayer to obey the *sasi* rules; it is God who punishes offenders. If there is a *kewang*, the members often support the system by patrolling areas under *sasi* and may or may not impose fines or other punishments. Where *adat* is still strong, or where the village government controls *sasi*, the role of the church is to provide support through prayers at *sasi* ceremonies.

Table 7.11. Occurrence of ceremonies, written rules, and sanctions in different forms of *sasi*.

Attribute	Number and % of each type of <i>sasi</i> institution having attribute				Overall (n=43)
	Church <i>sasi</i> alone (n=22)	Church and <i>adat sasi</i> (n=10)	<i>Adat sasi</i> alone (n=5)	"Other" <i>sasi</i> (n=6)	
Written rules	5 (23%)	7 (70%)	2 (40%)	4 (67%)	18 (42%)
Physical or monetary sanctions	2 (9.5%)	7 (70%)	5 (100%)	6 (100%)	20 (47%)
Special ceremonies	2 (9.5%)	7 (70%)	1 (20%)	3 (50%)	13 (30%)

Traditionally, the opening and closing of harvest times and places under *sasi* are accompanied by *adat* ceremonies. In modern times, the ceremony may be restricted to a prayer. More elaborate *adat* ceremonies still take place in villages such as Haruku and Nolloth but fewer than 100 people attend in the majority (75%) of cases. Roughly a third of *sasi* villages carry out ceremonies regardless of their size, island or religion (Table 7.10). Ceremonies are most common in villages having both *adat sasi* and church *sasi* but uncommon where church *sasi* is alone (Table 7.11).

7.4.2 Occurrence of marine management rules in *sasi* and non-*sasi* villages

During the inventory, both *sasi* and non-*sasi* rules pertaining to the fishery were catalogued. Fisheries rules do occur outside of the *sasi* institution, both in *sasi* and non-*sasi* villages (Appendix 7). Where gear restrictions, access restrictions, and sale of harvest or access rights occur outside of the *sasi* institution, the rules are developed and enforced by the village government.

The national ban on blast fishing and use of poisons is supported either formally (i.e., written as a legal village or *sasi* regulation) or informally (by verbal decree of the village leader), in a majority of villages (Table 7.12). Support for this rule in *sasi* villages is particularly strong. Regardless of the type of rule considered, the occurrence is highest in marine *sasi* villages and is also relatively high in villages that have *sasi* only on land or in the village. Even villages which have lost marine *sasi* have, on an average, a much higher prevalence of fisheries rules and hence, a significantly higher compound management score when compared with non-*sasi* villages (see Section 2.2.3 for method of determining management score).

Overall, the average marine management score for central Maluku is low because some villages have few or no rules affecting the fishery. Also, because *sasi* is applied to relatively small areas and few species, there is no comprehensive area or species management in place anywhere.

Table 7.12. Fisheries rules and marine management scores (see Table 2.5) in central Maluku: differences between villages according to the presence, absence or history of having *sasi*. Where an attribute is marked with asterisks, this indicates that the difference between *sasi* and non-*sasi* groups is statistically significant ($p < 0.001$); ns=not significant.

Attribute/activity (sig. diff. between <i>sasi</i> and non- <i>sasi</i> villages)	Marine <i>sasi</i> * n=17 n=	Lost marine <i>sasi</i> 20	Any <i>sasi</i> (land, sea or village) n=46	No <i>sasi</i> n=17	All villages n=63
Local fisheries rules other than ban on bombs and poisons***	17 100%	8 40%	33 72%	3 18%	36 59%
Avg. # species affected by local rules (<i>sasi</i> , <i>lelang</i> or other rule) ***	4.3	1.4	2.6	0.9	2.1
Non- <i>sasi</i> auction of harvesting rights ***	0 0%	3 15%	3 7%	0 0%	3 5%
Non- <i>sasi</i> fees for resource access rights (ns)	4 24%	8 40%	13 28%	3 18%	16 25%
Gear ban (ns)	16 94%	13 72%	37 83%	11 65%	48 77%
Management score (\pm SE) ***	7.35 \pm 0.30	3.05 \pm 0.55	4.95 \pm 0.45	1.83 \pm 0.41	3.97 \pm 0.38

In *sasi* villages, the distinction between *sasi* rules and other formal and non-formal fisheries rules is often blurred. In Haruku, for instance, the *kewang* actively enforces the national ban on blast fishing and this is accepted as part of *sasi*. Bans on the use of poisons, which also reinforce a national ban, may actually have a history that predates the national prohibition, as this ban occurs among written *sasi* rules (see Appendix 6). Formal village rules may also be called *sasi* rules even if, in the strict sense, they are not. In Paperu, for instance, new formal village rules set in place by the LKMD are referred to as *sasi* but there is no enforcement by a traditional *kewang*. The term marine *sasi* is increasingly used in common parlance to include any marine management effort, regardless of the level of involvement of *adat* authorities.

It is interesting to note that although the auction of marine resource harvest rights occurs outside of marine *sasi*, it only occurs in three villages that used to have marine *sasi* in the past and still maintain some sort of *sasi* institution (Appendix 7). Situations where fees are collected in exchange for access rights also occur in non-*sasi* villages. Harvest and access rights that are sold, rented out or auctioned cover the same species that are typically under *sasi*, i.e., inshore pelagic fish (e.g., Tengah-Tengah, Abubu, Tuhaha, Tial, Wakal, Akoon), sea cucumbers (e.g., Tial), top shells (e.g., Nolloth outside of *sasi* area), and ornamental fish (e.g., Hulaliu, Tial).

7.5 Discussion

7.5.1 Defining *sasi*

Comparing our inventory results with information collected by Evans et al. (1997) one notes differences. This illustrates the difficulty of making an inventory of an institution that is in continuous change and may be defined differently according to one's perspective (village history, social class etc.), and details which are often only partly known by any given informant. People may claim to still have *sasi* even though it has not been physically practiced in years. Information gained from villagers is often fragmentary or even contradictory, and must be cross-checked. Evans et al. (1997) recorded the village of Seith in Ambon as having no land

sasi, whereas our respondents were able to provide a detailed account of where and how land *sasi* is practiced in the village territory. On the other hand, Evans et al. record *sasi* as occurring in Hila, whereas we note its absence. It seems that *sasi* in Hila has been slowly dying and has been practiced to some extent into the 1990s. Whether at this point you proclaim it dead or alive is a matter of opinion. Our results should be seen not as an attempt to provide some definitive single answer to the question of what is *sasi*. That is clearly impossible. Rather, our results are a snapshot of village-level perceptions in 1997.

Some will want to disagree with the fact that we have included among “*sasi*” villages a few where there is no access restriction applied to local residents. Our approach has been to honor our respondents’ concepts of *sasi*, not impose any academic definition. If villagers in Rohua, Amahai and other parts of Seram say they have *sasi*, we have recorded the presence of *sasi*, even though their system does not conform with *sasi* as practiced in traditional villages of the Lease Islands. In the same vein, we record *sasi lelang* in Muslim villages such as Kabauw and Pelauw as *sasi*, even though the connection with *adat* tradition has become tenuous.

7.5.2 Variability and core concepts

The inventory shows that occurrence and attributes of the *sasi* institution and marine *sasi*, in particular, vary with village religion, population size and island, and also according to whether it is *adat*, church or “others”. Marine *sasi* is most common in villages of 2,000-3,000 people and is most usually administered by *adat* or local government leaders, with the church playing only a supporting role.

Despite the welter of variation in the institution as operationalized in villages of central Maluku, *sasi* evokes a consistently positive response from village authorities, who regard it as good and useful even if in their own village, *sasi* is lost or non-functional. The value of *sasi* is seen to lie in prevention of theft, optimization of village incomes, rational resource use and, in some cases, resource conservation.

The inventory reveals that in any one village, the *sasi* institution of today is never a comprehensive management system. Its scope and area of application are very limited. Considering the sum of its many variants, however, we can also say that *sasi* does involve many concepts, attributes and structures that are important in any marine resource management and conservation regime. These include:

1. The concept of open and closed areas / open and closed seasons.
2. The concept of community tenure rights over a marine area.
3. The concept of limiting access to resources.
4. Controlled harvest and distribution of benefits.
5. Locally developed and agreed upon regulations. These may be specific to the village, (limitation of gear types, size of fish or shellfish harvestable) or may reinforce national laws (prohibition of blast fishing, use of poisons).
6. Local wardens or enforcers (the *kewang*) who have defined rules of process as well as prescribed sanctions to impose.
7. A responsibility shared by all residents to report violations of *sasi* rules.
8. Methods operating to advise all residents at regular intervals of the substance of *sasi* rules.
9. An overall goal of improving or maintaining community welfare which, being rooted in *adat* or the concept of the unity of man with nature, is consistent with modern concepts of sustainable use.
10. A hierarchical institutional structure wherein various tasks are divided among clearly

- defined bodies (i.e., village government, *kewang*, church).
11. Low or no financial cost to the formal government i.e., *kewang* members and church leaders involved are not paid wages, although they may receive a share of harvests. Local government offices may also receive income from the sale of harvesting rights for communal resources.
 12. Resilience and the ability to evolve.

7.5.3 *Island synopses*

Haruku Island has the largest proportion of existing *adat sasi* and is also unique in that every village has some form of *sasi* and most have village *sasi*. Of all the islands, Haruku has the lowest incidence of gear restrictions and local fisheries rules, and the highest incidence of marine resource rental or auction.

Saparua, a predominantly Christian island, is exceptional in that over half of all villages have marine *sasi*, and a further four villages have lost this form of *sasi* in living memory.

Nusa Laut is entirely Christian, and the villages are uniformly small. Church *sasi* prevails. *Adat sasi* persists in only one village and marine *sasi* and village *sasi* have died out entirely. None of the villages has written *sasi* rules. In the past, however, most of these villages practiced some form of marine *sasi* and/or *sousoki* (communal fishing).

The villages at Ambon Island had the least *sasi*. On this island, the coastal villages are mostly large (>3,000 people) and over half are Muslim. Because we did not include urban satellite villages in the inventory, the actual occurrence of *sasi* on the island is even less than indicated from our survey results.

Two-thirds of the *sasi* villages investigated on Seram have written rules and half perform *adat* ceremonies. Marine *sasi* as practiced in Seram is distinctive in that it may involve only fisheries rules. Area restrictions, where they exist, may not apply to local residents. Because the number of villages studied in Seram was very limited, this cannot be assumed to be generally true for the island.

7.6 **Conclusions**

Sasi, the local resource management institution, has a long history. The application of *sasi* to marine resources, however, has always been limited in scope and some modern forms of marine management date back only a few decades. As an institution, *sasi* has never been static but has changed with the times and been used by different proponents for different economic and social reasons, not simply for resource management. *Sasi* and the underlying *adat* culture have waxed and waned over time, absorbing and reflecting the impacts of colonialism, war, economic development and social change. However, despite past predictions of imminent demise, *sasi* and *adat* persist and are, therefore, resilient.

The majority of central Maluku villages still retain some form of local *sasi* institution, but only a quarter of them have rules pertaining to marine management. In the past, half of these villages had local marine management rules. Village leaders perceive *sasi* as a useful institution. *Sasi* practices vary from village to village. The governing and enforcing authorities may be *adat*, church, local government and/or private individuals holding harvest rights. In Christian villages, the church is an important supporter, whereas the role of Muslim leaders in *sasi* appears to be much more limited. Marine *sasi* is most prevalent in mid-sized villages

that are distant from the urban center of Ambon. In no case is management under *sasi* comprehensive; only small areas of shallow waters and few species are regulated. Nevertheless, the existence of *sasi* means that certain important management concepts are widely known and valued as part of local culture. From this, we can see that using *sasi* as the basis for development of a modern management institution can be considered to be efficient because, through *sasi*, these core concepts are generally known and seen to be legitimate. This reduces potential costs of public education and enforcement.

The promulgation of fisheries rules at the village level has clearly been influenced significantly by the *sasi* institution. Active marine *sasi* villages have the most rules in practice, but other villages where marine *sasi* has been lost or where some other form of *sasi* (land, village) persists are also more active in managing local marine resources than non-*sasi* villages.

Chapter 8

Comparison of Equity, Efficiency and Sustainability in *Sasi* and Non-*Sasi* Villages of Central Maluku

8.1 Performance of Marine Management as Perceived by *Sasi* and Non-*Sasi* Fishers

In theory, *sasi* rules that restrict access and limit harvest periods have the potential to provide long-term ecological as well as related economic benefits. In a few cases, recently revived or augmented *sasi* rules are explicitly meant to conserve or protect marine and coastal resources (for instance, in the Ihamahu and Haruku villages). In addition, there may be benefits in terms of equity and social harmony. Marine resources under *sasi* may be harvested as communal crops and distributed equitably among the population (for example, the *lompa* fish harvest at Haruku). Marine resources may also be sold to provide funds for infrastructure and projects that benefit the whole community (as in Nolloth with the *Trochus* harvest). It would also seem logical that a local institution would be more accessible and responsive to local needs than a centralized bureaucracy, and one can argue that *sasi* is relatively efficient as it does not rely on expensive state infrastructure and bureaucracy. But can these potential benefits be proven to exist?

To evaluate the performance of *sasi*, a method was used by which the perceptions of fishers on issues related to social and biological sustainability and the equity and efficiency of fisheries management in their villages could be quantified (Pomeroy et al. 1996). Each of the 508 respondents provided information on current conditions, changes through time (past 15 years) and future expectations for each of the indicators. For comparative purposes, the responses were divided into two groups: those from fishers in marine *sasi* villages and those from fishers in villages lacking the *sasi* institution.

8.2 Equity Indicators

Indicators used to measure equity were: 1) the role of fishers in management, 2) the individual access of fishers to marine resources, 3) fair distribution of fishing gears, and 4) economic equality among villagers. A definition for each indicator is given in Table 2.6. Significant differences between *sasi* and non-*sasi* villages (for statistical methods see Section 2.3.3) are represented in Tables 8.1 and 8.2. Comparisons were made between the average condition in the past in *sasi* and non-*sasi* sites, between past and present conditions in each type of village, and between average change through time in *sasi* and non-*sasi* villages (Table 8.1). The same series of comparisons was made for present and future conditions (Table 8.2).

The role of fishers in management

There were no significant differences between *sasi* and non-*sasi* fishers in terms of average current and past levels of the first three indicators of equity, i.e., the role of fishers in fisheries management, access of fishers to marine resources, and fair distribution of fishing gears (Table 8.1). Both types of fishers recorded a static level of involvement in management (Table 8.1) i.e., their role had not changed over the past 15 years. Perceptions of fishers from any one village regarding their involvement in management were usually mixed, as if involvement depended on factors other than being involved in the fishery. A few comments indicated that wealthier, commercial fishers had more influence than artisanal fishers but others simply said that some people's ideas were better than others and were listened to, or not, depending on their merit.

People from the same village were sometimes very consistent. For instance, comments by fishers in certain non-*sasi* villages (Saparua town, Seri, Hutumuri) and in Hulaliu, where *sasi* is being revived, suggested that in these villages fishers were never or rarely consulted and decisions on fisheries issues were made by local leaders. Fishers in Batudua, another non-*sasi* village, explained that they were not involved in management and that they did not really understand what activities management might include. In contrast, comments by fishers from other *sasi* and non-*sasi* villages (Tengah-Tengah, Seith, Porto, Eri, Itawaka, Seilale, and Siri-Sori) suggested that they had processes in practice to involve fishers in decision-making, (for the *sasi* status of villages, see Appendix 2). In Seilale, for example, the influence of the government IDT program (village development program), under which fishers were organized into groups, had had a large impact. In other villages as well, involvement in such a group was noted by fishers as a factor that made them feel involved in management.

By far, the most common factor cited as being influential in the discussion of village issues in general (102 comments) and fisheries rules in particular (65 comments), was the quality of village leadership. Other important factors were involvement in fishers' groups (34 comments), and awareness and education (55 comments).

Access of fish harvesters to marine resources

Both *sasi* and non-*sasi* fishers recorded a decline in access to resources over the past 15 years (Table 8.1) and they often referred to competition for resources with the commercial sector. In eight villages, fishers stated that there were arguments and conflicts between artisanal fishers and the motorized sector. Access to resources was expected to continue to decline, the increase in the use of modern, large-scale fishing gears being one of the causes. Non-*sasi* villagers were significantly more pessimistic about future access (Table 8.2).

Distribution of fishing gears

The distribution of fishing gears was seen by both groups to be getting more equitable over time (Table 8.1). This trend is expected to continue into the future (Table 8.2). Most harvesters commented on the changing face of the fishery and, again, the increase of modern gears. Respondents often expressed their belief that the type of gear owned was simply a function of a person's willingness to make an effort and work hard (48 comments) but others spoke also of government programs (16 comments) and a few mentioned access to credit.

Economic equality among villagers

Present-day economic equality within the village was seen as being on average the same everywhere. However, in *sasi* villages, people thought that this indicator had not changed over time, i.e., the level of equality had always been acceptable. In non-*sasi* villages, fishers thought conditions in the past were worse but had on an average improved, approaching conditions in *sasi* villages (Table 8.1). Neither group expected change in the future (Table 8.2).

8.3 Efficiency Indicators

Efficiency was measured through the following indicators: 1) communal decision-making, 2) ease of entry into the fishery, 3) control over access to fishery, and 4) compliance with fishery rules (for definitions, see Table 2.6).

Table 8.1. Perceptions of fishers (past and current conditions) measured using a self-anchored ladder scale combined with a structured interview of 15 questions. n=508 heads of fishing households, either from a marine sasi village (n=211) or non-sasi village (n=297). Significance of differences tested as per section 2.3.3. Probabilities as follows: ns=not significant, *= $p<0.05$, **= $p<0.01$, *= $p<0.001$.**

Indicator	Average past condition		Prob.	Average current condition		Prob.	Average change through time (past 15 yrs)		Prob.
	Sasi	No sasi		Sasi	No sasi		Sasi	No sasi	
<i>Equity</i>									
Role of fishers in management	6.56	6.48	ns	6.70	6.57	ns	+ 0.1 ns	+ 0.1 ns	ns
Degree of access to marine resources	8.33	8.60	ns	7.56	7.78	ns	- 0.8***	- 0.8***	ns
Fair distribution of fishing gears	6.09	5.85	ns	7.23	7.32	ns	+ 1.1***	+ 1.5***	ns
Economic equality among villagers	6.79	6.30	**	6.57	6.59	ns	- 0.2 ns	+ 0.3*	*
<i>Efficiency</i>									
Communal decision-making	6.92	6.44	*	6.85	6.71	ns	+ 0.1 ns	+ 0.3 ns	ns
Ease of entry into the fishery	8.34	8.44	ns	7.50	7.45	ns	- 0.8***	- 1.0***	ns
Control over access to fishery	6.76	6.35	ns	7.20	6.41	***	+ 0.4**	-0.06 ns	ns
Compliance with fishery rules	7.63	7.68	ns	7.45	7.09	*	- 0.2*	- 0.6*	*
<i>Social Sustainability</i>									
Tradition of collective action	8.69	8.39	*	7.67	7.15	**	- 1.0***	- 1.2***	**
Family well-being	6.24	6.34	ns	7.10	7.10	ns	+ 0.9***	+ 0.8**	ns
Income	6.71	6.19	**	6.42	6.82	**	- 0.3 ns	+ 0.6***	***
Community harmony	8.03	7.96	ns	6.90	6.21	***	- 1.1***	- 1.8***	**
Discussion of village issues	8.34	8.01	*	7.50	7.11	*	- 0.8***	- 0.9***	ns
<i>Biological sustainability</i>									
Marine resource health	8.77	8.45	***	5.92	5.81	ns	- 2.9***	- 2.6***	ns
Fish catch	8.93	8.70	ns	5.50	5.73	ns	- 3.4***	- 3.0***	*

Table 8.2. Perceptions of fishers (current conditions and future expectations) measured using a self-anchored ladder scale combined with a structured interview of 15 questions. n=508 heads of fishing households, either from a marine sasi village (n=211) or non-sasi village (n=297). Significance of differences tested as per section 2.3.3. Probabilities as follows: ns=difference not statistically significant; *= $p<0.05$, **= $p<0.01$, *= $p<0.001$.**

Indicator	Average past condition		Prob.	Average current condition		Prob.	Average change through time (past 15 yrs)		Prob.
	Sasi	No sasi		Sasi	No sasi		Sasi	No sasi	
<i>Equity</i>									
Role of fishers in management	6.70	6.57	ns	6.81	6.58	*	+ 0.11ns	+ 0.01ns	ns
Degree of access to marine resources	7.56	7.78	ns	7.03	6.89	ns	- 0.53***	- 0.89***	**
Fair distribution of fishing gears	7.23	7.32	ns	7.65	8.00	ns	+ 0.42***	- 0.68***	ns
Economic equality among villagers	6.57	6.59	ns	6.45	6.69	ns	- 0.12 ns	+ 0.10ns	ns
<i>Efficiency</i>									
Communal decision-making	6.85	6.71	ns	6.83	6.76	*	- 0.02 ns	- 0.74 ***	ns
Ease of entry into the fishery	7.50	7.45	ns	6.79	6.49	ns	- 0.72***	- 0.96***	ns
Control over access to fishery	7.20	6.41	***	7.54	6.59	***	+ 0.33*	+0.17 ns	ns
Compliance with fishery rules	7.45	7.09	*	7.06	6.59	ns	- 0.39***	- 0.50***	ns
<i>Social Sustainability</i>									
Tradition of collective action	7.67	7.15	**	6.91	6.41	**	- 0.76***	- 0.74***	ns
Family well-being	7.10	7.10	ns	7.47	7.48	ns	+ 0.37**	+ 0.39***	ns
Income	6.42	6.82	**	6.47	7.23	**	+0.05 ns	+ 0.41***	*
Community harmony	6.90	6.21	***	6.35	5.55	***	- 0.55***	-0.66***	ns
Discussion of village issues	7.50	7.11	*	7.36	6.72	**	- 0.12ns	- 0.40***	ns
<i>Biological sustainability</i>									
Marine resource health	5.92	5.81	ns	5.92	4.56	ns	- 1.18***	- 1.25***	ns
Fish catch	5.50	5.73	ns	5.50	4.49	ns	- 1.11***	-1.24***	ns

Communal decision-making

Fishermen in *sasi* villages had a relatively more positive perception of past communal decision-making. The degree to which villagers are able to make decisions communally has not changed over time (Table 8.1). However, whereas those in *sasi* communities expected this to continue, non-*sasi* fishers expected conditions to worsen in future (Table 8.2). The fishers in these villages spoke of the loss of respect for *adat*, increasing population, immigration of people with different values, and other outside influences as being factors in the decline. Fishers who were more optimistic referred to increasing awareness and education as positive influences.

Ease of entry

Ease of entry into the fishery was seen as declining over time because the cost of fees (26 comments) and of new gears (33 comments) increased. Also, the cost of fuel rose because fishers had to go farther out to sea to find fish (19 comments). Here, too, fishers were pessimistic about future change whether they lived in a village with marine *sasi* or in a place with no local management institution.

Control over resources and compliance

Current and future control over access to resources, as well as current compliance with regulations were rated higher in *sasi* villages. Both groups thought compliance rates had decreased over time and expected this decline to continue into the future. However, this breakdown in compliance was most marked in non-*sasi* villages. Differences among villages were also interesting. Fishers in the most traditional *sasi* villages (Nolloth, Haruku) perceived compliance to fisheries rules to be particularly high compared to the 26 other villages in the sample. Where *sasi* had evolved into a commercial transaction, with the *kewang* being not hereditary village police but a group hired to guard the resource extraction rights of an individual, fishers perceived compliance to be lower and on the decline (Kabauw, Pelauw). In villages where the *kewang* was active or where the village government played an active role in governing the fishery (mostly *sasi* villages), control over access was perceived as high, and this was generally regarded as good.

Fishers from three villages that had lost marine *sasi* as an institution but still had *sasi*-style rules in effect (Hulaliu, Tuhaha, Soahuku), perceived compliance to be significantly lower than in all other villages. Factors most commonly identified as influencing compliance were leadership (72 comments), allegiance to *adat* (27 comments), economic need (22 comments), education and awareness (22 comments), and the threat of sanctions (19 comments).

8.4 Social Sustainability Indicators

Five indicators of social sustainability were measured: 1) tradition of collective action, 2) family well-being, 3) income, 4) discussion of village issues, and 5) community harmony (for definitions, see Table 2.6).

For four of five indicators, current conditions were significantly different between *sasi* and non-*sasi* villages i.e., the tradition of collective action, community harmony and discussion of village issues were higher in *sasi* villages; income was lower. Considering the change in each indicator over the past 15 years (Table 8.1), we see that the changes also differed significantly between *sasi* and non-*sasi* villages for three indicators. The tradition of collective action and harmony declined more dramatically in non-*sasi* villages, whereas income levels increased.

Tradition of collective action

The tradition of collective action was strongest in villages having a *sasi* institution. Although the level of communal activity was in decline everywhere, it was significantly worse in non-*sasi* villages. The most common comment from fishers was that people who used to help one another voluntarily now expected cash payment.

Family well-being and income

Family well-being, defined in terms of housing, health, and education opportunities, was the same in *sasi* and non-*sasi* villages and on the increase. When asked to rate their incomes, however, *sasi* fishers gave themselves lower current and future scores than did non-*sasi* fishers. They also, on an average, reported static incomes, whereas non-*sasi* fishers reported increasing incomes. Perceived loss of income over time was related to age, being most sharply felt by the oldest fishers. The average age of fishers in *sasi* villages (50 years) was greater than that of non-*sasi* fishers (44 years).

Community harmony

Present and future community harmony was significantly greater in *sasi* villages, even though this group contained Haruku, which is currently in political turmoil (see case study). Although both groups perceived a decline in harmony over the years, and expected further deterioration, this decline was much more marked in non-*sasi* villages. The factor most affecting community harmony was drinking problems among youths (111 comments), especially in Seri, Hutumuri, Haruku, Seilale and Soahuku. Another common complaint on Ambon Island was the negative influence of the city, whereas fishers on other islands spoke of bad outside influences in more general terms (42 comments). Poor leadership (39 comments), unemployment (17 comments), land disputes (10 comments), and erosion of *adat* (6 comments) were also named.

Discussion of village issues

The level of discussion of village issues (past, present and future) was felt to be significantly higher in *sasi* villages. However, both groups of fishers thought that village issues were publicly discussed much less now than in the past. *Sasi* villagers thought this would not get any worse whereas non-*sasi* villagers predicted further decline in the future.

8.5 Biological Sustainability Indicators

Health of the marine environment was measured in terms of 1) resource health, and 2) fish catches. Both were seen to be in decline everywhere (Table 8.1). Neither fishers in *sasi* villages nor those in non-*sasi* villages were optimistic about the future (Table 8.2). The oldest fishers (over 60 years of age) perceived the greatest declines in both fish catches and the marine environment.

Fish catches

As *sasi* is applied only to a small number of inshore species, and fishers mostly target pelagic fish outside of *sasi* areas, this is not a reflection of catch rates within *sasi* areas but in the larger fishery. Fishers in *sasi* villages were more sensitive to declining catch rates over the past 15 years, perhaps because of their greater average age and longer experience at sea. When

explaining why they thought their catches had declined, no fewer than 133 respondents blamed increases in the number of modern fishing gears and a further 67 people pointed to the increase in lift nets (*bagans*) and FADs (*rumpons*) as being especially bad for the fishery.

Resource health

Fishers blamed the decline of resource health on many factors. The most common were: too many modern gears (133 comments), too many lift nets and FADs (67 comments), habitat destruction by fishing gears (35 comments), blast fishing (33 comments), use of poisons (16 comments), domestic wastes and other pollution (86 comments), oil pollution (37 comments), factory discharges (32 comments), lack of awareness (25 comments), and increasing population (29 comments). Complaints about various forms of pollution came mostly from Ambon Island and from Soahuku on Seram. Concern about blast fishing and the use of poisons was voiced on every island.

8.6 Socio-Economic Conditions in *Sasi* and Non-*Sasi* Villages

8.6.1 Economic score and relationship to *sasi*

Fishers in *sasi* villages were on average older, mostly Christian, and had relatively limited formal education (Table 8.3). The economic score of each fisher was calculated using data on land ownership, type of housing, fishing gear and boat (see Section 2.4.3). Although age and limited education were each negatively correlated with economic score, there was no statistically significant difference between average economic status of *sasi* and non-*sasi* fishers.

There were, however, significant differences in average economic score among the 28 villages. Fishers in Seith (*sasi*), Tiow (non-*sasi*), Iha (non-*sasi*) and Pelauw (non-*sasi*) were the poorest. It is not the presence of *sasi* that seems to be decisive, but religion may be a factor. In all these villages, either the dominant religion is Muslim or we interviewed Muslim fishers in a predominantly Christian village.

The villages with significantly higher scores than the above four were Morela (*sasi*), Siri-Sori (*sasi*), Soahuku (*sasi*), Eri (non-*sasi*), Ouw (non-*sasi*), Rutah (non-*sasi*) and Hutumuri (non-*sasi*) (see Appendix 2 for status of *sasi*). The other villages were intermediate. The seven “richest” fishing communities thus include three *sasi* and four non-*sasi* types. Two of the seven are Muslim. Therefore, there is no evidence from our data that *sasi* as an institution has either a significant positive or negative impact on the economic well-being of fishing families or their communities.

Table 8.3. Average status of *sasi* and non-*sasi* fishers, in sample of n=508.

Characteristic	<i>Sasi</i> fishers	Non- <i>sasi</i> fishers	F	P
Average age (S.E)	50.2 (0.83)	44.9 (0.68)	25.0	<0.001 (***)
Average years of education (S.E)	6.81 (0.15)	7.23 (0.14)	3.9	0.048 (*)
Religion	36.5% Muslim 63.5% Christian	44.7% Muslim 55.3% Christian	3.43	0.065 (ns)
Average economic score (S.E)	8.46 (0.15)	8.66 (0.13)	1.1	0.293 (ns)

8.7 Conclusions

Sasi as an institution has no demonstrable impact on the economic status of individual artisanal fishers as measured in terms of ownership of land, housing, boat and fishing gear. This is probably because the resources managed under *sasi* constitute a relatively small proportion of family income. Most income is derived from the deep-water pelagic fishery and agro-forestry. Fishers in *sasi* villages perceive themselves as being relatively poor in terms of their income. This may be related to the fact that the average age of *sasi* fishers is higher and age is negatively correlated with income. There is no evidence from our data that *sasi* as an institution has either a significant positive or negative impact on the actual economic well-being of fishing families or their communities. Religion, however, may be related to prosperity. It is generally acknowledged that Christians became relatively advantaged during the Dutch rule in Maluku.

Generally, there is better social sustainability in *sasi* villages (more harmony, communal activity, discussion of village issues) and lesser trends of deterioration through time. Also, *sasi* may be considered to be efficient because of the significantly higher compliance to fisheries rules in *sasi* villages. However, *sasi* is not inherently equitable in the sense of being inclusive or democratic. Common fishers in *sasi* villages feel no more involved in decision-making than fishers in non-*sasi* villages.

There was no evidence from the performance survey that *sasi* had any impact on the health of the fishery in general. This is seen to be in decline all across the study area.

Chapter 9

Impact of *Sasi* on Inshore Fisheries Resources and Habitat in Central Maluku

9.1 Marine Survey Results in *Sasi* and Non-*Sasi* Villages

A second part of the evaluation of the impact of *sasi* involved direct surveys of coral reef habitats and resources in marine village territories of *sasi* and non-*sasi* villages. Surveys were conducted in and near the *sasi* villages (i.e., Nolloth, Ihamahu, Itawaka on Saparua Island; Haruku and Sameth on Haruku Island). In several cases (Nolloth, Itawaka and Haruku), guarded *sasi* areas were investigated. The non-*sasi* areas of Nolloth, Haruku and Sameth marine village territories and the *sasi* area of Ihamahu, which is not actively protected, were also surveyed. In addition, coral reefs were investigated in non-*sasi* villages (Iha on Saparua Island, and Hutumuri, Lapaut, Toisapu, Seri and Airlow on Ambon Island). Detailed survey information can be found in Appendix 1. Maps of each surveyed area accompany the village case studies (Chapters 10-15).

9.2 Coral Reef Surveys in *Sasi* and Non-*Sasi* Areas

9.2.1 Saparua Island sites

There are no *sasi* rules applied to those portions of the marine village territories of Nolloth, Iha and Ihamahu that lie inside Tuhaha Bay (Table 9.1 and Figure 12.1). These areas lie directly in front of the villages. They have a less live coral cover and more dead corals and rubble than the outer coast. There was no sign of healthy reef fish stocks.

Table 9.1. Survey of village territories inside and on the northern edge of Tuhaha Bay, indicating overall average condition of the marine village territory directly in front of each village. Numbers refer to coral cover categories, i.e., 0=no hard bottom for corals, 1= \leq 10% cover on hard bottom, 2=11-30%, 3=31-50%, 4=51-75%, 5=76-100%. Abundance indicators: 0=absent, —=rare, -=uncommon, +=common, ++=abundant, +++=superabundant.

Location	Status	Dead corals	Live hard corals	Soft corals	Sand	Rubble	Fish	Bomb craters
Itawaka (northwest side)	<i>Sasi</i> , guarded	3	2	1	++	+	-	No
Nolloth	Non- <i>sasi</i>	4	1	1	-	++	-	No
Iha	Non- <i>sasi</i>	4	2	2	-	++	-	Yes (old)
Ihamahu	Non- <i>sasi</i>	4	2	1	-	++	-	Yes (old)

In Itawaka's marine territory, *sasi* is applied (Tables 9.1 and 9.2), but there is, nevertheless, evidence of past blast fishing. The northwestern part, bordering Tuhaha Bay, has less of a live coral cover than the northeastern part, which lies on the outer coast. South of Itawaka's marine territory is the part of Nolloth's main marine area which is not under *sasi*. The northern portion of Nolloth's east coast territory is devoid of living corals. The beach is covered in cobbles and the reef flat is exposed at low tide, making coral survival unlikely. South of this is a stretch of narrow fringing reef lying close to the shore. The coral cover here is on an average equal to that in the more southerly *sasi* area (Table 9.2). Fish are not abundant, but there are few dead corals or rubble, and no bomb craters are seen. Nolloth's eastern shore is a typical wave-exposed fringing reef, dominated by massive and soft corals.

Sasi is applied to an approximately 2.5 km long area at the southeastern end of Nolloth's marine territory. This *sasi* area is actively guarded to protect the top shells (*Trochus niloticus*) and sea cucumbers (various species). It has a good coral cover on a hard bottom that is interspersed with sandy patches. Tinauw, the area reputed to be the richest in top shells, has a mixed coral, sand and rock bottom, including one stretch of 51-75% hard coral cover (see Figure 10.1). Reef fish are common. There is not much rubble but bomb craters were detected, mostly in the very southern area. This southern reach borders a stretch of just a few hundred meters claimed by Ihamahu. Ihamahu's area is regulated under *sasi* but not actively policed and, therefore, extensively damaged by blast fishing.

Table 9.2. Average condition of coral reefs in village territories on the northeastern shore of Sapurua Island.

Location	Status	Dead corals	Live hard corals	Soft corals	Sand	Rubble	Fish	Bomb craters
Itawaka (northwest side)	<i>Sasi</i> , guarded	3	3	2	-	+	++	Yes (old)
Nolloth	Non- <i>sasi</i>	2	3	2	+	-	+	No
Nolloth	<i>Sasi</i> , guarded	2	3	2	-	-	+	Yes in 1/3 of tows
Ihamahu	<i>Sasi</i> , not guarded	4	3	1	-	++	+	Yes in all tows

9.2.2 Haruku Island sites

The villages of Haruku and Sameth jointly administer marine *sasi*. The *sasi* area is inside Haruku's territory and is mostly sea grass rather than corals. However, the *kewang* of Haruku attempts to protect the small patches of coral reefs in front of both villages. The survey was started at the northern edge of the marine village territory of Sameth (see Figure 11.1 for map). Where there was a hard bottom suitable for corals, there were also bomb craters and a great amount of dead corals and rubble (Table 9.3). In Sameth, where the total living cover sometimes exceeded 50%, soft corals were more abundant than hard corals. Few fish of any sort were seen with the exception of parrot fish. After completing seven tows over mixed sand and patchy corals, we reached a continuous sandy bottom and discontinued the survey. Tows were begun again in front of the Sameth graveyard and continued to the southern edge of the Learisa Kayeli River in Haruku. In this area, which is part of the *sasi* area, we found that the coral reef had been heavily damaged by sedimentation, which *kewang* members blamed on erosion stemming from mine exploration in the upper watershed.

Table 9.3. Survey data from marine territories of Haruku and Sameth. Numbers refer to coral cover categories, i.e., 0=no hard bottom for corals, 1= \leq 10% cover on hard bottom, 2=11-30%, 3=31-50%, 4=51-75%, 5=76-100%. Abundance indicators: 0=absent, --=rare, -=uncommon, +=abundant, +++=superabundant.

Location	Status	Dead corals	Live hard corals	Soft corals	Sand	Rubble	Fish	Bomb craters
Sameth	<i>Sasi</i> , guarded	4	2	2	+	++	-	Yes in over half of tows
Haruku	Non- <i>sasi</i> guarded	2	1	1	+++	-	-	No
Haruku	<i>Sasi</i> , guarded	2	1	1	++	-	-	No

9.2.3 Ambon Island sites

Hutumuri includes several *dusuns* (sub-villages), including Lapaut and Toisapu (see map in Figure 15.1). The marine village territory starts close to Batugong, located to the north of Toisapu. Between here and Toisapu, it is sandy bottom, which we did not survey. The shallow sand shelf (4-8 m deep) stretches out over 200 m, then dips to 20 m deep. Blast fishers targeting schools of pelagic fish commonly operate over the sand shelf.

Along the shore between Toisapu and Lapaut, and from Lapaut to Hutumuri, there is a narrow fringing coral reef (Table 9.4). The shore is mostly cliff, dropping rapidly to depths of 5-10 m. Surveys were conducted all along this coast to the bay in front of the Hutumuri village. Here at low tide, there is a 100 m exposed rock flat. Along the outer edge are living corals, barely submerged at low tide, which are very much trampled and only partly alive. The Toisapu, Lapaut, and Hutumuri marine village territories had a more live hard coral cover than Haruku-Sameth and slightly less than Nolloth.

The Seri cove is one of the few places on southern Ambon Island where there is a ribbon of coastal flat land, fronted by a beach of pebbles and dark sand dipping to a broad expanse (perhaps 100 m wide) of intertidal rock flat fringed with living corals. In contrast, most of this coast of Ambon Island is rocky cliff rising straight out of the water.

This shore is very wave-exposed during the eastern monsoon (May-September). Hard corals are, therefore, mostly massive forms. There are also areas of boulders and cobble bottoms where corals cannot survive. The hard coral cover in the Seri cove rarely exceeds 30% but soft corals are more abundant. Dead corals are most common directly in front of the village, where people gather shellfish and go spear fishing. To the northeast of the Seri cove, the shore drops steeply to deep waters and there is little or no coral reef. Seri's marine territory extends to the headland called Tanjung Vanahu, beyond which the coast is claimed by the village of Mahia (see map in Figure 14.1).

Seri's land territory is bounded on the west by Airlow, a *dusun* of the *desa* of Nusaniwe that includes the Muslim coastal hamlet of Wemi. We surveyed Airlow's coastal territory from the border of Seri and Wemi, south to Pintu Kota, the mouth of Ambon Harbor (Table 9.4). There is a river on the boundary between Seri and Wemi. In front of the Wemi village, the bottom is a mix of rock and sand, with soft, massive and sub-massive corals increasing with greater distance from

Table 9.4. Average condition of coral reefs in non-sasi village territories on the southern shore of Ambon Island. Numbers refer to average coral cover categories, i.e., 1= \leq 10% cover on hard bottom, 2=11-30%, 3=31-50%, 4=51-75%, 5=76-100%. Abundance indicators: 0=absent, —=rare, -=uncommon, +=common, +=+=abundant, +++=superabundant. Details of individual tows in Appendix 1.

Location	Status	Dead corals	Live hard corals	Soft corals	Sand	Rubble	Fish	Bomb craters
Toisapu	Non-sasi	2	3	1	++	-	+	Yes in half of tows
Lapaut	Non-sasi	1	3	4	-	-	++	No
Hutumuri Headland	Non-sasi	3	2	1	-	-	+	Yes in 1/4 of tows
Hutumuri Bay	Non-sasi	2	3	2	-	-	+	Yes in 1/4 of tows
Seri	Non-sasi	3	2	2	-	-	-	No
Airlow/Wemi	Non-sasi	2	3	2	-	--	+	N0

the fresh water influence. In this area, old rubble is common, as well as dead, algae covered, coral rocks. The area looked bombed or wave-damaged in the past but no recent craters were seen.

9.3 Top Shells and Sea Cucumbers in *Sasi* and Non-*Sasi* Areas

9.3.1 *Saparua* Island sites

Areas surveyed were less than 5 m deep at low tide. The first area surveyed for top shells (*Trochus niloticus*) and sea cucumbers was Hatwa, in Nolloth's *sasi* area. Here we were not able to find any top shells (Table 9.5). We then moved to Tinauw in the Nolloth *sasi* area, reputed to be the richest top shell habitat. Four top shells in three transects were found. The animals were hiding in shaded holes and crevices. A similar habitat was discovered in Wailalone, also in the *sasi* area. Then we moved onto a sandy habitat to check for sea cucumbers, as these had also been rare in the transects. Finally, we performed several transects at Wailesi at the southern end of the *sasi* area, and in the narrow Ihamahu territory immediately south of Wailesi. All transects were performed at low tide, as local fishers advised that at this time, top shells come out to feed. Top shells were divided into "juvenile" (4-6 cm) and "legal" (>6 cm), based on the *sasi* regulations. Work was scheduled around mid-day when light was optimal. However, this was not optimal for finding sea cucumbers, many of which tend to hide in sand during the day and surface at night. The *Stichopus* sp. and *Bohadschia* sp. found were typically hidden in crevices whereas the *Holothuria* spp. lay out in the open.

To check whether skilled harvesters would come up with comparable results, we hired two local fishers to perform 5-minute searches over the same areas. They also emerged with only small numbers of top shells and sea cucumbers (Table 9.6). In Ihamahu, the harvester commented

Table 9.5. Results of 50 m x 1 m transects in different parts of Nolloth's *sasi* area and to the south of Nolloth in the Ihamahu marine village territory.

Site	# Sea cucumbers, type and length	# Top shells and basal diameter	Notes
Hatwa (Nolloth <i>sasi</i> area)	1 <i>Stichopus</i> sp.: 30 cm, 1 <i>Bohadschia</i> sp.: 40 cm.	0	1-2 m depth; massive corals on sand, plus algae-covered rocks and old rubble.
Tinauw (Nolloth <i>sasi</i> area)	0	0	Branched, foliose and massive corals.
Tinauw	0	1 (9 cm)	Sand, rubble with occasional clumps of corals.
Tinauw	0	3 (4, 9 and 9 cm)	Shoreward of previous transect, bottom similar.
Wailalone (Nolloth <i>sasi</i> area)	0	2 (4 and 7 cm)	4-6 m deep, mixed sand/rock/corals.
Wailalone	0	0	Sandy area.
Wailalone	0	0	Sandy area.
Wailesi (south end of <i>sasi</i> area)	0	3 (4, 8.5 and 9.5 cm)	Rocky with clumps of corals and sandy patches.
Nolloth (average per 50 sq m)	0.25	Juveniles: 0.5 Legal size: 1.0 (hard bottom only)	
Ihamahu	0	0	Coral reef in moderate condition, looks like good top shell habitat.
Ihamahu	0	1 (8 cm)	Mixed rocks, corals and sand.
Ihamahu (average per 50 sq m)	0	Juvenile: 0 Legal size: 0.5	

that, unlike the *sasi* area of Nolloth, the Ihamahu area had no “signs” of top shells. He also said that this unprotected *sasi* area was subject to poaching by people from the Ouw village.

Table 9.6. Results of 5-minute searches by experienced harvesters (Ulis and Julius Tutawarima) at various sites inside and immediately to the south of the Nolloth *sasi* area. Habitat type: mixed rocks, coral clumps and sandy patches.

Site	# searches	Avg. # sea cucumbers# per search	Sea cucumber species	Avg. # “legal” size top shells (>6 cm) per search	Avg. # juvenile top shells (4-6 cm) per search
Tinauw, Nolloth	10	0		1.1	not collected
Wailalone, Nolloth	4	1.25	4 <i>Holothuria</i> spp.;	0	0
			one 19 cm; three black and slippery sp. of 42-45 cm 1 <i>Bohadschia</i> sp., 35 cm		
Wailesi, Nolloth (south)	4	0		0.75	1.00
Ihamahu marine village territory	4	1.25	5 black slippery <i>Holothuria</i> sp., 35-45 cm	0	0

9.3.2 Ambon Island sites

According to local informants, top shells and sea cucumbers had been harvested from the waters of Hutumuri and Seri over many years by Butonese and Madurese traders, but there has been no harvest in recent years because stocks have been depleted. We performed very careful transect searches in both areas and failed to find a single specimen of either inside the transects (Table 9.7). One sea cucumber was seen outside of the sample area. Both depth and habitat were comparable to those at the Saparua Island sites.

9.4 Butterfly Fish Counts in *Sasi* and Non-*Sasi* Areas

Butterfly fish, being obligate coral feeders with varied food preferences, are often most diverse where corals are similarly so. Approximately, 50 species of butterfly fish are believed to inhabit eastern Indonesia. Half-hour surveys of butterfly fish in seven different sites provided species counts ranging from 8 to 18 per site (Table 9.8). These counts were performed over the best coral cover available in each marine village territory.

Unpublished research conducted in Biak, Irian Jaya (I. Novaczek, *pers. comm.*), using the same method and personnel, suggests that counts of 12-18 are common, whereas counts over 20 usually are obtained only in very rich coral habitats. Counts under 10 are usually found where there has been extensive damage to the reef. In this case, the lower counts were all in *sasi* villages. In each case, there was evidence of blast fishing, with the most extensive damage being evident in Sameth, the site with the lowest number of butterfly fish.

Table 9.7. Ambon Island sites: 50 m x 1 m transects, searching for top shells and sea cucumbers.

Site	# Sea cucumbers	# Top shells	Notes
Seri	0	0	Over 50% cover of living hard corals, mostly massive and sub-massive, with <10% sand. Large cracked boulder bottom i.e., extensive good top shell habitat.
Seri	0	0	5 m seaward of #1, habitat similar.
Seri	0	0	5 m shoreward of #1, habitat similar.
Hutumuri	0	0	Hard corals 10-30%, mostly massive and sub-massive. 10-20% sand. Appears to be good habitat for top shells.
Hutumuri	0	0	On the rocky bottom, hard corals cover more than 50%, dead corals with algae 10%. Appears to be good top shell habitat. Mixed sand/rock area has only rare massive corals (10%) and extensive algae.
Hutumuri	0	0	First 30 m has over 80% dead coral rocks with algae. Last 20 m over living corals. One black sea cucumber (<i>Holothuria sp.</i>) seen but not on transect.
Toisapu	0	0	North of Toisapu. Bottom irregular, 0-10% sand, 75% dead corals and other animals, 5-10 % live hard corals (mostly massive and some table); 20-25% soft corals. Appears to be good top shell habitat.
Toisapu	0	0	Position seaward of and above transect, near sand flat. 50% soft corals, 20% hard corals, 30% dead corals with algae or other animals. Giant clams present but rare and small.

Table 9.8. Butterfly fish surveys in sasi and non-sasi village marine territories.

Species	Nolloth (sasi)	Ihamahu (sasi)	Sameth (sasi)	Hutumuri (no sasi)	Toisapu (no sasi)	Seri (no sasi)	Airlow (no sasi)
<i>Chaetodon adiegastos</i>				x			x
<i>C. auriga</i>		x				x	x
<i>C. baronesa</i>	x	x			x	x	x
<i>C. citrinellus</i>			x	x			
<i>C. ephippium</i>	x				x	x	
<i>C. guttatissimus</i>	x						
<i>C. kleinii</i>	x		x	x	x	x	x
<i>C. lineolatus</i>					x		
<i>C. lunula</i>			x	x	x		x
<i>C. melanotus</i>			x		x	x	x
<i>C. meyeri</i>	x	x	x	x		x	x
<i>C. ornatissimus</i>	x	x		x		x	
<i>C. punctofasciatus</i>		x			x		x
<i>C. rafflesi</i>	x			x	x	x	x
<i>C. semeion</i>					x		
<i>C. speculum</i>					x	x	x
<i>C. trifascialis</i>		x			x	x	
<i>C. trifasciatus</i>	x	x	x	x	x	x	x
<i>C. ulietensis</i>						x	
<i>C. unimaculatus</i>				x		x	x
<i>C. vagabundus</i>	x	x	x	x	x	x	x
<i>Forcipiger flavissimus</i>		x		x	x	x	x
<i>F. longirostris</i>		x		x	x	x	x
<i>Heniochus chrysostomus</i>	x	x		x	x	x	x
<i>H. various</i>	x		x	x	x	x	x
Total # spp.	11	11	8	14	17	18	17

9.5 Conclusions

The ecological benefits of *sasi* in terms of coral reef health were not clear-cut. In Nolloth, there was no detectable difference in the coral cover or butterfly fish diversity between the *sasi* and non-*sasi* areas. When compared to the adjacent marine village territory of Ihamahu, however, it was seen that the latter, which is less effectively guarded, was more scarred by blast fishing, more covered in coral rubble and relatively lacking in soft corals. The most damaged reefs, in terms of the dead coral cover and general absence of fish, were seen inside Tuhaha Bay and in front of Haruku and Sameth. Tuhaha Bay and Haruku Strait are both relatively heavily populated, heavily exploited areas. In contrast, reefs surveyed along the south shore of Ambon Island were in moderately good condition and comparable to reefs along the eastern shore of Saparua Island. Both of these shores are relatively isolated and thinly populated. Also, they are very wave-exposed during seasonal monsoons and thus are allowed to “rest” for part of each year.

Both *sasi* and non-*sasi* villages suffer from blast fishing. Even when a *kewang* is present and motivated to enforce the ban on this gear type (as in Haruku and Nolloth), that is not effective. *Sasi* areas are also vulnerable to damage caused by external forces, as seen in Haruku where sedimentation from recent mining exploration has damaged one area of coral.

Butterfly fish species, an indicator of coral diversity, were more abundant in the non-*sasi* areas (14-18 species) than in *sasi* areas (8-11 species). The lowest diversity, seen in Sameth, appeared to be correlated with damage from blast fishing. Evidence of blast fishing on a lesser scale was also seen in Toisapu and Hutumuri (non-*sasi*) as well as in Nolloth (*sasi*). Of the fish survey sites, only Seri and Airlow were free from bomb craters. These also had the highest fish diversity.

Data from previous surveys around Saparua Island (Leonardo 1996) indicate that the average living cover on reefs along the eastern shore is 42% hard corals and 26% soft corals. This suggests that the *sasi* area in Nolloth, where the living cover of hard corals averages 31-50% and the cover by soft corals averages 11-30%, is an “average” area compared to others on the same coast. Leonardo’s figures for the north shore are 24% cover of hard corals and 37% of soft corals. Our data from inside Tuhaha Bay, from in the protected marine territory of Itawaka, and from the unprotected territories of Nolloth, Iha and Ihamahu, suggest an average of 11-30% hard corals and <10% soft corals. Compared to the regional data, this is average for hard corals but below average in terms of the soft coral cover.

According to regional coral reef surveys (LIPI 1996), almost half of the reefs in central Maluku have a live hard coral cover of less than 25%. Compared to this, the marine territories of Nolloth, Ihamahu, Itawaka, Hutumuri, Lapaut and Toisapu are better than average for the region, whereas Haruku, Sameth, Seri, Iha and Airlow have relatively less hard coral covers. Thus, in this limited data set, there is no convincing correlation between marine *sasi* and coral reef protection. The reef condition seems more closely related to relative population density and fishing pressure than to the presence or absence of the *sasi* institution. More research into the condition of a larger number of guarded *sasi* areas would be useful.

Although not showing evidence of measurable habitat protection, surveys of *sasi* and non-*sasi* areas did indicate that the local management has resulted in demonstrable benefits at least in protecting two sessile species, top shells and sea cucumbers. Although there were suitable habitats in Hutumuri, Toisapu, and Seri, and these non-*sasi* villages did historically exploit both resources, sea cucumbers and top shells were extremely rare and absent, respectively. A poorly guarded *sasi* area subject to poaching and blast fishing (Ihamahu) also had very few top shells and sea cucumbers. This suggests these two resources may now be largely confined to *sasi* areas such as those of Nolloth, which are subject to harvest restrictions and guarded. Because of the limits of the survey areas and methods, it is also possible that deep-water refugia may exist for both species.

Chapter 10

Desa Nolloth, Saparua Island¹

10.1 Physical, Biological and Technical Attributes

10.1.1 Physical environment

The Nolloth village is situated on northeastern Saparua Island, one of the Lease Islands. Before the Dutch colonization, the people of Nolloth originally lived in the hills, organized in a clan structure (*margas*). Two groups of *margas* (*uku lua* with two clans and *uku lima* with five) descended from the hills and settled on the coast where the village of Nolloth lies today. People from what is now the Paperu village also came down from the hills at the same place but later, they split and moved south.

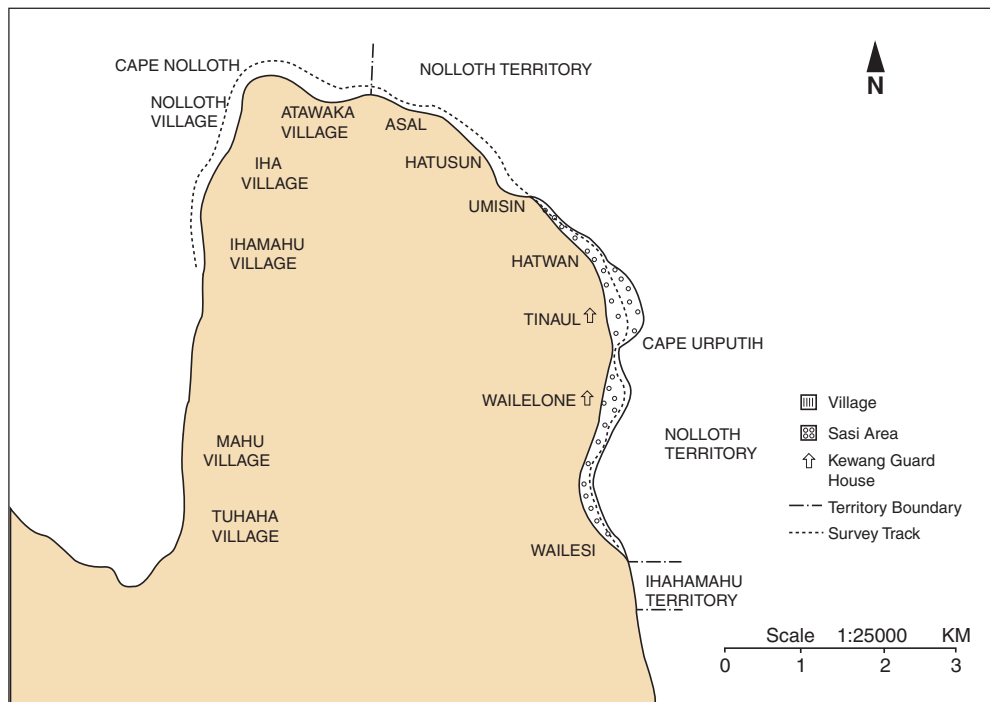


Figure 10.1. Sketch map of marine territory at Nolloth (features not necessarily to scale).

¹ For the data tables see Appendix 3. Nolloth has a relatively large (27 ha) land and sea territory (*petuanan*) compared to other villages (Antariksa et al. 1993). Stories vary, but it seems that at one time, the reigning raja of Nolloth collaborated with the Dutch and, in return, acquired more extensive marine and land rights than other villages. The land is divided among the *uku lua* and *uku lima*. Each of the two groups maintains its identity and has its own traditional leaders who mediate land disputes and manage certain natural resources in their territories.

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The forest garden area straddles the northeastern cape of Saparua Island (Figure 10.1), south of the village of Itawaka. The main marine territory lies along a 6-7 km stretch on the eastern side of the cape. South of Nolloth's village territory lies the shore claimed by Ihamahu (just a few hundred meters), then a stretch claimed by Itawaka and finally, the village marine territories of Ulath and Ouw. The villages of Iha and Tuhaha have no claims on this coast.

The marine *sasi* area is about 2.5 km long, lying within the southern reaches of Nolloth's village territory, approximately one hour by small boat from the village. The area is wave-exposed and fringed by a narrow reef dominated by massive and soft corals and interspersed with sandy patches (Andamari et al. 1993).

10.1.2 Biological characteristics

The majority of fishers (60%) target pelagic fish only, others, both reef and pelagic fish (33%). Fourteen fish species were recorded as commonly caught, i.e., eight pelagic and six reef fish (Appendix 3). In addition, men may collect several large shellfish species, while women collect mainly small shellfish. The fishers prefer the more profitable pelagic fishery to coral reef fishing since inshore reefs are already depleted.

Most fishing takes place in the open sea and not in the *sasi* area. Fishers perceived that the general condition of the marine environment has drastically declined over the past 15 years, and they expect resources to decline further in the future (see Section 10.8). In Nolloth, the main causes for resource decline identified were household waste and industrial pollution. The number of motorboats has also increased and subsequently, more oil spills into the sea.

Nearly all fishers also perceived significantly reduced fish catches. Blamed for resource depletion are the increasing numbers of vessels from outside Lease Islands and the use of modern gears, i.e., FADs (*rumpons*), fine mesh lift nets (*bagans*), nylon gill nets and blast fishing. Since the 1980s, the number of motorized boats, modern gears, FADs and lift nets has increased markedly around the Lease Islands. Fishers complain that pelagic fish no longer come to shore because FADs in offshore waters have disturbed their migratory routes.

Most fishers agree that fishing is different now from that in the past. They have to paddle further and further in trying to keep their fish catches stable. Nearly all fishers (93%) reported reduced catches and a subsequent decline in income. Over the last years, the price of fish has become so high that lower yields still provide an acceptable income. But gradually, price increases will no longer make up for the increased input of time and labor. In these times of increased financial needs (education, "luxury" commodities such as TVs), compounded by increasing prices for boats, engines and nets, fishers find it more difficult to cover their expenses and make a living.

Attributes of the sasi area

Under marine *sasi*, the harvest of top shells (*Trochus niloticus*) and sea cucumbers is regulated within a specific part of the sea. In the *sasi* area, different zones are recognized (Figure 10.1). The stretch called Tinauw, between Wailalone and Hatwan, is the richest fishing area for top shells. Sandy patches are key sea cucumber areas. A seaward fringe is where a restriction on the use of gill nets is enforced. These three zones in the *sasi* area are open and closed at the same time. The *sasi* products may be harvested only during the open season, which may be proclaimed at intervals as short as a few months or as long as three years. In the *sasi* area spear fishing, the use of nets, swimming and diving are not allowed during the closed season. Nevertheless, fishers who are village residents may fish using hook and line.

Sea cucumbers caught include *Teripang nanas* (green colored sea cucumbers) and *Teripang susu* (black and white ones). The latter attain huge sizes and are taken from deep waters (>30 m). In the past, they were harvested by Madurese compressor divers from Java, but are now collected more and more by local divers.

The top shells sit around 1-5 m deep at low tide, among the corals and rocks. Depending on the size and abundance of the top shells, *sasi* can be closed for up to several years. The optimal closure is three years. In three years, the animal matures and its shell reaches prime condition (Zerner and Thorburn, *forthcoming*). The minimum size for harvested top shells in Nolloth is four fingers (6 cm). After the harvest, the remaining small shells are left to grow.

Biological surveys indicate that Nolloth has better than the average live coral cover compared to other areas in Saparua (see Section 11.2). During the opening of *sasi*, spear fishers have access to the *sasi* area. Fishers report that the fishing is better in the *sasi* area than elsewhere. They believe that the ban on gill netting and destructive gears in the *sasi* area helps to preserve the live coral reef and allows the fish to grow. In fact, the *sasi* areas of Nolloth and Ihamahu were the only places surveyed by the research team in 1997 where top shells could be found at all (see Section 11.2). Top shell yields dropped precipitously through the 1980s (Evans et al. 1997). The 1998 harvest of almost 500 kg of top shells from the *sasi* area reveals that management under the new village head, who is committed to waiting at least two years between harvests, is allowing the resource to recover.

10.1.3 Fisheries technology

There are an estimated 400 fishers in Nolloth. Most fishers are involved in the pelagic fishery in the open sea using their small outrigger boats (*perahus*), or they work as crew on pole and line boats. The majority (70%) of fishers in our sample own their own small boats; only a few (7%) have a motorboat. The fishers in Nolloth mainly use hand lines and nets that are 50-150 m long. Most common is a type of net called *giob*, which has quarter inch mesh and catches *tuung-tuung* (*Cypselurus* spp.). Also very common are very fine mesh nets called *siru* and *tunggu* (1-2 mm mesh) and *komu* nets (4.5 cm mesh). Relatively few fishers have other types of nets, such as *lalosi* nets (4 cm mesh), *lema* nets (6 cm mesh), and "sardine" nets. 23% of the fishers in the sample interviewed did not own any gear. Often they lease, borrow or rent equipment, or they work on the boats of other fishermen. According to the people, whether a fisher owns gears and what types reflect a person's willingness to make an effort. The coast near Nolloth is wave-exposed and not suitable for lift nets. Therefore, in contrast to the non-*sasi* villages, lift nets have a relatively small impact on the local inshore fishery.

Artisanal and small commercial fishers

The artisanal and small-scale fishing grounds include the village marine territory of Nolloth and neighboring villages of Itawaka, Ouw and Ulath, as well as waters as far away as Nusa Laut, southern Seram and the Banda Islands (see Figure 1). Fishers do not necessarily go to sea everyday; it depends on weather and what other work is to be done on land. If fishing is close to home, fishers may go to sea several times a day and spend a couple of hours fishing each trip. If they head further out, they can be gone for 24 hours or more.

Catches vary greatly depending on gear type, species, weather and season. For the inshore pelagic fishery, the year is divided as follows: moderate seas in January-April with small catches; huge waves during May-September with hardly any fishing; seas are calm from October-December and catches large. On a good trip, a small-scale net fisher working with several helpers might bring two to four baskets of fish to shore. Depending on the species and size, a basket could hold 50-150 fish. The catch is divided according to long established tradition, with one-third going to the owner of the boat and net, two-thirds going to the other crew of up to four fishers. If the fish is caught at Nolloth, each man gets his share of fresh fish. If caught elsewhere and sold, they split the money. The boat/gear owner covers any expenses (gas for the motor, repairs). His profit is in the order of Rp30,000-Rp50,000 per fishing trip (USD12-USD20, early 1997 rate).

The costs for net fishers have risen dramatically in recent years. The price of some types of netting and nylon line and buoys has increased two to five-fold. Nets can last ten years but must be repaired three to four times a year. Before the currency crisis pushed prices up again in 1998, a longboat suitable for net fishing cost Rp5.5 million (\pm USD2,200), and a motor, Rp1.3 million (\pm USD520).

In spite of the increased difficulty in catching fish, most fishers see no reason for concern. Generally, the trend in fishing is still towards intensification and fishing techniques have increased both in number and in effectiveness (smaller mesh sizes, change to nylon nets). Rather than limiting their fishing, fishers compete over the fish and wish to have faster boats. The younger generation is apparently optimistic and would like to take up fishing. They explained that they fish with the same fishing methods used by older people from whom they learn to fish, but "with some improvements towards the modern methods".

Large-scale commercial fishers

Presently, there are seven large-scale, motorized pole and line boats operating from Nolloth. Each boat employs 25-30 fishers who are employed locally and learn "on the job". Their income is significantly higher than that of the artisanal fishers who, with their small outrigger boats, get at most 20 kg/day. Only one of the boats is owned by a family from Nolloth. The others are owned by Ambonese and Tulehu businessmen who have been active in the area since the 1980s. According to the village head, the commercial fishers prefer to operate from Nolloth because the Nolloth crew are skilled and honest. The boats spend Saturday nights and Sundays in Nolloth. On Sunday nights, they leave again to pick up baitfish in Pia or nearby Tuhaha, or from lift nets and seiners near Ambon or another island.

The economic benefits from the large-scale pole and line fishery are significant. The village does not collect any formal fees from the boats, but accepts "voluntary" contributions. The boat owner gives one share of the total catch to the church in Nolloth, half a share to local widows and orphans, and half a share to the village government and others who are helpful. The total

adds up to Rp50,000-Rp200,000 (USD20-USD80, early 1997 exchange rate) a month (see Chapter 5 for more details on catch divisions). All in all, the fishery brings in about Rp50 million (± USD20,000) a month, including the wages for about 150 fishers who work on the boats.

10.2 Attributes of the Community and Fishers

As of 1997, the middle-sized village of Nolloth has 2,546 inhabitants divided over 530 households. The average household size is about five persons. The village is 100% Christian with no recent history of in or out-migration. There is no tourism. Visitors usually visit relatives, and sometimes, they come to observe the *sasi* rituals.

Present village facilities include electricity, three elementary schools, two gas stations, a food market, a drug store and a banking service from the KUD. Many residents have TVs. The village has an open storm drain system. There are both private and community wells, with some water brought in from a spring in Itawaka, a village to the north. Additional water wells are currently being developed. The nearest health center is in Ihamahu, a neighboring village within walking distance.

Transportation to the village is good. The village has hard top road access, and there are frequent public minibuses connecting Nolloth with Saparua Kota, the largest town center on the island. Speedboats also take passengers and trade goods directly from Nolloth to the urban centers of Ambon on Ambon Island, and Masohi on Seram. Communication links are limited to a radio connection; there is no telephone.

Employment

The village is mainly dependent on agriculture and fisheries. Fishing is a full-time job for 40% of the villagers while another 30% fish part-time. There has been a slight shift from farming to fishing in recent years due to increasing revenues from fishing (higher fish prices).

Since 1979, the number of small shopkeepers has increased to 18. There are a few artisans who make furniture, and several who work in housing construction. The number of government employees has tripled from 16 to 44 persons as a result of the new government structure.

Table 10.2.

Village leaders in Nolloth	
1995- now	Pieter Huliselan
1987-1995	Arnold Matatula
1979-1987	Abner Selano
1971-1979	Niclas Matatula
no date	Jonatan Selano
no date	Yusuf Huliselan

10.2.1 Village government

The village head himself distinguishes three main political bodies in the village: the village head, the village officials and the cooperative (KUD) of which the manager is an important *adat* leader, the *tuan negeri*. In Nolloth, the church minister is also a noted person. Among these authorities, there is close collaboration concerning village matters and they are mutually supportive.

In Nolloth, there is a large overlap between traditional and modern village institutions. The LMD consists mainly of clan leaders (*kepala soas*) from the former *saniri negeri*. After the installation of the formal village structure, it became possible to elect a village head who is not from the *raja* clan. For example in 1987, Arnold Matatula became the new village head. He was also the treasurer but lost the people's trust following problems with village finances. Therefore, people were glad that in November 1995, Pieter Huliselan returned from Ambon to become the new village head. Being from the *raja* clan, he had a legitimate claim on this position. Yet, after the "election", he did not automatically have the traditional authority that is connected with the *adat* structure. The *tuan negeri* of the village had to perform a traditional ceremony to recognize him as the *kepala adat* (head of the *adat*). Because of his high legitimacy, the current village head has a very strong position in the village.

The village is financially supported through a national government program administered by the sub-district office (*Kecamatan*). After submission of an annual proposal, the village gets a Rp6.5 million (\pm USD2,600, early 1997 exchange rate) grant. One part of the grant is given to the PKK, another part is reserved for additional livelihood projects, but the largest share is used for village development, e.g., fresh water supply, rehabilitation of the village market and renovation of the village museum. The schools are supported mostly by community effort. The village economy receives additional support from relatives who live elsewhere (e.g., the Netherlands) and from renting out marine resource harvesting rights (*sasi*).

10.2.2 Village organizations

In Nolloth, the usual village organizations have been installed and are, to a more or less extent, active (see Chapter 6). As of 1997, the PKK is awaiting the arrival of the wife of the village head in January 1998 before starting any activities. The church organizations are all in place, but the *Pelwata* is attended by only a small number of women because the program does not meet the needs of ordinary women and they are too busy to attend. As with the PKK, women are not actively recruited. Most village women do not know what the organizations do, so interest to join is minimal. The youth organization of the church is relatively well attended and active in the village, e.g., cleaning up, helping the *kewang* etc. The organizations were quite conscientious in carrying out their programs.

Some women have organized themselves in the ARISAN savings group. The women say they act independently from the village government. Savings are used for small-scale trade (bread, sago) or to buy food. The TAKESRA was installed recently. The 22 members are saving Rp1,000 monthly to gain capital for a kiosk or sago trade. The village also has an IDT program. In two years, about 60 people benefited from this project. One use of the subsidy was to process and sell sago. Compared to the PKK and church organizations, the ARISAN, TAKESRA and IDT groups are more relevant to poorer villagers because they provide economic benefits.

The KUD in Nolloth is a *Manderinti* (highest level) and primarily occupied with the clove and nutmeg trade. Approximately, a third of the adults in the village are members. They get a monthly payment from the KUD and a yearly bonus. The amount depends on the profitability of KUD enterprises, i.e., through the operation of several shops and a speedboat. Their annual turnover is Rp70 million per year (\pm USD30,000, 1996 rate). The KUD donates Rp1-2 million yearly to both the church and the village government.

10.2.3 Role of women

Some women are working in the village organizations, often as treasurer or other “female-related tasks”, but they are not found in the LMD or LKMD. Despite their active role in income generating activities, women are excluded from most village affairs: 10% of survey respondents considered women to be completely outside of decision-making processes. Women’s public activities in the village are usually related to what they do in the household, i.e., they provide the refreshments at village meetings and traditional ceremonies. Women also expressed reluctance to take concerns directly to village leaders. They would be more likely to deal with their clan leader or try to approach government through the PKK or the wife of the village head.

Many women are involved in cottage-scale businesses related to food processing (sago², bread, smoked fish) and trading of fish and agricultural products. In the 1990s when the clove monopoly caused a severe reduction in income from cloves, pressure on marine resources and the number of women involved in fish trading³ increased tremendously. The women also harvest shellfish, small fish, and octopus from intertidal and shallow inshore waters. This is strictly a food fishery. The shell fishery has also intensified over the years, and for the women, it has become harder to find large shellfish as well as certain species.

The women are worried about the decline in marine resources because they depend on shellfish for food, and on the fishery for household income. To the women, *sasi*, just like most village matters, is “a government affair” and they have no voice in decision-making regarding *sasi* nor do they attend the *sasi* rituals. The women interviewed did express the need to be involved in decision-making on marine resource management. Yet, they thought that since their fishery is for food and not profit, the men in charge would not take their concerns seriously.

10.2.4 Profile of fishers

Of the 30 fishers surveyed, 93% were born in Nolloth and the same percentage has only elementary education. On an average, fishers in the sample were 47 years old, while nearly half of respondents were under 45. The respondents had an average of 6.6 household members, i.e., more than the overall village average. No women were interviewed.

On an average, fishers had been active in this profession for 27 years. They generally spend more than 8 hours per day at sea (most common is 7-10 hours daily), which is second highest from our sample villages. The fishers expressed great personal satisfaction in their chosen career but only 18% (still twice as high as the other villages) want their children to be fishers. Most (61%) want them to be government staff. Only three of the respondents belonged to a fishers’ group and membership in other village organizations was also low. All of them said that *sasi* is very important.

The principal part of their income (81%) is from fishing. Other income comes from land crops (peanuts, coconuts, spices etc.). About a third (27%) have income that is sent from a distant family member. Children who have left Nolloth have usually gone looking for work, and often provide the family with an external income that is on an average Rp264,000 (USD105, early 1997 rate) per year.

² The sago processed in Nolloth is imported from Seram, and the end product is sold in Ambon.

³ The women involved in the fish trade are usually those living next to the shore in Nolloth and Itawaka where fish are landed.

The economic indicator of the fishers' sample was made up of adding scores for land ownership, boat ownership, type of house and fishing gears (for full explanation see Section 2.5). Most fishers (83%) are landowners and almost half (47%) have permanent housing (cement with zinc roof). In Nolloth, the average economic score was 8.1 (with a standard error of 0.35), which is in the lower third of the 27 villages investigated (Appendix 2). When TV ownership is factored in, the economic score is 8.5, the lowest of the case study villages (see Appendix 3).

10.3 Market Attributes

Artisanal fishers in Nolloth generally sell their catch either directly to consumers or to small traders. A few (17% of sample) deal with wholesalers. Most fishers (97%) say it is they or their wives who set the sale price. The majority (70%) sell their fish in Nolloth or elsewhere on Saparua Island (17%). The key factor in choosing the point of sale is the price. Prices vary, but in 1997, it was usual for fishers to sell their mid-sized fish (*komu, lema*) for Rp1,000-Rp2,000 each while smaller species (*lalosi, sardinia*) could fetch Rp250.

Compared to fishers in other case study villages, Nolloth fishers sell a relatively high percentage of their catch. Only 13% is used for family consumption. Eight fishers said they do not eat any of the fish they catch, and none eat more than half of their catch. The shellfish and fish gathered by women, in contrast, are not sold but used for family consumption.

The small-scale fish trade is mainly in the hands of village women, called *papalele*, many of whom are wives of fishers. The female fish vendors buy and sell all kinds and sizes of fish, both in fresh and smoked form. The post-harvest processing of fish is limited to smoking. None of the vendors has access to ice. The price of fish depends on various factors: weather conditions, the amount of fish in the market, the size of the trader network, and the auction price of fish set by the fish brokers who handle commercial catches (see Section 3.2). The profit of the retailer can approach 150-200%.

The fish vendors mostly sell their fish in the local village market or in other villages on Saparua Island, including the town itself. The remainder ends up in urban centers i.e., Masohi, Tulehu and Ambon city. Fish are taken to market via public transportation: bus or speedboat. The women never travel to or from a market empty-handed and often deal in sago and vegetables as well as fish. Fish that cannot be sold fresh before noon are smoked and either go into the stock needed for a long distance trading trip or are peddled door-to-door in the village in the late afternoon.

Compared to the other case study villages on Saparua and Haruku, the wide range of markets enjoyed by Nolloth traders is exceptional. The fish vendors use their long experience and a strategy of flexibility to find the best place to sell fish for the best price. They gather information on city market prices from bus and speedboat drivers and from people freshly arrived home from the city. Those who choose a district or provincial market for their sales do this because: 1) the price is higher there than on the local markets, 2) it is easily accessible, and 3) they can sell fish together with other commodities.

10.3.1 Commercial large-scale fish trade

The financial control over the pole and line fish trade is mainly in the hands of Chinese Indonesians. The pole and line boats typically go out twice a week on 3-day trips, unloading fish at cold stores in Tulehu and Masohi.

The pole and line boats target pelagic fish, especially skipjack (*cakalang*). Fishing takes place throughout central and northern Maluku. Prices of fish are increasing. In February 1998, the price given to Nolloth fishers for export quality fish almost doubled. These trends are directly related to the availability of fish and to market structures. More details on the commercial fishery and on the commercial fish trade can be found in Chapter 5.

10.3.2 Trade in top shells and sea cucumbers

Under the current village head, there is a harvest of sea cucumbers and top shells from the *sasi* area every two years. There is a large market demand for sea cucumbers by Chinese traders as well as by Butonese and Javanese fishers who travel around the Moluccan seas. The KUD, which pays for the harvesting rights, sells both sea cucumbers and top shells to Chinese-Indonesian traders in Ambon.

Trochus niloticus is a protected species under national law and trade in top shells is, therefore, illegal. As a result, all shells must be sold to certain traders who have government permits to handle cultivated top shells and use this as a cover for trading wild shells. The profits enjoyed by those in control of this trade monopoly are significant (also see Zerner and Thorburn, *forthcoming*). On the international market, the price is paid in US dollars. The traders however, pay the villagers in Indonesian rupiahs and so benefit from the plunging exchange rates. Profits at the village level are far below what they could be if the controlled harvest of top shells in *sasi* areas was legal and villagers could gain direct access to the foreign market.

10.4 *Sasi* Institutional and Organizational Arrangements

Nolloth is one of the villages where *sasi* is still strong. The practice of *sasi* dates back at least to the colonial period (Huliselan 1996, *pers. comm.*). *Sasi* rules in Nolloth, whether implemented by *kewang*, church or the village government, are based on *adat* or customary law. In the absence of a formal and legal mandate to manage the marine village territory, *adat* provides village authorities with the legitimacy to undertake resource management and collect resource rents, both within and outside of *sasi* (Hualopu 1991). The *adat* rules are, in effect, the constitutional rules of the *sasi* institution.

Under *adat* law, the rights, authority and obligations of the *kewang* are defined, as well as the boundaries of the village territory and the marine *sasi* area. The rights of villagers to enter common property areas and utilize natural resources are recognized and supported. Some of these *de facto* rules and customs are written down, others are not, i.e., the decision-making process (see Appendix 6 for Nolloth *sasi* rules).

The traditional *sasi* institution (*sasi adat*) has been complemented with a type of *sasi* controlled by the church (*sasi gereja*) that is applied on coconuts. These arrangements are also not written down.

On land, *sasi* defines the areas belonging to different families and thus manages the resources as a private property system under constitutional rules. The sea, on the other hand, is by its nature seen as a common property resource with defined access rights in the *sasi* area. Within the village territory, local residents and their non-resident children have rights of access and withdrawal for all living marine resources except those under *sasi* or other village regulation (see below). *Adat* allows *sasi* authorities (the *kewang* and village government) to exclude outsiders from fishing in the village territory, or at least require that they ask permission and/or pay for access rights.

Collective-choice rules under *sasi* determine what types of activities may be controlled in the village, define a process and confer authority on certain leaders to resolve land and resource disputes. These rules also define the structure of marine *sasi* as an institution that regulates access and withdrawal rights in the marine *sasi* area. Examples of collective-choice rules are that the responsibility for patrolling the *sasi* area lies with the *kewang*, or that sanctions for stealing *sasi* resources are applied by the village head and the police.

Various sets of operational *sasi* regulations control the harvest of certain commercially important marine resources and terrestrial crops. These operational *sasi* rules are written down.

Harvesting is only allowed during the open season (*buka sasi*). Coconuts, for example, are harvested every three months for one week. The season is usually opened before Christmas so that people have money and food for the celebrations. Operational rules like these are not static and if no longer appropriate, they can be changed. *Sasi* on young pineapples, for example, is no longer enforced.

Under marine *sasi* the harvest of marine products, e.g., top shells and sea cucumbers, is regulated by the proclamation of operational rules (Table 10.4). During the closed season, access rights and rights of withdrawal are materialized through prohibitions on entering into the *sasi* area and on the use of certain fishing techniques. Evidently, the rights of withdrawal are restricted to the winner of the auction (KUD) and its assigned helpers. Common villagers cannot enter the area and partake in the harvest unless they are hired by the KUD. Outside the *sasi* area, harvest rights are sold on a regular basis, primarily to Butonese fishers.

Some rules are rather specific. The harvest of corals and large rocks is limited to what is needed to build a house, with a maximum of 2 m² per person. However, even though most people know that these rules exist, there may be confusion over exactly where the rules are applicable. Some rules are embedded in formal government rules. For example, for larger amounts of corals, according to the village government, a permit from the sub-district level is required. However, when asked about coral harvesting, the sub-district office declared that they would never grant a permit because officially, it is prohibited to harvest any coral at all.

Table 10.3. Products whose harvest times are determined under land *sasi*.

Land <i>sasi</i> operational rules
During closed <i>sasi</i> , it is prohibited to: <ul style="list-style-type: none"> • Harvest coconuts (<i>kelapa</i>), pineapples, mangoes, durian, jackfruit, bananas, nutmegs, areca nuts, and kanari nuts. • Cut sugar palm and cut sago leaves for roof construction. • Cut fruit trees and harvest young fruits.

Table 10.4. Operational rules on marine products.

Marine <i>sasi</i> operational rules
During closed <i>sasi</i> , it is prohibited to: <ul style="list-style-type: none"> • Harvest sea cucumbers, top shells (<i>Trochus niloticus</i>), <i>Turbo</i> spp., and <i>caping-caping</i> shells in the <i>sasi</i> area. • Swim in the <i>sasi</i> area except at the harvesting period. • Use gill nets and poisons in the <i>sasi</i> area at any time. • Take sand, corals and rocks without permission.
Non-<i>sasi</i> fisheries rules in the village territory
<ul style="list-style-type: none"> • Non-residents must have permission to fish in the village territory. • The harvest of sea cucumbers and top shells outside the <i>sasi</i> area is regulated. • Gill nets can be used only with a permit from the village head. • Blast fishing and the use of poisons are prohibited in the village territory.

In other cases, the operational rules may be overruled by the village head, who has the authority to make decisions based on constitutional rules (*adat*). In emergencies, when individuals ask to open *sasi* on their own land, permission is usually granted to harvest some products. For marine *sasi*, a communal resource, individuals cannot be granted access rights. However, in exceptional cases, the prohibitions on diving and harvesting may be lifted. Two occasions may illustrate this. First, in 1997, a research team from the Department of Fisheries in Jakarta was allowed to harvest top shells for an aquaculture project. Later, an ICLARM-Hualopu research team was allowed to enter the *sasi* area to carry out a biological survey.

However, this was only possible under the supervision of the *kewang* and after permission from the village head.

In addition to the official *sasi* area, a part of the village marine territory north of Umisini (Figure 10.1) is also managed for top shells and sea cucumbers. The ban on net fishing, diving and swimming is not exercised here. After the *sasi* harvest is complete, and if the KUD has agreed to it, Butonese or Madurese divers are usually permitted to enter after having paid a fee to the village head.

As well as the *sasi* rules, other formal operational rules exist. Gill net fishing, for example, is allowed only after explicit permission from the village head and the payment of a Rp100,000 fee. Blast fishing and the use of poisons are banned. These regulations are applied to all villagers and outsiders.

10.4.1 Marine *sasi*: the players

Decision-making is carried out by those who, according to *adat*, have the mandate to do this, i.e., the *raja* (who is also village head), the *tuan negeri* (who also happens to be the head of the KUD) and the *kewang*. Marine *sasi* is operationalized by the *kewang* in close collaboration with the village government. Both the *kewang* and the government are recognized by villagers as fundamentally *adat*-based organizations.

Because marine *sasi* in Nolloth has evolved into an institution for collecting resource rents for the village government, it is the village head who holds the key decision-making role. Although he confers with other authorities, it is really he who decides when and how often the *sasi* area will be opened. Also, if thieves are apprehended, it is the village head who imposes and collects the fine and who decides whether to turn the offenders over to the police.

The *kewang*'s main role is to patrol the area but its members do not have the mandate to punish offenders (see below). The *kewang* also monitors the size of the shellfish and sea cucumbers in the *sasi* area. When the products under *sasi* are big enough to be harvested, the *kewang* members inform the head of the *kewang* who will report to the village head. In a meeting with the harvesters (in this case, the KUD), the traditional authorities, and the church minister, a date is set to open the season.

Although the church plays a part in land *sasi*, and prayers accompany marine *sasi* ceremonies, the minister is not among the decision-makers or enforcers for marine *sasi*. As villagers explained, fish are too important to be under church *sasi* because an infringement of the rules would be punished by God and this would be too hard on people who are dependent on fish for food.

The KUD has no decision-making role, but has an economic interest, especially now that it organizes the harvest and division of the catch. The KUD officials and the members (to a lesser extent) share in the catch/revenues. The common villagers play no active role in *sasi* and are merely recipients of the indirect benefits derived from *sasi*.

Sasi is clearly a village-based institution. Outside organizations are not involved in *sasi* or decision-making. The police will only interfere on the request of the village head.

10.4.2 Ceremonies for marine *sasi*

The decision to close *sasi* is made by the village head and the head of the *kewang*. To close *sasi*, the *kewang* members gather in the house of the *pakter* (*kewang* leader), then proceed to the village head's house and from there to the *Baileo* or community house. At each street corner, a *kewang* member blows the sea shell, while the head of the *kewang* announces the *sasi* regulations (specific products and places). After the *sasi* signs (palm fronds tied to a stick) are put up, the ceremony is proclaimed over and *sasi* is closed.

When *sasi* is opened, there is a communal prayer in the office of the village government where villagers await the arrival of the attendants for "*buka sasi*". The real ceremony to open marine *sasi* takes place at the sea-shore near the *sasi* area. With the village officials and *kewang* in attendance, the *tuan negeri* makes a speech explaining how important *sasi* is and how the *kewang* is responsible for guarding the area. This is followed by a prayer by the minister. All the players (village government, traditional and religious leaders, and the *kewang* members) then go out to sea, where the minister prays again for a rich harvest. The village head utters an invocation in the traditional language and then sprinkles fresh water over the sea as a symbolic gesture. *Sasi* is declared open. Skin divers, hired through the village cooperative, harvest at least three top shells and there is a break during which everyone rests and eats a traditional feast (*patita*) provided by whoever has won the auction for harvest rights. Then the divers continue their work (see Figures 10.2-10.10).



Figure 10.2. Village authorities, *Kewang* members, and invitees gather on the beach

10.4.3 *The harvest*

In the past, *sasi* on top shells was opened every three years and all villagers who wanted to could participate in the harvest. Top shells were valued as a food source. In the late 1960s, top shells became a commercially interesting commodity and in 1968, the harvest was brought under government control. Later in 1978, the village government, with the consent of the people, decided to sell the right to the *sasi* harvest to outsiders in order support the village administration. The result was that common villagers saw their rights of access and extraction being exchanged for a system where they would only get indirect benefits.

Profits from the sale of top shells and sea cucumbers were attractive. However, during the 1980s, the former village head opened *sasi* every six months. The result was that the harvest dropped dramatically from 1,200 kg in 1988, to only 50 kg in 1994 (Evans et al. 1997). Now, with the new village head, they are back to a longer closed season (approximately two years). *Sasi* was closed throughout 1995 and opened near the end of 1996, and again, in January 1998.

Formerly, the right to harvest in the *sasi* area was sold to the highest bidder. This could be an outsider (e.g., Chinese traders from Ambon) or a local who hired clan members and friends to dive for the top shells. It also happened that a villager was “sponsored” by a Chinese trader to buy the rights. Common villagers without connections were excluded from the harvest. However, resistance against this style of business grew and the villagers objected to the sale of harvest rights to outsiders. To have more control over the harvest and more benefits for the villagers, in 1995 after his installation, village head Huliselan decided to arrange the harvest and sale of top shells through the village cooperative (KUD).

The harvesting is done by selected KUD members (skin divers). In 1998, they received Rp5,000 per kg of shells, which is about a third of the final sale price. Once the harvesters and other expenses have been paid, the profits are split evenly between the village government and the KUD. The village head will then contribute a part to the church and the *kewang*. The money for the village treasury is meant to be redistributed as the benefits to the village population in the form of development projects.

The total revenues from marine *sasi* can be considerable. The price per kilo (3-5 large shells) in 1996 was Rp14,000 (USD6, 1996 rate) and in 1997, Rp17,000 (USD7, early 1997 rate). Before the currency crisis, that meant that a 1,000 kg harvest could yield about Rp14 million or up to USD6,000 gross returns. In January 1998, *sasi* was officially opened again. The total catch of 460 kg top shells and 67 kg sea cucumbers was larger than in former years, but lower than expected. Previously, the divers had calculated that a harvest of over a 1,000 kg was feasible, but when they entered the shallow waters, most of the large shells were gone. Villagers believe the top shells were probably stolen during the Christmas activities in the village. The catch was sold for Rp19,500/kg for the high quality shells (300 kg) and Rp9,500/kg for the rest. The total yield was approximately Rp7.3 million, which at the then current exchange rate (1998) was only USD730.

Since trade in sea cucumbers has proven lucrative, the village head is studying the feasibility of sea cucumber culture at Tinauw in the *sasi* area. The villagers plan to have a holding area of stakes, planks and nets, feed the young ones with mangrove leaves and harvest every six months.



Figure 10.3. Kewang members await the ritual.



Figure 10.4. Prayer for the sasi ritual.



Figure 10.5. The traditional authorities pronounce the opening of sasi.



Figure 10.6. The village head pronounce the ceremonial words and sprinkles the water over the sea.



Figure 10.7. A diver enters the water and comes up with the first Trochus shell.



Figure 10.8. Other boats enter the water.



Figure 10.9. Opening of Trochus shell.



Figure 10.10. The ritual ends with a feast.

10.4.4 Enforcement

Enforcement of *sasi* on land crops is traditionally in the hands of the *kewang*. Nolloth has two *kewangs* (one from each clan group). Each has a leader, or head of the *kewang*, and both are under the authority of a man called the *pakter*. The 40 *kewang* members are selected from particular families. The *kewang* has a secretary, a treasurer, and two *marinyo* (news bearers).

When informed of an offense, *kewang* members will immediately go and try to make an arrest. They try to be fair in their approach and not cause bad feelings (and so maintain their legitimate position). When a thief is caught, the fine money goes to the *kewang*. Every villager is obliged to report *sasi* violations to the elders or the *kewang*. However, cases that concern family and friends are complicated matters and often go unreported. Villagers themselves play no role in enforcement.

Where there is a difficult problem with a persistent violator of land *sasi*, the *kewang* will ask the village head to help with enforcement or punishment. In the past, people were publicly sentenced, and would serve as an example. For instance, they could have to wear a sign around their neck that said: "Do not do what I did". Nowadays, offenders can be forced to work in the village (road construction, cleaning of the village), or may face corporal punishment at the hands of the village head. Serious offenders and especially outsiders may not be prosecuted locally, but are reported to the police in Saparua Kota.

The marine *sasi* area is guarded by the *kewang* members who stay in their two guardhouses. They take turns in guarding the area. Armed with knives and bamboo sticks, they patrol along the beach. However, the *kewang* lacks equipment such as motorboats, communication devices and modern weapons. Also, the remoteness of the *sasi* area makes it hard to control. In the case of thefts of top shells from the *sasi* area, the village head imposes large cash fines directly. Since the proceeds of *sasi* go to the village, the village head feels this is his responsibility although it is the *kewang* who guards the area. Recently, Butonese intruders were caught in the marine *sasi* area and punished to serve as an example.

Currently, enforcement based on *adat* is supplemented by the power of the church. The role of the church is mainly to perform the prayers for *sasi* to facilitate religious sanctions. In the past, thieves have been known to give themselves up to the church when overcome with fear of spiritual sanctions.

Where, as in Nolloth, the village head plays a key role in enforcement of marine *sasi*, his legitimacy is crucial. If the person is not trustworthy or not from the royal clan (*raja*), his position as an enforcer is weak. Such was the case with a former village head (Section 10.2.1). During his term, intrusion into the *sasi* area was more common than is the case currently. This was in part because he himself neglected the rules. When he opened *sasi* too often, depleting the resource for what appeared to be personal gain, he undermined the *kewang* and, thus, *sasi*. However, before *sasi* could collapse, this leader was replaced by a *raja* who has a strong position in the village and is very strict. His legitimacy allows him to enforce the regulations, and he has passed the news to neighboring villages that he is determined to deal with offenders vigorously.

10.4.5 Compliance

Every month, the *kewang* members catch one or two locals who steal coconuts from the village gardens. These are usually poorer villagers or people that indulge in greed. Income depends for a large part on the personal efforts that people make, and people who steal are usually considered “just lazy”. Thefts from the marine *sasi* area also occur. Within six months, there were two cases of intercepted thefts of top shells from the *sasi* area by outsiders (none by Nolloth villagers). In addition, there was the unconfirmed suspicion of a major theft of top shells over the Christmas holidays of 1997, just before *sasi* was opened. It is likely that such thefts are most common in the six months leading up to a harvest, when the top shells are relatively large and plentiful.

10.4.6 Significance of *sasi* and local knowledge

The *sasi* knowledge base shared by the head of the *kewang* and village elders is still strong. Common villagers have general knowledge of *sasi* and they conform to the regulations, but detailed knowledge is exclusive to *adat* elders. The current village head, who grew up in Ambon, was initiated into the *sasi* rituals by his predecessor and the head of the *kewang*. The head of the *kewang* shared only such knowledge as was appropriate. He is very careful to guard his knowledge because it is sacred. The head of the *kewang* and other village elders expressed concern that they would not live long enough to pass on the knowledge to suitable descendants. The son of the head of the *kewang*, for instance, seems uninterested in the information and thus is not ready to receive it. But to keep the tradition alive, it is essential that knowledge is passed on to the younger generation.

The two main objectives of *sasi* are said to be protection of the harvest and theft control. Most villagers have little practical knowledge about *sasi*; to them, *sasi* is part of tradition and people simply “do what the ancestors did.” What is clear to them though, is that *sasi* does have certain benefits. For example, it was mentioned that *sasi* protects the reef from being damaged by blast fishing and nets. Otniel Patty, a Nolloth fisherman explained: “*Sasi* helps to protect the area from people” and “to keep the fish big and many”. Most villagers and all fishers interviewed agree that *sasi* is important because it prevents people from stealing or destroying the resources. *Sasi* thus not only ensures that the products are ripe when harvested, but also that the yield is maximal. This works for forest products and certain marine products, but is not applied to fish because “people have to live” and a prohibition on catching fish could be unacceptable (Otniel Patty, *pers. comm.*). In the sea, conservation in the form of *sasi* regulations is only applied on resources that are *not* essential for people’s livelihood and that have a considerable market value, i.e., top shells and sea cucumbers.

To most women, marine *sasi* is less relevant than land *sasi*. The women gather shells in the *sasi* area but there are no *sasi* rules that directly apply to the species that they harvest. Apart from a share of the top shell yield, which they get if they are KUD members, the women, since they cannot work as harvesters, get no direct benefits from marine *sasi*.

From our interviews, it appeared that younger respondents generally valued *sasi* and they believed that traditional village leaders should protect it. They explained that as long as the relationship between the village government and the people is good, and as long as everybody collaborates in the management and implementation of *sasi*, it will be continued. However, to keep young people involved in *sasi*, it is necessary that they understand the purpose of *sasi* and get benefits from its practice.

10.5 External Institutional and Organizational Arrangements

The external institutional and organizational arrangements are the linkages between the village (government) and outside political organizations or government structures, and other external agencies.

Link with higher government bodies

The link with external government agencies is tenuous. Apart from the family visits from a sub-district representative, government officials are rarely encountered in the village. Neither have there been any meetings nor workshops related to marine resource management organized by higher government levels. The village head meets every three months in Saparua Kota with other village authorities to exchange information. Fisheries issues, however, are not discussed here. Fisheries regulations are not a high priority in the village; people are more concerned about developing the fishery. Besides, there is no government assistance for monitoring and there is no patrol boat for enforcement. Where the village head is concerned, the most reliable sources of information on fisheries regulations, besides the radio and TV, are the Ambon-based NGO Yayasan Hualopu, and friends in the university.

Links between the community and government fisheries management

The regional Fisheries Agency (*Dinas Perikanan Tingkat II Maluku Tengah*) is involved only in licensing the pole and line boats, which are licensed for two years at a time. The fisheries officers deal only with the boat owners. They have no contact with the crew, and do not give out information to them or make inquiries concerning the fishery.

Collaboration with other institutions

Yayasan Hualopu has carried out an extension program in Nolloth that aimed to inform people on customary laws and sustainable resource use. They also assisted with the current evaluation of management activities. In the past, information on marine issues and on marketing possibilities of other marine products was provided through their publication "Marinyo".

External economic influences

The decline in clove prices in the 1990s had a negative influence on the village income. Consequently, fishery and the trade in top shells and sea cucumbers became more important. When in February 1998, the government's monopoly on cloves was lifted, it initially had a positive impact on the clove price but later in the year, this was nullified by low harvests due to the drought. The full effect of the monetary crisis is not yet known (1998).

Infrastructure and development projects

There are no major constructions in or around the village. Within the village, there are small-scale development projects (infrastructure, small enterprises). In the sea, there are plans to establish sea cucumber aquaculture.

10.6 Incentives to Cooperate

The keys to resource management are enforcement of, and compliance with, fisheries rules and regulations. However, various contextual variables affect an individual's inclination to participate in, and be governed by, *sasi*.

Spiritual significance of sasi

Compliance and legitimacy are closely related to respect for the ancestral spirits and God. People in Nolloth believe that neglecting traditional rules or pledges results in illness or even death. Ceremonies are essential to win the ancestors' approval and to keep harmony, and they need to be carried out in the proper, prescribed way and by the appropriate people. Fear of, and respect for, ancestral powers are, therefore, profound. "*Sasi* is something from the ancestors, it needs to be followed." (Otniel Patty, *pers. comm.*).

Legitimacy

The *sasi* rules in Nolloth are the result of a collective process nested in *adat* and, therefore, highly legitimate. *Adat*, the traditional customary law, provides the constitutional basis of *sasi* as an institution. The village officials explained: "*Adat* is important, and *adat* cannot be changed. People acknowledge *adat* and this is their incentive to accept the rules and regulations that come with it."

The overlap between formal and traditional village authorities in Nolloth is very high compared to other villages. The village government is, therefore, seen to be highly legitimate. The legitimacy conferred upon the village head, through his association with *sasi* and *adat*, is an incentive for him to support and participate in *sasi*.

Sasi can and does evolve through time, as seen in Nolloth. With the increasing involvement of the church, the *sasi* institution has become both more complex and even more legitimate in the eyes of the people. On the other hand, the minister also comes to share the legitimacy and respect of *adat* through his association with *sasi*.

Status

There was no clear answer to the question why Nolloth still has *sasi* while it has been lost in many other villages. But although the villagers could not give an explanation for the strength of *sasi*, they felt it was important to have *sasi*. They were proud to be a *sasi* village and not in the least because of the attention of researchers, NGOs, and tourists that are attracted to the village. This pride and status apply to all the (traditional) village officials and *kewang* members.

Economic benefits

Village leaders make decisions concerning the harvest and sale of *sasi* resources: a position that is not only prestigious, but also allows them certain powers and economic benefits. The *kewang* members earn little in the way of economic benefits, but for them, the status makes up for their efforts and the time they spend guarding the *sasi* area and village.

Whereas land *sasi* benefits the individual landowners, the profits from marine *sasi* disappear into the village treasury. The KUD, harvesters, the *kewang* and church get direct shares, but the other villagers only benefit indirectly through village development. The money is spent

at the discretion of the village government and the villagers have neither knowledge of, nor control over, the expenditures. However, because the village head is well respected, people do not complain about the lack of transparency. Like most Mollucan villagers, Nolloth people believe that their leaders will act for the common good. This belief is an incentive to cooperate.

Most fishers interviewed, however, thought that the people should benefit from *sasi* directly. They argue that the revenues from *sasi* ought to be shared among those who are excluded from the fishery. Several respondents (Catharina Huliselan, Frederik Matatula, Augustina Lohenapessy) indicated that under the current arrangement, “the rich benefit more than the poor.” If the people do not feel they benefit, they will have less incentive to support *sasi*.

In our survey of 30 fishers, the majority (53%) disagreed with the sale of resource harvest rights to outsiders. Therefore, the move by the village head to sell the harvest rights to the local KUD rather than to outsiders was politically wise. At the moment, the enforcement of *sasi* regulations is strong and compliance high. However, if in the future, the people do not support *sasi* any longer because they perceive it to be too unfair, some will encroach on the area as soon as the power of the *kewang* declines.

Individual incentives to comply with *sasi* rules depend on well-being, income, fish catches and agricultural yields, in relation to economic needs. These needs include food and housing, school fees for children’s education and capital to invest in alternative, additional or improved livelihood activities. In the case of fishing, fishers see the need for new boats, engines and modern fishing gears. At moments when these needs are difficult to meet (start of school, monetary crisis, etc.), the temptation to trespass the *sasi* area will increase.

Sanctions

The sanctions and enforcement by the village head and *kewang* are an important incentive for people to comply. The *kewang* is impartial and vigorous in applying the rules, and, therefore, respected. The *kewang*’s authority and the fear of social or religious sanctions is amplified by the involvement of the church in *sasi*. “Even if the *kewang* is strong, the people are very clever and escape. God, however, is everywhere, and the presence of the church helps the people to obey the rules” (Otniel Patty, *pers. comm.*).

Social pressure

In a small village like Nolloth, it is difficult to move unseen. The 40 *kewang* members live all around the village, the government and church representatives keep an eye on their fellow villagers, and besides, there is peer group pressure from within the church organizations. It is hard to commit an offence without being spotted, and the social pressure to comply with the rules is likewise strong.

Conservation of scarce and valuable resources

Nolloth has valuable resources, i.e., top shells and sea cucumbers, for which there is a strong market demand. These initially provided the incentive to institutionalize and then strengthen marine *sasi* as a means of collecting resource rents. The continuing success of *sasi*, in providing sustainable harvests in the face of virtual extinction of these resources in other areas, is an incentive to maintain the institution. The Nolloth villagers have already experienced the dramatic decline in harvests that follows when *sasi* is opened too often, as happened under the former village head in the 1980s. This experience has helped them appreciate the importance of careful management of the *sasi* area.

Acknowledgment of problems in the fishery

The acknowledgment of fisheries problems differs more between young and old people than between males and females. Over-fishing is a problem particularly mentioned by older fishers. Many younger fishers have limited knowledge of management issues and are not too concerned. This is also the case with women who have a strong idea that sea resources cannot be depleted because they are a “gift from God”. Therefore, although some people do think it is important to protect the resource, the idea that marine resources are infinite is still strong, and young men, especially, tend to think in terms of intensifying rather than managing the fishery.

Attitudes

Laziness and greed were often mentioned as a reason for people to non-comply. Most offenses committed by young people involved theft of coconuts, simply because they were “greedy”. Another reason for non-compliance is the current tendency towards individualism as the result of modernization. Several times, it was mentioned that people need education on natural resource management and must become aware of the fact that natural resources have to be protected. This is believed to be one way of increasing compliance.

10.7 Patterns of Interaction

The history of *sasi* in Nolloth shows that the system is a common property regime of which the access rights and the rights of withdrawal have changed. In the late 1960s when top shells became a commercially interesting commodity, government officials realized that the *sasi* system offered an institutional and legal means to control the top shell harvest and its profits (Zerner 1995). In Nolloth in 1968, Matatula, the village-level government head, issued a proclamation declaring the existence of *sasi* on top shells within community waters and asserted control over *sasi* on behalf of the local government (Matatula in Zerner 1995). From a common pool resource where, at set times, the whole community could harvest, the rights of extraction have become limited to a defined group within the community (divers appointed by the village cooperative).

The benefits are divided amongst the appointed harvesters, the KUD and the village government. It is stressed that the benefits are for the community as a whole in the form of village development. The villagers benefit indirectly and some villagers benefit more than others (e.g., KUD members). Also, common villagers no longer have the rights of extraction or the rights of access. In theory, the resource is still managed as a common property, but now that benefits flow to the village government, in practice, the property rights regime has changed from communal to private property. The benefits are for the community, but it is the village leader who makes the decisions on how to spend the revenues for village development.

This is an important issue in the functioning of *sasi* and compliance to the *sasi* rules. In Nolloth, compliance to *sasi* and other fisheries rules depends, for a large part, on the position of the village leader. At first when the former village head controlled the benefits from *sasi*, villagers complained and compliance was said to decline. However, before *sasi* could collapse, a new village head took his seat in the village government. Based on his highly traditionally legitimate position and a strong *kewang* system, the *sasi* rules are currently complied with.

Compliance, however, must also be seen in the light of marine resource use in general. The *sasi* area is only a small part of the total fishing area used by the fishers. Nolloth’s artisanal

fishers have always ventured far to sea in their small boats to catch skipjack, tuna and other pelagic species. This reduces pressure on the *sasi* area and also decreases any incentive to break *sasi* rules.

In the past (15-20 years ago and more), most fishers targeted reef fish within the village marine territory, and fish were both abundant and cheap. However, with the introduction of nylon gill nets, the area became too crowded with nets and fish were rapidly depleted. Fishers moved increasingly into the pelagic fishery. In response, the village government instituted rules to limit the use of gill nets on the inshore reef by imposing access fees. In this case, the rule was developed outside of *sasi* and applied to the entire village territory.

There is a general agreement, especially among the village elders, that the depletion of the reef fish stocks was caused by over-fishing. People are becoming more environmentally aware, and *sasi* is said to be important for protection of natural resources. Even so, management in the form of a closed area and regulated harvest is applied only to several sedentary species in the *sasi* area.

For the pelagic fishery, the village government follows the general policy set out by the national government, which is to try and further expand the fishery (Budiman 1982 and Hannig 1988 in Mantjoro 1996). Nolloth fishers are involved in government programs that supply motorboats and larger nets with fine meshes. Although the village government sees the need to address the decline in the fishery, regulations limiting the number of fishers or types of gears allowed are not part of the strategy. The importance of fish as a primary source of income and food impels the village government to opt for intensification instead of management. The results (higher yields) are “promising”. At a meeting, the village officials explained: “It has already become better since they became motorized and can go further to get the fish.” It is thus clear that compliance within a limited area – whether communal or private property – is easy when there is a state-governed open-access area where fishers have unlimited access.

10.8 Outcomes

10.8.1 Equity

1. The role of fishers in management

The role of fishers in management is seen as having improved compared to the past, but is expected to remain stable in the future (Table 10.5). Some fishers mentioned education as enabling them to partake in discussions. However, the hierarchical structure in the village keeps fishers from direct involvement in decision-making and this is not likely to change in the near future. Compared to the other villages, Nolloth has the smallest proportion of fishers (33.3%) who actually want to change the fisheries rules. The majority (56.7%) agree with the current regime.

When asked about power-sharing, 60% of fishers thought the government had most or total responsibility for fisheries management, 33% thought the people shared responsibility equally with the government, and the remaining 7% felt the community had more responsibility.

2. Access to resources

The fishers' individual access to fisheries resources has significantly declined and they expect more restrictions in future. The respondents explained that this is caused by the fact that there are more and more regulations and the requirement of permits. Over 50% of the fishers thought it was acceptable to ask for dispensation to enter the *sasi* area. This does not mean that this would be granted (because it would not), but reflects the fishers' wish to have flexibility in the application of rules.

3. Distribution of means of production

The distribution of means of production among Nolloth fishers is perceived to be much fairer now than in the past, and it is expected to improve further. Ownership of fishing gears is seen to be related to personal ambition and willingness to work. Therefore, the fishers argue that everybody who wants to, could work for fishing gears etc. Besides, there are the government programs that include the fishers and help them generate money.

4. Income distribution

When asked about the level of economic disparities between the villagers, fishers reported that conditions have remained the same. The village women distinguished three social classes: the rich, the medium (who are just able to send their children to school in Ambon), and the poor (who live on a subsistence level). Social status is easily recognized in the housing situation of the villagers. Fishers appear to be mostly in the middle and lower classes. Contact between the different classes seems limited. One fisher mentioned that the drop in clove prices positively influenced the level of economic disparities, because, although it had a dramatic effect on Nolloth's economy, it leveled out the incomes of people in the village. Individualism caused people to look only for their personal advancement, resulting in competition.

Although in the minds of fishers, *sasi* appeared to provide more benefits to the rich than to the poor, it was not identified as a factor contributing to economic disparity. This is probably because *sasi* applies to a limited area, not to the larger fishery that supports most fishing families.

10.8.2 Efficiency

5. Communal decision-making

The degree to which fishers have been able to communally make decisions with regard to the fishery has decreased and future expectations are negative. Many fishers (77%) saw the style of decision-making in the village as being a process of common or majority agreement. The other fishers felt that the village head, with the village government staff, makes all the decisions. In fact, whether or not the people are involved in decision-making at all depends mainly on the village leader.

A number of factors may have had an effect on decision-making. It could be that the introduction of modern fishing gears has caused divisions among harvesters. Also, over the last years, some fishers have seen their access and harvest rights in the *sasi* area being decreased in favor of fishers who are members of the KUD. The introduction of national fisheries rules directed to the village from Jakarta could add to a feeling of alienation. Finally, the *soa* system, in which the community members were represented through their clan leader, has been replaced by the *dusun* system. This could have disrupted traditional decision-making units.

All in all, only 10% of the respondents felt that local groups had no role in decision-making at all. Most respondents (87%) said that outsiders had no influence in village decision-making, but all agreed that every stakeholder should be involved in decision-making.

6. Ease of entry (costs)

Entry into the fishery is perceived to be, on an average, more difficult because of rising costs. Fishers expect costs to rise even more in the future. In Nolloth, fishing has become more expensive because people cannot fish in the *sasi* area; they have to go further out to reach pelagic resources and they have to buy new types of gears in order to have good catches. The recent increase in the price of fuel and the currency devaluation make fishing and purchase of fishing gears and engines even more expensive.

7. Control over access

Government control over access to the fishery has increased and is expected to become stronger in the future. This is especially the case where it concerns the enforcement of *sasi*. Over 50% of the fishers felt that they should be able to ask for and get harvesting rights in the closed *sasi* area if needed. Strikingly, relatively many fishers (43%) found it no problem to sell rights to outsiders. In contrast, our key informants had stated that fishers/villagers strongly objected to the sale of harvest rights to the Chinese because they wanted to keep the benefits for themselves.

8. Compliance

Compliance with fisheries rules as perceived by our respondents is said to be relatively high (score 7.47) and has not changed significantly over time. This is contrary to the fishers in the key informant interviews who stated that compliance has become better now that there is a new village head who is trustworthy. There are no changes in compliance to be expected in the future.

10.8.3 Social sustainability

9. Family well-being

Generally, family well-being is moderate compared to other villages and has remained stable over the years. No changes are expected in the future.

10. Income

The actual income of people has not changed dramatically, but individuals noted an upward or downward change depending on whether they have seen their catches increase (fishers with modern gears), or decline (artisanal fishers).

11. Tradition of collective action

Most fishers perceive the tradition of collective action in Nolloth to be stable over time. Many fishers rate past performance very highly (score 9-10). The comments that some fishers made about this question indicated a perception that people's interests are shifting towards individual profits due to economic pressures. Still, the church and the village government collaborate closely in organizing the villagers. The decision to sell the *sasi* harvest rights to the KUD instead of to outsiders is a good example of cooperation between the leading village institutions.

12. Discussion of village issues

Discussion of village issues is perceived as being relatively high (score 8). There are no significant changes over time. From the interviews, it became clear that management problems of the fishery in the village area are not publicly discussed.

13. Village harmony

Village harmony is highest compared to other villages (score 6.20), and has not changed significantly over time. Conflicts generally arise over land, sago and cloves. Alcohol abuse was also mentioned. At the village level, conflicts are more apparent, especially in cases where outsiders try to illegally harvest *sasi* products. Others, however, had the opinion that conflicts in the community were less now than in the past. An important role is played by the village head, who is legitimate and trusted by the people. The harvest rights and boundaries of the *sasi* area are also generally accepted.

10.8.4 Biological sustainability

14. State of the marine resources and fish catches

The general condition of the marine environment has drastically declined. Fishers perceived an average 31% decline over the past 15 years, and they expect conditions to decline another 15% in the future (also see Section 10.1).

15. Fish catches

Fish catches have also reduced drastically. The average drop noted was 38%, and the fishers expect a further decline of 20% in future. In Nolloth, the main problems causing both general decline of the resources as well as declining fish catches were said to be: 1) pollution, 2) intensification of the fishery, and 3) the use of modern gears.

Nevertheless, biological surveys indicate that Nolloth has better than the average live coral cover compared to other Saparua shores (Tables 9.1-9.4). Also, fishers report that the fishing is better in the *sasi* area than elsewhere, suggesting that the management system does have a positive effect on the state of the inshore resource.

10.9 Synthesis

Nolloth is an example of a village that has successfully integrated traditional and formal government structures. Decisions are made by the village government, but with the implicit consent of the villagers who trust the government to make the right decisions for them. The village head has a powerful position, but he is legitimate, respected, and trusted not to abuse that power. The political structure theoretically allows participation or open discussions, but the common villagers (women and the poor, in particular,) are excluded from decision-making. In some cases, they could work through clan leaders, who are government officials, to get their point to the village government.

Table 10.5. Results of the performance analysis in Nolloth. n=30 heads of fishing households. ns=trend not significant; *p<0.05, **=p<0.01, ***=p<0.001.

Indicator	Average current condition on scale of 1-10	Average change through time (statistical significance)		Average future expected change (statistical significance)	
<i>Equity</i>					
1. Role of fishers in management	7.63	1.2667**	+13%	0.1000ns	+1%
2. Access to marine resources	6.60	-1.6667***	-17%	-0.8667***	-9%
3. Fair distribution of fishing gears	7.63	1.7333***	+17%	0.4667*	+5%
4. Economic equality	6.67	-0.4333ns	-4%	-0.5667ns	-6%
<i>Efficiency</i>					
5. Communal decision-making	6.77	-0.8667*	-9%	-0.5333**	-5%
6. Ease of entry into the fishery	7.20	-1.0333*	-10%	-1.000***	-10%
7. Control over access to fishery	7.30	1.1667*	+12%	0.4000*	+4%
8. Compliance with fishery rules	7.47	0.4333ns	+4%	-0.5000ns	-5%
<i>Social Sustainability</i>					
9. Family well-being	7.13	0.7333ns	+7%	0.0333ns	+0,3%
10. Income	6.23	-1.0667ns	-11%	-0.3667ns	-4%
11. Tradition of collective action	7.53	-0.8333ns	-8%	-0.4667ns	-5%
12. Discussion of village issues	8.00	0.6667ns	+7%	0.0333ns	+0.3%
13. Community harmony	6.20	-1.1667ns	-12%	-0.7667*	-8%
<i>Biological sustainability</i>					
14. Marine resource health	5.63	-3.1333***	-31%	-1.5333***	-15%
15. Fish catch	5.23	-3.7667***	-38%	-2.0333***	-20%

Not everybody is selected to partake in the government programs that aim to improve the livelihood of poor villagers. The ones not included feel that the village government does not address their concerns. These people, who represent the lower social classes in Nolloth, have less confidence in the village government and say that “they take care of themselves.”

Women in the village are marginalized and have a dependent attitude. Communication among women also seems minimal where it concerns village issues or problems. This is possibly a result of village organizational structures that are hierarchical and leave little space for internal discussions. Ordinary women have no voice and are not well represented within the women’s organizations. When it comes to village affairs and decision-making, the women generally show a lack of interest.

Nolloth has a relatively strong local resource management system because it has a strong village government and an organizational structure that includes traditional authorities. The village has clearly defined operational rules that are written down, executed according to accepted collective rules and based on *adat* constitutional rules. Compliance to the rules is high, not in the least because of an active and functional *kewang* system. Nolloth does face difficulties defending its territory against outsiders. In these cases, the Saparua police force can be counted upon to assist, but only if the *kewang* catches the offenders first.

The Nolloth form of *sasi* confers certain economic benefits to the village, in general, and to the ruling elite and their associates, in particular. Leaders associated with the institution are also rewarded with high social status. However, the institution cannot be said to be inclusive or democratic. In fact, the originally common property regime has become a system with private property rights.

The village government uses the financial benefits from marine *sasi* for development projects and infrastructure. The villagers thus benefit indirectly. To the villagers, *sasi* is meaningful, especially in regulating thefts and general destruction of resources. It is considered relevant and important to village life and “people are used to it.” The cooperation of traditional and government authorities and the church, in the context of *sasi*, serves as a model for cooperation in village life and contributes to social sustainability.

Fishers, as a group, do not participate in the development of *sasi* and other fisheries regulations, and there is mild resentment over the fact that the system of selling harvest rights seems to benefit the rich more than the poor. The *sasi* system thus proves not very equitable, but it is still highly legitimate. On the other hand, *sasi* in Nolloth is certainly efficient: decisions are made with a minimum of fuss by a respected central authority and the rules are enforced at no cost by volunteers in the *kewang*. The biological outcomes are also positive. Despite the severe general resource degradation, the *sasi* area has relatively healthy resources. *Sasi* rules are only applied to two commercially interesting products in a small area and *sasi*, therefore, has little impact on the larger fishery.

Although the ladder survey indicated strongly that marine resources (and fish catches) are in decline, fishery problems in the sense of over-fishing are not generally acknowledged. Pollution and the use of modern fishing techniques are seen as having a major impact on the fishery but interventions to deal with these are not suggested. Although they need to go further and further for their daily catch, most fishers still catch enough to cover their daily needs. The impact of the decline is also obscured by the fact that fish prices have increased and, thus, rewards are still good. The species caught have changed dramatically over the years. From inshore fishing on demersal fish, the fishery is now nearly fully geared towards pelagic fish in the open sea.

However, there are no plans for enhanced fisheries management outside of the *sasi* regulations. The sub-district, regional and provincial levels of government do not support monitoring or enforcement of fisheries regulations in Nolloth. Since *sasi* regulations are limited in scope and area of application, there is a need for more elaborate fisheries management. Collaboration between village and outside organizations such as Yaysan Hualopu are, therefore, important. Collaborations with other institutions should be developed to: 1) educate people and complement people’s knowledge on the environment to facilitate resource management, 2) support a process to monitor *sasi*, and 3) facilitate productive activities (additional income) to support *sasi*. There is also a need for higher government levels to provide more information, suitable legislation, and support.

Chapter 11

Desa Haruku and Sameth, Haruku Island¹

11.1 Physical, Biological and Technical Attributes

11.1.1 Physical environment

As the story goes, the history of Haruku village dates back to the 8th century. Haruku and Sameth were situated in the mountains of Haruku Island, together with the kingdom of Alakka that consisted of five villages. Initially, the Alakka people conquered Haruku and Sameth, but in a second battle, the victory was for Haruku. The Alakka kingdom was divided into what are now the villages of Hulaliu, Pelauw, Kabauw, Rohomoni, and Kailolo. The confiscated land areas were returned to Haruku and that is how the village is today. The people of Sameth live in close proximity. In fact, the two villages run together and from the sea, appear to be one village.

The Haruku village is situated on the west side of Haruku Island. Haruku Strait separates it from Ambon Island. Arriving by boat, the dominant structures seen are a large church and remnants of the old Dutch fort “Zeelandia”. Over land, the village is more difficult to reach because of the mountainous topography and steep roads.

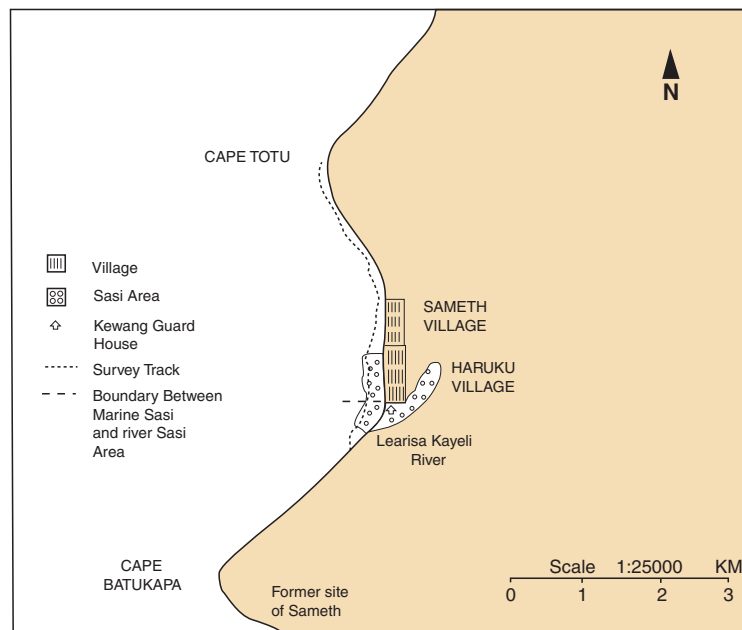


Figure 11.1 Sketch map of Haruku village territory (features not necessarily to scale).

¹ Data tables for case study village can be found in Appendix 3.

The village has a large forest garden area (360 ha) that starts at Tatuhutu at the west side of the island.

Haruku's marine territory is a patchy mixture of sea grass beds, sand and patches of corals. The *sasi* area for pelagic fish capture runs along the coast from the village meeting hall (*Baileo*) to the *kewang* house near the mouth of the Learisa Kayeli river. Along this stretch of coast, the bottom is predominantly sand and sea grass. It is in the Learisa Kayeli river that the *lompa* fish (*Thryssa baelama* spp.) are caught when *sasi lompa* is open.

The outermost edge of the *sasi* area in the sea is a coral fringe. The idea of expanding *sasi* to cover top shells (*Trochus Niloticus*) and sea cucumbers in the rocky area near the fringing coral reef is currently under discussion. The size of these resources has not been estimated. The purpose would not be commercial, but in the first instance, it would serve simply to prevent people from taking these species so that their populations could recover.

Since about 1992, a mining consortium has been exploring the Haruku area and has determined that the island contains an ore body rich in copper, lead, zinc, silver and gold. Although stating that they would not go into exploitation because this would mean the mass removal of population, exploration, nevertheless, has continued and there are fears among many villagers that eventually, a mine will go ahead and they will lose their land.

11.1.2 Biological characteristics

Most Haruku fishers target either pelagic fish exclusively (43%), or both pelagic fish and reef fish (43%). Fifteen species of pelagic fish and 10 reef fish were recorded as commonly caught (see Appendix 3). In addition, fishers target squid, sea urchins, and two types of shellfish.

Since 1995, fish catches in Haruku have declined dramatically. The respondents perceived an overall drop of 30% in fish catches over the past 15 years, and they expect a further decline of 17% in the future. Also, the state of the marine environment has declined significantly during this period. Motorboats allow the fishers to go out further to fish and the use of modern techniques increases fish catches; however, the fishers agreed that these introductions are a major threat to the fishery. The increasing numbers of nets and lift nets cause fish catches to decline.

Our biological survey has shown that the corals are in poor to moderate condition. Blast fishing and the use of toxins destroy the coral reefs and are mainly used by intruders from other villages, particularly from Rohomoni which lies to the north. The negative effects are aggravated by the mine exploration activities that seem to cause sedimentation of the coral reef patches near the mouth of the Learisa Kayeli river, and pollution which reduces the water quality.

Illustrative of the decline in resources is the trend in *lompa* fish harvests in the Learisa Kayeli river. Reduced yields have been occurring more frequently. When a lift net operating near the mouth of the Learisa Kayeli river over-fished the stock, the opening of *sasi lompa* had to be abandoned in the years 1993-94. Fishers also report that the number of fishers harvesting when *sasi lompa* is open has increased. This happened when, after his visit in 1986, Emil Salim, the Minister of Environment, invited everybody to join the "famous" *lompa* fishery. Some fishers, therefore, believe that their decreased catches are related to the greater degree of competition.

In 1997, the season was exceptionally poor. Early in the season, as usual, the *lompa* fish were spotted in the sea and *sasi* was closed. After a while, the fish vanished never to return. It was generally blamed on the high water temperature as an effect of El Niño. Others, however, blamed it on the water pollution caused by the mine. As of today, no research has been carried out to determine whether the fish stocks are affected by pollution or whether reduced yields are climate or effort-related impacts.



Figure 11.2. Haruku fisher mending a fishing net.

In the meantime, the *kewang* and local NGOs are active in creating a higher awareness with the people about environmental problems. As a result, the planting of mangrove trees along the coast has been promoted, and people are developing a strategy to stop the mining activities.

11.1.3 Fisheries technology

Almost all fishers own boats (*perahus*) and 27% also have motors – a much higher percentage than is found in most other villages surveyed. The most common fishing gears are nets (50%), hand lines (27%), spears and fish traps. Fishers from the shore use cast nets and beach seines with a mesh size of 2-3 cm. For the *lompa* fishery, the women use a small scoop net. The use of bombs in the local fishery is also reported. Quite a large number (23%) of fishers owned no fishing gear at all.

Apart from their activities in the *lompa* fishery, not many women fish. If they fish, they work part-time. Jemi Maatita, originally from Nusa Laut, explained how women on her native island fish with cast nets. However, in Haruku a woman fishing embarrasses the family, and therefore she has limited her fishing activities to gathering shellfish. According to the women, the number of shellfish in the *sasi* area exceeds that of the open-access area.

There are no lift nets owned by Haruku fishers. Formerly, they operated in Haruku waters, but since they over-fished the stock at the Learisa Kayeli river, the use of lift nets near the *sasi* area is restricted by *sasi* rules.

11.2 Attributes of the Community and Fishers

Haruku is a middle-sized village with a population of 2,122 people who are divided over 480 households. The average household size is six. Five percent of the predominantly Christian village has an Islamic background (101 people). Each year, about 70 people leave the village for educational purposes of whom the majority never return when they find work elsewhere. There is no significant in-migration. Haruku is the only one of the six case study villages that attracts tourists. Some come to visit the *kewang* house but most come for the opening of *sasi lompa*, which is a real festival. There are no resorts or anything of the kind; visitors reside with local villagers and pay for bed and breakfast.

The village has its own health center and there are three schools: primary (SD), junior high (SMP) and senior high school (SMA). Most adults have only primary education (870), but more than 25% have some higher level of education. The village has a fresh-water supply. Canals, sewer pipes and septic tanks handle household waste. The village has electricity and some people have TVs.

Transportation links to Haruku are limited. There is only one minibus in the village and transport to and from the village by road is irregular. From Pelauw, the road is steep and part

of the year, inaccessible. From Ambon Island, however, the village can easily be reached by boat in half an hour and there is a regular boat service. Communication links are minimal; there is no telephone connection.

Employment

The majority of the employed adults (295) are registered farmers. Cloves are an important cash crop. Most people combine fishing and farming. Of the 150 registered fishers, only 20 men fish full-time. The number of people involved in various trades and construction activities is 89, there are 16 vendors in the village, and 42 people are government officials. For all occupations, the numbers have increased since 1979.

11.2.1 Village government

In 1979, the new village structure became a fact. The LMD, consisting mainly of former members of the *saniri negeri*, was chaired by the village head. Three committees were established to deal with: 1) general affairs, 2) government, and 3) development. However, the introduction of this new village structure caused a division within the village government: the formal government bodies, on one side, and the traditional *adat* institutions (e.g., *kepala soa*), on the other. Political stress led to unstable leadership.

Table 11.1.

Village leaders in Haruku	
1997- now	Jonas Pieter Ferdinandus
1993-1997	Bertie Ririmasse
1989-1993	Michel Talabessy
1980-1989	Bertie Ririmasse
no date	Domingus Nanlohi
no date	John Polnaya
no date	Domingus Ferdinandus
no date	Johannes Ferdinandus

The 1997 elections made Jonas Pieter Ferdinandus the new village head. Over the previous 10 years, Haruku was governed by several interim leaders (Table 11.1). Often, interim leaders come into power if a village head is not able to finish his term in office or if nobody wants to run for the job after his term ends. In this case, the formal election may be postponed until there are sufficient qualified and acceptable candidates.

The interim village heads lacked the mandate to restructure the LMD with the result that, at the time of our research (1997), the LMD was not fully functional. This was aggravated by the perception that the formal elections in 1997 were manipulated to ensure that a pro-mining leader won the contest. One of the former village heads and *raja*, Bertie Ririmasse, was not allowed to run for office owing to alleged communist sympathies. In fact, he was a popular leader committed to environmental conservation. In the end, voter turnout was low and the new village head became elected with a slender majority. Not only was the village divided, but within the LMD, a pro and contra group also arose.

Village affairs are currently being managed by the village head, the village secretary and the vice-chairs of the LMD and LKMD. In the meantime, the village head is trying to reconcile the LMD members and re-organize it into a functional institution.

Because he lacks general support in the village and legitimacy, the position of the village leader is rather weak. Illustrative is the fact that people question his descent while, apparently, the village head is from a *raja* line. Besides, according to tradition, he was inaugurated by the *kepala adat Latu Hari Hari* to make him also *kepala adat* or traditional village leader. Representatives from the Kissya and Hendatu clans were present, as well as the church minister and the *kepala adat* of Sameth. Nonetheless, many villagers feel that his leadership is not legitimate.

In Haruku, the shift of authority from the clan to the LMD has seriously undermined the traditional village structure. The village head explained: "The year 1979 was not a good year for Maluku. It was a mistake to apply the new structure (Law No. 5, 1979) in every province because it was designed for the Javanese situation." *Adat* leaders, such as the *kapitan*, the *tuan negeri*, the *kepala jajano* (head of the young women who have marriage partners from outside the village), and the *kepala mangari* (head of the young men) are still acknowledged but not actively involved in the village government. Also, before, the villagers were represented through the clan (*soa*) structure. This structure has been replaced by a general, geographically-based structure and the village is divided into *dusuns* (RT and RW, see Section 4.3). This has caused confusion where it concerns, for example, the division of the fish after the *sasi* harvest. The only sphere in which the clan system is still functional is social occasions, e.g., funerals and weddings.

The *kewang* is the only traditional institution that is functioning, but it is operating outside the formal village government and as such, not acknowledged. In the eyes of the people, however, the position of the *kewang* is strong and its authority highly legitimate.

Building on the appreciation by the villagers of *adat* structures, the village head has proposed to re-institutionalize some of the old *adat* rituals and practices and to renovate the *Baileo* (traditional community house). One of the customs that will be re-established is that when somebody marries a person outside Haruku, the newcomer is to be introduced to the Sahumahu clan. However, whether these attempts will include re-establishment or acknowledgment of political functions, i.e., the *kewang*, is not clear.

11.2.2 Village organizations

The KUD was installed in 1981 and has 187 members of which more than 50% are women. The KUD is prosperous and derives a significant income from the clove trade. The KUD also runs a kiosk, a savings and credit unit (USP), a unit grinder and it processes the billing for the electricity company. The KUD is not involved in the *sasi* harvest. Profits are shared among the members. Membership fees are high; the initial payment is Rp25,000 (USD10, early 1997 exchange rate) and members must also save Rp500/month. The KUD officials have well-built houses and own means of transport such as boats. Although it was stated that the KUD acts autonomously from the village government, supporters of the former village headman boycott it.

Both government and church women's organizations are not active. The PKK awaits the formalization of the new village government and involvement of the wife of the new village leader. Future activities, however, are already planned, e.g., sowing, gardening, cooking and general participation of women in village programs. The *Pelwata* was established in the 1920s and has 250 members. But they, too, are awaiting the inauguration of a new leader (at the time of our study, in 1997, the new church minister had just arrived). Their program has the standard activities. The church also has a men's group (*Pelpri*) and a youth wing.

The *Kaolina* is a sub-group of TAKESRA and was installed in 1997 by government decree. The program target is to increase the income of poor (women) farmers. The organization is

supported by the wealthy who donate 2% of their income. A total amount of Rp800,000 (USD320, early 1997 exchange rate) is administered by the chairlady, Carolina Kissya, and is used for the small-scale enterprises of the 20 members. If they succeed in repaying the original loan, they get an additional Rp2 million loan to start a larger enterprise.

The IDT government program to support the poor, consists of four savings groups of 25 people each (men and women). The beneficiaries are selected by the village government. Every month, the profits of the kiosk and credit unit are divided amongst the members. So far, they have performed well. There is good financial management and more groups will be established later.

Learisa Kayeli is a local organization that is occupied with environmental issues (nature conservation) and the implementation of *adat*. Up until 1998, the organization was led by Bertie Ririmasse and collaborated closely with the *kewang*. Haruku is the only case study village that has an environmental organization.

11.2.3 Role of women

Since the late 1980s, and especially after the drop of the clove price in 1991, marine resources have become increasingly important. Many women are directly dependent on the sea as a source for food and income. The *lompa* fish that the women catch are dried and so provide food for several months. Naturally, *sasi* is very significant to the women in Haruku. “*Sasi* covers everything”, they say. However, the women regret there is no *sasi* on young fruits in the home gardens because theft is prevalent. The women know the *sasi* rules and live in accordance with them, but have no mandate to change or adapt them.

Historically, women played an important role in the village. There are stories of female village leaders and *kewang* members, but over the years, this has changed and now men occupy all the important political positions. The concept of “women being less capable than men” limits women’s role in decision-making and reduces their activities to those related to their role as household manager, e.g., income-generating activities, treasurer in village organizations, or as food provider at festivities.

Women are informed of new laws or government decisions through the church or PKK. Women are not allowed to speak at formal meetings, and if they have any suggestions, they would have to submit them informally through a *kewang* or LMD member, the church minister or the village head. As a consequence, the women’s self confidence in the political sphere is low. Although in our interviews, they came up with some relevant ideas, they do not see how they could contribute to the village because they feel “they are only small fishes”. Our respondents, of whom a third considered women to be completely outside of decision-making processes, confirmed this idea.

Interesting is the fact that the village head suggested, as part of the re-organization of the village government, that women (as well as commoners) should be able to take a seat in the newly to be installed LMD.

11.2.4 Fisher profile

The average age of the respondents was 50 years, and 37% of them were under 45. Only one woman was interviewed. Relatively few of the fishers (67%) were actually born in Haruku; most originated from the other islands. A large majority (80%) have only elementary education.

The fishers have, on an average, 6.8 household members. Children that have left the village have gone for work, and less often to school or to be married. Almost 30% of the fisher households in our sample have an externally derived income of, on average, Rp343,500 (USD137, early 1997 rate) per year. The standard of housing in Haruku was relatively low. A third had type 4 housing (cement with zinc roof), while the others had wooden or *gaba-gaba* (palm) houses.

The economic indicators, made up of adding scores for land ownership, boat type, house and gear, averaged 8.3 (with a standard error of 0.42). This puts Haruku into the middle third of all the 28 villages in the performance study. When TV ownership is factored in, the score becomes 8.7, leaving Haruku (with Nolloth and Seri) in the lower half of the case study villages.

Most respondents are land owners (83%), but, on an average, 66% of the family income is from fishing. The fishers were highly experienced. The average number of years the men had spent fishing was 30. They spend on average 8 hours at sea each day, with 6-10 hours being most common. Despite the long days at sea, the men were generally satisfied with their job. Most men stated that they are used to fishing, but over 40% would change jobs if they could find less strenuous work as a salesman, carpenter, mechanic, etc. Also for their children, the majority preferred other jobs over fishing, with a strong preference for government positions.

11.3 Market Attributes

On an average, 26% of fish caught are eaten by the family. Seven fishers from our sample of thirty eat more than half of their catch. Seven others do not eat any of the fish they catch. A large part (70%) of fish sales is direct to consumers, mostly in the local market. The fisher or his wife usually sets the price. The rest reaches larger markets, e.g., Ambon, through wholesalers or through female fish vendors (*papaleles*). The key factors in choosing the point of sale are proximity of the market and the price paid for the fish.

11.3.1 Local fish trade

Besides fish, Haruku women trade all sorts of products such as sago, bread, fruits, etc. Many women have husbands who work as fisher-farmers so they sell the family's harvests. The price of fish is set by the female fish trader, not by the harvester. There are no credit or debt relations between the female fish traders and their providers. Currently in Haruku, there is a group of female fish vendors who is assisted in its business through financial capital from the Masohi Fisheries Service in Seram.

11.3.2 Commercial small-scale trade

Trade with other villages and a town is largely in the hands of local female retailers. Their long years of experience (15-20 years) provide them with a fine nose for marketing. Fish of all kinds of types and sizes are bought locally or from fishers from other villages (from Tulehu, Waai and Mamala on Ambon or from Rohomoni on Haruku). The fisher usually will have an arrangement with a particular retailer. The small-scale traders (*papalele*) go as far as Oma, Tulehu and Ambon to sell the fish. When fish are scarce in Haruku, they bring them back from these markets.

Regional markets (e.g., Masohi on Seram) provide the highest profits to the fish traders, up to 150-200%. Now that fish have become scarcer, the prices, compared to the 1980s, have increased. The consumer's preference for fish, however, has not changed.

Haruku fishers are not involved in any large-scale commercial fishery.

11.4 Sasi Institutional and Organizational Arrangements

Haruku has an active *sasi* system, which defines the use of terrestrial and marine resources as well as social behavior. The collective and operational rules and regulations are embedded in *adat* custom. *Sasi* was established before the Dutch colonial period and was the result of a collectively-felt need to protect the village's natural resources against theft and intrusion from outsiders. *Sasi* has had periods of decline but has been fully active since the revitalization of the *kewang* in 1979. The *sasi* rules and regulations are written down in a book composed by the head of the *kewang* (Kissya 1995).

The marine resources of Haruku are open-access resources, but in designated parts, resource use is restricted by *sasi* rules during certain periods of the year. During *sasi*, the resource changes its status to that of a common pool resource to which access is limited and harvest rights arranged, but where the benefits are for the whole community. The system includes the principle of redistribution, which forms an important aspect of village life.

Table 11.2. Sasi regulations of the Haruku village.

Land sasi	<ol style="list-style-type: none"> 1. Seasonal prohibition on the harvest of fruits and trees. 2. No trees may be cut along the riverbank except for sago, and these have to be replaced.
River sasi	<ol style="list-style-type: none"> 1. Seasonal prohibition on the harvest of <i>lompa</i> fish (<i>Thryssa baelama</i>). 2. Prohibition on running or cleaning boat engines in the river and on spilling oil.
Marine sasi	<ol style="list-style-type: none"> 1. Seasonal prohibitions on catching <i>sardinia</i>, <i>momar</i> (<i>Decapterus macrosoma</i>), <i>make</i> (<i>Clupea fimbriata/stereolepis</i>; <i>Lutjanus sanguinens</i>), <i>kawalinya</i> (<i>Selar cryonophthalmus</i>), and <i>tatari</i> (<i>Rastrelliger kanagurta</i>). 2. Seasonal prohibitions on use of boats and nets in the <i>sasi</i> area with the exception of cast nets that are used from the beach. 3. Prohibition on harvest of top shells (<i>Trochus shell</i>) and sea cucumbers under <i>sasi</i>; other shell fishing is allowed. 4. Prohibition on the use of lift nets. 5. Prohibition on <i>karolo</i> nets with extreme small meshes. 6. Stones, sand and corals are also under village regulations. For the harvest of corals, permission has to be asked from the village government and a fee paid (Rp10,000 per piece).
General fisheries rules	<ol style="list-style-type: none"> 7. There are no auctioned fishing rights (<i>lelang labuan</i>) in Haruku, but non-residents must ask for permission to fish in the village waters. 8. There is a general prohibition on blast fishing and the use of cyanide.

The rights of entry and withdrawal are defined under *adat* law as collective rules and, as such, guarded by the *kewang* and the church. Local operational fisheries rules as described in *sasi* can, in theory, be applied to any resource as long as they do not contradict national fisheries law. In Haruku, formal fisheries regulations have been incorporated into the traditional *sasi* regulations.

The *sasi* regulations have been adapted to modern times. New regulations, for example, concern the use of lift nets, *karolo* and other fine mesh nets.

11.4.1 Sasi

River Sasi

For *sasi* on *lompa* in the river, a specific set of rules defines the opening and closing of the river, access rights and division of the catch.

Lompa fish, a sardine-like pelagic fish species, enters Haruku waters yearly. The immature fish (ca. 1 cm) are seen off the coast in April or May. Within weeks of their first appearance, the young fish start running into the river, where they spend the daylight hours. Usually the ceremony to close *sasi* is at the moment when the fish are entering the river at spring tide.

When *sasi* is closed, at every corner of the village, the head of the *kewang* blows a traditional trumpet shell and pronounces this closing (nowadays with a megaphone). The head of the *kewang* has to go to the mountains to pick a sacred tree for the sticks that are used at the *adat* ceremony. According to tradition, the sticks should be secretly taken into the *kewang* house. After the ritual ceremonies are complete, the signs, made of sticks and coconut leaves, are set in place to define the *sasi* area. From this point on, the river and mouth of the sea are no longer accessible for fishers so that the fish can grow. Over some months, the fish will swim from the river down to the sea and back in daily cycles. When after about 6-7 months they reach maturity (ca. 10 cm), people believe they spawn in the river. Then the *kewang* head picks a date for opening the fishing season.

The night before the opening, the *kewang* carries out another ritual and people place barriers into the river so that the fish cannot escape. The opening of *sasi* is always planned when there is a low tide in the morning, so that people can easily enter the water to catch the fish. At the sign from the head of the *kewang*, everybody (i.e., men, women, locals and strangers) starts fishing. The village head of Sameth explained: "The opening of *sasi lompa* is a fiesta; it is a social event and people share. If somebody would have an empty container, the people of Haruku would fill it up." Everybody thus can fish. Later, the fish are gathered and divided. A great deal of fish are directly consumed in a traditional feast, what are left are dried by the villagers to be eaten in the following months.

Sasi lompa is an extremely important aspect of village life. It not only provides the villagers with fish and confirms social relations, but foremost, the ceremony and opening of *sasi* (*buka sasi*) are a spectacular event which attracts visitors from all places, and this means a great deal to the villagers (see as an illustration, the newspaper article by Hann 1996).

Marine Sasi

Sasi on pelagic fish is closed when the small fish are spotted in the sea, usually around July-August when there has been a high tide. The *kewang* and fishers monitor the fish and when they are big enough and have settled in the sea grass beds, a date will be set by the LMD to open *sasi*. When *sasi* is opened, the head of the *kewang* performs the rituals according to tradition while the villagers witness the event.

The fishery is coordinated with Sameth, the neighboring village. After the ceremony, the net owners will draw lots and groups of 10 to 20 fishers with beach seines enter the water. They take turns and fish until the efforts exceed the benefits. At the time of our research (July 1997), *sasi* on both the sea and river was closed.

The harvest from marine *sasi* is divided among all villagers, including those who do not fish by profession. One part is for the church, another for the village head, and a third for the widows; the rest is divided amongst the households. This principal stems from the realization that benefits from the sea have to be shared among all villagers. The direct re-distribution of resource benefits makes Haruku's marine *sasi* unique.

11.4.2 *Sasi: the players*

In *sasi*, the three principal social institutions play a complementary role or, as the village head attests: "The village head is the government and arranges it, the church prays for it, and the *kewang* watches the people and enforces it."

The formal village government has no active role in resource management or monitoring. The village head in Haruku is also inaugurated as *kepala adat*. This position allows him to open and close *sasi* together with the village head of Sameth, the church people and the head of the *kewang*. However, compared to Nolloth, the role of the village head is relatively insignificant.

The *kewang* is the principal institution when it comes to the execution of marine *sasi* and enforcement of the rules. Officially, the head of the *kewang* functions under the authority of the village head. However, when the *kewang* and *sasi* were revitalized in 1979 (see Section 11.4.3), the *sasi* rules were written down and revised by the traditional council of clan leaders, and not by the formal government. The *kewang* has become a relatively autonomous institution and only relies on the village government when its members have to deal with offenders of *sasi*.

The Protestant church of Haruku plays an important role in *sasi*. The church's involvement in *sasi* on coconuts goes back many years and is executed in collaboration with the *kewang*. When *sasi* on coconuts is closed, the people gather in the *kewang* house where there is a communal prayer "to protect the people from stealing." Cloves have only been under church *sasi* since 1992 when theft was so intense that the people asked the village head to put the crop under church *sasi*. Church *sasi* has been stable over the last years because the church is independent from village politics, or as the church minister explained: "People commit to God and not to the village head."

The church minister feels strongly that there is a mission for the church in *sasi*. Gradually, the church is getting more significant and it is slowly taking over "*adat* things". The minister explained: "*Adat* is a behavioral code, not a traditional law. The spirit of *sasi* is *adat* and thus part of the culture. But where *adat* provides the cultural framework, the church provides the spiritual content. Therefore the church and *adat* have to merge."

The formal enforcers (police) play a marginal role. The local policeman assigned by the state (the *catadara*) represents formal authority. In reality, his authority is limited and when local authorities cannot deal with a matter, it is reported to the police in Pulauw. Occasionally, the police patrol catches a blast fisher, but it does not have its own speedboat. The police station is 18 km from the village and the police tend to leave the arrest and prosecution of offenders to the local authorities.

A last organization that may not be very prominent, but that is essential for the future execution of *sasi* is the *kewang kecil* or mini-*kewang*. It was installed in 1994 by Eliza Kissya (the current head of the *kewang*) and is meant for children who assist the *kewang*, report offenders, and take care of mangrove reforestation. The group is open for boys and girls from all social classes. The main purpose is to secure prolongation of the *kewang* and start environmental awareness

among young children. Through their involvement in environmental activities, the mini-*kewang* members become more aware of the need for nature conservation. Besides, since the children are from different families, the mini-*kewang* serves as a bridge between the pro and contra groups in the village.



Figure 11.3. Children, of whom some are mini-*kewang* members, in Haruku

11.4.3 History of the *kewang*

Haruku and Sameth share the *kewang* for the sea because both villages have access rights to the same area. For land resources, each village has its own *kewang*. Eli Ririmasse, the head of the *kewang* for the sea, narrated: "A long time ago the ancestors lived in the mountains. The grandmother of the Ririmasse clan was the leader. Later she met the grandmother of the Kissya clan who arrived from Ambon and joined the people living in the mountains. When Haruku moved down from the mountains to the coast, the two women led the ceremony. They played a very important role in the village beside the *raja* because they could use black magic. The women and the *raja* established the *adat* institution and developed *sasi*. They chose a *kewang* from each clan and that is why there are two *kewangs*."

Throughout history, clashes between the *kewang* and village leader were prevalent. In 1962 under village head Johannes Ferdinandus, the head of the *kewang* resigned and until 1979, the village had no *kewang* at all. In 1967, a new *kewang* head had taken position, but very briefly. He was not from the original *kewang* line and when he fell ill, he feared it was caused by the divine wrath of the ancestors and he quit. At the time, *sasi lompa* was still performed by the village officials, and despite the weak enforcement and lack of rituals, people respected the rules.

In the meantime, Eliza Kissya, a descendant from the original *kewang* clan, learned about the *kewang* practices from his uncle. In 1979, he was ready and re-established the *kewang*. Ely Kissya became the head of the *kewang* for the land. The current head of the *kewang* for the sea is Eli Ririmasse who was appointed in 1994. He functions under the authority of Kissya who is the *tuan tanah* (oldest clan). Since then, the *kewang* has become a strong institution in the village when it comes to *sasi* and natural resource management. Its position was strengthened after it won a national environmental award in 1982.

Status is an important reward for the *kewang* members, especially since the financial benefits are minimal. The money the *kewang* members get from fines is just enough to cover their expenses e.g., for transport, meetings, maintenance of the *kewang* house etc. The *kewang* has always been supported by the former village head, Bertie Ririmasse. Now that the new village head has arrived, their position is undermined. The new village head encourages the mining operations in the village, which goes against the conservation goals of the *kewang*. Because of their environmental concern, the *kewang* members had to form an opposition. However, in order to be formally acknowledged, the *kewang* needs support from the village head. To be really effective, and preserve the natural resources of Haruku, the *kewang* and the village head need to collaborate.

11.4.4 Enforcement

Enforcement is traditionally in the hands of the *kewang*. The *kewang* members, the mini-*kewang* or regular villagers report violations to the head of the *kewang*. The head of the *kewang* will order his members to catch the culprit. Before, the *kewang* would act independently. As long as it concerns relatively small offenses, the head of the *kewang* still disciplines the offender, but in more serious cases nowadays, the police will be involved.

The church also plays a role in enforcement. Compliance is stimulated through communal prayers in which people commit themselves to the *sasi* rules. The success the church has in “enforcing” the rules on coconuts and clove leads to the question whether the involvement of the church should be elaborated.

The church minister acknowledges the ancestral spirits and *adat*, but feels that the church is of a higher order and thus could be of more significance. The *kewang*, on the other hand, accepts the collaboration with the church, but stresses that *sasi* is *adat* and that the role of the church should be limited. Its members argue that everybody knows the rules, that the ancestors are involved, and that the *adat* ceremonies are important to ensure success. In order to collaborate productively, the church needs to respect these *adat* structures.

11.4.5 Compliance

There are no available data on rule violations. According to the villagers, compliance is relatively high due to the tight rules, *adat* and custom. However, it was stated that the number of offenses has risen since the current village head came into power. The conflict between the village head and *kewang* is a main reason for people to non-comply. A few respondents expressed economic need and a lack of respect for the *kewang*. Some of the offenders are poor, but often, people steal for fun or to test the rules.

11.4.6 Significance of *sasi* and local knowledge

Sasi is spiritually of great significance as J. Rehena, the church minister, explained: “Everybody carries it because it is *adat* and part of their culture”. As part of daily life and culture, everybody has knowledge about *sasi*.

Traditional sacred knowledge concerning *sasi* is in hands of the two *kewang* heads and *adat* elders. Knowledge is passed from father to son, but the head of the *kewang* had to learn it from his uncle. The new village head spent most of his time in Ambon and thus did not share the knowledge that comes with his position. Since he is inaugurated as the *kepala adat*, he has to learn about *sasi*. He derives his knowledge from the former head of the *kewang* and the members of the traditional village council.

For the Haruku people, *sasi* is highly significant. Due to the involvement of Yayasan Hualopu, a local NGO, the people in Haruku have become more environmentally aware than those in most other villages. Their idea that *sasi* is important to “preserve the environment until everything is ripe, to keep it sustainable and in good shape” is underscored by *sasi* rules that are meant to protect resources, e.g., the obligation to plant a tree at the riverbank after you have cut one, the prohibition on oil spilling and the bans on destructive and overly-efficient gear types. Although *sasi* is not exclusively meant to preserve the resources, it creates potential for sustainable resource management.

11.5 External Institutional and Organizational Arrangements

Links between the community and government fisheries management institutions

Recently, an official from the fisheries department assessed the fisheries resources of the village to see which have potential for development. The government programs in the village were mainly training: for the LMD, the women’s organization, and for the fishers on the use of motorboats.

Links with higher government bodies

Links with the higher government levels are limited. Government officers, including fisheries staff, visit the village irregularly. The village head knows that there are fisheries laws, but new laws are not actively communicated to the village. Fisheries management in Haruku, as in the other villages, is not yet an issue and the fishery tends to intensify due to the government subsidies for new nets and programs such as IDT, which supply new fishing gears.

The village government is subject to the sub-district government. The possibility for the village to bring up ideas and forward these to the higher provincial or national governments, however, is limited. The local government could make propositions and deliver them to the sub-district government for approval, but this office has no independent authority to approve the plan. This is a problem where it concerns the mining permit, which was issued from Jakarta. There is no structure that allows either the village government or the *kewang* to appeal against this decision.

Collaboration with other institutions

Since 1995, Haruku has been the scene for various coastal zone management promotional activities like workshops. Over the past years, several institutions and organizations have carried out training and programs: 1) Pattimura University (the Environmental Studies Center and Fisheries Faculty) on aquaculture and development, 2) local NGOs (e.g., Hualopu and Baileo) and several government agencies were involved in several training and awareness programs, 3) JANNI, a Japanese organization, supported a mangrove rehabilitation program, 4) OXFAM has included Haruku in its study tour, 5) the Department of Industry initiated a wood-carving training, but 6) the most prominent visitors were representatives from Ingold and Aneka Tambang to give lectures on community involvement in the proposed mining.

External economic influences

In the Strait of Haruku where local fishers operate, they face competition from large-scale fishing companies including the government-owned *P.T. Perikani*, based in Ambon.

Infrastructure and development

The environment of Haruku is seriously affected by the mining operations executed by Ingold and Indometal in collaboration with an Indonesian firm Aneka Tambang. Ingold and Indometal are Canadian companies that are already promoting shares on the international market based on the results of their explorations on Haruku and further prospecting on Ambon, Saparua and Nusa Laut. Now that the preliminary drilling has been successful, the mining operations will be extended with detrimental effects for the environment and the village society. Already, the intervention has led to political conflicts and soon there will be severe conflicts over land. There will be infrastructure changes since the government is planning to provide finances for road construction and public toilets at the end of 1997.

On the other hand, the operations will be beneficial in terms of job opportunities for laborers and construction companies. The need for increased economic activities has been aggravated by the current currency crisis in Indonesia.

11.6 Incentives to Cooperate

The keys to resource management are enforcement of, and compliance with, fisheries rules and regulations. However, various contextual variables affect an individual's inclination to participate in, and be governed by, *sasi*.

Tradition

Tradition and *adat* are kept very much alive by the active elders. *Sasi* is an intrinsic part of the Haruku culture and automatically, people have great respect for *sasi* regulations.

Status

Haruku has a history of resource management. Their *sasi* system on *lompa* fish is unique in the region and widely appreciated. In 1982, Haruku obtained an environmental award from President Suharto. In 1986, the Minister of Environment, Emil Salim, came to Haruku personally to open *sasi*. These highly appreciated visits have stimulated the people of Haruku enormously in their willingness to comply to *sasi* rules.

Economic benefits

People have direct benefits from marine *sasi* and *sasi lompa*. The catches are divided fairly amongst the villagers and the opening of *sasi* is a feast. This is a strong incentive for people to respect *sasi* regulations.

Destructive fishing methods are used by a small part of the population, mainly immigrants, who have no entitlement to land, and derive little benefit from resource management. This is their incentive to non-comply. The use of destructive techniques and intensification of the fishery are, in general, aggravated by the current economic crisis in the country.

Sanctions

The *kewang* members take a tremendous pride in their position. Their commitment to manage the resources and enforce the rules is very strong. The vigorous enforcement is a strong

incentive for the people to comply with the *sasi* regulations. However, if the *kewang* is undermined by conflicts and lack of support from the village leader, its position will weaken and some people will be encouraged to try breaking the rules.

The church plays an important role in enforcement through their communal prayers. Respect for God and fear of retribution keep people abiding to the rules.

Social pressure

Since most people benefit from *sasi* in terms of resources and status, peer group pressure to respect the rules is strong. The fact that many young children are members of the mini-*kewang* and authorized to report offenders will be a strong incentive for people (and young children) to abide to the rules.

Conservation purposes

The continuous efforts of Ambon University and local NGOs have led to awareness by a large part of the population and people are developing an appreciation for resource management. Visible protection of natural resources is in many cases an incentive for people to comply with the rules.

Awareness

The programs carried out by various external institutions have created environmental awareness that will be an incentive for some people to comply with the rules.

Youths can partake in the mini-*kewang* where they learn about the environment and how to protect it. They are rewarded within the organization but also see the effect of their personal efforts. Children thus learn to appreciate nature and this will be an important incentive not to destroy the resources.

11.7 Patterns of Interaction

The village territory can be categorized as a collective good and as such, under the responsibility of the village. A clear set of property rights has been installed to secure a stream of benefits for all. Fruit and tree gardens are private property, but harvest rights are arranged under *sasi* as a collective right. *Sasi* on land is imposed to provide benefits to the individual while protecting the resource.

The sea is a communal property (*res communes*) in which the resource is controlled by an identifiable community of interdependent users. An identifiable community in this context refers to the people who live in Haruku-Sameth (Mantjoro 1996a). The members of neighboring villages on the same island are excluded. Marine *sasi* has direct communal benefits and people have the right to them.

This system, however, is under threat. Land resources, which are private property, are subject to national legislation that defines all land as belonging to the state. Article 33 of the national constitution enacted in 1945 stipulated that land and water-based resources belong to the state and will be exploited to the optimum for the wealth and welfare of all citizens (Mantjoro 1996a). This has allowed the Ministry of Mining and Natural Resources to issue a permit for mine exploration in the area.

This has led to social and political stress in the village. A split has developed between a group that supports the mining operations because of the potential economic benefits, and a group that is concerned with environmental destruction and the disregard of land ownership. The village head leads the first group while the *kewang* typically supports the latter. A conflict between the two groups will negatively affect *sasi*. The role of the *kewang* will weaken dramatically and although the *kewang* is locally highly legitimate, its members may find they are no longer in the position to enforce the *sasi* rules.

The *adat* rules do not deal with impacts of mining on small islands and the *kewang* is powerless against the mining corporations. The activities of Ingold, Indometal and Aneka Tambang have not only had a negative impact on the environment and people's land and forest gardens. The conflicts in the village have weakened the program that was developed to create environmental awareness and organize the community in coastal management.

11.8 Outcomes

11.8.1 Equity

1. The role of fishers in management

The role of fishers in management is seen as having been the same in the past, but fishers expect a little improvement. Education has made people "smarter" and their opinions are more respected.

The fishers noted that a strong role for the village government and *kewang* is customary. It is the leaders who make the decisions about the fishery (together with the lift net owners, as one person noted). When asked about power-sharing, over half thought that the government had most or total responsibility for fisheries management, while the rest thought the people shared responsibility equally with the government. Although it was mentioned that people trust that the decisions the leaders make are good for the village, some also said it would be preferable to increase direct involvement of fishers so that not all the decisions are made by the village government alone. Half of the fishers agreed that fisheries rules should be changed.

2. Access to marine resources

Access to marine resources is limited by the *sasi* rules. The fishers' own access to resources is seen to be significantly less now than in the past. The reasons for the decline are unclear. Nearly half (40%) agreed that a fisher in need should be able to ask for and get harvesting rights in a *sasi* area during the closed season. Only 10% of the fishers agreed with the sale of resource harvest rights to outsiders.

3. Distribution of means of production

The distribution of the means of production is seen to be fairer now than in the past, but further future improvements are not expected. The overall number of boats and gears has increased and so have the fishing efforts as people have obtained more machinery. However, declining yields, more pressure, and competition are having a negative effect on the equality among fishers. Larger boat owners have more capital and are increasingly powerful.

Table 11.3. Results of the performance analysis in Haruku. n=30 heads of fishing households. ns =trend not significant; * =p<0.05, ** =p<0.01, * =p<0.001.**

Indicator	Average current condition on scale of 1-10	Average change through time (statistical significance)		Average future expected change (statistical significance)	
<i>Equity</i>					
1. Role of fishers in management	6.07	0.5333ns	+5%	0.5333*	+5%
2. Access to marine resources	7.50	-1.2000***	-12%	-0.6667***	-7%
3. Fair distribution of fishing gears	7.00	1.8333***	+18%	0.4000ns	+4%
4. Economic equality	6.13	-1.0333*	-10%	-0.7667**	-8%
<i>Efficiency</i>					
5. Communal decision-making	6.73	-0.1000ns	-1%	-0.0333ns	-0,3%
6. Ease of entry into the fishery	7.07	-1.6333***	-16%	-1.1333***	-11%
7. Control over access to fishery	7.47	1.2333**	+12%	-0.1000ns	-1%
8. Compliance with fishery rules	6.73	-1.1000*	-11%	-0.5667*	-6%
<i>Social Sustainability</i>					
9. Family well-being	6.47	0.4333ns	+4%	0.7000*	+7%
10. Income	6.00	-1.1333*	-11%	-0.2000ns	-2%
11. Tradition of collective action	6.30	-1.8333***	-18%	-0.9000***	-9%
12. Discussion of village issues	6.40	-1.5667***	-16%	-0.1000ns	-1%
13. Community harmony	5.73	-2.4000***	-24%	-0.9333**	-9%
<i>Biological sustainability</i>					
14. Marine resource health	6.00	-2.6000***	-26%	-1.4333***	-14%
15. Fish catch	5.73	-3.0333***	-30%	-1.7333***	-17%

4. Income distribution

On an average, the level of economic equality is perceived to have declined and is expected to decline significantly in the future. The reasons for the decline are: 1) because of increasing opportunism, and 2) because some people simply work harder than others. On the other hand, some people reported that the drop in clove prices has resulted in more equality among the villagers, because the very rich have “dropped” into the middle class. Also, the fact that generally people have to work harder and others are supported by government programs, has resulted in more equality.

11.8.2 Efficiency

5. Communal decision-making

Communal decision-making is seen as stable. The style of decision-making in the village was seen by 62% as being a process of common or majority agreement. The rest thought that the village head, with the village government staff, makes the decisions. In either case, the process is seen to be legitimate. However, when asked directly about their involvement, nearly all respondents (97%) agreed that all stakeholders should participate in decision-making, especially now that people have become more educated.

Seventy-three percent felt that local groups do have a role in decision-making, whereas an even larger number (83%) was convinced that outsiders had no involvement at all. Outsiders are mostly Butonese fishermen.

6. Ease of entry (costs)

The costs of entry into the fishery have significantly increased (16%) and are expected to rise another 11% in future. Around Haruku Island, people have to pay in order to fish in specific parts of the sea and this is especially the case for Butonese fishers who have to pay goods, gears, or fish, to the respective village government. Our sample contained a number of Butonese fishers and, therefore, the perceived costs were relatively high (score 7.07).

7. Control over access to the fishery

Control over access to the fishery is seen to be better than in the past. The *kewang* was said to play an important role in controlling access and enforcing regulations, and the mini-*kewang* will ensure control in the future. However, for the future, no changes are expected. It was said that control has to be good because people depend on the fishery.

8. Compliance

According to the fishers, compliance is high. However, compared to the past, compliance with fisheries rules has declined by 11%. It was explained that the conflict between the village head and the *kewang* is, for some people, a reason not to comply. Also, people who do not respect the *kewang* do not abide by the rules. Compliance is expected to decline 6% further. Compared to villages where *sasi* is lost, however, compliance rates are still high (score 6.73). The respondents explained this score as being due to tight rules, *adat* and customs that are still important to the people.

11.8.3 Social sustainability

9. Family well-being

Family well-being has remained the same compared to the past, and is expected to improve only slightly in the future. The villagers' livelihood has been negatively affected by the declines in clove harvests and clove prices. They had to turn to the cultivation of cacao and coffee. A common notion of the respondents was that "people will have to work harder especially since the prices for daily needs have increased."

10. Income

Fishers reported a significant 11% decline in their income over the past 15 years, but expect no major changes in the future. The drop in clove prices has been disastrous, but for the farmers who are also fishers, the decline was compensated by higher prices given for the fish.

11. Tradition of collective action

It was felt that the level of communal action had gone down significantly: 18% less compared to the past and a further drop of 9% was expected in the future. The respondents rated past performance as high (mostly score 8-9 out of 10). At the root of the decline lie personal financial interests and growing individualism (especially of young people), loss of customs, and good leadership. However, collaboration is part of the culture, i.e., "the way they were brought up" and over half of the fishermen felt that this will keep them working together.

12. Discussion of village issues

The open discussion of village issues is reportedly in decline. A number of respondents felt that the degree to which people can participate in discussion depends for a large part on the village head. He was said to arrange all village matters as do, to a lesser extent, the LMD and the *kewang*. People, however, felt that they are becoming more educated now and wanted to participate more in the discussion of village issues.

13. Community harmony

The number of conflicts in the village has increased dramatically (i.e., harmony has declined by 24% and is expected to decline further). According to the fishers in our sample, this was due to the elections and political division in the village. Other main problems were alcohol abuse and juvenile delinquency.

At the family level, there are conflicts over the garden boundaries and ownership of the trees. Usually these problems are dealt with within the family. Conflicts have been arising since the number of people in the village increased, but the new village structure has also caused confusion.

Sasi and marine access rights, as defined under *sasi*, provide no ground for conflicts. The *kewang* takes its job seriously and people are aware of that and respect the rules. The equitable sharing of *lompa* fish managed under *sasi* is a key aspect that promotes harmony in the village.

11.8.4 Biological sustainability

14. State of the resource

The fishers perceived an average 26% decline in the condition of marine resources over the past 15 years. They expect resources to decline another 14% in the next 15 years. Sediment, as a result of the upstream mining activities, pollution and the use of modern fishing gears and bombs, have had negative effects.

15. Fish catches

The latter also have a negative impact on fish catches. Nearly all (93%) of the fishers reported significant reductions (-30%), and in the future, the fishers expect the situation to become even worse (-17%). More reasons for this decline can be read in Chapter 8.1.

11.9 Synthesis

Sasi in Haruku is unique because it recently has been “greened” in the sense that new rules with overt environmental purposes have been introduced. Government programs stimulate the use of modern nets and intensification of the fishery. However, the authority of *adat* and *sasi* regulations is strong enough to keep these developments within bounds. The high level of collaboration with outside NGOs and researchers also sets Haruku apart. The village has been included in various environmental programs and has served over the years as an example of successful resource management. The *kewang* plays an important role in the extension of environmental knowledge and it is crucial that the *kewang* remains functional. At the moment, however, its position is weakened due to conflict with the government.

One of the key features of *sasi* in Haruku is its emphasis on equity. Catches of *lompa* fish and other pelagic fish, both from river *sasi* and sea *sasi*, are shared among the village population. The derivation of direct benefits promotes social harmony. This stands in contrast to the situation in some other villages where the routing of harvest profits through the village government for “village development” or the sale of *sasi* harvest rights to outsiders are often resented by the common villagers.

Under the local management system that affords protection to juvenile fish and prohibits overly-efficient harvesting, *lompa* harvests in Haruku appear to have the potential for biological sustainability. However, because the species under management is pelagic fish and thus may be intercepted outside of the protected area, this sustainability is very vulnerable. Local management can only hope to ensure stock health if the fishery is restricted to community waters. In fact, most *lompa* and other pelagic fish are caught by offshore lift nets where the profit-sharing system and minimal crew wages promote intensification of fishing efforts.

Sasi in Haruku is undoubtedly efficient in that it is carried out with a minimum of expense and compliance to rules is high because of the legitimacy of the *kewang*.

Currently, however, this strong *sasi* system is undermined by political instability, conflicts between the village head and the *kewang* and environmental degradation due to mining activities on the village territory. Property rights issues and access to land resources are subject to conflicts. Whereas some people welcome the potential employment and economic activity from mining, others fear the loss of their land and livelihood. If a planned resettlement scheme is realized, the village of Haruku, together with its distinct *sasi* institution, will be consigned to history.

Even in the exploratory phase, the ecological impacts of the mining activities on the environment are manifest: downstream sedimentation pollutes the river estuary and covers the corals and thus forms a direct threat to the *lompa* fishery. Interviews conducted by Yayasan Hualopu in 1997 show that, even though they do not fully comprehend the potential destructive effects of mining operations in the future, the villagers are concerned about these environmental impacts. The possibility for villagers to defend their interests, however, is limited by the centralized village structure that effectively excludes them from the decision-making process.

At the moment, the village head is trying to restructure the LMD into a functional village government. His strategy to get support and to become a more legitimate leader is to base his actions on *adat* structures. He also concentrates on “politically correct” issues such as the involvement of women in the village government. In the meantime, however, the village is at an impasse.

Strict application of the *sasi* rules and the education of young children through their involvement in environmental management are the two building stones of *sasi* in Haruku. The village leader was optimistic and felt that *sasi* would be continued because “it is a traditional thing and Haruku has a *kewang*, which makes it stable”. The authority and responsibilities of the *kewang*, however, have never been formalized and now that the influence of formal authorities, like the police, is becoming more prominent, acknowledgment is imperative. The relationship between the village head and the *kewang* is decisive for the stability of *sasi*. Only under a functioning village government and through collaboration with the *adat* leaders, church and *kewang*, can village resources be protected.

Chapter 12

Desa Tuhaha, Saparua Island¹

12.1 Physical, Biological and Technical Attributes

12.1.1 Physical environment

Tuhaha is situated on the peninsula of Hatawano, facing Tuhaha Bay. On the opposite side of the bay lies the Pia village. Except for the water right in front of the Pia village, the fishing rights over the bay seem to be exerted by Tuhaha. The bay is divided into four zones (Figure 12.1). Three are subject to access limitations: the former *sasi* area; a part for which the fishing rights are auctioned (*lelang labuhan*); and a part that is reserved for the village head.

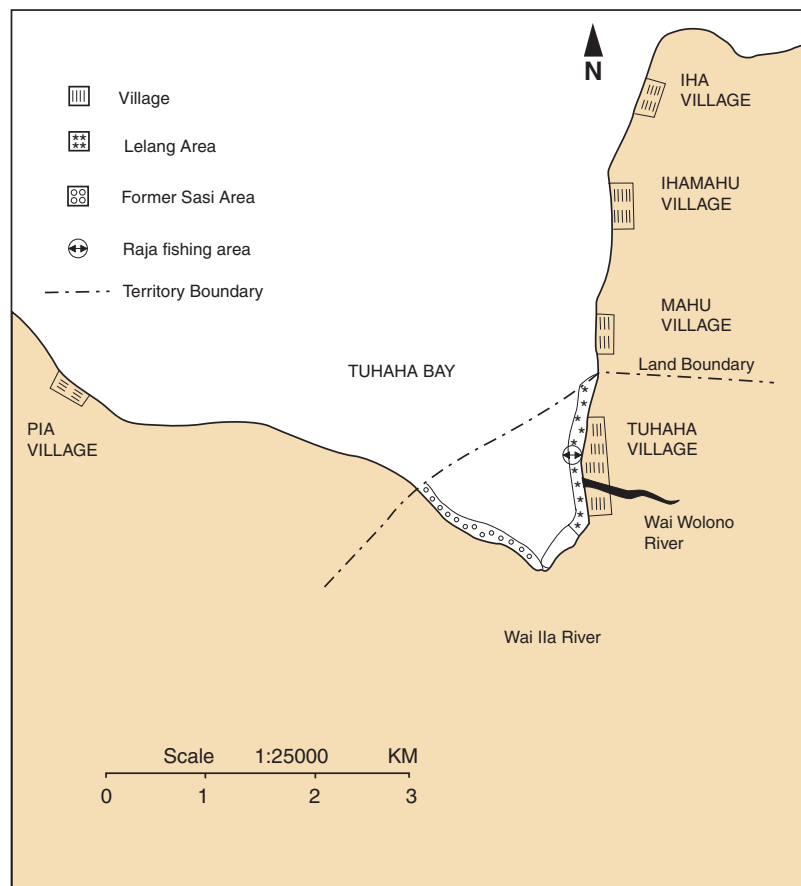


Figure 12.1. Sketch map of Tuhaha Bay (features not necessarily to scale).

¹ For data tables see Appendix 3.

The former *sasi* area is a shallow stretch that runs west from the village to the point where the river enters the bay. It runs along the shore from the low tide level to the high tide level i.e., the intertidal level. The 3 m deep area (at high tide) is a sea grass bed and an important fish spawning place. If the new *sasi* regulations are installed, the boundaries will be shifted a bit outwards because the traditional spot for the *sasi* sign has been built upon. Beyond the *sasi* area lies the auctioned area. This 500 m long stretch runs towards the outer bay up to the village. Around the pier lies an area called the “*lelang kepala jembatan*”, where the village head used to put his lift net². The fourth zone, the middle section of the bay, is an open-access zone where fishing is free (see Figure 12.1).

12.1.2 Biological characteristics

The fishing grounds of Tuhaha fishers are located in Tuhaha Bay, along the outer coast of Saparua Island and in the Strait of Seram. The majority of fishers (57%) target both reef and pelagic fish, while 40% catch pelagic fish only. About 20 fish species were recorded as commonly caught: 11 pelagic fish and 9 reef species (see Appendix 3). In addition, fishers target various types of shellfish.

All fishers reported a negative trend in their fish catches and a general decline of the marine environment (see Section 12.8.4). The main causes, according to the fishers, were the increasing number of fishers and the shift from traditional to modern gears. The increasing numbers of FADs and lift nets have intensified the fishery dramatically and are said to have had a destructive effect on the ecosystem. The larger numbers of motorboats have led to the additional problem of oil spills in the water.

12.1.3 Fisheries technology

There are approximately 200 small boats and four motorized boats in the village. Of our fishers' sample, 70% owned a small boat (*perahu*) and 7% had an engine. Most fishers used hand lines and (cast) nets, 37% had hand lines only and 27% owned no gear. Three of the respondents owned lift nets (Appendix 3).

Of the five lift nets in Tuhaha Bay, one is owned by the village head; the rest are owned by other villagers. In order to place a lift net, the owner has to buy a permit from the Fisheries Agency and ask permission from the village head, which is usually granted. Most artisanal fishers have strong objections against the lift nets³. Some of them, however, benefit. They work with the lift nets at night. With the lights on their small boats, they lure away the fish from the lift net, so that the net can be dropped. In exchange, they are allowed to fish around the lift net and get a percentage of the catch.

Lelang labuhan

A special case of a private property resource with harvest restrictions enforced by the temporary owner of a particular part of the bay is the *lelang labuhan* or the auctioned fishing

² In our last conversation (Oct. 1998), the village head explained that the use of lift nets has become prohibited within the bay. Regular fishers, whom he appoints, can now use his privately owned area. If a fisher really needs it, he can also ask for permission to fish in his area.

³ Apparently, the village government has acknowledged the negative effects of the lift net fishery. As of 1998, the use of lift nets is no longer allowed within Tuhaha Bay in order to preserve the fish spawning grounds. They have to be placed 1.5km from the shoreline.

rights in a particular part of Tuhaha Bay. The system has been known to exist for at least 50 years. The boundaries were originally defined by the community through a referendum in the community house (*Baileo*), but no women voted. The auction takes place in January and is attended by hundreds of people but few are wealthy enough to join the bidding. The revenues from the auction go to the village government. The catches from the auctioned area are exclusively for the lessees.

The auctioned area is a 500 m stretch of shallow water along the bay. The area is divided into five separate pieces each worth Rp100,000 to Rp300,000 (\pm USD35-100, 1997 rate). The pieces can be rented out separately, and used for fish traps (*sero*). However, in order to allow fishing with long nets, it is preferred to have more than one piece.

When Sahusilawani was installed as the village leader, his family won the rights over substantial parts of the auctioned area. In 1997, four-fifths of the auctioned area were in the hands of Fredric Sahusilawani, a cousin of the former village headman. For the four pieces, a total sum of Rp650,000 was paid (\pm USD230, 1997 rate). Sahusilawani uses long nets (100-200 m) in the area (7 m high, mesh size 5 cm). The area is perfectly suited for trap fishing too, but he could not proceed due to a lack of hands to place the fish traps in the water.

The other part was in hands of Pieter Lohenapessij who paid only Rp80,000 for it. Lohenapessij uses mainly nets to catch *palala* fish (*Abudefduf sordidus*) and *bulana bulana* (*Mugil cephalus*). Another species that attracts fishers to the auctioned area is *komu* (*Auxis tharsard*). At the time of the interview (December 1997), the fish had not yet appeared and his efforts had not been profitable, but he hoped for the best.

Whereas *sasi* has largely vanished, the regulations in the auctioned area are still in practice. The strength of *lelang* (the auctioning of fishing rights) lies in the fact that it has always worked independently from the village government and the *kewang*. It largely depends on the owner who is responsible for the enforcement of access rights. Jacob Sahusilawani (the brother of the current (co-)owner of the auctioned area) explained: "I have all the rights over the area.

All the people have to pay to me if they want to fish, otherwise they have to go to court." If necessary, he can count on friends, the police and the village head, to enforce his rights, but generally, compliance has been high. Lohenapessij also explained that intrusion into his area was limited. He had made it very clear to the fishers that he would allow night fishing, but if he saw fishers pulling their nets during daytime, he would inform the village head who would fine the offender or send him to the police.

There are no conflicts over the access restrictions or the boundaries of the area. People are not happy with the restrictions, but are afraid of the sanctions and accept them because it is tradition. Or more pragmatically put by Jacob Sahusilawani: "If you are poor, you are poor; what can you say, what can you do?"

12.2 Attributes of the Community and Fishers

Traditionally, like Nolloth, Tuhaha was situated in the hills. The village was governed by the *tuan negeri* (traditional village leader). The current *tuan negeri*, Max Aipassa, explained: "The Aipassa family is the family that has the greatest power in the village. They are the leader of all traditional authority. It is the biggest clan and also the clan of the *kapitan* (war leader). Long ago, it was the *kapitan* who managed the village; there was no *raja* in Tuhaha. It is also the clan that fought the

Dutch in the Pattimura Battle in 1817.” He explained further that during the Dutch colonial period, the people were forced to come down to the shore. The Sasabone clan followed the orders and the clan leader became the regent for the Dutch. The Aipassas, however, refused to come down. They split into two groups; one went to Seram and the other remained on Saparua. From the hills, they fought the Dutch. The clan later moved down to what is now Tuhaha.

With 2,022 inhabitants, Tuhaha is a middle-sized village. The 417 households have an average size of five persons each. Only 10% of the predominantly Christian village is Islamic. These Islamic Butonese, however, are 3rd generation inhabitants. There is no recent in-migration. Except for 40 households that took part in a transmigration program and moved to Seram in the 1970s, Tuhaha has no history of significant out-migration. Some 25 young people leave the village each year. There is no tourism in the village.

Tuhaha has a health center (PUSKESMAS). There are two primary schools and a junior high school in Tuhaha. The general education level, however, is relatively high with 700 people having attended elementary school, 150 junior high school, and 150 senior high school (data from 1993). The village has electricity and some people have TVs. The village also has a fresh water pipeline system and septic tanks to contain household wastes.

The transportation links to Tuhaha are good. There are frequent minibuses and the village has a hard top road. There are seven motorcycles and five public transport buses in the village. The communication links are minimal. The village only has a walky-talky system and for communication, relies primarily on the mail.

Employment

Most villagers combine fishing and farming. However, Tuhaha has a relatively small forest-garden area and farming is apparently no alternative for the growing population. This may explain the significant increase in the numbers of fishers from 49 registered in 1993 to more than 200 in 1997.

There are two small active home industries. The number of shopkeepers, laborers and government employees has increased since 1979. As of 1998, there are over 50 government staff in Tuhaha.

12.2.1 Village government

For village administration and physical development, the Tuhaha village government receives an annual subsidy of Rp6 million (\pm USD2,100, 1997 rate) from the district level. Additionally, they receive Rp1.5 million for the PKK women’s organization. The village revenues are used for development projects e.g., a pier in the harbor, a fresh water supply, and a fence project. For these projects, the money from the auctioned area is also used. The village government bears the actual costs while the villagers provide the labor.

Over the last 20 years, the village government has experienced periods of political instability due to, amongst other causes, conflicts between the village headman and traditional authorities. In the 1970s, Sahusilawani implemented the new government structure. The traditional leaders were included in the formal village government (LMD), but their authority based on *adat* was not acknowledged. The *tuan negeri*, Max Aipassa, however, insisted that his traditional position (and, therewith, *adat* law) be formally acknowledged and in the meantime, refused to accept his formal position in the LMD. This conflict is one reason why the LMD has been dysfunctional over the last years.

Several interim leaders have not been able to set up a functional village government (Table 12.1). To end the political instability, Albert Tanalepy, a businessman who works in Surabaya, was asked to come back to Tuhaha to become the village head. He agreed, but since his business also demands his attention, he spends regular intervals outside the village. People do not like his absence, but are generally content with their new leader. "He speaks English and he is very generous because he takes care of the harbor, fences and a fresh water supply" commented Mrs. Lopatty, one of our respondents.

Table 12.1

Village leaders in Tuhaha	
1994-now	Albert Tanalepy
1992-1994	Interim leader
1963-1992	Frans Sahusilawani
1958-1963	Johanis Sahusilawani (interim)
1917-1958	Hendrik Dominggus Tanalepy (father of current leader)

As of 1997, the village government was still in the process of establishing itself. Of the 17 LMD members, four persons are from the traditional *saniri negeri*. The other elected members are regular villagers. The village head and village government members agreed to revitalize *sasi*, to establish a *kewang*, and to acknowledge the authority of the *adat* institutions. In the course of 1998, an agreement is to be reached between the formal and traditional authorities on the development of a new structure in which division of roles and responsibilities are defined.

12.2.2 Village organizations

Most of the other common village organizations are present in Tuhaha. The PKK is active and offers a program that connects more to the daily life of women than in other villages. Membership is higher than in Nolloth, but is also dominated by women from the higher social classes.

The *Pelwata* is also active and meetings are attended by women from all social groups. They felt involved and said that they benefited from the church organization. However, the formation of annual programs was in arrears, which hampered the activities.

There are four IDT groups, but there is no KEP for fishers. Both the TAKESRA and ARISAN are present and mainly occupied with sago processing. Members in these last groups are, so far, mainly men. It was proposed that in 1998, programs be set up for women.

Tuhaha has no village cooperative (KUD).

12.2.3 Role of women

In early history (before 1800), the village seems to have had a female *raja*. Apparently, times have changed because today, women's influence on village matters is limited to household affairs. This is the sphere where the women can make decisions, but even so, in most cases, they need consent from their husbands.

Women play an important role in the village as petty traders. They trade in palm sugar, sago and fish. Many women sell the fish they get from their husbands. Shellfish are gathered and

used for household consumption. Women thus are highly dependent on marine resources, but they are not involved in resource management. Now that *sasi* will be re-established, their opinion is not sought. The women simply wait for things to happen: "If the village government wants to establish *sasi*, they will do that." (Augustina Lohenapessij, a Tuhaha fish trader). Consequently, women have little practical knowledge of *sasi*; they only know that "*sasi* is good".

Likewise, in other village matters women are generally not consulted. About 23% of the fishers in our sample considered women to be completely outside the decision-making process. Women are not invited to general government meetings, and have no say in village expenditures. Only when training and programs are planned specifically for women, are they asked for advice. Yet, because women in Tuhaha harvest, trade and consume marine resources, their involvement in decision-making is crucial.

12.2.4 Profile of fishers

The average age of the 30 respondents was 53 years, and 11 were under 45 years old. Only two women were interviewed. Nearly all of the respondents were born in Hulaliu. Their families consist of seven people on an average. Children who have left, have mostly gone to work with a few leaving for school or marriage. Of the respondents 73% had only elementary education, less than the average education level in Tuhaha.

Nearly all fishers (97%) are landowners, but the principal part (75%) of the household income comes from fishing (a relatively high percentage). Additionally, 27% of these households have an externally derived income of an average Rp596,000 per year (USD238, early 1997 rate). The fishermen were highly experienced and had spent on an average 34 years in the fishery. On fishing days, they spend about nine hours at sea, while a third of the fishers made fishing trips of 12 hours.

Despite the long hours at sea, nearly all Tuhaha fishers expressed satisfaction with their jobs. They felt happy and free at sea and fishing provided them with an acceptable income. Nine fishers said they would change their job if somebody offered a more profitable alternative. Although the respondents were satisfied with their profession, only 7% wanted their children to be fishers. Farming was not a favored alternative either. Three-quarters of respondents would much rather see their children become government staff.

The economic indicator of the fishers' sample is made up of adding scores for land ownership, boat type, house and gears. Most fishers lived in a cement house with zinc roof. The overall average economic score for 27 villages was 8.6, SE=0.10. For Tuhaha, the indicator was 8.7 (with a standard error of 0.36), which is mid-range (Appendix 2). Adding TV ownership brings the total score to 9.3, which is second highest among the case study villages.

12.3 Market Attributes

Approximately 75% of the fish sales are direct to consumers. The fishers sell their fish either through their wives or other female fish vendors. Small amounts are sold at auctions through fish brokers (*borok*) or sold to wholesalers.

The fish vendors sell over half of their fish in the local market. About 20% are taken to the town of Saparua and the rest go to regional centers. The key factor in choosing point of sale is price. In most cases, the fishers say the price is set by the fisher or his wife, although in fact, larger market forces clearly define limits for fish prices.

The fishers in Tuhaha sell the major part of their catch; only 23% are used for household consumption. Four fishers of our sample do not eat any of the fish they catch, and none eat more than half of their catch.

12.3.1 Local fish trade

The trading of artisanal catches is mainly in the hands of women. Our respondents had extensive experience in retail (20-30 years). Especially after the clove market was monopolized, more women reverted to the fish trade. The women trade in all kinds of fish that they take as far as Masohi (on Seram Island). They buy the fish straight from local fishers in Tuhaha, Nolloth and Saparua. However, unlike the Nolloth traders, they bring no merchandise back to Tuhaha. Between the buyer and seller, there is no relationship, i.e., the person who comes first gets the fish. The fish vendors in Tuhaha sell only fresh fish. The fish that are not sold are smoked or dried and used for household consumption. Other post-harvest techniques are not used.

In the 1980s, prices for fish were low, but currently the prices are very high. Despite the high prices, the preference of consumers for fish has not changed.

12.3.2 Commercial-scale trade

Tuhaha Bay is an important provider of baitfish that are caught with lift nets. The small fish are sold to the large pole and line fishing boats that use them as bait to catch, amongst others, skipjack and tuna. At night, these fishers from Ambon come to buy the fish directly from the lift net fishers. These lift net fishers receive an initial payment of Rp2,000 per bucket of fish, plus an additional 10% of the revenues made by the pole and line fishers. These transactions are based on trust, and it is not surprising that, between the two parties, long-term trade relations sometimes exist.

Others send their fish to auctioneers who wait at the fish landing areas and take the fish to the market in Ambon. In this case, the price paid usually depends on the outcome of the auction and can vary daily, but the price can also be determined between the buyer and seller beforehand (see Chapter 3).

If there is no such arrangement, the lift net fishers may choose to bring their fish to local or regional markets (e.g., Tulehu, Ambon, Masohi), wherever they have regular customers. The market in Seram is dominated by South Sulawesi traders and here the fish are sold for cash only.

12.4 Institutional and Organizational Arrangements

12.4.1 Loss of *sasi*

The former *sasi* regulations in Tuhaha were designed during the Dutch colonial period. The regulations were designed by the *kewang* and the traditional village leaders and approved by the Dutch. The aim of *sasi* was to protect the resources from destruction and also to provide boundaries for both the land and the sea territories. On the land, *sasi* was applied on fruits, e.g., cloves, durian, bananas, and coconuts. *Sasi* regulations prevented theft and assured timely harvests during which large amounts of ripe products could be harvested.

Later, in the 19th century, *sasi* operational rules on fish were established. Fishing was prohibited in both the nursery grounds and the river estuary. The main target species was *lompa* fish

(*Thryssa baelama*)⁴ and the rituals of opening and closing the area were comparable to the current *lompa* fishery ceremonies in Haruku. Additionally, the spawning grounds of the fish were protected in the *sasi* area. Later, other sea products under *sasi* were sea cucumbers and top shells (*Trochus niloticus*). Until they finally disappeared in the 1980s, the regulations basically did not change. The regulations were never written down.

The exact year in which *sasi* was abolished is not clear. According to the current village head, Tanalepy, *adat* was abolished in 1958 and *sasi* was subsequently lost. Max Aipassa, the *tuan negeri* at that time, stated that he performed *sasi* rituals in 1963, 1969, and 1983. From this information, it can be concluded that the process of the decline of *sasi*, on the constitutional level, has had a different pattern of loss than the practical (operational) aspects of *sasi*. The process of decline has also been irregular.

Aipassa's explanation of the loss of *sasi* was also not attributed to the loss of *adat*, but to political problems in the village during the reign of the former village head. He explained that in the 1960s, conflicts arose between the people and the village headman at the time, Sahusilawani. In the process, the village became divided into two parties that were extremely hostile towards each other. One group was in favor of the village head and the other group opposed him. At the height of the turmoil in 1969, the house of Max Aipassa, who was mistaken for that of a member of the opposition party, was attacked. He immediately resigned his post (*tuan negeri*) and no longer performed the *sasi* rituals.

In order to restore the peace in the village, the village leader convinced Aipassa to resume his post again and to continue *sasi*, which Aipassa did. Between 1969 and 1983, *sasi* is said to have been active, but with ups and downs. Apparently, the villagers were not particularly interested in *sasi*. In 1983, new conflicts arose in the village. Again, the village became divided into pro and contra groups with respect to the village head, and again there was political turmoil. Apart from this, the members of the *saniri negeri* (traditional village council) were involved in a land dispute. As a result of these political conflicts, the *kewang* withdrew and the *tuan negeri* resigned for a second time. According to his information, the last *sasi* sign was put up in 1984 and since then, *sasi* can be considered dormant.

Table 12.2. Timeline of events in Tuhaha

Year	Decline of <i>sasi</i>
1958	The old <i>raja</i> died and was succeeded by an interim <i>raja</i> . Some people marked this year as the end of <i>adat</i> and the end of <i>sasi</i> .
1960	Max Aipassa became the <i>tuan negeri</i> .
1963	A new <i>raja</i> , Frans Sahusilawani, was installed.
1964	Sahusilawana quit and was succeeded by an interim <i>raja</i> . Later he took up his post again.
1969	Incident with Sahusilawana, and Aipassa resigned. Later he agreed to take up his position again.
1969-1983	This year marked the first stage in the recent decline of <i>sasi</i> . <i>Sasi</i> still exercised (rituals were performed), but people were not very interested.
1983	Second conflict in the village and between Aipassa and Sahusilawani. The <i>kewang</i> quit.
1984	Last <i>sasi</i> ritual performed and Aipassa resigned, marking the final collapse of <i>sasi</i> . Later Aipassa took a seat in the formal village government.

⁴ Nowadays, the *lompa* fish are caught throughout the year. *Lompa* fish are mainly caught when the weather prevents the fishers from going out to sea.

Sasi on coconuts was taken over by the church, which required no *kewang*. Land *sasi*, however, was no longer actively implemented, and the marine *sasi* area was encroached upon by people who fished for economic reasons.

Sasi on coconuts is still applied in the village. The enforcement and regulation of the harvest are arranged by the church. Although it handled *sasi* on coconuts successfully, the church never became involved in marine *sasi*. Bram Pattipeluhu explained: “The church could not take the responsibility. When *sasi* is closed, the villagers go to the church and swear they will obey the rules. Everybody knows, however, that people, especially in times when the economic pressure is high, do not always comply with the rules. If people encroach the *sasi* area while it is under the observance of the church, not only would they have to face the punishment from the ancestors, but also from God himself.” When asked if this was true, the church minister added: “The power of God is great. So to avoid a situation where many people have to deal with these powers, it is best to involve the church only in *sasi* regulations that are easily observed by the people.”

After the abolishment of *sasi*, the area turned into an open-access area and what some people feared came to be: the resources declined. When asked what *sasi* meant to them, various respondents replied in a similar way as Abraham Pattipelu, who explained: “If there is no *sasi*, everything will be destroyed. Nothing is left for the next generations.” Although it has been dormant for at least 10 years, *sasi* is still valued and regarded as important for village life.

12.4.2 Fisheries regulations

Current village fisheries regulations mostly concern the use of lift nets and destructive fishing techniques. Registration is meant to control the number of lift net fishers in the bay. There is also a formal restriction on mesh size to prevent the use of the extreme small *karolo* nets (1-3 mm meshes). Blast fishing, cyanide fishing and the use of other destructive fishing techniques are also prohibited. There is no active enforcement, but the use of bombs is said to have drastically gone down since one fisher died while blast fishing (Lopatty, *pers. comm.*). Other rules mentioned were a ban on cutting mangroves in the bay and harvest restrictions on sea cucumbers. Apparently, neither of these regulations is enforced. Tuhaha has no *sasi* system or *kewang* and relies on the police for enforcement.

12.4.3 The players

The main players in fisheries management in Tuhaha are the village government and the owner of the auctioned area. The *kewang* has been abolished and no comparable enforcement institution is present. The police reside too far away to be effective in enforcement and their role is limited to the prosecution of offenders presented by the village officials.

Tuhaha’s fisheries are managed largely by private persons for their personal benefit. The temporary owner of the auctioned area will protect his property rights himself with the aid of some selected people and the village government. The part that traditionally belongs to the village head is also under his supervision; he will decide which people are allowed to use the area. The rest of the bay, except for the Pia territory, is managed by the village government, i.e., the village head, who is involved in the decision-making process concerning the allocation of fishing rights in the deeper parts of the bay and the collection of fees.

In Tuhaha, the fishery is dominated by a few wealthy people, i.e., those who can afford to rent the private parts of the bay and those who own the lift nets (including the village head)

and other valuable fishing devices. Artisanal fishers are largely excluded from transactions and, therefore, do not play an active role in fisheries management. The common villagers and women have also no say in the fishery.

12.4.4 Enforcement

During the Dutch colonial period (19th century), the enforcement of village regulations was carried out by a 50-member *kewang* force. Offenders were taken to the community house (*Baileo*) where they were tried by the village court. A common way of punishing people was to tie a red cloth around their neck and waist and make them walk around the community house as a form of public shaming. Offenders who did admit their crimes could also be fined while those who did not confess risked death by vengeful ancestral spirits (*Aipassa, pers. comm.*).

In a later phase, the local village government was no longer allowed to carry out justice independently from the colonial powers. The *kewang* was to bring offenders to the Dutch “*controleur*” (government official) or “*polis Belanda*” who would punish them.

Later, when the Dutch colonial period ended, the cooperation between the *kewang* and the police continued. Offenders were halted by the *kewang*, who brought them to the police office for prosecution. Since the *kewang* has been abolished, it is the village officials who report to the police in Saparua.

The actual enforcement of formal and informal rules is still a critical issue. National fisheries law should be enforced by the police. On the village level, however, the police personnel lack authority and legitimacy because they are influenced by personal relationships. Therefore, although they are the formal authority, the effectiveness of the police in enforcing both formal and informal rules is low.

An interesting example of strong local enforcement is the one applied on the auctioned area. The access rights to this private property regime are strictly enforced by the temporary owner, his appointees and with back-up from the village government. The limitation of access rights is based on tradition. Because of this, but also because the owner protects his access rights strictly and the sanctions are severe, compliance is high. This thus seems an effective way to manage certain parts of the fishery, despite the lack of a legal enforcement agent.

12.4.5 Compliance

Abraham Pattijpelu, a fisherman from Tuhaha, explained that compliance to regulations is based on traditional beliefs in powers of ancestral spirits and *adat*. If an offender is not caught by the *kewang* or police, he may have “a lucky day”. This does not mean, however, that the offender will go unpunished. The spirits of the ancestors or God can make the person sick. Therefore, it may happen that somebody who breaks the rules gets ill. “The person then realizes he has stolen and will go to the *kepala adat* (the village elder) to confess. Subsequently, the *kepala adat* will perform a traditional ceremony and pray for him. After that the spirit will not disturb him any longer and the person is released,” Pattijpelu added. Although today the people’s belief in these spirits has diminished, they would not run the risk of neglecting these forces, and, therefore, spiritual powers still play an important role with regard to compliance.

Despite the strength of these spiritual enforcement mechanisms, active enforcement is important. When in Tuhaha the *kewang* resigned, encroachment of the *sasi* area became a problem. Poverty was often used as an excuse for breaking rules. Bram Pattipeluhu, a retired fisher, explained that the local government was not strict in enforcing rules because “when people starve, they will go and catch fish.” Our performance study, however, indicated no

significantly lower economic score for Tuhaha compared to other villages. In fact, the economic situation is above average. Even though nowadays people have greater economic demands, it is likely that other factors, for example, the political instability in the village, contributed to non-compliance (also see Section 12.8).

12.5 External Institutional and Organizational Arrangements

Link with higher government bodies

The village government obtains information regarding laws and ordinances through the district government. An officer visits the village approximately 15 times a year to carry out extension programs and to give advice to the villagers. Other government agencies, like BAPPEDA, are not active in the village. There is no support from higher government levels to enforce the existing fisheries laws. The villagers, for instance, have never seen a patrol boat in the area.

The village head gets general information about policy issues through regional government meetings. This forum has to date not dealt with fisheries management, which, in the light of general fisheries development and intensification, is not yet an issue.

In 1993, the Fisheries Agency of central Maluku initiated a program in Tuhaha to stimulate and develop the local fishery through the establishment of fishers' groups and extension programs on the use of modern gears. For some unknown reason, the program was not particularly successful.

Collaboration with other institutions

Recently John Lokollo, a legal expert from Pattimura University, came to the village to talk about the extension of the formal government structures and laws and the potential role of village institutions in marine resource management.

Technical assistance was further provided by Yayasan Hualopu for the establishment of aquaculture (sea cucumbers) but natural disasters ruined the project. Additional extension programs promoted the use of fish cages, cold storage techniques, sea cucumber processing and awareness training on sustainable resource use. Material on marketing possibilities for other marine products was provided through the Hualopu publication "*Marinyo*".

External economic influences

The effect of the drop in clove prices may have had less effect on the local economy compared to other villages, because cloves are not extensively produced in Tuhaha. The size of the forest-garden area limits agricultural production.

Economic stress was several times mentioned as affecting resource use, despite the relatively high average score for family well-being. The monetary crisis also affects the villagers, but to what extent, this is not clear.

Infrastructure and development

There are no major infrastructure or large development projects around the village.

12.6 Incentives to Cooperate

In Tuhaha, incentives for fisheries management have to be studied on different levels. Firstly, there are the incentives that people used to have or still have with regard to compliance to the former *sasi* rules. Secondly, there are the incentives that explain the fishers' conformation to the formal rules (i.e., on blast fishing) and their acceptance of the limitations imposed under a private property rights regime. Finally, there are incentives to re-institutionalize *sasi* or a similar form of fisheries management.

Adat

Before *sasi* collapsed, compliance was high and enforcement vigorous. The traditional *adat* leaders enforced the rules and respect for ancestral spirits was prevalent. Reluctance to harvest unripe fruits and small fish in the *sasi* area was high because "if you took it, you would break the traditional rules." This respect for *adat*, which is still present, is an important building foundation for *sasi* and for compliance with fisheries regulations.

Sanctions

Strict enforcement by the owners of the auctioned area is a key incentive to comply with current access restrictions. On the other hand, lax enforcement allows for non-compliance to the rules limiting the numbers and mesh size of lift nets.

Acknowledgment of problems in the fishery

Mostly older people had a very strong idea that without *sasi*, resources will be destroyed. The younger fishers also noted negative effects related to the abolishment of *sasi*, but most of these fishers target pelagic fish. They fish inside Tuhaha Bay only when the sea is too rough to go beyond. These fishers did mention the increased number of fishing boats and introduction of modern gears as causing problems, but active fisheries management is not yet discussed. Nevertheless, they acknowledge that the spawning grounds in the bay need to be protected. This realization is an important incentive for revitalization of *sasi* and will enhance compliance to fisheries regulations that may be installed.

Government support for management

A few women in our sample stated that they believe that marine resources are a gift of God and that harvests depend on God's will. It is up to the people, however, to protect and preserve the resources. They say this concern should be supported by the village government and should be passed on to the higher levels, so that government could help the villagers to manage the resources. For long-term protection of the resources, the women said *sasi* has to be revitalized.

Interests of the local government

The village government has certain interests in the re-institutionalization of *sasi*. The establishment of a *kewang* and acknowledgment of traditional authorities based on *adat* would provide a legitimate basis to implement local rules and restore order in the village. Moreover, the village government is interested in the financial benefits that are associated with *sasi*, i.e., the auction of the harvest rights of commercially interesting products. Political stability and economic benefits are thus important incentives to revitalize *sasi* and enforce the rules.

Local knowledge

The *tuan negeri*, the *kepala kewang*, and other traditional village authorities share the sacred knowledge and secret language (*bahasa tanah*) of *sasi*. In order to preserve this knowledge, it has to be passed to the younger generations. The *tuan negeri*, for example, while awaiting his son to reach the age when he would share his knowledge, wrote his narratives on *sasi* in a small book. This knowledge is essential to preserve the *sasi* ideology and it is an effective tool in providing a management structure for *sasi*, i.e., the definition of rules and regulations, rights and responsibilities.

Economic needs

Most fishers target pelagic fishes and are not dependent on the inshore fishery. *Sasi* regulations and access restrictions are, therefore, not expected to jeopardize the livelihoods of the fishers. Still, economic needs can be an important incentive for fishers to non-comply. Where fish catches fail to provide adequate livelihoods, fishers may be negatively affected by the installation of fisheries rules. In such cases, livelihood programs such as aquaculture may be introduced at the same time as the new rules, so that people have less of an economic incentive to non-comply.

Legitimacy

The sale of harvest rights to outsiders while restricting the access of fishers to the *sasi* area can seriously undermine the management system. If *sasi* predominantly benefits the village government and/or if the villagers only obtain indirect benefits, the incentive to comply to the rules is low. Direct benefits and involvement of the fishers would be strong incentives for fishers to preserve resources and to comply with the *sasi* regulations.

12.7 Patterns of Interaction

When the *kewang* decided to withdraw, the clashes between landowners in the village increased. Since then, the village has had a history of political turmoil and unstable leadership. In order to restore village harmony and security and to control resources, it has finally been decided, after three years of deliberations, to re-establish *sasi*.

In 1997, the revitalization process started. In the meantime, the idea has been presented to the newly installed *Latupati* (an island level institution). The first action was to make the LMD operational. During a village government meeting, arrangements were written down and presented to the *tua tua adat* (traditional village elders) for approval. It was decided to make the formal structure dominant over the traditional village institutions. The main players in the process of revitalization are, therefore, the village head and the LMD members who have *de jure* authority. The *tuan negeri*, who is also the *kepala adat*, will have *de facto* authority (i.e., is responsible for the *sasi* rituals). A third key player is the church minister. The village head, together with the traditional leaders, will choose the new *kewang* members. The *kewang* will be re-installed as a part of the LKMD, but its actual power will be limited. Its role is to notify the village head of offenses and report the offenders to the police. The common villagers are not involved in the process of revitalization; they will be informed of the decision in a general meeting.

The operational rules that are planned for *sasi* concern both the land and the sea. Marine *sasi* regulations will be applied on fish (*bulana bulana* or *Mugil cephalus*) and on sea cucumbers (*Holothuria scabra*) for which there is a market in the city of Ambon. In the bay, only traditional fishing methods will be allowed. The rights to harvest in the marine *sasi* area will be auctioned,

with the revenues going to the village. This means that some fishers will face access restrictions. Initially, the village government expects some resistance because “without *sasi* they can fish wherever they want.” In the long run, however, the village government does not expect problems because many villagers feel that “*sasi* is good for the people” and will thus support it.

The village government realizes that for the continuation of *adat* institutions and *sasi*, they need the active support and input from younger generations. The fact that the *sasi* regulations would defend the fishers’ interest through the active exclusion of fishers from surrounding villages will stimulate support for *sasi* from young people.

In Tuhaha, successful revitalization is highly dependent on a functional *kewang*. Most people trust the government to take decisions for them and they will thus respect *sasi* regulations as a government decision. Others, for example, those who view *sasi* as a restriction, may cause problems. The *kewang* is needed to “help the people to respect the *sasi* regulations”. Based on tradition and the fact that the *kewang* members, through a vow, commit themselves to apply the law to anybody who breaks the rule without favour, the *kewang* is highly legitimate. Besides, if a *sasi* regulation is broken, it is the *kewang* that is the legitimate actor: “The police cannot do anything because it is traditional.” Therefore, for the practical enforcement of *sasi* regulations, a *kewang* institution is indispensable.

Finally, it is essential for stability that formal and traditional government institutions are integrated in a defined structure that is acceptable to both parties.

12.8 Outcomes

12.8.1 Equity

1. The role of fishers in management

The participation of fishers in management is seen as having remained the same over time and most fishers expect either stability or a slight decline in the future. Perceptions on the role of fishers in management vary greatly. Some say that fishers are more educated and aware, and could and should thus participate in the management process. Others are happy with the fact that the village head makes the decisions. They trust the village government to make the right decisions for them.

When asked about power-sharing, 63% thought the government had most or total responsibility for fisheries management, while 33% thought the people shared responsibility equally with the government. Only 3% saw the community’s responsibility as being dominant.

2. Access to marine resources

Despite the breakdown of *sasi*, which turned the *sasi* area into an open-access regime, the fishers’ personal access to resources is seen to have declined compared to the past, i.e., the 1980s, when the *sasi* area was a common property regime. The fishers expect to be more restricted in future. The re-establishment of *sasi* in combination with the limited access to fishing grounds and the auctioned area, plus the increasing numbers of lift nets in the bay, influence this perception. Note, however, that perceptions were highly variable⁵. In general, older fishers who own motorboats (i.e., the small-scale commercial sector) are the ones who perceive access to be most restricted.

⁵ Because of the division of Tuhaha Bay into various fishing zones, i.e., the *sasi* area, the auctioned area and the open sea, the question concerning access may have led to confusion which is reflected in the varied answers.

3. Distribution of fishing gears

The distribution of fishing gears was seen to be fairer now than in the past, and this is expected to improve in future. It was noted that the number of fishing gears increased due to growing numbers of fishers, and that fishers are becoming more skilled. This caused a more even distribution of gears.

4. Income distribution

When asked about the level of economic disparities, the fishers reported no change compared to the past. They expected less disparity in the future. The fall in clove prices was not dramatic but is said to have had an equalizing effect on incomes. People seeking to advance their own economic position also tend to reduce economic disparity at the village level. The introduction of modern gears and access to capital most likely play their roles here.

12.8.2 Efficiency

5. Communal decision-making

Partnership in fisheries decision-making is seen as having remained the same. Most respondents see the style of decision-making in the village as being a process of common or majority agreement. However, 40% of the fishers thought that the village head, with or without village government staff, makes the decisions. This does not necessarily mean that this is perceived as centralized decision-making. Traditionally, people believe that decisions made by the village leader are for the good of the community.

About 83% of the fishers in our sample felt that local groups played a role in decision-making. Four people noted that education makes people more capable of actually getting involved. Nearly all agreed that every stakeholder should be involved in decision-making. A large majority said that at this stage, outsiders had no involvement.

6. Ease of entry

The ease of entry to the fishery has declined compared to the past because of increased costs. Access fees (tax) have increased, especially for large-scale fishers (those using lift nets); artisanal fishers pay less. Most respondents expect costs to be worse in the future.

7. Control over access

The control over access to the fishery is seen as having remained the same over time. The government control over large fishing gears and boats is perceived to be firm.

Nearly half of the respondents agreed that a fisher should be able to ask for and get harvesting rights in a private property zone, i.e., the *sasi* area during the closed season and the auctioned area. A large majority (77%) disagreed with the sale of resource harvest rights to outsiders, but not to the extent that this is ground for conflicts. The majority of the fishers agreed with the existing fisheries rules while 37% thought they should be changed.

8. Compliance

Compliance has declined significantly compared to the past, and this trend is to continue in the future. Besides the lack of enforcement due to political instability, "laziness" was a reason

for people to invade the easily accessible *sasi* area. Compliance depends greatly on the firmness of the village head (and the church minister). Every month, a few offenders are caught. Most are young men who steal coconuts to buy cigarettes or just for the fun of it. Written information with exact data on compliance rates and types of offenses is not available in Tuhaha.

12.8.3 Social sustainability

9. Family well-being

The economic well-being of the fisher households has significantly improved compared to the past. The reasons, according to the respondents, were the village development programs, family assistance by the village government, and increased personal efforts. Various people mentioned “increased efforts” as having an effect on personal well-being: positive for those who want to work harder or negative for people who were not able or willing to put more efforts into the fishery and other activities. In the end, it was explained, some became richer, and some poorer. No further changes are expected in the future.

10. Income

Fishers report no changes in income over the past 15 years and expect income to remain static in the future as well. The fishers have a pronounced bimodal distribution, i.e., they fall into two groups: “poor” and “rich” (also see above). Fishing yields have declined, but the price of fish has risen which makes up for the loss in income.

11. Tradition of collective action

People were previously more involved in collective activities. Generally, past performance was rated high (mostly score 8-10). The perceived downward change compared to the past is significant. The reasons given for the decline are increasing individualism, the payment system through which people have to pay for assistance, alcohol abuse and low awareness (i.e., “loss of values”). From the notes, it also became clear that the village head or the church can either stimulate or obstruct collaboration. The expected future drop is also significant despite the fact that nearly half of the respondents noted that conditions will stay the same or improve, because collective action is part of the tradition.

12. Discussion of village issues

Discussion of village issues is less compared to the past and future prospects are also negative. The fishers noted that their input in village matters depends largely on the village head.

13. Community harmony

Community harmony has declined significantly, and further decline is expected. Education and changes in the way people raise their children are causing more conflicts in the village. Alcohol abuse is also an important factor. Finally, population growth was mentioned. This possibly refers to conflicts over land.

Conflicts at the village level (which were not directly mentioned by the fishers) were those between traditional and formal village authorities. These conflicts have their roots in the 1960s and caused the formal village government (LMD) to be dysfunctional over the last few years. The demand for acknowledgment of traditional authorities is currently being addressed through the revitalization of *sasi*, when *adat* will become an integral part of the village structure.

Table 12.3. Results of the performance analysis in Tuhaha. n=30 heads of fishing households. ns=trend not significant; *= $p<0.05$, **= $p<0.01$, *= $p<0.001$.**

Indicator	Average current condition on scale of 1-10	Average change through time (statistical significance)		Average future expected change (statistical significance)	
<i>Equity</i>					
1. Role of fishers in management	6.47	-0.2667ns	-3%	-0.6333*	-6%
2. Access to marine resources	6.33	-1.9000***	-19%	-1.3333***	-13%
3. Fair distribution of fishing gears	7.23	2.1333***	+21%	0.5000*	5%
4. Income distribution	6.30	-0.3667ns	-4%	-0.7667*	-8%
<i>Efficiency</i>					
5. Communal decision-making	6.80	-0.1333ns	-1%	-0.3000ns	-3%
6. Ease of entry into the fishery	6.73	-1.5333***	-15%	-0.9333***	-9%
7. Control over access to fishery	6.63	0.3333ns	+3%	-0.3000ns	-3%
8. Compliance with fishery rules	6.20	-1.9667***	-20%	-1.4667***	-15%
<i>Social Sustainability</i>					
9. Family well-being	7.07	1.7000**	+17%	0.3667ns	+4%
10. Income	6.97	0.3333ns	+3%	-0.4667ns	-5%
11. Tradition of collective action	7.03	-1.2667**	-13%	-0.9333**	-9%
12. Discussion of village issues	6.80	-1.0000**	-10%	-0.8000**	-8%
13. Community harmony	5.73	-2.6000***	-26%	-1.7333***	-17%
<i>Biological sustainability</i>					
14. Marine resource health	6.00	-3.0667***	-31%	-1.8667***	-19%
15. Fish catch	5.87	-3.2667***	-33%	-2.4000***	-24%

There are no conflicts about the sale of harvest rights and access restrictions. The boundaries of the auctioned and rented areas are seldom challenged. The artisanal fishers have become disturbed by the efforts of the fishers using lift nets and the purse seines. Thus sectoral competition is a major issue in coastal management.

12.8.4 Biological sustainability

14. Marine environmental health

Fishers perceived a significant decline (31%) in the condition of the marine environment over the past 15 years, while over the next 15 years, they expect it to decline another 19%. Although, according to some respondents, the marine environment has become cleaner due to less litter on the beach, the general perception is a decline due to the use of more and more destructive fishing techniques.

15. Fish catches

All fishers reported a negative trend in fish catches over the past 15 years, while over the next 15 years, they expect resources to decline further due to intensification, i.e., the use of modern fishing gears (see Section 12.1).

12.9 Synthesis

Tuhaha was chosen as a village where *sasi* was lost in living memory. In Tuhaha, *sasi* declined over a long period of time before it finally disappeared in the 1980s. This was mainly caused by political problems, i.e., conflicts within the village between pro and contra groups with regard to the village headman, but also between the traditional and modern village authorities. As of today, the problems are not yet resolved and the LMD not fully functional.

The village organizations, i.e., *Pelwata*, PKK, and savings group are all active, but there is no KUD in Tuhaha. The economic situation in Tuhaha is average compared to the other five villages in our sample.

Tuhaha has a relatively small garden area and the village is heavily dependent on fishing. Both the fish catches and general condition of the marine environment have deteriorated significantly. Compared to the other villages, Tuhaha fishers spend on average the most hours at sea (> 9 hrs per trip). Nevertheless, fisheries management is not yet an issue in the village. Catches have declined but are still sufficient, plus the high prices currently paid for fish make up for the reduced quantities. In fact, the village plan includes aquaculture as well as expansion of night fishing using lamps.

To solve the conflicts with the traditional authorities (and, therewith, improve the functioning of the village government) and to regulate access to resources, *sasi* is being revitalized. The opinion of the villagers on *sasi* varies: some hardly remember it, while others find *sasi* important. The cultural and social significance of *sasi* was especially stressed by the traditional village leaders who obviously have seen their authority decline together with *sasi*. Without exception, the respondents agreed that *sasi* is functional in preserving the resources against over-exploitation and theft. *Sasi* is also still valued as a mechanism to control social behavior (e.g., alcohol abuse).

The village officials see great commercial potential for marine *sasi* on valuable sea cucumbers. Harvest rights will be auctioned and income will be generated for the village. The process of revitalization is mainly an action of the formal village government, in which traditional leaders collaborate. Individual villagers are not directly involved. They will not get direct benefits from *sasi*. Nevertheless, support from the villagers is high because 1) it is tradition, 2) it protects the resources, and 3) it will stop intrusion from outsiders.

Possible threats to the re-establishment of *sasi* are economic difficulties and the indifference of young people towards *sasi*. The village government is aware of these issues. The main obstruction is the incomplete integration of traditional institutions and regulations within the formal government structure. The system is said to have been acknowledged by the *Latupati*, but acknowledgment from higher government levels is also required. What is important is that the village leader has a strong position, is trusted by the villagers, and collaborates closely with the traditional authorities in the village. If this is the case, the realization of local management will face only minor difficulties, because general support from the villagers is strong.

Chapter 13

Desa Hulaliu, Haruku Island¹

13.1 Physical, Biological and Technical Attributes

13.1.1 Physical environment

Hulaliu is situated on the north side of Haruku Island between the two coastal villages of Aboru in the east and Kariu in the west (see Figure 1). Similar to the other villages, the people explained how they originally lived in the hills. The village was subdivided into 12 clans (*margas*) under two *kapitans*, Taihutu and Noiija. Later a third *kapitan*, Siahaya, was included in the village structure. Under the influence of foreign traders, the villagers were converted to Islam. In 1527, the Portuguese arrived in Haruku Island and they attacked the villages. Under the Portuguese, the villagers changed their religion to Catholicism. When the Dutch arrived in 1590, Hulaliu, as well as the villages of Kailolo, Pelauw, Rohomoni and Kabauw, settled on the coast. Hulaliu became a Protestant village.

Behind the village, lies an extensive garden area that runs southwards in the direction of the village of Aboru. The village territory of Hulaliu stretches from the point of Haluamuna to the headland at Waihokol (see Figure 13.1).

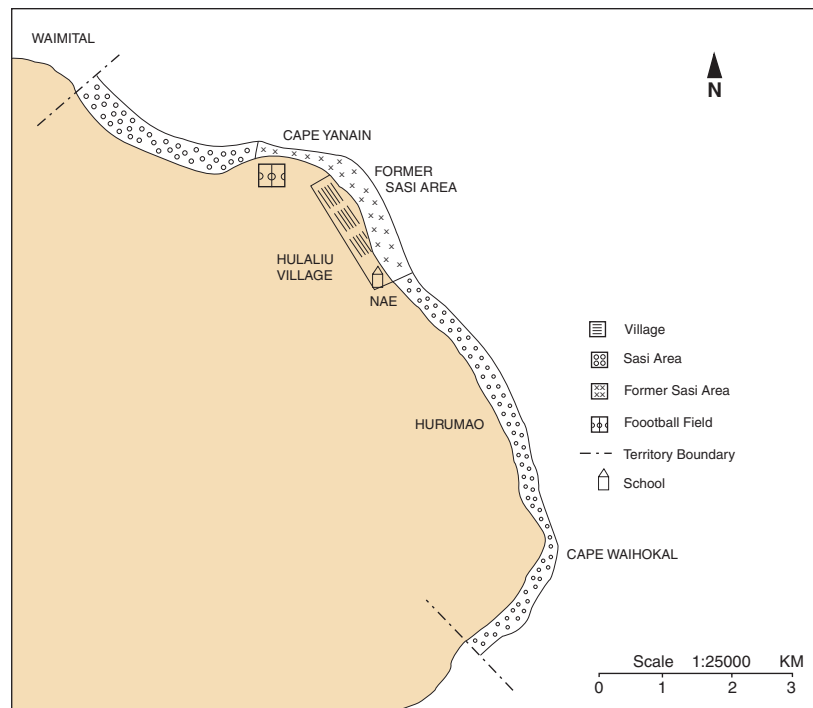


Figure 13.1. Sketch map of Hulaliu (features not necessarily to scale).

¹ For data tables see Appendix 3.

Hulaliu lies on the south shore of Seram Strait, which is the main fishing area. The fishing grounds are divided into the white waters (shallow) and the blue waters (deep). Along the drop-off is a coral fringe. When the weather is calm, most fishers go out to fish in the deep strait between Haruku and Seram, but when the weather is bad and the currents strong, fishing is limited to the near-shore shallow areas, like the former *sasi* area.

The former *sasi* area covers a 3 km long, shallow stretch of water in front of the village. It runs from the SNP school in the south to the headland just north of the built-up area. The *sasi* area is mainly used by fishers who fish from the shore with cast nets, and by shellfish gatherers. The area is divided into different parts depending on the marine products that can be found. The predominantly sea grass area is an important nursery ground for fish.

The village of Hulaliu claims (informal) property rights over certain parts of the deep sea and shallow areas. Fishers from outside, using a particular area for a certain period of time, are required to pay a fee to the village government.

13.1.2 Biological characteristics

The majority of the fishers (57%) target both reef and pelagic fish. Twenty-one types of fish were recorded as commonly caught. In addition, fishers target octopus and various shellfish.

In the shallow waters, women are active in shell gathering, mainly for consumption. One female respondent mentioned she used vegetable poisons (*akartuba*) to catch the fish trapped in the shallow waters at low tide. Shellfish are an important food supplement when there are no fish available. Women also catch top shells (*lola*), *japing-japing* shells (also called *Mancadu*), and black oysters. The pearl oyster shells are sold, while other shells are locally used as garden decorations or the like (see Figure 13.2).



Figure 13.2. A village garden in Hulaliu.

The women we interviewed explained that there are still many shells on the beach. They do not feel the situation is deteriorating, but admitted that big shells (>30 cm), like the one the *kewang* uses for announcements, can no longer be found. An old lady, Anto Siahaija (71), has been picking shells since she was a 17-year old girl. She explained: "There are still big shells on the *meti* (shallow coastline),

but the people have taken many.” The women felt that the harvests were small, but still sufficient. Apart from shellfish, fish catches have also declined dramatically. Nearly all fishers in our sample reported reduced catches (also see Section 13.8.4). The use of modern gears, increased fishing efforts, and especially blast fishing, cause catches to decline. The use of destructive fishing techniques, like bombs, appears to be prevalent and was mentioned by nearly 30% of the respondents as a major cause for coral reef destruction. Other human activities that have an impact on the resource are the harvest of corals for house construction, littering, the use of toxins and the increase in the numbers of fishing gears.

13.1.3 Fisheries technology

Angling (*pancing*) is the most common fishing technique used by Hulaliu fishers. Other techniques used are nets, fish traps, spears, beach seines and lift nets (*bagans*). Of our respondents, 43% had only hand lines and 27% had nets. Six fishers (20%) owned no gear at all. About 70% of the village households (22 fishers in our sample) have a boat, but only one fisher has an engine.

The fishers also report the use of bombs and poisons in the local fishery. Blast fishing takes place mainly in the coral reef area at the transition between the shallow and deep waters. According to the fishers, these are the breeding grounds for fish and usually left alone. Often, economical pressure is said to be the driving force behind resource destruction, but currently the area is subject to local bombers who are said to act out of discontent with the current village government (read: village head).

There are three lift nets operating in Hulaliu waters owned by Asnanolaita, Noiija, and a third person. A fourth lift net is under construction. The lift nets provide baitfish for hook and line fishers from Ambon Island (Galala, Halong, and the city of Ambon).

There are also five beach seiners operating in Hulaliu. These seiners target baitfish used by pole and line fishers. The beach seines are made of the *karolo* net that has been used since the 1970s. This net is generally regarded as a destructive fishing technique because of the extremely small meshes. There are two types of beach seine nets. There is the “*siru siru*” net which is used for *puri puri* fish only, and has a mesh size of 3 mm. There is also the *kareng kareng* which is used for both *laor* (a type of worm) and *puri puri* fish (a tiny fish used in food). This net has a mesh size of only 1 mm.

Large-scale fishing activities in the area are limited.

Auctioned fishing rights

In the 1980s, Maurits Taihutu, the village head at the time, decided to rent out parts of the sea to outsiders. It is, however, not unlikely that even before this date, fishing rights were sold. The entrance fee, paid to the village head, was supposed to be shared with the *kewang* that would use it for its meetings. However, Taihutu neglected to share the money and had a dispute with the *kewang*. In the process (when *sasi* also declined), the *kewang* ceased to exist. Contrary to the history of *sasi*, though, the rental system still exists.

Regardless of their catch, outsiders pay Rp40,000 a day to the village. Revenues for the village can reach up to Rp350,000 (\pm USD150, 1996 rate). The shallow area is extremely suited for traditional gears like the hook and line (using small baitfish), floating nets, cast nets, and the *bubu* (a fish trap). The fishers are supervised by the villagers, who take the opportunity to

learn their fishing methods. Some fishers come from neighboring areas. A group of Tuhaha fishers, for instance, rented the shallow area in 1993 for two months. Others come from further away, i.e., Sulawesi or Arburu. Sometimes the arrangements with outside fishers lead to problems. In 1996, there was a group of fishers who caught lobsters, but they destroyed the coral reef in the process. Since these fishers did not even have a permit, they are still being prosecuted. Other fishers target ornamental fish which are not caught by local fishers.

It is also possible to rent parts of the deep sea. Decisions on licensing these to fishers are made by the village government without consultation with the villagers, while the revenues are for the village (government). When an agreement is reached with the outside fishers and the decision is made, the village head will announce in the village which parts are rented out. The local fishers then are not allowed to fish there.

13.2 Attributes of the Community and Fishers

Hulaliu is a middle-sized village with 2,122 inhabitants. The people are divided over 359 households with an average size of five persons. The total number of families has increased over the years due to population growth. The predominantly Christian village has a small Butonese minority of 130 persons. The migration rate is negative. The emigrants are relatively small numbers of youngsters who leave for Ambon to go to school and never return. There is no tourism in the village.

Hulaliu has its own health center (PUKESMAS). There are two elementary schools (alternately in the morning and afternoon), and a high school. The village is equipped with water pumps and has 160 m open waste water canals (plus an additional 28 m from the school to the sea). Ninety-five houses have septic tanks. The village has electricity and some villagers have TVs.

Compared to the other villages, transport links are extremely low. There are asphalt roads, but there is no frequent mini-bus service. Chartering transport is very expensive. The nearest village where speedboat service is provided is Pelauw, approximately 10 km away further along the road. Hulaliu has no telephone connection and for communication, the village depends on hand-delivered mail.

Employment

Hulaliu is predominantly agriculture-oriented. The official village records registered 797 farmers and only 18 fishers. But as in the other villages, this figure is not accurate because most people fish part-time or seasonally. Only three people were reported as professional, full-time fishers and these were the lift net owners. Currently, the number of people fishing is increasing because of the need for the additional income.

Since 1979, the number of vendors and traders has increased from 6 to 24, and the number of laborers has increased from 6 to 34. The most significant increase, however, are the people working for the village government. Before, there were 10 government officials (mainly teachers), but after the restructuring of the village government, the number of government staff has increased to 79.

13.2.1 Village government

Hulaliu receives annual subsidies from the higher government levels for village administration and development. The subsidies are supplemented by contributions from relatives who live outside the village or abroad, and by the fees derived from the lease arrangements with outside fishers who fish in the Strait of Seram.

In 1979, the traditional government structure was replaced by the formal structure as prescribed by the district government. The traditional *saniri negeri* members were placed in the new village council LSD (*Lembaga Social Desa*) which became the LMD in 1980. The members of the traditional village council have always been descendants from the Taihutu, Noiija, and Siahaya clans (Table 13.1). The Noiija clan is the clan of the *kepala adat*. The Siahaya clan traditionally safeguards village security; they are the *kewang* clan. The Taihutu clan delivers the *tuan negeri*. These clans are still highly respected in the village.

Table 13.1. Principal village clans.

Leader	Name of the soa (clan)	
Noiija	soa Nusahuhu	
Taihutu	soa Pake	- 5 other margas
Siahaya	soa Sourissa	- other margas
Bebas	Pendatang	- for outsiders

The new election system did not change the ruling authorities. The LMD members are chosen through the *adat* laws, so that the village representatives still represent particular families. Presently, the LMD consists entirely of members of *adat* clans. Theoretically, the new election system would enable more villagers to be involved in village governance, but as of today, the common villagers are represented through their clan leaders.

What was adopted from the new government structure was the procedure to choose the village head who was no longer appointed by the traditional village elders. Domingus Noiija, the current village head, is from the Noiija clan and has a traditionally legitimate position (Table 13.2). He was elected, but with a minimum required number of votes. As a result, he faces a large opposition party in the village where the political situation is extremely unstable.

In his function as *kepala adat*, Noiija carries out the *adat* rituals as far as they still exist (e.g., arrange the *Tomanusa* which is the dowry paid when a man from another village marries someone from Hulaliu). The *kepala adat* also has a hand in the design of village regulations, and this explains why the arrangements surrounding the revitalization of *sasi* are carried out by Noiija.

Table 13.2.

Village heads in Hulaliu	
1996-now	Domingus Noiija
1993-1996	Interim government (Nelis Noiija)
1985-1993	Hans Maurits Taihutu
1979-1983	Nataniel Taihutu
1971-1979	Interim government
1969-1971	Frits A. Matulesy
1958-1969	Interim government
1954-1958	Semuel Laisina
1949-1952	Rosalia M. Laisina

13.2.2 Village organizations

The PKK was established in the 1970s. But since the wife of the current village head took over from Christina Noiija Taihutu last year, the PKK has become inactive. The activities (a kiosk, breeding chickens, baking and family gardens) were not continued. The wife of the new village head is not active and limits her activities to cooking for the school and providing secretarial support to her husband. The weak position of her husband, the village head, will surely not motivate the women to join the PKK.

The *Pelwata* aborted most of its activities when the former chairlady became involved in a conflict with the *Pelwata* officials. When she left, the problems were not over, because the new minister's wife is not interested in the position of chairlady of *Pelwata*. Despite the lack of an active chairlady, the *Pelwata* continued the bible services, skills training, and regular visits to other villages and the sick. However, the *Pelwata* is not fully functional. Hulaliu once rejected a *Klasis* program. It concerned a recreation program for which the women simply stated that they had no time.

The KUD or "*Haturua*" (lit. two stones) has existed since 1985 and is active. The KUD has a kiosk, a credit system, a speedboat, and a minibus, but the main income is derived from the trade in cloves. The KUD does not deal with fisheries or fisheries management. The benefits are divided among the 163 members in a yearly meeting. Despite the fact that the KUD has an active savings program, membership is lower than these in the other villages.

There are two KEP organizations in the village. The first was established in February 1997 to improve the productivity of fishers in Hulaliu. The members, appointed by the village government, received Rp3 million (\pm USD1,070, 1997 rate) government funding to purchase boats, nets and other fishing gears. The fishers will be trained, and after the money is invested, the revenues will be saved. Recently, a second KEP was established for female fish traders.

There are four IDT groups in Hulaliu and a group of farmers started an "agro business" supported by the Department of Agriculture.

People can save their money either through the ARISAN savings group (open for men and women) or the KUD. Besides these formal groups, there are no informal meetings.

13.2.3 Role of women

Women in Hulaliu are very skilled in dry-land agriculture, especially the cultivation of corn and yam. They have a leading role in cultivation, maintenance, harvest and post-harvest activities, whilst men only support women in this sector. However, the drought has drastically decreased the women's income from agriculture. After clove prices dropped, women shifted their attention to marine resources. Currently, marine resource use by women is rather intense. Commodities, such as shells, snails and the fish they find at low tide, are usually for family consumption. For income earning, the women trade fish they obtain from the fishers.

Despite their activities on the economic and household levels, women are excluded from decision-making processes in the village. The village head argued that women are involved in village affairs, but as in the other villages, only where they concern "women's activities". Women perform public tasks like being secretary and treasurer, or work in the refreshment section, but they are not involved in decision-making. The traditional system limits women's involvement in activities related to development planning. Programs are usually "top-down"

and designed by higher government levels. When the village government has a meeting, the village head informs his wife about new developments. She will invite or inform the minister's wife and the head of the school, who will pass the message to others.

Not only are women excluded from decision-making, they could neither name anybody to represent them. As a result, the women feel excluded from "official procedures". This was confirmed by 23% of the respondents of the general survey who considered women to be completely outside of decision-making processes.

13.2.4 Profile of fishers

Only 70% of the fishers in our sample were born in Hulaliu; the other 30% came from other parts of the island, Saparua and Ambon. The sample comprised one female respondent only. The average age of the respondents in our sample was 47 years, while half of the respondents were under 45 years old.

The fishers have on average 6.6 household members. Children who have left have gone to school or work. One-third of the households have an externally derived income averaging Rp485,700 (USD194, early 1997 rate) per year. In our sample, 60% of the people have only elementary education.

Eighty percent of the respondents own land. Seventy-seven percent had type 4 housing (cement with zinc roof). The economic indicator of the fishers' sample is made up of adding scores for land ownership, boat type, house and gears (see Section 2 and Appendix 2). At Hulaliu, this indicator is 8.7 (with a standard error of 0.38), which is middle range. Adding TV ownership as a factor, the score rises to 9.1, close to the average for the case study sites (see Appendix 3).

The average years the men spent in the fishery is 25. Compared to the other five villages, Hulaliu fishers spend relatively short periods at sea with on average 6 hours per day, with 2-5 hours being most common. In this light, it is not surprising to see that Hulaliu fishers get significantly less of their income from fish compared to fishers in Tuhaha and Nolloth, this being only 56%. Besides, a relatively large part of the catches (26%) is used for consumption.

Eighty percent of the fishers said they were satisfied with their job. They described it as their "hobby", and felt that fishing was good because it provides them with a daily income. The disadvantage of fishing is that it is a hard life. Half of the fishers would change their job if there was a better alternative. Some fishers aspire to have their own fishing business. For their children, only 10% the fishers aspired a future as fishers. The majority (70%) preferred their children to become government employees.

13.3 Market Attributes

13.3.1 Local fish trade

Nearly all fish sales are made directly to local consumers, usually through the fishers' wives. The key factor in choosing the point of sale is its proximity. A part of the fish goes to wholesalers. On an average, a third of the fish caught is eaten by the family. Of the 30 respondents, seven eat more than half of their catch, while five fishers do not eat any of the fish they catch at all.

Before, the top shells (*Trochus Niloticus*) were harvested for their meat. The shells only became commercially interesting in the 1960s. With the decline of *sasi*, the regulated harvest of these shells was, however, not possible. The village government realizes the potential for top shells and this is one of the reasons that *sasi* is being revitalized.

13.4 Institutional and Organizational Arrangements

13.4.1 Loss of *sasi*

Sasi was established in the early 19th century during the reign of Abraham Tuanakotta (the “*Pati Kotalesia*”). Since then, *sasi* has had alternate periods of decline and revival (Figure 13.3). As far as people can remember, *sasi* was abolished during the reign of Frits Matulesy (1969-1971). In the following eight years, Nelis Noiija was the interim village head, and he re-established *sasi* but to no avail. During the headship of Nataniel Taihutu (1979-1983), the process of decline started again, to reach its downfall during that of Maurits Taihutu (1985-1993).

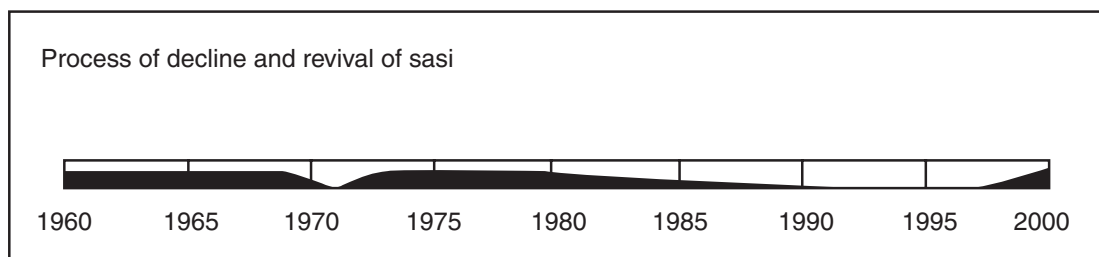


Figure 13.3. Process of decline and revival of *sasi*.

As had happened before, the decline coincided with problems between the political authorities. This time, the impetus was the village head who confiscated the fine money meant for the *kewang*. The *kewang* members were discouraged and left the enforcement of *sasi* regulations to the village government. The village officials, however, did not establish their own enforcement and offenders had a free hand. The process of decline reached its lowest point when the villagers entered the *sasi* area. Bobby Leisana, a local fisher, remembered that the *sasi* signs were put up, but after several months, the villagers ignored them and entered the sea. The *kewang* members did not stop them because they had resigned, and the villagers thought: “If they don’t take *sasi* seriously, then we don’t take it seriously either.” In 1993, marine *sasi* definitely vanished; land *sasi* was taken over by the church.

13.4.2 Former *sasi* regulations

The traditional *sasi* rules were originally written in the secret language *bahasa tanah*. Unfortunately, the original set of written rules was lost by the former head of the *kewang*. The current village secretary, Nelis Noiija, compiled a new set which will be used in the new *sasi* system.

The *sasi* operational rules are embedded in a set of general *adat* rules which define geographical boundaries, resource use and social behavior. Social behavior is mainly regulated through operational rules. A collective-choice rule is that resources have protection (lit. “Do not destroy anything”). This rule is specified through operational rules, which define the products the rule is applicable to, when, where, and by whom. Marine *sasi*, for example, principally

restricted access to the *sasi* area through seasonal closures. Every three months, the *sasi* area would be open for three weeks during which all (non-destructive) fishing techniques were allowed. Once open, there were no regulations to limit the harvest of specific fish species (Albert Matulesy, *pers. comm.*).

13.4.3 Formal fisheries regulations

Aside from the prohibition to fish with destructive fishing methods (i.e., bombs and poisons), there are limitations on the mesh sizes being used (minimum mesh size >1.5 mm). In order to protect the shoreline, the harvesting of sand, stones and corals (except for small corals) is prohibited. However, no enforcement agent is present to enforce these rules. At all times, a permit can be obtained from the village government, which allows the harvest of marine products outside the shallow waters. There is no restriction on the use of lift nets, but owners have to register at the village office.

13.4.4 The players

The fishery in Hulaliu is dominated by artisanal fishers who have access to all the fishing grounds except those reserved for outside fishers. Management consists primarily of the levying of access fees by the village government. The village head is the key player when it comes to implementing fisheries regulations and the revitalization of *sasi*. The church is exclusively involved in *sasi* on coconuts. There are formal fisheries regulations, but these are not actively enforced. There is no local enforcement agent and the police personnel are not direct players in resource management.

Traditional authorities, such as the head of the *kewang*, play no active role in fisheries management, but are the keepers of the traditional local knowledge on *sasi* which is passed from father to son. Until *sasi* is revitalized, it is important to keep this knowledge because it will be the base for the structure of the new *sasi* system.

13.4.5 Enforcement

During the heyday of *sasi*, the rules were enforced by two *kewang* heads assisted by 20 *kewang* members. The commitment of the *kewang* was strong. The former *kewang* head in Hulaliu, Albert Matulesy, explained: "The rules are applied to anyone, with no exception, not even for a *kewang*'s wife. If she would take anything that is not ripe, and he (i.e., the *kewang* husband) would not interfere, another *kewang* might see it and punish him. But also if nobody would see him, the ancestors would deal with it." The *kewang* oath (to apply the regulations to any offender regardless of their position or relationship) ensured fair and legitimate enforcement. Small cases were fined, but serious offenders underwent more severe punishment. While drums were played in the background, the offender was made to walk around the village dressed in coconut leaves tied around the waist. While walking, people would beat him/her with wooden sticks. This custom ended when the position of the *kewang* was undermined by the village head, who would confiscate the fine money. The village head further undermined the *kewang*'s authority when he protected his relatives, who broke the rules, against the *kewang*. The *kewang* was discouraged and not willing to deal with the lack of support, and they decided to quit.

The *kewang*'s authority was taken over by the church. Enforcement was effective: "When the *kewang* was alive, the people would break the rules all the time. But when control was taken over by the church, the people obeyed," Bobby Leisana, a Hulaliu fisher explained. The strength of enforcement by the church lay in the fact that the church as an institution was more stable than

the village authorities. The church was more continuous than the ever-changing village government which, each time, would install a new *kewang* with members who supported that particular village government (read: village head). This was possible, because only the position of the *kewang* head is based on descent; the *kewang* members were chosen. The change in *kewang* and their position towards the village authorities led to favoritism and undermined the effectiveness of the *kewang*. As a result of their strong position, the church became a major pillar in resource management.

Another aspect that made the church an institution with regard to enforcement is the power of the institution itself. Bobby Leisana illustrated: "The advantage of church *sasi* is that you actually do not need any guards, since God sees everything and will punish the offender." He explained: "Several times people took coconuts during *sasi*. A few days later they got severe stomach aches and had to admit their crimes to the priest." For land-based products, thus, church *sasi* is strong and effective. Similar to the situation at Tuhaha though, the option to have marine *sasi* enforced by the church was not considered.

The formal authority and responsibility for law enforcement, including fisheries regulations, are in the hands of the police. The fact, however, that the police personnel are based in Pelauw, 10 km from Hualiu, reduced their effectiveness significantly. For example, when an offender breaks the rules, the village officials would have to make a formal report to the police, but by the time they arrive the offender has already disappeared. Therefore, the village officials (LMD and LKMD) are the ones catching offenders, but this implies certain risks. The village government realizes that if they or, for example, the *kewang* members injure the offender, the local authorities could be held liable. Therefore, they will not deal with the offender locally but bring him to the police.

Since the implementation of the new formal village structure, the prosecution of offenders is handled according to the formal government regulations and procedures. Traditionally, the local court consisted of the *saniri negeri*, the village officials, and the *kewang*, and despite the abolishment of these structures, *adat* law is still taken into account. The village authorities collaborate closely with the sub-district government, and once a case is in the hands of a judge from the sub-district, the village leaders can still influence the matter. This, of course, also allows the village leaders to manipulate the course of events in favor of their relatives. From our study, it appeared that the formal enforcement structures are inadequate. For example, despite the village fishery regulations, there is a relatively high occurrence of dynamite fishing and the use of poisons.

13.4.6 Compliance

Since *sasi* disappeared, compliance to fisheries rules has become a problem. The lack of an enforcing institution creates opportunities for illegal fishing. The belief in ancestral spirits and their revenge is still mentioned as an important reason for people to comply, but it was obviously not sufficient to keep the people on track when *sasi* was lost. Economic difficulties aggravated the situation. In order to get their share in what had become an open-access resource, people infringed the *sasi* area. The short-term benefits exceeded the need for a management system.

The process of decline is illustrated by Ama Sihaya, an old fisher-woman, who stated: "The grace of God is lesser, the world is getting harder and harder, and the people are not good anymore." Currently, *contra* groups in the village use destructive fishing techniques to undermine the village head's authority and encroachment and bombing are merely a sign of political dissatisfaction. This situation severely undermines village authority and it will definitely affect compliance to the new village regulations that the village head proposes.

13.5 External Institutional and Organizational Arrangements

Link with higher government bodies

The links with the higher government levels are maintained by the village head. Ordinances and development programs are sent to the village through the district government. The regulations are adapted by the village head who sends them back for approval. The village head knows that there are fisheries regulations, but has no copies of these in the village. He explained that if he wants to be informed about the law, he would ask the Fisheries Agency or Fisheries Department of the Municipality of Ambon.

With regard to fisheries management, the role of the national government is limited. Fisheries management is not yet an issue in Hulaliu. There is no active enforcement of fisheries laws; the villagers have never seen a patrol boat. Resource management, i.e., the enforcement of local regulations, is carried out by the village government.

Twice a year, representatives from BAPPEDA, the planning agency, visit the village. Other visitors are officers from the Fisheries Agency. They showed an interest in the fishing methods of the people and promoted aquaculture (fish). However, the village has had a shrimp farm that failed due to the rough seasons and the wind from the sea.

The village head of Hulaliu realizes that support by government institutions is important. He suggested to the higher government levels to recognize *adat*. Later, he reported that the plans to revitalize *sasi* were actually approved. The village head explained: "They cannot change everything, it is *adat*."

Collaboration with other institutions

Collaboration with other institutions is seen as crucial for technical assistance and the development of sustainable resource use. In 1993, the Hualopu Foundation and the Environmental Studies Center of Pattimura University worked in Hulaliu to produce a booklet on the management of local resources. The coastal management plan, which was the output from the project, aims to preserve the natural resources. One component is the revitalization of *sasi* and re-establishment of the *kewang*. A second component is the establishment of fish ponds for the fishers to provide an additional income.

Learisa Kayeli, the small NGO based in Haruku, currently also has a project in Hulaliu.

External economic influences

In Hulaliu, a village with an extensive forest-garden area, the drop in clove prices has had a negative effect on household well-being. People had to diversify their activities in order to earn a living, and it has had a negative effect on natural resource management. The current monetary crisis aggravates the situation even more, but to what extent is not yet clear.

Infrastructure and development

There are no large-scale development or investment projects in or around the village. The mining operations in Haruku village have not yet had an impact on Hulaliu. Activities that will be the result of mining operations, such as resettlement schemes, are as yet not taken seriously. The village government also stated that if they are ordered to leave, they would obey because it is a decision of the higher government, and that needs to be followed.

13.6 Incentives to Cooperate

The key to resource management is compliance. Despite the fact that currently compliance to fisheries regulations is low, there are certain motivations for people to comply with existing, or newly to be installed regulations for resource management.

Custom

Due to the gradual loss of *sasi*, some people were actually not aware of the fact that *sasi* had been lost. When asked about marine *sasi*, they explained: "There are regulations on taking marine products." Even though there are no *sasi* signs, no ceremonies, and no *kewang*, this group of people will follow the fisheries regulations whether or not they are prescribed by *sasi*.

Positive opinion on sasi

The women we interviewed generally approved of *sasi*. The involvement of the church (in *sasi* on coconuts) is an improvement compared to the past. Christina Noiija Taihutu (wife of the former village head) explained: "When *sasi* was still *adat*, women were excluded from the ceremonies, but now that *sasi* is organized by the church everybody can go." Women's involvement in *sasi* thus stimulates appreciation of *sasi* and compliance to the rules.

Sanctions

Fear of God and the ancestors' spirits are important reasons for people to comply with the rules. The collective prayer (commitment) in the church induces social control mechanisms, which will be a stimulus for people to follow the rules.

Enforcement

The installation of a local enforcement agent is important for a functioning management system. In particular, the *kewang* is an effective institution. Its legitimate position allows the members to enforce the rules, but only if they act independently from the village government.

Involvement of the formal enforcer, the police, can also be an extra incentive for people to comply with the rules. If the newly to be installed regulations are approved by the higher government, the village can ask for police support which will help to stimulate compliance.

Position of the village head

A strong disincentive to comply with the rules is the weak position of the village head. In contrast to, for example, Nolloth, the village head in Hulaliu has no firm ground to exert his authority. In the eyes of nearly half the village population, he is not a legitimate leader and their dissatisfaction is a reason to use illegal fishing methods.

Benefits

The village head has great interest in the commercially interesting commodities that he wants to place under *sasi*. The revenues, however, will be used to boost the village treasury. The villagers strongly oppose fisheries rules if they will not gain direct benefits. The sale of harvest rights to outsiders is also an important disincentive for fishers to comply with the rules.

Acknowledgment of a problem

Even though fish catches and the state of the resource have declined dramatically, the limitation of catches, and fisheries management in general, is not yet an issue. The women mentioned a decline in the number and size of sea shells and they thought that over-exploitation was the reason for the decline. Nevertheless, this was not a reason to limit or regulate the harvest. The same attitude is expressed by the male fishers.

Other women still use the extracts of poisonous plants to fish in the shallow waters, even though the women know it is harmful and is prohibited. Generally, most fishers do not seem to link their activities to the general decline in resources. Besides, they believe that resources will always be available since they are “a gift of God”. The lack of knowledge and awareness causes people to disregard regulations.

13.7 Patterns of Interaction

Currently, Hulaliu is in the process of revitalizing *sasi*. The idea has been initiated by the village head who is also the *kepala adat* and as such, is entitled to do so. The procedure followed is slow and carefully designed. This because the last attempt to revitalize *sasi* in 1986 by Taihutu, failed due to a strong contra movement. This course of events is likely to happen again. Currently, the strategy of the village head was to start initial deliberations with the village officials and the sub-district government respectively. After the LMD approved the plans, the village head talked to the church minister to ask for his collaboration.

At that stage, the villagers were not informed or consulted because the village head was afraid that his opponents would sabotage the plan. First, the village head wanted to have the regulations approved by the sub-district so that he would have formal support and could send for the police if people did not cooperate.

In November 1997, a *kewang* head was installed and 30 *kewang* members selected. The selection went through the *kepala dusuns* who asked the people in his area who were interested. The *kewang* members initially consisted of representatives from different families (“everybody with the right skills can join”), but, of course, these were those who approved of the plan (and the village head).

Sasi rules

The objective of the new *sasi* rules is “the protection of the culture through the exclusion of outsiders” as Noiija described it. The rules aim to keep people from destroying the resource and from taking unripe products, e.g., top shells and sea cucumbers.

The current set of *sasi* regulations is a combination of the formal fisheries rules and traditional *sasi* regulations with some adaptations to the current situation. These fisheries regulations are written down. The rules for resource use are applicable to terrestrial and marine resources (see Table 13.3).

Besides these harvest restrictions, there is a restriction on the mesh size for the *karolo* nets, used by lift nets in the pelagic fishery (>1.5 mm).

The marine *sasi* area will be divided into three parts: a specific are for sea cucumbers in the central part, the *Mencadu* shells are protected in the northern part, and top shells in the southern part (see Figure 13.1).

Table 13.3. Sasi rules in Hulaliu.

<i>Land sasi</i>	<ol style="list-style-type: none"> 1. Coconuts are under <i>sasi</i> and there is a prohibition to cut young (straight) leaves at the top of the tree (because this kills the tree). 2. There is a restriction on the harvest of young fruits of the durian, pineapples, <i>campedak</i> (type of <i>nangka</i>), jackfruit, and mango trees.
<i>Marine sasi and pelabuhan (harbor)</i>	<ol style="list-style-type: none"> 1. There is a seasonal prohibition on collecting top shells and gastropods. 2. There is a seasonal prohibition on collecting sea cucumbers. 3. There is a ban on fishing with vegetable poisons, e.g., <i>akar tuba</i>, <i>hutung</i> / <i>buah perdamatan</i> and <i>aiasa</i>. 4. There is a ban on fishing with bombs, chemicals and other poisons. 5. There is a ban on harvesting stones, sand and corals in front of the village.

Benefits

The village government decided to auction the rights to harvest in the *lelang* area, but only to Hulaliu inhabitants. The revenues from the auction are used to provide the village with an income and pay the *kewang*. The benefits will be split equally between the *kewang* and the village government. The villagers, however, prefer a public harvest from which they would derive direct benefits. It also would prevent the village head from confiscating the access fees. Having learned from the past, the villagers’ trust in the village government is limited.

The players

Acknowledgment of the local regulations by the sub-district government is necessary to make them operational. Formally of course, the *sasi* regulations will at all times be subject to higher government laws, i.e., they may not contradict the national fisheries laws and/or environmental regulations. The advice of the higher government officials is, according to the village head, “to take *sasi* as *adat* and do it traditionally”, which is what he will do.

The tasks with regard to *sasi* are divided as follows: the government office organizes and monitors *sasi*, while the *kewang* and church secure enforcement and compliance. The role of the church is very important because the people will have to commit themselves to the *sasi* regulations through a communal prayer. The practical enforcement is in hands of the *kewang*.

The police will not be actively involved. The village head felt he did not actually need them: “*Sasi* is a traditional *adat* thing.”

Participation in the decision-making process has been limited to the village government, the *kewang* and some active villagers. A meeting was organized to discuss the scope of *sasi*. Lahesina, one of the new *kewang* members who attended the meeting, explained that the meeting was not attended by common fishers: “It is for the government and the people who work in the sea (read: lift net owners).” Later, the plan was presented in the *Baileo* (traditional community house) where people could make suggestions. However, not the whole village was present, and only three women turned up. The audience suggested an increase in the penalty for offences that affect people’s livelihood and this idea was accepted.

A centralized procedure, such as the one described above, is perfectly acceptable to the villagers and many people stated that they did not expect to be included. Others were not even aware of the fact that *sasi* was being re-installed, but they felt that it was a decision of the government and the church, and that they would hear the message about *sasi* over the megaphone once it was implemented.

13.8 Outcomes

13.8.1 Equity

1. Role of fishers in management

Generally, the role of fishers in management has not changed compared to the past, but in the future, the fishers expect the situation to be worse. Answers were extremely varied (score 2-10 on the 10-rung scale), and a positive or negative perception is likely to depend on the attitude of the respondent toward the current village government (supportive or not). The voice of a pro-government person is more likely to reach the village officials.

When asked about power sharing, 77% thought the government had most or total responsibility for fisheries management. The rest thought the people shared responsibility equally with the government.

2. Access to resources

Compared to the past, the fishers' access to resources has not changed. It was noted that people were free to fish anywhere they wanted, except for the rented areas, and that only lift net owners need a permit. In the future, however, fishers expect significant reductions. The current open-access area will become restricted once *sasi* is re-established. Access to the shallow coastline for cast net fishers and women will be limited too, because some of the shellfish caught by women have a commercial value. These harvest restrictions, however, will negatively affect the household well-being in terms of food. The restrictions on the fishing area of cast net fishers and the fishers who do not own a boat, will most probably result in major problems.

3. Distribution of fishing gears

The distribution of means of production is seen to be significantly fairer now than in the past, and this is expected to get even better. No explanations were given for this change.

4. Income distribution

When asked about the level of economic disparities, the fishers reported that conditions had not significantly changed. No change was expected in the future.

13.8.2 Efficiency

5. Communal decision-making

Compared to the past, the involvement of fishers in fisheries decision-making has declined significantly. A third of the respondents stated that the village head – with or without village government staff – makes all the decisions. The breakdown of customs, the political situation, and decision-making behind closed doors play a role here.

Nevertheless, most fishers see the style of decision-making in the village as being a process of common or majority agreement. The people trust the village government “to know what they do” and are confident that the government's decisions will benefit the village. All agreed that stakeholders should be involved in decision-making. A large majority (83%) felt that local groups had a role in decision-making, while the same percentage stated that outsiders were excluded. It was mentioned that the church could have a positive influence on the participation of fishers in management involvement.

6. Ease of entry (costs)

Ease of entry has declined significantly compared to the past and further decrease is expected in the future. It was mentioned that outsiders have to pay in order to fish. Local fishers, however, also experienced higher costs, but did not specify why. Probably the necessity to acquire more expensive fishing gears due to competition plays a role here.

7. Control over access to the fishery

Control over access to the fishery has not changed over time, but it is expected to decline slightly in the future. Again, perceptions varied.

Access is mainly regulated by the village government. Over half agreed that a fisher should be able to ask for and get harvesting rights in a *sasi* area during the closed season. Nearly all disagreed with the sale of resource harvest rights to outsiders. However, they have no power to change this. About 63% of the fishers agreed that fisheries rules should be changed.

8. Compliance

Compliance with fisheries rules has drastically declined since the past, and further deterioration is expected. There are no data on the numbers of offenders caught each month, but the villagers explained that certain people use the political instability in the village as an excuse to ignore the rules. Most offences are made because of economic needs, but foremost, because of lack of control by the village head.

13.8.3 Social sustainability

9. Family well-being

Family well-being has improved significantly, but is not expected to improve in future. The drop in clove prices has had a negative effect on family well-being, and it was mentioned that the people lack the skills to improve their livelihood. On the other hand, there are some factors that stimulate family well-being, such as the improved infrastructure and favorable markets which stimulate profits.

10. Income

Fishers reported no significant increase in income over the past 15 years and expect no further change. Better infrastructure and job prospects have a positive effect on income. Favorable are also the high prices paid for fish, but yields are low. The lack of hope for future prosperity shows that people understand that the benefits from rising prices will only last as long as fish are available. It was also noted that markets are far away which makes trade difficult and less lucrative.

11. Tradition of collective action

Hulaliu fishers rate past performance very high; scores of 8-10 predominate. Compared to the past, the respondents perceived a significant negative change in communal activities in the village. They expect it to drop further in future. The main causes for the decline are the change in mentality (materialism) and the payment system which replaced the voluntarily help people had provided before. Other people blamed the "village administration" (read: village head) for the decline in collective action. Thirty percent of our fishers' sample hoped that the conditions would not change because "it is tradition".

12. Discussion of village issues

Discussion of issues is significantly declining compared to the past and further decline was expected. This was blamed on the village head and the loss of customs, possibly due to political stress.

13. Community harmony

Community harmony has also declined significantly compared to the past and further deterioration is expected. Conflicts are caused due to drinking and problems over land and cloves. However, the main problem is the political situation in the village and harmony depends a great extent on the village head. Some hoped that education would make people more aware and would lessen the conflicts in the village.

13.8.4 Biological sustainability

14. Fish catches

The fishers in our sample perceived a serious decline in their individual fish catches of 34%. They expect a further decline of 16% in future. The main causes for declining fish catches are the use of modern gears, increased fishing efforts, but especially blast fishing.

15. State of the marine environment

The general decline in the condition of marine resources over the past 15 years is 32%, while Hulaliu fishers expect resources to decline another 22% in the future. The use of destructive fishing techniques and other human activities have an impact on the state of the resource (see Section 13.1).

13.9 Synthesis

When the new village structure was introduced in Hulaliu, the *adat* and the formal village structure merged. It is not clear to what extent the traditional authorities still play a role related to their traditional position, especially when it comes to decision-making, rule development and enforcement. The situation is obscured by the fact that the village is under political stress, which affects the functionality of the village government and centralized the decision-making processes. The key figure on the scene is the new village head. His election was controversial and he won with only a small majority. The opposition has a strong position in the village and formed a contra group. What exactly happened is not clear. According to *adat*, the position of Noiija as a village head is legitimate, but ever since he became elected, his position has been unstable.

The fragile position of the village head undermined the PKK women's group, which has been dysfunctional since the elections, but the political division also influences membership of other village organizations. Communal activities have declined and conflicts have increased. The resources are declining as a result of blast fishing directed as a sign of protest and to stress the inability of the village government to enforce the rules. However, despite these problems, or maybe in an attempt to solve them, the current village head started the process of revitalizing *sasi*.

Table 13.4. Results of the performance analysis in Hulaliu. *n*=30 heads of fishing households. *ns*=change not significant; *=*p*<0.05, **=*p*<0.01, ***=*p*<0.001.

Indicator	Average current condition on scale of 1-10	Average change through time (statistical significance)		Average future expected change (statistical significance)	
<i>Equity</i>					
1. Role of fishers in management	5.93	-1.2333ns	-12%	-0.8000*	-8%
2. Access to marine resources	6.53	-1.1667ns	-12%	-1.0000***	-10%
3. Fair distribution of fishing gears	7.33	2.2667***	+23%	0.6000*	+6%
4. Income distribution	6.60	0.6000ns	+6%	-0.1000ns	-1%
<i>Efficiency</i>					
5. Communal decision-making	6.17	-1.6000**	-16%	-0.8667***	-9%
6. Ease of entry into the fishery	6.13	-1.9667***	-20%	-1.1667***	-12%
7. Control over access to fishery	6.63	-0.0666ns	-0.7%	-0.6333*	-6%
8. Compliance with fishery rules	5.80	-2.2667***	-23%	-1.2333***	-12%
<i>Social Sustainability</i>					
11. Family well-being	7.43	1.3333*	+13%	0,2333ns	+2%
12. Income	6.70	0.8333ns	+8%	0.0666ns	+0.7%
13. Tradition of collective action	7.20	-1.6667***	-17%	-0.8667***	-9%
14. Discussion of village issues	6.07	-2.3333***	-23%	-1.2667***	-13%
15. Community harmony	5.70	-1.8667***	-19%	-0.8000*	-8%
<i>Biological sustainability</i>					
14. Marine resource health	5.60	-3.1667***	-32%	-2.0333***	-20%
15. Fish catch	5.50	-3.4000***	-34%	-1.5517***	-16%

In the context of political instability, the process of revitalization is precarious. It offers, however, interesting insights concerning the conditions needed to allow the process to take place, as well as the right strategy under these circumstances. At the same time, it demonstrates the extent to which *sasi* is resilient and able to evolve. In order to avoid obstruction by his opponents, the village head developed a strategic plan. Higher government levels are involved as a formal back-up for the process, but the traditional authorities and the church are also included in the deliberations. Common villagers, on the other hand, were excluded until the plan was in the final phase to avoid preliminary obstruction or sabotage.

Thus far, it seems that Hulaliu has successfully attempted to get recognition of *adat*, as well as *sasi*, by higher government levels. The sub-district government in Masohi, on the other hand, acknowledged that *sasi* is “*adat*” and as such, should be locally implemented, and enforced by the *kewang*. By playing it through the higher government, however, in case of problems, the village head secured back-up by the police who formally have the authority to interfere in village affairs. The process of revitalization is merely a “one-man show” run by the village head. Traditionally, as the *kepala adat*, he is in the position to re-establish *adat* institutions by himself. On the other hand, the lack of transparency may obstruct the process in a later phase. The decline of *sasi* in the past was due to mismanagement of the village head who confiscated fine money that belonged to the *kewang*. He undermined the authority of the *kewang* who resigned and instigated the loss of *sasi*. Wider back-up and clear defined responsibilities of every involved institutions are, therefore, crucial. The fact that the new *sasi* system will generate money for the village only, without direct benefiting the local fishers directly, is also a point to take into account. The villagers’ interest is to get access to the fishing grounds and secure protection of the resources against outside exploitation, including the rented parts of the village marine territory.

The decision-making process, according to the villagers, should be more transparent. On the one hand, they trust the village government to take the right decisions for them, but awareness and education, stimulated by NGOs working in the village, make people more independent and responsible. If the interests of the fishers are not met, the process of revitalization may face major obstructions, especially by those who are already not in favor of the village government.

Epilogue

On 13th December 1997, *sasi* on coconuts was opened. The harvest provided the people with an income to celebrate Christmas. When *sasi* was closed again on 28th December, *sasi* on marine products was also announced and in January 1998, a *kewang* was installed and *sasi* was officially effective.

However, when our research staff visited the village in August 1998, *sasi* had already faced major challenges. Of the 33 *kewang* members who were installed, only 10 were left and willing to continue their job. The reason for their resignation was, like before, the village head. In February 1998, when *sasi* was still closed, the village head made an arrangement with fishers from Ambon which allowed them to catch ornamental fish in the village marine territory. The *kewang*, however, was not consulted and felt excluded. In March, parts of the sea were again rented to outsiders. The village head wanted to share the Rp60,000/day he obtained with the *kewang*, but the *kewang* refused. They argued that they only wanted to be involved in decision-making, especially where it concerned the sale of harvest rights, because it was agreed upon that no fishing was allowed. The *kewang* members explained that they could not carry out their job if the village head himself ignored the regulations. By November 1998, a number of *kewang* members resigned and/or were replaced. The head of the *kewang* decided to quit his job and joined the contra group in the village. Another *kewang* head took his place.

After these problems, the villagers asked the village head to put *sasi* on coconuts again under the authority of the church. The village head refused, or at least, did not immediately respond to this request, and village support for *sasi* decreased. In the light of these developments, it will be interesting to monitor the process to learn about the obstructions that cause *sasi* to be functional and to identify the conditions under which it will be able to successfully manage the resources.

Chapter 14

Dusun Seri, Desa Urimesing, Ambon Island¹

14.1 Physical, Biological and Technical Attributes

14.1.1 Physical environment

Seri is situated on Ambon Island and functions as a *dusun*, an administrative section under the authority of the Urimesing *desa*² (a higher administrative level). Urimesing has four *dusuns* all of which are geographically separate villages: Seri, Kusu-kusu, Mahia, and Tuni. In the past, Seri was the governmental capital because it was the residence of the royal raja clan, the Wattimena family. At a certain point in time, it was decided by a new village head to make Kusu-kusu the seat of government for the *desa* of Urimesing.

Seri covers the areas called Kudamati, Karang Tagepe and Siwang. With 16 km² (or 1600 ha) of land area, Seri is the largest *dusun* in Urimesing (total land surface of 62.5 km²). The village area is delineated by the city of Ambon in the north, *dusun* Mahia in the east, *dusun* Airlow in the west and the Banda Sea in the south (see Figure 14.1).

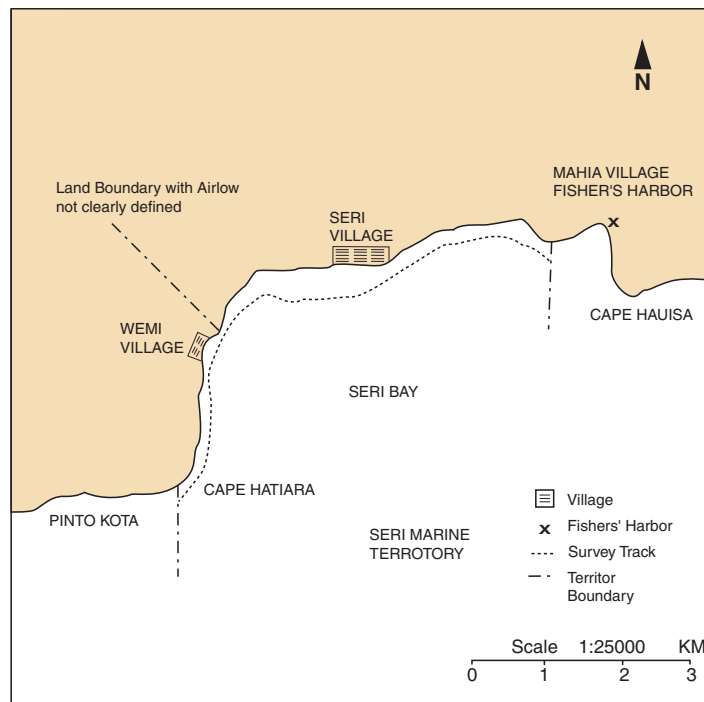


Figure 14.1. Sketch village map of Seri (features not necessarily to scale).

Seri has spacious agriculture land with fertile soils, fresh water sources and potential fish resources. An upwelling in the Banda Sea right off the coast of Seri attracts pelagic fish and makes the fishery highly productive.

¹ Data tables for the case study villages can be found in Appendix 3.

² Dusun Seri will be referred to in English as a village.

14.1.2 Biological characteristics

Many fishers (55%) target pelagic fish exclusively. Another 24% fish both pelagic fish and reef species. Seventeen fish were recorded as commonly caught: 10 pelagic fish and 7 reef fish. In addition, fishers target shrimp, squid, and a type of shellfish (see Appendix 3). Women are also involved in shell gathering.

Fishers perceived an average 11% decline in the condition of marine resources over the past 15 years, and they expect resources to decline another 15% in the next 15 years. More than half of the fishers of our sample reported decreasing catches. They noted an average drop of 21% in fish catches, and expect a further decline of 11% in future. However, they noted that catches fluctuate seasonally.

The main causes for the general degradation of the marine environment as perceived by Seri fishers are pollution from factories, oil spills, and littering the beach. The decline in fish catches is ascribed to the increasing number of nets and the number and size of boats. Although modern gears (FADs, small mesh lift nets) and motorboats lead to over-exploitation, they also lead to increasing yields for some.

To deal with the declining catches, the Social Department initiated a carp breeding program. Some villagers were trained to carry out fish farming, and now they cultivate silver carps in their house yards. The juveniles are sold. The people are rather enthusiastic about the cultivation of silver carp in ponds because the fish are bought by the Chinese from Ambon at the price of Rp10,000/kg (approximately 300-750 gram/fish). In a restaurant in Ambon, the fish are worth approximately Rp25,000/fish (\pm USD10, 1996 exchange rate).

14.1.3 Fisheries technology

Seri has 75 registered fishers, but most farmers (150) also fish part-time. In the fishers' sample, 79% owned boats (*perahus*), but none had a motor. Most common fishing gears are nets, hand lines, poisons and spears. Of all the fishers interviewed, the majority only had hand lines and the rest had nets. Some fished at FADs. Five fishers (17%) owned no gear at all, but it is very well possible that these fishers work on the boats and use the lift nets of the commercial fleet.

The number of fishers working on the lift nets and FADs is not known. Others work on the fishing boats (seiners), where they get approximately Rp50,000 a night per person (\pm USD20, early 1997 exchange rate). A fishing boat takes approximately 20 young men in a fishing trip.

Artisanal and small commercial fishers

Many small-scale fishers use a *giob*, a 70 m long net. The best months for *giob* net fishing are January, June, July and November; in September and October, catches are average. The fishers work six days a week. Their fishing grounds are about 3-4 km away (one hour by boat). The fish may be sold directly to consumers by the fisher's wife, but in cases where the catch exceeds three baskets (approximately 600 fish), the fisher will sell the fish through a *borok* (fish broker) or to a wholesaler. Earnings vary between Rp20,000 to Rp40,000/day (USD8-USD16, early 1997 exchange rate).

To start a fishing business requires about Rp350,000 or approximately USD140. A boat costs Rp100,000 and nets cost about Rp35,000/10 meter. Additionally, a fisher will spend on an average Rp5,000 a week for repairs. A net can last up to 10 years, but since it needs major repairs each year, it is often cheaper to buy a new net.

Large-scale commercial fishers

The bait fishery which uses FADs, purse seines and lift nets is highly developed on the Seri coast. Most lift nets are owned by outsiders, but two are in the hands of local fishers. During our research, 15 purse seine boats, at least 48 FADs and lift nets, two long liners and one trawler (the *Mina Raya V* used for fish transport) were observed in operation (Sahertian, *pers. obs.*). Of the 15 purse seiners off the coast of Seri, four are owned by a Butonese fisher who lives in Wemi (near Seri), one boat is owned by a fisher from Hatalai, and two are in hands of local fishers.

The purse seine fishery is arranged through an array of informal agreements among the boat owners, the crew and buyers etc. There is a code of conduct that fishers abide by, which regulates the division of catches and facilitates labor arrangements and responsibilities (see Chapter 3).

14.2 Attributes of the Community and Fishers

In 1997, the total village population of Seri was 1991 persons divided over 425 households with an average household size of 4-5 people. The large majority of villagers is Christian with a minority (10%) of Islamic Butonese people. There is no indication of migration. Last year, 16 tourists visited the village.

The village has a health center and electric service (there is TV). There is an elementary school. A public water supply provides the houses with fresh water. Canals and septic tanks handle wastewater and sewage respectively.

The village is connected by asphalt road and there is public transportation straight to the city of Ambon where the main (fish) market is. The distance from Seri to Ambon is 24 km and to the sub-district center, Amahusu, 17 km. Seri is situated near an important landing place for fish called Wemi. The means of communication are limited; there is one telephone in the house of the *dusun* head.

Employment

Contrary to the official figure, approximately a quarter of the population are full-time fishers (also working on boats and lift nets) of whom 75 fish in the artisanal sector. Most people work both as fishers and farmers. The forest gardens are mainly cultivated during the east monsoon season (the wet, rainy season) when vegetables and fruit trees are planted. In the dry season, people work both as fishers and part-time farmers. In the last month of the dry season, people start to plant their gardens to anticipate the incoming rainy season. However, when the dry season is too long, people take up fishing again.

The numbers of fishers, farmers, vendors/shopkeepers (20), laborers and government officials (160) are higher in 1997 than in 1979. In the past 10 years, the number of fishers has increased because the fishing facilities have improved.

14.2.1 Village government

Seri is a *dusun* (sub-village) of Urimesing and, therefore, does not have an independent village government. The LMD of Urimesing has 17 members of which four are representatives from

Seri, including the *dusun* head. The representatives have an important function in channeling the people's ideas to the village government. At the moment, only two representatives are still active, the others retired. They have not yet been replaced. Originally, they were traditional authorities and were appointed by the *dusun* head. Supposedly, the fact that no wages are paid makes it hard to find replacements.

The *dusun* government of Seri itself consists of the *dusun* head and his secretary. They are assisted by a head of RT (neighborhood group) in Karang Tagepe. According to the new government structure, the *dusun* head is appointed by the village headman of Urimesing. The appointment is acknowledged through a decree at the sub-district level (on behalf of the mayor of the Ambon municipality). Government decisions are communicated to the people by an elected *marinyo* (lit. messenger).

For the last 10 years, the *dusun* head of Seri has been H. Wattimena, 72 years of age. He is a highly respected and a legitimate leader, although some feel he is not strong enough and, therefore, have more faith in the remaining *adat* leaders. Wattimena's authority is based on his descent and position in the government, but also on his intellect. He is a schoolteacher who stresses the importance of education, hard work, honesty and discipline.

The *dusun* head is responsible for the development of the *dusun*. The annual *dusun* development proposal is first tabled at a meeting of the Urimesing LMD. From there, the proposal is sent to the Development Planning Agency (BAPPEDA) of the Ambon Municipality for approval. The development programs are based on the needs of the people. The villagers, however, like to see results before they adopt a new innovation. To motivate his people, the *dusun* head personally demonstrates projects, e.g., a vegetable yard and silver carp pond. Because of his concern, the people have confidence in him.

Since Seri lost its central position in the *desa* of Urimesing, the people in Seri feel marginalized. Many government programs and social activities are now focused on Kusu-kusu. Besides, they do not feel that the government of Urimesing is legitimate. The current leaders (Tuhumury, Gasperz, DeFretes and Gomies) are not from the traditional *raja* clan. The Seri villagers have more confidence in traditional leaders because the new elected leaders "are more concerned about money than about the people." In some cases, for example, non-*raja* leaders have sold *adat* lands to get extra income. The *raja* clan on the other hand, possesses both *adat* lands and family gardens in the forest. Therefore, they do not worry about their income and can concentrate on the peoples' needs. Besides, people believe that the descendants of the *raja* clan can talk to the dead ancestors and that they have supernatural powers to govern the village.

As a result of their discontent, the Seri villagers decided to become an independent village. In 1997, a proposal to change the status of Seri from a *dusun* to that of a *desa* was accepted by the Urimesing LMD and enforced by a decree (No. 141.2/1391/1997). The process was accelerated by a *dusun* meeting in which representatives from all clans agreed to nominate one single candidate for the next elections for the village head of Urimesing: someone from the *raja* (Wattimena) clan. This will increase the chance of winning the election. Once a person from Seri is the new village head, he can change Seri's status from a *dusun* to that of a *desa* with an autonomous village government.

The *dusun* head explained that people in Seri hold to the principle of *Tiga Batu Tungku* (the three stones of a fireplace), in this case, the village government, the church, and the teachers³.

³ In sasi villages, the three stones are usually the village government, the church and *adat*.

He said that these three groups have to work hand in hand to develop a village or *dusun*. It is interesting, however, that he did not list *adat* among their “*tungku*”, indicating the political position of the traditional structures in Seri.

The *dusun* government cooperates closely with the church. The government activities, e.g., cleaning up the roads, construction of fences and water canals, are announced during the church services. Church activities are, in turn, reported to the *dusun* government. The church also maintains good relations with the Islamic minority (Butonese) in the village. The church involves the Butonese people in extension programs and their children attend the Christian primary school in Seri. Before they go out to sea, the Islamic fishers usually ask the church minister to pray for them. In return, they donate fish for the annual meeting of the church congregation.

14.2.2 Village organizations

There are two Protestant churches in Seri territory (one in Seri and the other in Siwang). The secretary of elders in Seri is Johanis Tuhumury, 53 years of age. The congregation consists of more than 1,150 people. Besides maintenance of church facilities, the church is involved in economic activities. They collaborate with the government on the silver carp culture program, and they execute a gardening program to generate income for members (cultivating chickens and planting banana trees). Part of the profit goes to the church. The church plans to build a lift net, but has no funds for construction and labor.

The women’s organization of the church, *Pelwata*, has 177 members. It focuses on spiritual activities such as bible studies, but is also involved in social and economic activities including ARISAN, an informal savings group. Within the *Pelwata*, problems concerning attendance and child care are openly discussed. The Youth Wing of the church in Seri was formed in 1958, has 60 members and is active.

In his position as *dusun* head, Wattimena supervises and co-ordinates social organizations in the *dusun*. The PKK was established in the 1970s, has 120 members and is chaired by Rachel Wattimena. The objective is to activate women in alleviating the economic problems of their families. Over the last couple of years, the PKK itself has become dormant due to lack of funding and interest from the PKK officials in Urimesing.

The current PKK program includes ARISAN (also see *Pelwata*) and the women’s productive group “Emping Melinjo Seri Jaya” (*emping*=chips and *melinjo*=fruit) which was founded in November 1997 by the Urimesing village government. The group is under the supervision of the Department of Industry and Trade and sells products in the Matahari store in Ambon (a large supermarket). The products they produce are dry shredded fish meat of mackerel and skipjack, banana chips, ginger powder, vegetables, etc. In the store, the shredded fish meat is worth Rp12,500 a pack (USD5, early 1997 exchange rate).

The TAKESRA was founded in May 1997 by the Family Planning Agency. This group, also chaired by Rachel Wattimena, involves nearly all low-income women in the *dusun*. The 20 members work as fish and vegetable sellers in the Ambon markets. The members save their money in the post office and will be eligible to borrow money from the government after saving money for one year. The chairperson, for example, will use the loan as a capital to trade chickens and pigs in the Ambon markets.

The women’s groups in Seri are highly productive. Besides the fact that the village is close to the city of Ambon, it has access to external capital and marketing channels from the Department

of Industry and Trade. The Social Department may also provide funding for social groups in the villages.

The chairman of the Youth Wing, Weitema, also leads a youth group, Karang Taruna, established in 1978 by the Social Department to stimulate economic activities among youths. The group planned various enterprises, amongst others carp breeding, but none has been very successful.

Seri has no KUD.

14.2.3 Role of women

Many women in Seri are teachers or civil servants. Women also play a key role in trading products from their forest gardens and the fishery. They are important providers of household income.

Despite their importance for the village economy, women are generally not involved in decision-making. They rarely attend meetings. Occasionally, for example, when guests from the district level visit the village, the village head will ask the women to prepare a small presentation on a topic that relates to the purpose of the visit. In other cases, the church organization represents the women, but mainly on women's issues such as child care programs.

Nevertheless, the feeling of consensus decision-making is strong in Seri: only 3% of the fishers in our sample considered women to be completely outside of the decision-making processes. In reality, women have a strong implanted feeling of inferiority vis-à-vis the men-governors in the village. When asked about their input in fisheries management, they said that "they have no opinion" and they tend to agree with what is decided by others. Only few women would like to be represented in government meetings.

Women generally seem less concerned with the situation in the village than in the household. Here things could be improved, especially in the light of the current monetary crisis. Merry Abrahamsz, a woman from Seri, explained: "Women would like to manage the family better, and plan things together with their husbands. The wife should help to find some more money and try to manage the money better."

14.2.4 Profile of fishers

Nearly all the respondents in our sample were born in Seri. A large proportion (72%) had only elementary education. A relatively large number (66%) of respondents are under 45 years of age. The fishers' household consists of 5.7 people on an average. Children who have left, have gone to work or school (few left for marriage). Two women were interviewed.

On an average, the respondents were 42 years old and they have been fishing for 19 years. The average hours of fishing is 7.6 hours per day, with 5-10 hours at sea being most common. Although many of the respondents (86%) are landowners, on average they derive 65% of their income from fishing. Additional income is derived from farming. Only 7% have an externally derived income (which is relatively low), but the average contribution from outside is substantial: Rp775,000 per year (USD310, early 1997 rate).

The economic indicator of the fishers' sample for Seri was made up of adding scores for land ownership, boat type, house and gears (Section 2.5). Nearly 72% of the respondents had type

4 housing (cement with zinc roof). For Seri, the indicator is 8.6 (with a standard error of 0.25), which is in the middle of the 27 villages (Appendix 2). If TV ownership is added, Seri scores 8.8, one of the three lower scores for the case study villages (Appendix 3).

The fishers are highly satisfied with their job. They are free and happy when they are at sea, and it gives a good income. For some, it is also frustrating and difficult to be a fisher. The Seri fishers had the strongest tendency to change jobs if they could find a better alternative (54%). They wanted to be independent, have less physical labor and an easier job. Only 4% want their children to be fishers. The best alternative for them, according to their fathers, was to become government staff. However, compared to other villages, the options and alternatives mentioned were more varied, e.g., tradesman, worker in the city.

14.3 Market Attributes

Artisanal fishers in Seri sell about half of their catch directly to local consumers. None of the fishers eat more than half of their catch but all eat some. On an average, 22% of the fish caught are eaten by the family. Most of the fish are sold in the city of Ambon (93%), the rest are sold to female fish traders.

14.3.1 Local fish trade

Small-scale fish trade is mainly in the hands of women. Before, when there were no asphalt roads, the women had to walk to the Ambon market. At that time, not many women in Seri were involved in trading. But now that the infrastructure has improved, markets have become more accessible. The demand for fish has also increased, and most men work full-time on their boats. Improved fishing techniques such as purse seines have increased yields. There is thus enough work and the wives and daughters of the fishers are now becoming more and more involved in the processing and selling of fish.

The number of traders has increased rapidly from about 15 in the 1980s to more than 40 currently. Anyone is free to trade fish. Besides the local vendors, there are Butonese and people from Eri, Airlow and Latuhalat who come to Seri to buy fish. A fishing boat from Mahia is active in Seri waters and the fishers catch their fish in Seri. In the eastern monsoon season, fish are caught in Eri.

Most female vendors buy their fish directly from the fishing boats; others sell the fish caught by their husbands and sons. In most cases (69%), the fisher or his wife sets the price. The women base their price on information from larger fish traders and wholesalers, or on the price of fish traded the day before.

If the vendor does not have enough money to pay for the fish right away, she sells the fish first before paying the fisher. This arrangement requires trust and, therefore, it is easier if the transactions happen between relatives and friends. On days no fish are caught, the fish vendor needs credits from other people. She repays them according to the fish price on the market. All these arrangements are informal. Generally, however, the transactions are well managed and cause no problems.

For the women, the main market is Ambon. Others take fish to villages on the island, e.g., Latuhalat, Eri, and Amahusu, or sell them to another vendor (*papalele*) or to the fish factory. The key factor in choosing the point of sale is price, closely followed by family or other social connections.

Women, generally, do not trade processed fish. During the fishing season, the women smoke or salt the fish for consumption and sell the rest fresh. The marketing of fresh fish is sometimes difficult. The fish are not transported using ice or anything to preserve them. Sometimes, the means of transport are limited and by the time the women reach the market, the fish have already lost freshness and the price goes down.

Other problems that the fish vendors face are related to the informal nature of the small-scale fish trade. It is possible to buy or rent sales tables at the Ambon market but they cost Rp175,000 (USD76, based on the 1996 exchange rate) and renting is Rp7,500/month. The small-scale vendors also pay Rp300/basket in market tax. Many women have unofficial market spaces, but sometimes when they arrive at the market, they find that they are not allowed to use them anymore. Other women lack capital, which hampers their marketing.

Despite these problems, marketing for women from Seri is relatively easy because of the proximity of the market to fishing grounds. Improved transportation, fish processing and secure market spaces would help the women to improve their situation. Generally, however, women are satisfied with their businesses.

14.3.2 Commercial fish trade

The boat owners have a choice of selling their catch directly to the pole and line fishers, to female fish vendors, or taking it to a large trader (*borok*) who auctions the fish in the city of Ambon.

Many boat owners have a trade relation with a particular *borok*. For example, Sam Kalahatu, a purse seine captain from Seri, sells his fish either via a trader called “La Obe” or straight to the cold store in Tulehu for eventual export. The trader pays the boat owner the net revenues from selling the catch minus 10%, which is the payment for his services. This transaction is based on trust. There is no written contract, and once a *borok* is proven to cheat, he will be dismissed from this service. The advantage to the fisher is that he has a steady market and although the prices in Ambon fluctuate, they are usually higher than those at the fish factory. For example, at the cold store he will get only Rp20,000 per basket of *momar* (*Decaptherus macrosoma*), about half the retail market price. At the same time, the trader is also assured of a supply of fish. If both parties follow their unwritten obligations, the relation can function for years.

The fish from Seri are sold through the following channels:

1. Directly to long line boats as baitfish.
2. Through the fishers’ wives who act as vendors and sell fish directly to consumers at home or at the local market.
3. Through other small-scale traders who bring them to the Passo market or Ambon.
4. Through a large-scale trader (*borok*) who auctions the fish at the Ambon market.
5. To the cold store in Tulehu (Sumber Aneka Tata Bahari).
6. To the PT Dharma Samudera, a fish company in Ambon (for larger quantities).
7. The fish can be directly sold to the Mina Raya V, a large trawler that transports the product to Bali.

14.4 Community Institutional and Organizational Arrangements

Seri was chosen as a representative of a non-*sasi* village. The village headman explained: “Before, when the population size of Seri was still small, there was marine *sasi*. Now, there are too many people and it became difficult for the *dusun* government to control the *sasi* area.” *Sasi* is not functioning anymore as a village level institution, but some remnants of *sasi* are still present.

A remnant of *sasi* that apparently is still practiced by a few people is *sasi* on coconuts. It is an individual kind of *sasi* arranged by the church (*sasi gereja*). A person can ask the minister to pray for and announce *sasi* on his coconut garden. After a 3-6 month *sasi* period, the church is asked to pray for the opening of *sasi*. The owner and his family can then harvest the coconuts for one or two weeks (depending on the owner's needs) before the garden is closed again.

If a person has several gardens with fruit trees, i.e., coconuts, *duku* (lansium fruit), nutmegs and *langsar*, he can ask to have *sasi* on one or more gardens. This allows the owner to harvest fruits from non-*sasi* gardens for his daily needs while protecting the other gardens from damage and theft.

14.4.1 Fisheries regulations

On the local level, there is support for the national prohibition on blast fishing and use of poisons, i.e., the *dusun* head is prepared to enforce the rules, but, as he explained, there is no problem with non-compliance. The official permits that outsiders need to use their nets, boats and lift nets are issued from a higher level of the government.

Some local informal rules are applied on the commercial fishery. Net fishers are required to have a permit from the Fishery Agency. Lift net operators also have to pay contributions to the village and are obliged to hire local labor. The fees can be up to Rp100,000/year (USD43, 1996 exchange rate). Outsiders and owners of fishing vessels also have to pay the *dusun* for the rights to harvest marine products such as top shells, sea cucumbers and shrimp. They pay Rp25,000-Rp50,000 for the right to fish. Since the village has formally no right to ask for a fee, the contributions are "voluntary", but if not paid, the boat owner runs the risk of his gears being destroyed.

The fishery as well as fish trading is open to everyone and there are no formal regulations on access for locals. Minimal access rules placed on outsiders are meant to collect revenues not limit access. There are no rules governing the landing of fish. Most local rules deal with division of catch, labor, or marketing. They are informal and are commonly agreed upon, and as stated earlier, based on reciprocity.

14.4.2 The players

There are no direct players in fisheries management in Seri. A *kewang* or comparable enforcement institution is not present. Neither the village head of Urimesing nor the LMD is involved in management or rule enforcement. The *dusun* head of Seri plays a distant role in managing the payments from, and placement of, lift nets.

The Department of Fisheries and the Department of Transport play no role in fisheries management apart from the issuing of permits. They receive taxes, but do not provide any facilities for landing, storing and trading fish.

Seri's fisheries are for a large part governed by market mechanisms, relationships among the owners of commercial gears and their crew, and interactions of artisanal fishers and traders at the market place. Small-scale fishers sell their catches through their wives or other relatives. These women (small-scale traders) deal with auctioneers and wholesalers. All these relations are based on trust and mutual dependency.

14.4.3 Enforcement

Seri has no *kewang* or police or other enforcing agent. Minor crimes are settled by the *dusun* head who plays an important role in the village. He regulates social behavior (punishes thieves, drunks and offenders), and he arranges labor for village activities. His actions are legitimized through *adat*, but he will not undertake action or punish young people without consent from their parents.

The village head knows that the people are busy and therefore, instead of organizing a formal meeting, he asks them to join informal meetings (after the Sunday service) to talk to them about development issues, *adat* laws, drinking problems, taxation etc. He allows the people to express their ideas in the meetings because he realizes that his people are getting more critical and are smart. "However", he said, "as their leader I try to be smarter than my people." He thus has a great influence on the villagers and is personally involved in the regulation of social behavior.

14.4.4 Compliance

Enforcement and compliance have to be studied in the light of large-scale fishing and the use of modern gears. The boat operators work under regional and national law, and cannot be sanctioned by the local village government. Even if the village did have a formal enforcement institution, its mandate would not comprise these outside fishers. On the other hand, if the boundaries of Seri fishing grounds were acknowledged and rules formalized, fisheries regulations (i.e., on mesh size) could be implemented.

14.5 External Institutional and Organizational Arrangements

Link with higher government bodies

Government officials from the (sub-) district level, municipality, provincial agencies and the municipal PKK group, visit the *dusun* about five times a month. Seri is more frequently visited than the other *dusuns* in the Urimesing village.

The village has been involved in several development programs proposed by higher government levels. The Animal Husbandry Agency established local groups, and most households now grow chickens. The agency officials routinely visit Seri each month for vaccination and skills training.

The Fishery Agency assisted three fisher groups to build lift nets. Target groups were fishers that had no nets or were not associated with commercial lift nets. However, in 1995, the project was abandoned after the lift nets washed away during the eastern monsoon period.

The Fishery Agency also conducted a week's training in silver carp culture and hatchery. For this purpose, the leader of the project was sent to a fish culture apprenticeship in Bogor. Apparently, this fish breeding program is a success.

In 1996, Seri obtained assistance directly from the Public Works Department to renovate houses and to construct footpaths. With this aid, Seri won a national competition for housing and environment development in 1996. As a gift, the Department gave additional funds and cement to build drainage canals and pathways to the primary school, church, beach and water source. The construction of more canals and pathways is proposed.

Collaboration with other institutions

In 1997, a private organization called “Sarana Maluku Ventura” organized a credit system through which the fishers can obtain a 15 HP engine for a boat. The fishers have to pay back 15% of their catch. In 1997, a loan for one boat plus engine was issued. In 1998, another six engines were distributed, and 14 more are planned.

External economic influences

The economic crisis has apparently caused the number of FADs (and lift nets) to decline. Before the monetary crisis, 20 FADs were owned by local people, five in 1997 and in 1998, only three were left because there was no money to replace the lost and damaged FADs.

Infrastructure and development projects

The fishers complain about the nearby wood factory that causes pollution.

14.6 Incentives to Cooperate

The keys to resource management in Seri can be found on two levels. First, there are the formal fisheries rules (e.g., on blast fishing and use of cyanide) that must be enforced. Secondly, there is the effect of the largely unregulated large-scale fishery. Currently, this type of fishing has a positive effect (higher catches) for the commercial sector, but is already acknowledged as a possible threat to the fishery in general on the longer term, i.e., artisanal fishers blame their falling catches on the commercial sector.

Tradition

Lien Wattimena explained: “Traditionally the fishers would only fish at the “dark moon”. When the moon was full, it was impossible to fish and so the fish had time to grow. But now the fishers fish all the time. Also when it is full moon, they gather the fish with the lift net while it is better to let them get bigger before you catch them.” The acknowledgment of traditional limitations to fishing could be an incentive to comply with new fisheries regulations if similar restrictions were in place.

Local knowledge and problem acknowledgment

Although there is a firm belief that God will protect the fishery, women and men in Seri seem to have a notion of the need to manage their fishery. Merry Abrahamsz, one of the female respondents, for example, came up with a very clear statement that “the amounts of fish and the sustainability of the resources depend on how we manage them.” The increasing number of fishing boats and lamp fishing are regarded as a problem because the fish have no time to mature.

The solutions according to the fishers were: diversification, the processing of fresh fish, aquaculture projects, but most important, the prohibition on bombing and the use of cyanide. Besides, water pollution needs to be controlled. This realization and the acknowledgment that current practices lead to destruction, are clear incentives to fisheries management.

Competition

Coral reef destruction, however, is only one of the problems that people face. The increasing competition with outside and commercial fishers plus the intrusion of large-scale fishers and companies, have a large impact on the local, artisanal fishery. It is not surprising that the majority of the respondents (55%) disagree with the sale of resource harvest rights to outsiders. As long as their interests are not defended, and others would have access to the benefits derived from improved management efforts, the local fishers have no incentive to cooperate.

Economic needs

The depleting fish catches urge the fishers to go further away to fish. Local fishers have inadequate fishing techniques to reach the remaining fish resources, and they lack the capital to obtain competitive fishing gears. In some cases, competition from outside fishers forces the fishers to sell their catch for lower prices. All in all, this situation is a disincentive to comply with fisheries regulations.

Lack of alternatives

The increasing numbers of FADs obstruct inshore fishing. The fishers asked the village government to develop the small-scale fishery and recently, there have been some moves to organize the fishers in the village. They tried aquaculture of top shells, but the natural conditions are unfavorable. Offering alternatives will help the fishers to comply with fisheries regulations and limit over-fishing.

Establishment of fisher groups, training, and workshops are needed to educate people and create awareness. Responsibility should be shared. Fishers see the village government as being responsible for support, i.e., providing ideas and technical assistance for the fishers' groups. Women specifically asked to learn fish processing and to be provided with capital.

Economic incentives

The perception of the crew working on the commercial fishing boats is different than that of the small-scale fishers. The commercial crews have a clear interest in large catches. Their income is marginal, and proportional to the catch. This arrangement is a strong incentive for over-fishing by the commercial fleet.

Establishment of an enforcement agency

The villagers felt the need to stop the decline of the marine environment and asked for a village meeting. Plans have to be made and a role defined for the LMD and LKMD. The fishers would like to see enforcement of the law on blast fishing, but this is only possible if there is a *kewang* or similar institution that can enforce the rules. The establishment of such an organization would have a positive effect on fisheries management.

Attitude

The average scores for the state of the resource, fish catches, family well-being, income and distribution of benefits, indicate that generally, the Seri people have a positive attitude and hope for the future. Their development, security and economy are perceived as satisfactory. In fact Seri, as the representative of Maluku Province, won the first prize in a national competition for the development of housing and the environment in 1996. The pride of the people and the fact that they have seen they can actually achieve something communally, are positive incentives for further cooperation in, for example, fisheries management.

Leadership

The *dusun* head, who is said to be highly legitimate and respected by most people, plays an important role in the development of the village. Others criticized him for being in this position too long and for being not strong enough. But as a former school teacher, he has had most of the villagers under his wing at some time, and still wields authority over them. He is said to rule as an understanding man and he tries to involve local villagers in meetings. A good example and strong, active leadership are important incentives for fisheries management.

14.7 Patterns of Interaction

Seri's fishery is in a good condition because of a rich upwelling area in front of the village. The intensification of the fishery, through the use of lift nets and large-scale purse seiners, has led to increased catches for the commercial sector. Artisanal fishers have observed a decline in their catches, but the idea of intensifying fishing efforts still prevails. For poverty alleviation, the fishers thought, the best strategy was to build a lift net.

However, due to the ever-increasing, apparently unregulated, installation of fishing devices, the resource is deteriorating even more. Permits, however, are granted by higher government levels and all that the Seri village government can do is informally ask for access fees.

Few regulations, combined with a lack of enforcement agent, leave the Seri fishery as an open-access regime. For the artisanal fishers, there is no alternative but to increase their efforts. The large-scale fishery is productive and powerful. In order to regulate the fishery and manage it for the common good, regulations should be installed and a management regime established.

14.8 Outcomes

14.8.1 Equity

1. Role of fishers in management

The role of fishers in management has not changed significantly over time. The perceptions of past, current and future roles are varied. Some feel that the *dusun* head makes all the decisions. Others noted that the fishers are involved and that their input has increased. For example, when researchers come to the village or training is conducted, the villagers are invited to be present and discuss matters. Some fishers noted that people can easily make decisions more now that they are better informed and educated.

When asked about power sharing, the majority of the fishers saw the community as having main responsibility for fisheries management. Roughly a third felt that the government had actually most or total responsibility for fisheries management, while 7% felt responsibility was shared equally between the people and the government.

2. Access to marine resources

The fishers' individual access to resources has diminished significantly compared to the past and they expect more restrictions in future. People explained that access is limited because they are required to have permits to enter the sea and because the boundaries of the fishery

are defined. Additionally, it was noted that certain nets, boats, and outside fishers need a permit, and that there is a ban on the use of destructive gears.

3. Fair distribution of means of production

Distribution of the means of production is seen to be fairer now than in the past, and this is expected to continue to improve. In Seri, 13 people stated that the numbers of fishing gears increased as the result of increased efforts and competition. They explained that peoples' incomes improved and more people are fishing, so the spread of gears is wider. The strong market position of Seri and an improved transport system also contributed positively to this trend.

4. Income distribution

On an average, the level of economic disparities has remained the same, but opinions were varied. Personal efforts and motivation were mentioned by some people to explain why economic levels have become more equal. Others mentioned the same factors as the reason why differences increased. People also perceived heightened competition and an uneven spread of capital.

14.8.2 Efficiency

5. Communal decision-making

Partnership in fisheries decision-making has remained the same. Nearly half of the fishers perceived conditions to be static. The style of decision-making in the village is seen by most fishers as being a process of common or majority agreement. This may be a result of the respected and legitimate leadership of the *dusun* head. Although he plays the key role in decision-making, the needs of the people prevail. However, a third of the respondents felt excluded and complained that "people are never heard". They do suggest ideas in village meetings, but the suggestions are rarely implemented or agreed upon. One example was about the pollution caused by the wood factory in the neighboring village. The fishers complained but the government did not handle the problem.

Nearly all respondents agreed that all stakeholders should be involved in decision-making. Of the respondents, 93% felt that local groups already had a role in decision-making, but only 31% said that outsiders were involved. This number is significantly higher than in the other villages, possibly because our sample included some commercial fishers that do have an influence on village affairs as well as commercial links to the outside.

6. Ease of entry (costs)

Due to increased costs, entry into the fishery is perceived to be significantly more difficult than in the past. Fishers expect costs to continue to rise in the future. Reasons given are: 1) taxes, 2) larger investments in gears and boats, and 3) increased fuel costs because fishers have to go out further to reach productive fishing grounds.

7. Control over access to marine resources

Control over access by the village over the fishery has not changed significantly. There are no fisheries regulations in place, and there is no enforcing agent. Artisanal fishers and villagers can fish freely, while outsiders have to pay a "voluntary" contribution. Over half of the fishers agreed that fisheries rules should be changed.

8. Compliance

On an average, compliance with fisheries rules has not changed significantly, but the variance in answers is wide. Some respondents felt that compliance is lower now, while others felt it is actually higher compared to the past. This last group of fishers thought that compliance is high because of the sanctions and control, tighter rules, and awareness. It was mentioned that compliance depends highly on the village government (*dusun* head) and the church. Considering the absence of an enforcement body, these comments are confusing.

It was noted that compliance depends on economic needs that may force people to break the rules. One-third of the respondents agreed that it was acceptable for a fisher to break the rules.

14.8.3 Social sustainability

9. Family well-being and income

Family well-being has improved over the last years, but no further improvements are expected in the future. The notes from Seri showed a very diverse picture. Increasing competition is an important factor influencing well-being. Competition often has a negative connotation but some felt that their increased efforts improved their well-being. However, in most cases, the improvements were counterbalanced by increased economic needs.

10. Income

The income of fishers was reported to have significantly increased over the past 15 years. Development programs, improved infrastructure, and higher catches from large-scale fishing techniques have a positive effect on the household income. The fishers' future perspective is generally positive too, but some small-scale fishers expected a future decline of their income once the fish stock is depleted.

11. Tradition of collective action

Communal activities in the village were significantly less compared to the past and are expected to drop even more in the future. The main cause is said to be the introduction of the "rental system". This change refers to the fees that people nowadays ask for services that they would deliver for free before. Loss of tradition, individualism, conflicts in the village, alcohol abuse and TVs were also mentioned as negatively affecting communal activities. The fishers rate past performance as very high (mostly 10s) but opinion on future performance is extremely divided with scores ranging from 1 to 9.

12. Discussion of village issues

Discussion of issues in the village has decreased significantly compared to the past, and further decrease is expected.

13. Community harmony

Harmony in the community is perceived as being significantly less now than in the past and further deterioration is expected. The score on village harmony was not only very low compared to other villages (5.07), but nearly all respondents also made notes about conflicts in the village, a clear indicator that this issue is on people's minds. Alcohol abuse, primarily by youths, is a major problem. Leadership is another important reason for conflicts. Minor

reasons were unfair competition and external influences that caused conflicts. Elders blame the conflicts on the life style of the youths. Only two people noted that harmony in the village is positively related to increased awareness of the people, and one person even tried to explain how fishing reduces criminality in Seri: “Almost all young men fish at night, sell the fish, sleep and prepare to fish again the next day, so they have no time to drink and fight”.

14.8.4 Biological sustainability

14. State of the resource

The fishers perceived a significant decline in the condition of marine resources over the past 15 years, and they expect an even more severe decline in the future. There were some positive comments about a cleaner environment because more people are aware now, but most comments described the deterioration of the resource and some claimed that certain types of fish have disappeared.

15. Fish catches

More than half of the fishers in our sample reported significantly decreasing catches. They noted an average drop of 21%, and expect a further decline of 11% in future (also see Section 14.1).

Table 14.1. Results of the performance analysis in Seri. n=29 heads of fishing households. ns=trend not significant; *= $p<0.05$, **= $p<0.01$, *= $p<0.001$.**

Indicator	Average current condition on scale of 1-10	Average change through time (statistical significance)		Average future expected change (statistical significance)	
<i>Equity</i>					
1. Role of fishers in management	6.52	-0.2069ns	-2%	0.2759ns	3%
2. Access to marine resources	7.72	-1.1424***	-12%	-1.2414***	-12%
3. Fair distribution of fishing gears	8.41	2.7931***	+28%	0.8621***	+9%
4. Economic equality	7.17	0.7931ns	+8%	0.2069ns	+2%
<i>Efficiency</i>					
5. Communal decision-making	6.72	-0.1379ns	-1%	-0.3793ns	-4%
6. Ease of entry into the fishery	6.48	-1.7241***	-17%	-1.5517***	-16%
7. Control over access to fishery	7.52	0.9310ns	+9%	0.3103ns	+3%
8. Compliance with fishery rules	7.69	0.8621ns	+9%	-0.2069ns	-2%
<i>Social Sustainability</i>					
9. Family well-being	7.59	1.4483*	+14%	0.1724ns	+2%
10. Income	7.72	1.8621***	+19%	0.9655***	+10%
11. Tradition of collective action	6.48	-2.1724***	-22%	-1.6207***	-16%
12. Discussion of village issues	6.86	-1.5517***	-16%	-0.6897*	-7%
13. Community harmony	5.07	-2.8966***	-29%	-1.2069**	-12%
<i>Biological sustainability</i>					
14. Marine resource health	7.10	-1.0690*	-11%	-1.4828***	-15%
15. Fish catch	6.55	-2.1379***	-21%	-1.1379**	-11%

14.9 Synthesis

Seri has many productive farmers, animal growers, and fishers. Compared to other *dusuns* in the Urimesing village, Seri is doing well. The government programs, e.g., chicken breeding, are successful, and generally, people see their livelihood improving. Although the figures of well-being and income are not significantly higher than those in the other villages, the Seri people are relatively confident and optimistic. This is not in the least owing to the current village leader who, despite the resistance of some, is determined to work for the prosperity of the village.

Village institutions (church and government) seem to cooperate well. The village organizations, informally organized under the PKK, function and are involved in economic activities. There is no KUD but there are several local productive groups.

Seri has easy access to local and regional markets and the market structures are interesting. Small-scale fishers usually sell through their wives or other female fish vendors. Large-scale fishers have several options but often sell to traders who auction the fish for them in return for 10% of the net sale price. The traders often auction the fish to female vendors. If a vendor cannot pay directly, she can take the fish and pay later. Trust is a key factor in these transactions.

Between the commercial owners and their captains and crew, comparable relations exist. A crewman's percentage may be paid months after the harvest and people have to trust the boat operator to pay these revenues. If a trader, fisher or boat operator neglects his duty to pay, or if he cheats, he will be cut off from further interactions.

The current situation in the Seri fishery is especially difficult for artisanal fishers. There is a large divergence in income and opportunities between the artisanal and the large-scale commercial fishers. Even though artisanal fishers are more likely to identify resource problems and reduced catches, fishing efforts are generally increasing. The fishers on the large fishing boats get a percentage of the catch, which is a clear incentive for them to try to increase their yields.

At the same time, there are no fishery management rules in place that regulate access and limit efforts. Except for the fact that outside fishers pay a contribution to the village, the marine resources of Seri are open-access. Only the national prohibition on destructive fishing techniques is being implemented, but besides the *dusun* head, there is no enforcing agent.

The situation for artisanal fishers is difficult. While few of them have the means to compete with large-scale fishers or fish in remote fishing grounds, outside fishing vessels have government permits that allow them to fish in Seri's waters. The local administrative structure, however, cannot challenge the permits issued by higher government bodies. Besides, the village government takes a dualistic position. On the one hand, they are concerned with the fishers and try to help them financially through government programs. On the other hand, they are pleased with the significant fees and fish derived from the large-scale fishery.

The fishers feel strongly that a local enforcement mechanism should be in place. The village government is likewise interested in a better organized fishery. It is very well possible that, when Seri has derived a more autonomous village status, its fishers will be able to design local regulations and establish an enforcement structure so that the fishing grounds can be managed under a property rights regime.

Chapter 15

Dusun Toisapu, Desa Hutumuri, Ambon Island¹

15.1 Physical, Biological and Technical Attributes

15.1.1 Physical environment

Hutumuri lies on Ambon Island², bordered by the Halong village in the north, the Passo village in the east, and the Rutong village in the west. In the 1950s, when Hutumuri became very large, the village split into *dusuns* (lit. garden). One of the *dusuns* is Toisapu, which lies north of Hutumuri on the edge of Baguala Bay (see Figure 15.1).

The *dusun* boundaries of Toisapu run from the Toisapu bridge up to the next bridge towards Hutumuri. This stretch is about 1 km long by road. Hutumuri has a large forest-garden area and most people are farmers. They cultivate cloves and coconuts.

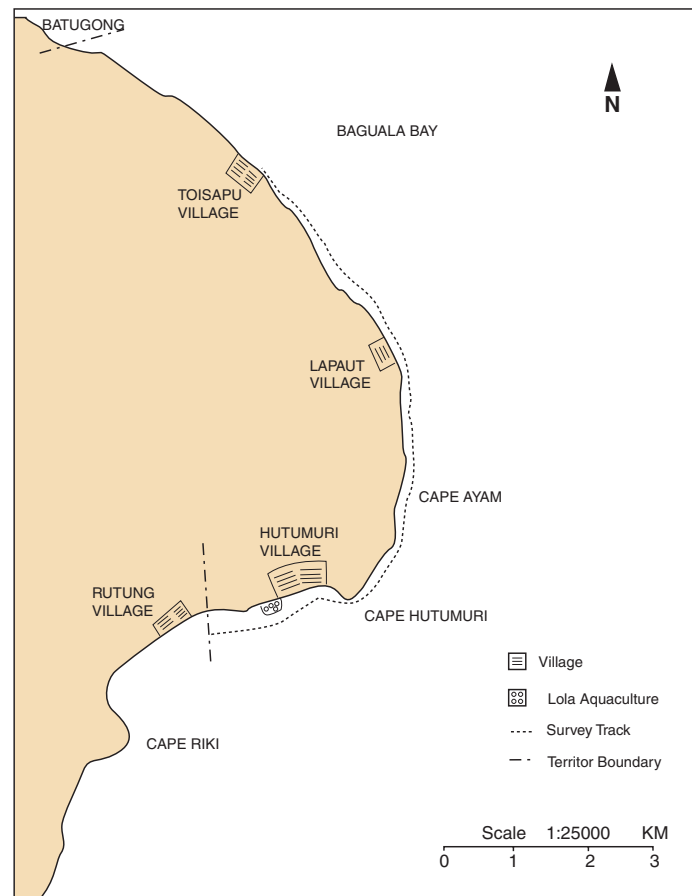


Figure 15.1. Sketch village map of Toisapu-Hutumuri (features not necessarily to scale).

¹ Data tables for case study villages can be found in Appendix 3.

² Toisapu and Hutumuri fishers were interviewed because there were not enough fishers in Toisapu alone.

The main fishing grounds for the fishers of Hutumuri traditionally lie in Baguala Bay. Due to industrial activities around Baguala Bay, the water in the bay has become polluted. In addition, competition from commercial lift nets has increased. Therefore, the fishing grounds now extend north to Tial.

15.1.2 Biological characteristics

The greatest number of fishers (40%) target only pelagic fish, while a further 17% fish both pelagic fish and reef fish. Seventeen species of fish were recorded as commonly caught: 10 pelagic fish and 7 reef fish. Women are active in *bameti* (shell gathering) for food production. No shellfish were listed as commercially important.

The marine environment has visibly deteriorated and fishers expect further deterioration (see Section 15.8.4). If they have the appropriate gears, fishers nowadays go as far as Liang, Nurue, and the island of Seram to fish (see map). Most of the fishers (76%) also reported reduced catches. Certain fish species have become rare or seem to have disappeared, i.e., *tatih* (type of tuna), *cakalang* (skipjack) and *komu* (mackerel). Baitfish are still abundant in the bay and the use of lift nets is prominent.

The most outstanding threats to the marine environment around Toisapu-Hutumuri are a plywood factory and two fish plants. The factories release wastewaters that pollute the bay. Oil spills from large boats and the use of toxins and bombs in the fishery have devastating effects on the local fishing grounds as well.

Fish catches depend to a great extent on the techniques used. For fishers using lift nets and FADs, fish catches are increasing. But more than a third of our sample fishers saw these modern, highly competitive gears as a threat to the fishery.

15.1.3 Fisheries technology

There are fewer than 15 full-time fishers in Toisapu and, therefore, it was decided to include Hutumuri fishers in our survey. Nearly all the fishers own their own boats (*perahu*) but only 17% have motors.

Commonly used fishing techniques are nets, fish traps, hand lines and lift nets. Nearly half of the fishers in our sample (46%) had nets, 27% had only hand lines, and 17% used other gears. Six lift net owners were part of our sample. Ten percent of the fishers owned no gear at all. It is very likely that these fishers work on the lift nets.

Artisanal and small-scale fishery

Most artisanal fishers fish in front of Toisapu and Hutumuri. They have no preference for certain species or sizes of fish. Commonly caught with hand lines are *tengiri* (*Gymnosarda unicolor*), *silapa* (*Pristipomoides sieboldi*), *gorara* (*Lutjanus basmira*), and *gora* (*Holocentrus* sp.), (also see Appendix 3). Reef fish, such as the last two species, get a better price in the market.

Generally, fishers go out 1-3 times a week depending on the availability of baitfish. The best time to go out is at full moon and spring tide. The best months for fishing are September and October when the tides are highest. Other months with large amounts of fish are April-June and November.

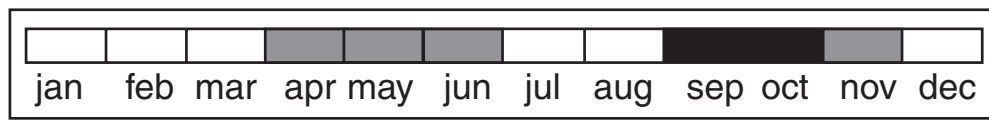


Figure 15.2. Fishing seasons (black color is high season).

If a fisher catches only a small amount (5-15 fish), he will take the catch home to his wife who will sell the fish. If he has a good catch (20-30 fish), the fisher will sell them through an auctioneer (*borok*). The fish are sold locally, in Passo or in the Ambon market.

A hand liner will on an average earn a net profit of Rp5,000 to Rp30,000 per trip to sea (USD2-USD12, early 1997 exchange rate). In order to start hand line fishing, certain investments have to be made. Fishing lines cost Rp10,000, and a box of hooks of Rp1,500, but the major investment is the boat. Before the currency crisis, a boat would cost up to Rp100,000, but prices have gone up and a boat currently costs Rp150,000 or more.

Large-scale commercial fishery

Lift nets are common in Hutumuri's waters. There are no restrictions to the placement of lift nets in the water. Owners obtain permits from the Department of Fisheries and pay only Rp50,000 to the village government for a six-month fishing season.

Of all the lift nets, only six are owned by locals and five of these are Butonese villagers. All the others are in the hands of outside entrepreneurs from the Chinese Indonesian community. Few villagers have a lift net because, firstly, the village is not traditionally a fishing center. Secondly, the investments in a lift net are heavy. The price of a lift net before the currency crisis was Rp50-75 million (\pm USD20,000-USD30,000, 1996 exchange rate), while in early 1998, the price had already increased by at least 50%.

Also common in the large-scale fishery are FADs, in this case owned by Butonese fishers. These fishing installations are also expensive: Rp0.5 million before the crisis and up to Rp1 million in 1998.

The numbers of both FADs and lift nets are increasing, to the despair of small fishers. At night, there are so many lift nets at work in the mouth of the bay, that they actually form a wall and block the fish from the bay (Ais Sohouw, *pers. comm.*). Most of these large-scale fishing gears are in the hands of urban businessmen and the small-scale fishers feel that their fish are being taken by outsiders.

15.2 Attributes of the Community and Fishers

Dusun Toisapu is politically dependent on the Hutumuri village and has politically the same position as *dusun* Seri in respect to Urimesing. Toisapu has 1,400 inhabitants divided over 264 households of approximately five persons each. Because the number of inhabitants is less than 2,000, it cannot obtain the status of a *desa* (lit. village).

In Toisapu, we could not find enough fishers and decided to enlarge the village sampling area to include Hutumuri proper. Hutumuri has 3,285 inhabitants (including the population of Toisapu and other *dusuns*). The 692 households consist of five people on an average. Nuclear families are common. Approximately 95% of the people in Hutumuri are Christians. About 100 Moslem Butonese villagers are mainly involved in fishing.

Tourism is limited to occasional foreigners, for instance, relatives from the Netherlands. More common are the students from the Fishery Faculty of Pattimura University who come to the village to do their fieldwork.

The village has a health center, a hospital and a resident doctor. It is the only case study village with a banking service. There is an elementary, a junior high and a senior high school in Hutumuri. Through a public water supply, water is piped to homes. Open storm drains and settling tanks receive household waste. The village has electricity and TV.

The village lies close to the city of Ambon markets and transport is frequent. The road has a hard top, but at some parts of the road are dangerous curves and steep hills. Communication with Hutumuri is difficult and can be done by mail only. Hutumuri has no telephone or radio connections. Toisapu, on the other hand, has two telephone lines (one public and one private).

Employment

Hutumuri has a large forest-garden area and 85% of the people are farmers. Most fishers work only in the calmer season. The number of full-time fishers in Toisapu is less than 15.

Over the past years, the number of farmers and fishers has decreased. Droughts and natural calamities have caused a great loss of crops. For the fishers, the costs of fishing equipment and taxes have increased. As a result, more and more people are switching to other occupations.

The number of vendors has increased to 45. The number of laborers (house construction, furniture) is almost the same as before 1979, i.e., more than 50 people. There were very few government employees before 1979 because there was no high school and no health center at that time. Now, one in ten villagers is a present or pensioned government employee.

15.2.1 Village government

In 1979, when the new government structure was implemented in Hutumuri, the *saniri negeri* (traditional council) was replaced by the LMD. Three of the five former clan leaders (*kepala soas*) obtained positions as heads of government affairs, general affairs and development affairs respectively. The two remaining leaders obtained informal positions as RTs (leaders of neighborhood units). However, as RTs, they were subject to their former equals. For clan leaders of high prestige and status, it was an important demotion. As a result, they never functioned in the formal village structure.

The village head at the time, Lewarilla (1982-1993), also abolished the appointment of the village head based on the *adat* system. When he passed away, no new leader was elected and only in 1996 – after a three-year period of interim leadership – was J. Lilipory, aged 58, inaugurated as the new village leader of Hutumuri.

At the inauguration, the LKMD was installed, but a real village government (LMD) was never established. Instead of the representatives from the *adat* institutions, the church, the PKK, and the KUD that normally has seats in the LMD, the village is governed by a group of influential villagers. People do not support the LMD, but neither have they confidence in the higher government levels who failed to question the village head about the LMD and passively accept his reports about its activities.

The current village head in Hutumuri has no firm position in the village. He is not from the traditional *adat* lineage (i.e., Tipiorij or Waas). One villager complained “anybody who can get support from influential villagers nowadays can become a village leader.” Besides, people feel that he has insufficient management skills and so have no confidence in him. His position is further undermined by lackluster staff, whose motivation has flagged ever since government officials and the heads of the RTs³ stopped receiving regular salaries.

Faced by conflict and confusion, the new village head decided to reorganize the village government. In the course of 1998, a new LMD will be formed that will include all traditional clan leaders (including the *tuan negeri*). The ones who are old or who have died will be replaced and elected by the clan members. In total, the new LMD will have 10 clan leaders: five *kepala soa adat* (traditional) and five *kepala soa perintah* (government). The former will take care of *adat* affairs, while the latter will be involved in government affairs. In this way, both *adat* and government sides are involved in the decision-making process. The village head is to inaugurate the officials and have their positions acknowledged through an official decree from the municipal government in Ambon.

Dusun Toisapu will be represented in the Hutumuri LMD by the *dusun* head, Poli Thenu. Unlike the village head in Hutumuri, Thenu has a highly legitimate position in his *dusun*. He takes care of the village in such a way that people feel included; they, therefore, trust him to represent their interests.

15.2.2 Village organizations in Hutumuri

Most village organizations are based in Hutumuri. The Protestant church in Hutumuri was established by the Dutch in 1830. In 1997, the congregation consisted of 1,884 people. There is a close working relationship between the church and the village government. Important announcements from the government are made after the Sunday service. Sometimes instead of bible reading during an in-house service, there are lectures about agriculture, improving family income, health, etc. The church also works together with the village government to maintain a social organization called “Muhabet” of which Hutumuri has five.

People have confidence in the church because it has a more solid structure and is more accountable than the village government. Also, the government development programs are developed without involvement of the people, and therefore, the more participatory church programs are preferred. The church programs include spiritual empowerment, environmental programs (cleaning up places containing potential diseases), economic programs (development of clove cultivation), and social services (yearly gifts to elders and low-income families). The church officials are responsible for the implementation of the programs.

Carolina Souhuwat-Thenu chairs the *Pelwata* in Hutumuri, which aims to “unite and nurture women as wives and mothers in relation to their responsibility in the family life, to the mission of God in the world, and to village development.” Membership is relatively low (154) because for many people, the economic burdens are too heavy (they have to wear special clothes to the meetings etc.). In 1984, when the church opened its branch in Toisapu, a church youth wing was established. Under the supervision of Jakob Waas, the 40 members develop spiritual and social skills that will help them to become leaders.

³ The RT groups consist of several neighborhood households. It is the lowest level in the government structure.

The PKK in Hutumuri was established in 1984. The majority of PKK members are farmers' wives, with very few teachers and wives of civil servants. The main activities of PKK are gardening, skills training, trade and sports. Income is derived from the sale of vegetables and each unit had an ARISAN savings program. However, the PKK has been dormant since the previous village head passed away. The wife of the current village head has health problems and the members feel uncomfortable about initiating their own activities without her because "they honor the wife of the village head as their leader."

The KUD in Hutumuri was established in 1988, but really developed when in 1992, an asphalt road was opened. The KUD in Hutumuri is successful and was recognized as the best KUD in Maluku in 1997⁴. The KUD trades in cloves and nutmegs; it operates a shop, a minibus, a coconut and sago grinder, it has a credit and savings system, is involved in gasoline retail and processes bills for the Electricity Company. A fishery unit is to be started in February 1998. The KUD officials and 18 workers are paid a monthly salary of Rp100,000 (USD40, early 1997 exchange rate) plus a share from the annual profit. The annual profit is divided into three parts: 5% for officials, 5% for workers (through the manager) and the rest for the members. Besides, the members get cheaper goods from the KUD shop and have access to loans and credit. The membership fee is Rp10,000 and compulsory savings are Rp500/month. Although the KUD is doing very well, the members feel that they have few benefits. They feel that most of the profits are for the officials and workers of the KUD. The low clove prices paid to producers, for example, were beneficial for the KUD, but the revenues were not reflected in the annual share of Rp10,000 that the members received.

In 1992, a group of fishers in Hutumuri received a fishing boat and net (purse seine) from the Provincial Fishery Department. The KUD provided the capital (Rp11 million or nearly USD5,000, 1996 exchange rate) for the operational cost of the enterprise. However, as of 1996, the fishers were not able to pay the money back. They decided to return the boat and fishing net to the KUD as payment. Now the KUD plans to hire the fishers as KUD workers (to run the fishing enterprise) to assure that the fishers will not lose their jobs. This plan will be discussed in the annual membership meeting in February 1998.

15.2.3 Village organizations in Toisapu

Several church organizations, Takesra, and IDT are represented in Toisapu.

For the IDT program, each village receives a Rp20 million loan (\pm USD8,700, 1996 exchange rate) from the government which may be paid back without interest. In Hutumuri, there are three IDT groups of which one is in *dusun* Toisapu. In 1996, the 32 members received a Rp6.5 million fund to be used to grow pigs, chickens, peanuts, yam, etc. There was a suggestion for a fishery enterprise, but because all members are farmers, the idea was turned down. Within the year, the individual loans of Rp200,000 have to be repaid so that a new, larger enterprise can be started.

In 1996, the Takesra savings group "Lansat" was established in Toisapu as a government initiative by the Ambon branch of the National Coordinating Agency for Family Planning (BKKBN). The members are women (farmers) with a low income. The members save Rp1,000 each month, and with an additional Rp200,000 government loan, they will start an enterprise. The current group has five Ambonese and six Butonese members. Beside the Lansat, two new Takesra groups have just been established, but they are not yet active.

⁴ In 1997, the manager of KUD Hutumuri represented Maluku during the celebration of the KUD anniversary in Jakarta (a photograph on the wall shows him shaking hands with President Suharto).

Besides these programs, the head of RT II in Toisapu initiated some programs. His main task is to take care of the 43 households in his area. He acts as the mediator between the government and the people. Besides, he stimulates people to cultivate animals or productive plants in their yards, and initiated a family savings program. A previous activity is to clean up public facilities.

15.2.4 Role of women

Women in Hutumuri are involved in both village and church activities. Most women sell garden crops and a few (± 10) trade in fish. Women are also active in shellfish gathering for household consumption.

Amongst themselves, women do discuss issues of interest, such as the rise in school fees. Apparently, the women can express their opinion in church meetings, although it is usually the secretary who voices the women's concerns. In meetings at the (sub-) village level, women are represented by church members.

Although women play an important role in the fishery and fish trade, meetings on fishery related issues are not attended by women. They are not directly involved in decision-making in the village. Of the fishers in our sample, 17% considered women to be completely outside of decision-making processes. However, during other interviews, women did express a strong preference to be involved in decision-making.

15.2.5 Profile of fishers

The average age of the fishers in our sample was 47 (age range 29-85), and 51% were under 45 years old. Two women were interviewed. Of all the respondents, 77% have only elementary education. The fishers have, on an average, 6.5 household members. Children who have left the village have gone to work, school, or marriage.

Hutumuri is not a typical fishing village; the original inhabitants are farmers. Most fishing is done by Butonese fishers who have immigrated into the area. Of our 30-fisher sample, 60% were born in Hutumuri, and most of the other 40% of the fishers were Butonese. Only 7% of the fishers were related to a founding family or locally important clan.

Many fishers are landowners (73%), but fishing was the primary source of income for most of them (also 73%). Fishing is the second largest source of income for a further 23%. On an average, 64% of family income is from fishing, while 67% of the fishers in our sample said they covered daily needs from fishing alone. Only 14% of the households had an externally derived income, but the average income from these external sources was Rp1,585,000 per year (USD634, early 1997 rate), which is high compared to the other villages. Other sources of income were diverse.

The average time the men have spent in the fishery was 28 years. Most fishers spent 4-6 hours per day at sea. Compared to the other villages, this was relatively short.

A high number of fishers (25) expressed great satisfaction in their work. "It is my hobby" and "Fishing suits my talents" were common comments. They also noted that fishing provided the family with an income, and that the profits were good. Only five fishers would change their job if they could, if it paid better, and was less tiring. However, only a small number (7%) wants their children to be fishers; 23% wants them to be government staff but the largest number wants them to be wage workers or professionals (i.e., "other" category).

Over half of the fishers (59%) had permanent housing (cement with zinc roof) and 54% had TV sets. The economic indicator is made up of adding scores for land ownership, boat type, house and gear. Overall average economic score for 27 villages was 8.6, SE=0.10. For Hutumuri-Toisapu, the indicator was 9.7 with a standard error of 0.43 (Appendix 2). Factoring in TV ownership (Appendix 3), the score was 10.4, the highest of all the case study sites. However, despite their apparent high economic scores, Hutumuri fishers were relatively dissatisfied with their level of well-being and pessimistic about the future.

15.3 Market Attributes

Artisanal fishers in Toisapu-Hutumuri sell their catch through their wives who act as small fish traders. More than half of the fish sales are sold directly to local or city consumers. Fishers can also decide to sell their fish to small vendors (20%) or through an auctioneer (*borok*) (27%). Occasionally, the fisher will take his catch directly to a retailer in Ambon.

On an average, 21% of the fish caught are eaten by the family. Three of the fishers do not eat any of the fish they catch, while none eat more than half of their catch. Marketing is never a problem as fish are always sold out. Usually fish are sold fresh, but the fish that are caught at night are smoked and sold the next day.

15.3.1 Local fish trade

Compared to the other villages, not as many people have picked up trade. Most do some buying and selling as a side activity to make some extra money for education, clothes etc. This is probably related to the fact that trade was only stimulated when the transport system from Toisapu-Hutumuri to the city of Ambon was improved. Toisapu is now a regional landing place and buzzing with activities. Traders come from all over the Lease Islands and Ambon to either sell or buy fish. When fish are abundant at the Ambon market, the traders will take the fish to Hutumuri to sell.

The fishers' wives sell their fish locally or take them to the Ambon or Passo markets. The key factor in choosing the point of sale is the price they get for the fish, which in most cases (67%) is set by the fisher or his wife. Fish prices fluctuate every day, depending on the weather conditions, demand, supply etc. The women get information about prices from other fish traders in Toisapu or Ambon. There is no credit system and the fish are paid for in cash.

Between the fishers and the female fish vendors, there are two types of agreements. If the fish trader is an outsider, he or she has to pay for the fish right away, but if it is somebody from the village, the fish trader can take the fish, sell them and pay the fisher afterwards. This relation is based on trust and interdependency. If there is any sign of cheating on either side, the fishers will sell their fish to another trader or the female fish trader will buy her fish from somebody else.

15.3.2 Commercial fish trade

The price that the traders get at the Ambon market depends largely on supply and demand: when fish are scarce, the price increases. It is the market auctioneers who set the price each day.

Hand line fishers often buy baitfish directly from the lift nets. In some cases, the lift net operators agree on a price among themselves and ignore the market price.

Trade in fish is not formally arranged. The Hutumuri KUD is not involved in the fish trade, and neither the fishers nor the traders are well coordinated. The fishery is individually-oriented and as a result, the fishers have a weak market position and the market is not managed for their benefit.

15.4 Community Organizational and Institutional Arrangements

Hutumuri is a non-*sasi* village highly dependent on agriculture. Fishery has never been the main occupation of the original residents. Neither *sasi* nor any other fisheries regulations have ever been developed. The village government is said to have a rather weak role with regard to fisheries management. There is no *kewang* to enforce regulations if there were any, but the Hutumuri people do respect the *kewang* and *adat* in other villages.

Since there is no *sasi*, fishers from outside can freely fish in Hutumuri's waters; they only need a license from the Provincial Fishery Agency. This is to the great dismay of the small-scale fishers in Hutumuri who have a hard time to catch enough fish as it is. Fishers are aware of the destruction outside fishers cause and the pressure they put on the marine resources. At one point, the fishers seem to have had some regulations to limit the fishery to let the stocks grow, but these rules were not respected.

15.4.1 Fisheries regulations

The few agreements that the village does have concern lift nets. Lift net owners are required to make a "voluntary" contribution to the village in order to fish. Usually they will donate a part of the catch, and the village government will ensure that the total value will be around Rp100,000 a year (\pm USD40, 1996 exchange rate). Officially, the village government could never ask for a fee, but if the lift net fishers neglect to pay, they would face negative consequences at the hands of local fishers. In exchange for their contribution, they are allowed to fish and get supplies (e.g., drinking water) from the village. Unlike in other villages, there are no restrictions on mesh size "because in Hutumuri people only catch big fish."

Except for the payments made by lift net owners, there are no parts of the sea granted to outsiders, that is to say, by the local village government. Official permits are arranged at higher government levels. When asked if resource harvest rights should be sold or rented to outsiders, 67% of the respondents disagreed.

15.4.2 The players

As in Seri, the fishery in Hutumuri is for a large part governed by market mechanisms and trade relationships. Hutumuri is an important market place and traders and commodities go in and out. Small-scale fishers sell their catches through various channels, but primarily through female fish vendors. Commercial fishers work through auctioneers or bring their catch to the cold store. Between harvesters, traders, and sellers, there are long-term relationships based on trust.

The commercial fishery has a clear incentive to over-fish. Lift nets require large investments, and especially since the currency crisis, fishing efforts have increased. This tendency was aggravated by the drought of 1997, which forced many part-time farmers into the fishery.

Since there is no fisheries management in Toisapu-Hutumuri, there are no direct players besides the village head. He handles the informal arrangements, e.g., the collection of fees that is demanded from outside fishers and lift net owners. He is also the one who reports to the police if the formal fisheries laws are neglected, e.g., the prohibition on the use of bombs and other destructive gears.

There is no local enforcement mechanism, e.g., *kewang*, and the police play a marginal role in fisheries management.

The fishers, especially from the artisanal sector, have a clear idea about what causes the marine environment to decline. They suggest installing a management system before the fishery is depleted. The LMD of Hutumuri, however, is partly dysfunctional and the village head lacks the authority to be a main player in organizing the people towards management.

The influence of the church on people is significant. The church is a more stable institution, and people prefer the church programs to those of the government. Traditionally, however, the church has never been involved in resource management and although support of the church is indispensable, it is not likely that it will play an active role in future resource management.

15.4.3 Enforcement and compliance

There are few fisheries rules that are applied to the Hutumuri-Toisapu fishery. Compliance to these formal fisheries rules is perceived to be low. Management of fishery resources in Hutumuri can materialize only if the fishery laws can be enforced. Fishery problems, such as the use of bombs to catch fish, are usually reported by the head of the *dusun* to the Water Police Squad, and in a few cases, the police actually went after bombers (who came from outside Hutumuri). Generally, however, enforcement is difficult because local enforcement structures are not in place and offenders cannot be forced to pay.

The fact that the LMD is not fully functional at this stage does not help either. Many villagers regret this state of affairs, and feel that there should be some kind of fisheries management to protect the resource, as well as to improve people's livelihoods. There are ideas to coordinate fishers groups through the KUD in cooperation with BAPPEDA (Regional Development Planning Agency), have awareness training, and develop local fishing enterprises. In addition, the re-establishment of a *kewang* or comparable enforcement institution is necessary.

15.5 External Institutional and Organizational Arrangements

Political link with higher government bodies

National fishery laws are supposed to be delivered to the village by field extension officers. But if these officers do arrive in the village, they only come to have their logbooks signed, which the village head refuses to do.

Between 20-30 times a year, government officials from various institutions – mainly the district and municipal offices – visit the village. Hutumuri is involved in various fishery programs from the Fisheries Agency. The extension programs usually involve the Butonese because they are full-time fishers. The activities are under the jurisdiction of the village and *dusun* government.

The Fisheries Agency has advised the people, who are farming-oriented, to develop more fishing activities in Hutumuri. Together with the Department of Industry and Trade and the Department of Agriculture, the Fisheries Agency initiated training on fishery resources and operations, improved fishing methods, economic aspects of the fishery and regulations. Training was delivered by the KUD. There has been no training on fisheries management, and the higher government levels are not involved in enforcement. Navy or police patrol boats never visit Hutumuri.

Collaboration with other institutions

The village head frequently meets with government officials from various departments and the Ambon Municipality. He also attended a course and training about village government.

One *adat* custom is still operational. Among certain lineages of Hutumuri, Sirisori and Tamilow, there are strong traditional ties. Every five years, descendants of these clans meet to commemorate their *pela gandong* (lit. “united by ancestry”).

External economic influences

Because Hutumuri is near two important market places (Passo and the city of Ambon), local trade is significant. A good transport system enhanced market activities and many people have changed from fishing to the production of cash crops. The drop in clove prices and the drought in 1997/98 caused a great loss of crops and many people returned to the sea to fish in order to make ends meet.

Infrastructure and development projects

There are two industrial activities in the vicinity of *dusun* Toisapu, a fish processing plant and a paper mill, both in Batu Gong. The fish processing plant provides work for 21 people, and 8 women from Toisapu work in the paper mill.

The oceanology branch of the Indonesia Institute of Sciences (LIPI), in collaboration with the village government, has conducted a trial on the cultivation of top shells in Hutumuri. Juvenile shells were used to restock the coastal area. The people support the project. Two villagers (P. Lilipory, a police veteran, and B. Souhuwat) are paid Rp. 75,000 a month each to control the project facility and fish ponds.

15.6 Incentives to Cooperate

Acknowledgment of a problem

Fishers notice a clear deterioration of their natural resources. The fish and paper factories pollute the water in the bay, blast fishers destroy the corals and schools of fish and the use of FADs and lift nets depletes the baitfish stocks. The fishers have to go further out to fish. Their traditional methods, however, cannot compete with the modern fishing gears and the fishers cannot afford to buy modern gears themselves. Aquaculture is difficult because the natural conditions (winds and currents) are unfavorable. The small-scale fishers have now come to the conclusion that the fishery has to be managed.

Economic needs

Economic needs, however, as a result of the drought at the end of 1997 that caused crops to fail, and the subsequent monetary crisis, forced people back into the fishery. Even people who never fished before joined the boats of the established fishers and learned “on the job”. Economic needs are an important incentive for over-fishing.

Stabilization of leadership

The village leader plans to use the re-institutionalization of *sasi* and *adat* institutions. This is partly to legitimize his position, partly to meet the villagers’ demands for stronger management. The position of the current village leader, however, is weak. The formal village government is not fully functional either. This situation is a strong disincentive to comply with, or support, local management.

Tradition

In the eyes of traditional leaders, Hutumuri is an *adat* village. After the formalization of the village government structure, the *adat* laws were not exercised consistently and as a result, the villagers have developed an indifferent attitude towards *adat*. The youths in Toisapu are involved in some *adat* activities like the “*cakalele*” dance, but the *adat* tradition has lost its significance for them. If *sasi* regulations for resource management are going to be re-established, they will only be respected and continued if they are designed in a way that is meaningful to the village youths and young fishers.

Role of the church

The influence of the church on people is significant. However, people are rather conservative, and sometimes it is hard to motivate people because they like to see results first before they start new activities. If the people see that a program has a positive effect, it will be an incentive for them to cooperate.

J. Istia, the church minister, explained that a strong leader has to be aware of the needs of the people, should be well educated and “live by example”. The current leadership, however, is weak and unstable. The church is a more stable institution, and because the people are more involved, they prefer the church programs to those of the government. It is thus important to involve the church in any resource management or livelihood development efforts.

15.7 Patterns of Interaction

Except for a concrete barrier built to protect the village shoreline from wave erosion, the village government has not yet coordinated any action to protect coastal resources. It claims to be helpless against the outside fishers who come from all over Indonesia, e.g., Madurese and Butonese fishers. They fish the Hutumuri waters right up to the shoreline, ignoring the 200 m zone off the shore line where no commercial fishing is allowed.

Fishers identify two major problems: the inability of village government to manage resources, and competition between local artisanal and large-scale commercial fishers. However, the fishers are not represented at government meetings.

The fishers, though, have ideas on how to overcome some of these problems. They have suggested the creation of a strong management system. If the village has a *kewang* with legal status, the village government could stop the bombing, use of cyanide and the pollution from the factories, which affect the fishery. Fishers would also like to see the small mesh nets regulated and suggest zoning the fishing grounds with one part for the lift nets, an open area where people could fish, and perhaps a zone for a fish nursery or aquaculture project. The fishers explained that these were their own plans and that the government had not yet been involved. They had had some meetings and the relationship between fishers and government is getting better, but the plans are in a preliminary stage.

At the same time, however, the village head told our research team about his plans to re-establish *sasi*. Apparently, there are some commercially interesting fish resources in Baguala Bay, e.g., top shells, which have to be protected from theft by outsiders. The village head plans to establish the *saniri negeri* (including the LMD, LKMD, and village leaders) and a *kewang*. He explained that the villagers will be consulted, but that resource management will be a government affair.

When it comes to trade, the fishers feel that they should cooperate more. Currently, every fisher is working individually and, therefore, they have a rather weak market position. The fishers would like government support to organize themselves. If the government would provide the capital for their businesses and subsidies to buy modern fishing gears, groups of about four fishers could be organized and have a boat, engine and gill net. The investment would be Rp10 million (USD4,000, early 1997 exchange rate), which they expect to be able to return after a year. Then they could work independently. The fishers would also like to have training and awareness programs.

15.8 Outcomes

15.8.1 Equity

1. Role of fishers in management

The role of fishers in management is not very high (5.5 on a scale of 10), and not changing over time. Opinions, however, were varied. According to some fishers in our sample, the village government has a decisive role in determining whether and which fishers participate. They felt that education has made people more capable of joining the discussions on fisheries management and that they should be permitted to participate.

When asked about power-sharing, 53% thought the government had most or total responsibility for fisheries management. Seventeen percent thought the people shared responsibility equally with the government, and 30% saw the community as having more responsibility.

2. Access to marine resources

The fishers' access to marine resources has significantly declined compared to the past and the fishers expect more restrictions in future. Access has been influenced by government interventions, the need for permits, and tightening of rules. What rules these are, is not clear. Thirty-seven fishers expressed a preference to change the rules.

3. Fair distribution of fishing gears

Distribution of means of production is seen to be significantly fairer now than in the past, and this is expected to continue to improve. However, it is more likely that it is the result of a general increase in fishing gears, than a change in distribution. Economic needs, competition and education pushed people to exert more personal effort to make a living. More people went to the sea, and purchased gears, and thus the total capital investment increased. More people have fishing gears now, but distribution depends very much on the extent to which fishers are able to compete and on how much effort they are willing to put in.

4. Economic equality

When asked about the level of economic disparities, fishers reported that conditions had not changed significantly. Future change is also not expected. Equality is stimulated through the establishment of fisher groups and a general increase in income in the village. Factors that affect economic disparities in a negative way are: 1) the reduction in clove prices, 2) differences in education, 3) differences in personal efforts, 4) availability of capital, 5) personal motivation, 6) increasing competition, and 7) access to government programs.

15.8.2 Efficiency

5. Communal decision-making

Partnership in decision-making is also limited, and has not changed over time. The majority of the respondents felt that the style of decision-making in Toisapu-Hutumuri is a process of common or majority agreement. Others felt that most decisions are made by the village head, with or without the village government staff. However, education has made people more aware and these fishers feel they want to be involved. They agreed that all stakeholders should be involved in decision-making. Of the fishers, 87% actually felt that local groups had a role in decision-making, but only 17% felt that outsiders were involved.

6. Ease of entry

Entry into the fishery is significantly harder (23% change) due to rising costs that fishers expect will increase in the future. Although the general tendency for poor farmers is to start fishing, one fisher stated that "although fish are still abundant, the number of fishers decreases because of high costs of fishing." Toisapu-Hutumuri fishers complained about the increasing costs of gears and maintenance. Fees and increasing fuel costs (due to the longer distances to the fishing grounds) have also made fishing more expensive.

7. Control over access to the fishery

Control over access to the fishery is seen to be the same as in the past, but again perceptions vary greatly. It must be noted that the question was interpreted as "the ability of the government to limit access of outsiders to resources", and since the village government has no role in enforcement and neither are there "security officials" or a *kewang* to take this role, control is minimal. On the other hand, there were fishers who stated that personal awareness of people and supervision by the government positively influenced control.

8. Compliance

Currently, compliance is seen to be 16% lower now than in the past. It was explained that compliance decreased due to a weak government leader, the loss of *adat*, inadequate education, increased economic needs and generally less control over the fishery. Although there appear to be no fisheries rules besides the national fisheries law and the obligatory fees paid to the village government by lift net owners, people believe compliance to fisheries rules will decline further. When asked if it was acceptable for a fisher to sometimes bend or try to break the rules, only 13% agreed.

A small group argued that increasing awareness, control and sanctions have resulted in higher compliance.

15.8.3 Social sustainability

9. Family well-being

Family well-being has not changed (on an average) and there is no change expected in the future. Answers, however, were varied. People who saw their well-being decline, argued that more effort had to be made to get money. They explained that economic needs increased, money became more important and people now have more expenses. Meanwhile the clove price has dropped. Others noted an increase in well-being and said it was a result of increased efforts, participation in development programs and education.

10. Income

With regard to their income, the fishers reported a significant average increase of 14% and they expect it to rise significantly in the future. A third of the respondents explained that although the fish catches decreased, the high prices paid for the fish compensated for the loss. Other factors that positively influence a person's income are a favorable marketing position, the use of modern gears, better transport, and increased efforts.

Three people, on the other hand, felt their income had declined. Their catches decreased since the water had become polluted, competition was increasing, and they were getting older so they could not work as hard anymore.

11. Tradition of collective action

Past performance in terms of collective action was rated high (8-10 on the ladder scale). This was attributed to education, the village government, tradition and social bonds. Some customary *adat* activities, like the maintenance of the *Baileo* (the traditional community house), are still carried out by villagers. However, individualism and the payment system have undermined collective action significantly. Communal activities in the village decreased 16% compared to the past and are expected to drop on an average 10% in future.

12. Discussion of village issues

Discussion of issues has not changed dramatically over time.

13. Harmony

Harmony in the community is significantly less than in the past, and further deterioration is expected. Many conflicts are local and concern the forest-gardens. As in Seri, drinking is a major problem and was noted by nearly half of the respondents. The reasons for alcohol abuse and the general increase in conflicts are, according to the respondents: 1) unemployment, 2) low consciousness as a result of little education, 3) a lack of government control, 4) conditions in the city, 5) economic demands, and 6) external influences.

15.8.4 Biological sustainability

14. State of the resource

The state of the resource has deteriorated dramatically over the past 15 years (down 37%) and further decline is expected in the future (21%). The reasons for this decline are given in Section 15.1.

15. Fish catches

Fish catches have also declined dramatically (down 35%). Certain fish species have become rare or seem to have disappeared. Fishers have to go further out to maintain their catches. Currently, the high prices make up for the lost quantity, but they expected the situation to deteriorate further in the future (21%).

15.9 Synthesis

The political situation in Hutumuri is a typical example of confusion caused by the introduction of the new formal village structure. The village government faces the dilemma of whether to govern the village according to traditional *adat*, or through the formal laws. As they see it, the *adat* law acknowledges the traditional social structures, clan relations and the function of *adat* institutions like *kapitan*, *kepala soa* and *raja*. The new national law, on the other hand, emphasizes the importance of institutional structures like the LMD and the LKMD.

If Hutumuri follows the national law and establish the official units under the Municipality of Ambon, the *adat* institutions would become redundant. But the villagers believe that only when *adat* laws are practiced correctly, the village will be prosperous, so they object to the abolishment of *adat* institutions. Therefore, the formation of the LMD in Hutumuri would actually be only to accommodate the government regulations.

The current village head owes his position to the new government structure because he is not from the traditional *raja* line and, therefore, not legitimate in the eyes of the villagers. His lack of management skills and failure to install active government and enforcement institutions have further undermined his position.

These issues have become critical now that the environmental situation, and therewith the well-being of the villagers, are deteriorating. The fishers in Hutumuri-Toisapu are educated, aware and more critical than in most other villages. The fishers love their profession – “it is in our blood” – and they see their livelihood threatened by industrial activities and large-scale fishing. The idea that it is the outsiders who benefit from their resources is strongly rooted in the fishers’ heads.

Table 15.2. Results of the performance analysis in Hutumuri-Toisapu. n=30 heads of fishing households. ns=trend not significant; *= $p<0.05$, **= $p<0.01$, *= $p<0.001$.**

Indicator	Average current condition on scale of 1-10	Average change through time (statistical significance)		Average future expected change (statistical significance)	
Equity					
1. Role of fishers in management	5.50	-0.6333ns	-6%	-0.2333ns	-2%
2. Access to marine resources	8.30	-0.8667**	-9%	-0.9000**	-9%
3. Fair distribution of fishing gears	7.10	1.7333***	+17%	0.9667**	+10%
4. Economic equality	6.57	0.3667ns	+4%	0.3333ns	+3%
Efficiency					
5. Communal decision-making	6.30	0.4000ns	+4%	0.1000ns	+1%
6. Ease of entry into the fishery	6.33	-2.2667***	-23%	-1.0667***	-11%
7. Control over access to fishery	6.43	-0.4000ns	-4%	-0.0666ns	-0.7%
8. Compliance with fishery rules	6.63	-1.6333***	-16%	-1.3333***	-13%
Social Sustainability					
9. Family well-being	6.20	-0.8000ns	-8%	-0.6000ns	-6%
10. Income	6.80	1.4333**	+14%	0.7333*	+7%
11. Tradition of collective action	6.37	-1.6000**	-16%	-1.0000**	-10%
12. Discussion of village issues	7.30	-0.5000ns	-5%	-0.4000ns	-4%
13. Community harmony	5.70	-2.2333***	-22%	-0.9333***	-9%
Biological sustainability					
14. Marine resource health	5.00	-3.7000***	-37%	-2.0667***	-21%
15. Fish catch	5.27	-3.5333***	-35%	-2.1333***	-21%

Most Hutumuri-Toisapu villagers are originally farmers but their increasing dependency on the fishery due to the drop in clove prices, the drought and current economic crisis, brings these issues clearly to light. The entrance of Baguala Bay appears blocked with lift nets and few are owned by locals. The fishers are not able to compete with urban entrepreneurs because they lack capital (a lift net costs over a Rp100 million or \pm USD35,000, 1997 exchange rate). Locals have to fish outside the bay currently because it is polluted and because hardly any fish are able to actually get in when their way is physically blocked.

The economic position of Hutumuri-Toisapu fishers is, compared to other villages in central Maluku, relatively good. Hutumuri has the advantage that it is close to Passo and the city of Ambon where the main markets are. There is a good transportation system and it is easy for people to sell their products. A clear indicator was given by the church minister who explained that in most villages in Maluku, people donate only a few hundred rupiahs after the service, while in Hutumuri people can donate more than ten thousand rupiahs. However, although the economic indicator scores high, the present situation is deteriorating, and Hutumuri-Toisapu villagers are negative and have a bleak outlook on the future.

However, local fishers have some ideas and initiatives to improve the situation. They want to establish a management system and strengthen their market position by working through the village cooperative (KUD). They organized meetings with the village head to discuss the possibility of zoning the fishing grounds into parts for local fishers, outsiders and aquaculture as well indicating some otherwise restricted area. The village head grasps this opportunity to re-institutionalize *adat* institutions such as the *kewang*. He also wants to reorganize the village government in such a way that the *adat* positions are represented and functional. This works

both ways: first, the village would have a regulatory system and an institution that enforces the rules, while at the same time, the village head would strengthen his own position.

The Protestant church in Hutumuri has a strong influence on the people, especially since the village government has become unstable. Still, the relationship between the church and the village government is tight: the government uses the church meetings to publicize important information, and the church is represented in the village government.

In the process of formalizing the traditional village institutions, it is essential to involve the church. It can play a major role in the education of the people and in the decision-making process in the village. The church programs that improve the livelihood of people can support future management efforts in the bay.

Chapter 16

Comparative Analysis of Case Study Sites

16.1 Introduction

This chapter is a comparative analysis of the six case study villages: Nolloth and Haruku with a strong *sasi* institution, Tuhaha and Hulaliu where the *sasi* institution is dysfunctional and was lost in living memory, and Seri and Hutumuri-Toisapu, two villages that never had *sasi* or lost it a long time ago. Contextual variables that are compared among the villages are classified as biological and technical, socio-economic, institutional and organizational, and external. Fisher attitudes and performance indicators (e.g., efficiency, equity and sustainability) in the villages are also compared. The significant relationships between contextual variables, attitudes and the performance indicators are then investigated. This enables us to identify some factors that have an impact on coastal management in central Maluku fishing villages. Detailed demographic information of the six case study villages is presented in the individual case studies and in Appendix 3.

16.2 Comparison of Contextual Attributes of Case Study Sites

Biological and technical attributes of the case study villages were largely comparable (Table 16.1). Hulaliu and Hutumuri, being more focused on exploitation of land resources, were less dependent on fisheries. The village territories were physically similar, the main difference being the degree of wave exposure in the marine territory. Tuhaha differs from the rest in being enclosed within a bay, whereas Nolloth, Seri and Hutumuri-Toisapu are fully wave-exposed. Haruku and Hulaliu are intermediate, as they face narrow straits rather than open sea.

Available fish resources are everywhere similar, but pelagic fish are particularly abundant off the coast of Seri. Both Seri and Hutumuri waters are dominated by the commercial baitfishery. In every village, most fishers are artisanal and small-scale and most use simple gears and do not own motorboats. Fishers with no gears or no boat work as crew on commercial vessels or participate in communal fishing activities. These fishers are most numerous in Nolloth and Haruku, least numerous in Hutumuri. There were no lift net owners in either Haruku or Nolloth. Top shells and sea cucumbers appear to be only available in guarded *sasi* areas.

In their socio-economic and market attributes, the villages are also rather similar (Table 16.2). Of interest is that most villages in central Maluku define their marine territories as extending only to the edge of the fringing coral reef. In Tuhaha, however, the village claims a large area in Tuhaha Bay, while Seri claims an even larger part of the sea. Ownership, or at least the right to collect access fees, is applied for deep sea waters i.e., as far out to sea as can be seen. Three of these Christian villages had a minority of Muslim fishers, although we did not interview any of them in either Seri or Tuhaha. Fishers in the *sasi* villages were much more likely to be related to socially important clans (*soa besar*), compared to the fishers in more heterogeneous villages on Ambon Island (Seri and Hutumuri). The main distinguishing feature of the non-*sasi* villages was their proximity to the city of Ambon with its markets, employment opportunities and more advanced infrastructure. Of the villages on the smaller islands, Hulaliu was the most isolated.

Organizations at the village level were very similar (Table 16.3). Organized fishers groups were usually IDT and KEP, i.e., fisheries development aid groups. Haruku is distinctive in having both an environmental organization and a youth *kewang*, both spearheaded by traditional leaders. Village governments varied in that the LMD was more or less functional and incorporated *adat* leaders to different degrees. These differences were related to the legitimacy of the village head. Nolloth's leader, being a respected *raja*, was highly legitimate. In Haruku, conflict between the village head and *kewang* over mining reduced the leader's legitimacy. People even disputed whether he was properly from the *raja* line or not. The leaders of Haruku, Hulaliu and Tuhaha all have residences in Ambon and frequent absences from their villages cause political problems. Hulaliu's village head also faces serious problems from a contra group that actively seeks to undermine his position. In Hutumuri, the village head is not from the *raja* line and is considered to be an outsider with no legitimacy. The *dusun* head in Toisapu is, however, considered legitimate. Seri is similar in that the *dusun* head is of the *raja* clan but the village (*desa*) head is not. Traditional leaders in Seri are seeking to change their status from a *dusun* to a *desa*.

Table 16.1. Biological and technical attributes: comparative view of case study sites. Y=yes, N=no, L=limited, M=moderate, H=abundant, intense or highly applicable; nd=no data available.

BIOLOGICAL ATTRIBUTES	Marine sasi		Sasi being revived		No sasi	
	Nolloth (Desa)	Haruku (Desa)	Tuhaha (Desa)	Hulaliu (Desa)	Seri (Dusun)	Hutumuri (Desa) and Toisapu (Dusun)
Coastal village on small island	Y	Y	Y	Y	Y	Y
Two seasonal monsoons	Y	Y	Y	Y	Y	Y
Tropical climate with adequate rain	Y	Y	Y	Y	Y	Y
Level of marine stock exploitation	H	H	H	M	H	M
Fishery resources	Y	Y	Y	Y	Y	Y
Top shell and sea cucumber resources	M	nd	nd	nd	L	L
Wave-exposed shore	H	M	M	M	H	H
Coral reef in village territory	H	M	M	H	H	H
Sea grass bed in village territory	L	H	H	M	N	L
Fishers target reef fish	40%	56%	60%	90%	45%	60%
Fishers target pelagic fish	93%	86%	97%	67%	66%	78%
TECHNICAL ATTRIBUTES						
Fishers with no gears nor boats	<30%	<25%	<30%	<30%	<25%	0
Fishers with small boats without motors	63%	53%	63%	70%	79%	78%
Fishers with motorboats	7%	27%	7%	3%	0	11%
Number of hand liners and net fishers	H	H	H	H	H	H
Presence of lift net and FAD owners in village	N	N	L	L	M	H
Territory dominated by large-scale pelagic fishery	N	N	M	M	H	H

There were several important differences among villages in their external attributes (Table 16.4). Tourism is only a feature in Haruku, and this is largely restricted to visitors who come to the annual *sasi* ceremony. Haruku is also unique in having mining exploration activity in the watershed. Hutumuri suffers environmental impacts from external development, i.e., fish and plywood factories polluting Baguala Bay. None of the villages had significant interaction with provincial or national agencies.

Table 16.2. Comparison of socio-economic and market attributes in case study villages. Y=yes, N=no, L=limited, M=moderate, H=abundant, intense or highly applicable; nd=no data available. * Also see Tables 16.6 and 16.7.

SOCIO-ECONOMIC ATTRIBUTES	Marine sasi		Sasi being revived		No sasi	
	Nolloth (Desa)	Haruku (Desa)	Tuhaha (Desa)	Hulaliu (Desa)	Seri (Dusun)	Hutumuri (Desa) and Toisapu (Dusun)
Settled by Seram islanders	Y	Y	Y	Y	Y	Y
Founding families moved down from the hills during Dutch occupation	Y	Y	Y	Y	nd	nd
Large land territory	Y	Y	Y	Y	Y	Y
Marine territory to edge of fringing reef	Y	Y	N	Y	N	Y
Marine territory extends into Tuhaha Bay	N	N	Y	N	N	N
Marine territory extends out to sea	N	N	N	N	Y	N
Village population between 1,500 and 3,500	Y	Y	Y	Y	Y	Y
Percentage of population Christian, Ambonese	H	H	M	H	M	M
Fishers of Butonese origin at work in village	N	N	Y	N	Y	Y
Fishers related to traditional leaders	47%	73%	33%	53%	21%	7%
Most villagers fisher-farmers	Y	Y	Y	Y	Y	Y
Telephone link	N	N	N	N	N	Y
MARKET ATTRIBUTES						
% Income from fishing*	81%	66%	75%	56%	65%	64%
% Fishers serving on-island markets	89%	88%	86%	97%	97%	93%
% Fishers oriented to off-island or national markets	11%	12%	14%	3%	3%	7%
Large-scale commercial fishery	M	N	M	N	H	H
Local fish trade dominated by female retailers (<i>papalele</i>)	H	H	H	H	M	M
Artisanal and small-scale fish catch marketed through <i>boroks</i> (fish traders)	M	L	M	L	H	H
Direct road or regular boat access to Ambon city market	L	M	L	N	H	H

Table 16.3. Comparison of institutional and organizational attributes of case study villages. Y=yes, N=no, L=limited, M=moderate, H=abundant, intense or highly applicable; nd=no data available.

COMMUNITY INSTITUTIONAL AND ORGANIZATIONAL ATTRIBUTES	Marine sasi		Sasi being revived		No sasi	
	Nolloth (Desa)	Haruku (Desa)	Tuhaha (Desa)	Hulaliu (Desa)	Seri (Dusun)	Hutumuri (Desa) and Toisapu (Dusun)
Presence and activity of government development groups	H	M	H	M	H	M
Presence and activity of church groups	H	H	M	M	H	H
Organized fisher group(s)	Y	N	N	Y	Y	N
Environmental organization	N	Y	N	N	N	N
<i>Adat</i> organization (<i>kewang</i>)	Y	Y	N	N (+1998)	N	N
<i>Kewang</i> group for youths	N	Y	N	N	N	N
LMD functional (1997)	H	Y	Y	Y	H	N
Village leader from traditional <i>raja</i> clan	Y	Y	Y	Y	N (<i>desa</i>) Y (<i>dusun</i>)	N (<i>desa</i>) Y (<i>dusun</i>)
Integration of <i>adat</i> leaders into the LMD	H	H	Y	Y	Y (<i>dusun</i>)	N
Village leader has legitimacy for majority of villagers	H	N	Y	N	Y (<i>dusun</i>)	N (<i>desa</i>) Y (<i>dusun</i>)

Table 16.4. External attributes of case study villages. Y=yes, N=no, L=limited, M=moderate, H=abundant, intense or highly applicable; nd=no data available.

EXTERNAL ATTRIBUTES	Marine sasi		Sasi being revived		No sasi	
	Nolloth (Desa)	Haruku (Desa)	Tuhaha (Desa)	Hulaliu (Desa)	Seri (Dusun)	Hutumuri (Desa) and Toisapu (Dusun)
Minimal in- and out-migration	Y	Y	Y	Y	Y	Y
Tourism	N	L	N	N	N	N
Village involved in national development programs	Y	Y	Y	Y	Y	Y
Mining exploration	N	Y	N	N	N	N
Factory pollution in inshore waters	N	N	N	N	N	Y
Active interaction with provincial and national government agencies	N	N	N	N	N	N

16.3 Comparative Analysis of Institutional Arrangements for Fisheries Management

Every village is subject to national fisheries law, but because of poor communication from the national level, few villagers are aware of the content of these laws. For instance, the national regulation on the mesh size of lift nets is universally ignored. Many village leaders at least profess to support the ban on blast fishing and use of poisons, although only in Haruku and Nolloth are there written village regulations. Other types of formal and informal fisheries rules are mostly found in the *sasi* villages. *Sasi* institutions in every case are said to have the aim of protecting resources, but in three out of four cases, a key aspect of the institution is provision of resource rents to the government. Only in Haruku are catches directly shared out among community members (Table 16.5).

The church plays a role in supporting compliance to fisheries rules in Nolloth. In Nolloth, Haruku, Tuhaha and Hulaliu, the church controls village *sasi* on coconuts. In Seri, individuals may also ask the church to put *sasi* on individual trees or gardens.

Hutumuri, in particular, is totally open access, the only “rule” being in the form of a desire to collect fees from lift nets, in the absence of a collection mechanism. Management in Seri is similarly largely restricted to the collection of access fees from outsiders wishing to use nets or deploy lift nets and FADs in Seri waters. Tuhaha is unique in having areas of marine territory that are auctioned out and then patrolled and harvested by the auction winner. Depending on *sasi* status and proximity to a police station, enforcement is carried out by the *kewang*, village government, police or some combination. In no case is there proactive patrolling of village territories by police, navy or the Fisheries Agency, nor is there interaction with outside agencies with respect to fisheries management. Fisheries management is also never a major issue, largely because, with the exception of a few leaders in *sasi* villages who have been exposed to NGO ideas, villagers do not know what fisheries management might entail.

Table 16.5. Village by village comparison of marine resource management attributes. Brackets are used where proposed if sasi is revived. Y=yes, N=no, L=limited, M=moderate, H=abundant, intense or highly applicable; nd=no data available.

SASI ATTRIBUTES (current or proposed)	Marine sasi		Sasi being revived		No sasi	
	Nolloth (Desa)	Haruku (Desa)	Tuhaha (Desa)	Hulaliu (Desa)	Seri (Dusun)	Hutumuri (Desa) and Toisapu (Dusun)
<i>Sasi</i> status	H	H	L	L	N	N
<i>Sasi</i> area on coral reef	Y	N	N	(Y)	n/a	n/a
<i>Sasi</i> area on sea grass	N	Y	(Y)	(Y)	n/a	n/a
<i>Sasi</i> on top shells and sea cucumbers	Y	N	(Y)	(Y)	n/a	n/a
<i>Sasi</i> on pelagic fish	N	Y	(Y)	N	n/a	n/a
Village head/ <i>raja</i> active in <i>sasi</i> (practice or revival)	H	Y	H	H	n/a	n/a
<i>Tuan negeri, ketua adat</i> active in <i>sasi</i>) (practice or revival)	H	Y	Y	Y	n/a	n/a
Stated objective <i>sasi</i> laut (current or future) to protect resources	Y	Y	Y	Y	n/a	n/a
<i>Sasi</i> aims to share benefits equally	Y	H	N	N	n/a	n/a
<i>Sasi</i> to provide village government income	Y	N	Y	Y	n/a	n/a
<i>Sasi</i> provides direct benefits for all villagers	N	Y	N	N	n/a	n/a
<i>Sasi</i> area boundary clear, undisputed	Y	Y	Y	N	n/a	n/a
FISHERIES MANAGEMENT ATTRIBUTES						
Village subject to national laws	Y	Y	Y	Y	Y	Y
Fisheries agency in contact with village	N	N	Y	Y	N	N
Blast fishing and use of poisons formally banned by village rule	Y	Y	N	N	N	N
Blast fishing and use of poisons informally banned	N	N	N	Y	Y	N
<i>Lelang</i> (auction) of harvest rights	Y	N	Y	Y	N	N
Collection of other access fees or "voluntary contributions"	Y	N	Y	Y	Y	Y (attempted)
Formal (written) village restriction on use of nets, traps, mesh size	Y	Y	N	N	N	N
Proactive patrols by police, navy, fisheries agency	N	N	N	N	N	N
Enforcement by village head	Y	N	Y	(Y)	N	N
Enforcement by <i>kewang</i>	Y	Y	N	(Y)	N	N
Enforcement by <i>lelang</i> owners	N	N	Y	N	N	N
Enforcement with police assistance as requested	Y	N	Y	Y	N	N
Church support promotes compliance to fisheries rules	H	Y	N	N	N	N
Non-compliance for political reasons	N	Y	N	Y	N	N
Awareness of fisheries management activities, issues	Y (only village head)	Y (only <i>kewang</i>)	N	N	N	N
Active exchange of information with official fisheries management institutions	N	N	N	N	N	N

16.4 Comparison of Profiles and Job Satisfaction Among Fishers

16.4.1 Profile of fishers

The age of the respondents in Haruku and Tuhaha was significantly higher than in Seri (ANOVA and Duncan's test, $p < 0.05$). As a result, Seri fishers had the least experience in fishing, i.e., 19 years, compared to averages of 25-34 years in other villages (Table 16.6).

There are significant differences among the six villages in the percentage of catch eaten and also in the proportion of income derived from fishing. Nolloth fishers eat significantly less of their fish than fishers in Tuhaha, Hulaliu and Haruku (Duncan's test, $p < 0.05$), and also gain the largest percentage of their income from fishing (Table 16.2). Hulaliu fishers get significantly less of their income from fish compared to fishers in Tuhaha and Nolloth (Duncan's test, $p < 0.05$).

Table 16.6. Fishers' profile in case study villages.

Fishers' profile	Nolloth	Haruku	Tuhaha	Hulaliu	Seri	Hutumuri
Average years of education	6.2	7.1	7.2	7.6	7.1	7.2
Average age	47	50	53	47	42	47
Average years of experience in fishery	27	30	34	25	19	28
Average hours / day fishing	8.6	7.9	9.6	5.8	7.9	7.2
% of all recorded lift net owners	0%	0%	21%	21%	8%	50%
% catch eaten	13%	26%	23%	26%	22%	21%

Table 16.7. Percentage of fishers targeting inshore reef fish, offshore pelagic fish or both, in each village.

Target species	Nolloth	Haruku	Tuhaha	Hulaliu	Seri	Hutumuri
Reef fish only	7%	13%	3%	33%	24%	47%
Pelagic fish only	60%	43%	40%	10%	55%	40%
Both reef and pelagic fish	33%	43%	57%	57%	21%	17%

Most villages target the same set of species (see Appendix 3). In Nolloth, 60% of fishers target exclusively pelagic fish, while only 7% target only reef fish (Table 16.7). In Seri, a similar number targets pelagic fish, but a relatively large number of fishers (24%) targets reef fishes exclusively. This is possibly correlated with the relatively good state of the reefs in Southern Ambon.

Fishers in Nolloth and Tuhaha fished significantly (Duncan's test, $p = 0.03$) longer hours per day compared to those in Hulaliu. Hutumuri fishers also fished significantly less than Tuhaha fishers. Nolloth and Tuhaha are highly dependent on the fishery. Hulaliu, in contrast, has productive lands and is agriculture-oriented. In both Nolloth and Haruku, there has been a shift from farming to fishing due to increasing fish prices and the reduced price for cloves.

16.4.2 Economic status

On the overall economic score, Hutumuri scores significantly higher than Nolloth and Haruku, the *sasi* villages (Duncan's test, $p = 0.05$). The differences among the other villages are not statistically significant. Also if we consider accommodation, the *sasi* villages have poorer housing. Housing in Ambon is relatively good. The best housing is in Hulaliu (land-rich) and Seri (fish-rich). More fishers in Hulaliu and Haruku have an external income compared to those in Seri (Duncan's test, $p < 0.05$). However, the average amount of money annually transferred to Hulaliu and Haruku is relatively low (Table 16.8).

Table 16.8. Economic status of fishers in case study villages. Economic score=adding land ownership, house, boat, type of gears and TV (see Section 2.5.3). Minimal housing=made of light materials such as sago palm thatch; Low=made of light materials plus wood or lumber; Medium=combination of lumber and concrete with thatch roofing; High=made of concrete and metal roof.

	Nolloth	Haruku	Tuhaha	Hulaliu	Seri	Hutumuri
<i>Average Economic score</i>	8.47	8.70	9.27	9.10	8.81	10.35
<i>Standard deviation</i>	2.22	2.47	2.12	2.22	1.64	2.59
% of sample with external income	26.7	33.3	26.7	36.7	6.9	13.8
Average external income/year (in Rp)	263,750	343,500	596,250	485,730	775,000	1,585,000
Average external income/year (in USD, early 1997 exchange rate)	10,550	13,740	23,850	19,429	31,000	63,400
Housing (% of fishers in each category)						
<i>Minimal</i>	20%	17%	7%	3%	0%	3%
<i>Low</i>	20%	23%	7%	13%	7%	24%
<i>Medium</i>	13%	30%	30%	7%	21%	14%
<i>High</i>	47%	30%	56%	77%	72%	59%

Possible explanations for the lower economic score of the *sasi* villages include the limited access that fishers have over the resources, which reduces individual benefits. This is the case where the benefits from *sasi* are spent for village development in general (Nolloth) or re-distributed among all villagers (Haruku). Besides, the *sasi* villages have no large-scale fishing gears (lift nets and FADs) which provide high individual benefits but are intensive and generally seen as destructive. On the other hand, the difference may have more to do with access to markets (distance, infrastructure) or the relatively advanced age of the *sasi* village fishers (Table 16.2).

Hutumuri has no restrictions on the fishery at all. Our fishers' sample in Hutumuri included approximately half of all the lift net/FAD owners interviewed and this could explain why the average economic score is high.

16.4.3 Job satisfaction

In all villages, most fishers are highly satisfied with their jobs. The general positive answers included "I like my job", "It is in my blood" and "It is my hobby". Most fishers (87%) in the sample from the six villages report that they would still become fishers if they had their life to live over. However, most fishers acknowledged the dangers and insecurity associated with fishing. When asked if they would change occupations if an alternative were available, 36% said "yes". This varies a great deal across the villages, however, from a low of 20% in Hutumuri and Nolloth to a high of 54% in Seri (Table 16.9). The most likely reason to change was if they could find something more profitable. The differences between the six villages are statistically significant ($p < 0.02$).

Table 16.9. Job satisfaction in case study villages.

Job satisfaction (in % of fishers' sample)	Nolloth	Haruku	Tuhaha	Hulaliu	Seri	Hutumuri
Are satisfied with their job	86	83	97	80	86	89
Would change job if they could	20	43	31	50	54	20
Want job for children: in fishery as government official	18	7	7	10	4	8
	61	68	73	72	75	28

Finally, when asked what kind of job respondents would like for their children (Table 16.9), only 9% chose fishing, the majority (63%) selecting a “government job”. This finding is not surprising given the fact that most parents would like their children’s position to improve. What parents want for their child, however, may differ from what the child desires. Nolloth and Hutumuri fishers have the highest score for job satisfaction and the lowest tendency to change. However, most Hutumuri fishers do not want their children to enter the fishery, while many do in Nolloth. In Hutumuri, fishers mentioned various alternatives for their children e.g., trader, craftsman. That is the reason why the percentage who chose the option “government official” is relatively low. This reflects the key contextual difference between Hutumuri and the other villages: proximity to Ambon with its markets, jobs, and infrastructure.

16.5 Comparative Analysis of Fishers’ Attitudes Towards Fisheries Management

In every village, the majority of fishers said *sasi* is important but in Seri and Hutumuri, there was a sizeable minority who thought it unimportant (Figure 16.1). In every case, the majority of fishers disagreed with the sale of resource harvest rights to outsiders, and fishers in Hulaliu and Haruku were particularly firm. The majority of fishers in each village considered decision-making in their village to represent the wishes of all or a majority of people, although there were no mechanisms in practice for public consultation. In Tuhaha and Hulaliu, a relatively large number of fishers (i.e., respectively 40% and 37%) did think that decision-making was dominated by the interests of the village head and his LMD. It was clear in every village that participation of all stakeholders in decision-making was seen as desirable, but fishers also clearly perceived that women were marginalized, especially in the villages on Saparua and Haruku Islands. Perception of the relative roles of government and communities also varied, with more Ambon Island fishers, especially those in Seri, perceiving the community’s role as relatively important (Table 16.10).

Table 16.10. Village by village comparison of fishers’ attitudes towards marine resource management.

FISHERS’ ATTITUDES TO MARINE RESOURCE MANAGEMENT	Marine sasi		Sasi being revived		No sasi	
	Nolloth (Desa)	Haruku (Desa)	Tuhaha (Desa)	Hulaliu (Desa)	Seri (Dusun)	Hutumuri (Desa) and Toisapu (Dusun)
% fishers who agree with sale of marine harvest rights	43%	10%	24%	7%	41%	18%
% who see decision-making in village as being agreed by all or majority	78%	62%	60%	63%	69%	74%
% fishers who strongly agree that all stakeholders should have a role in decision-making	72%	77%	83%	83%	40%	48%
% who perceive female involvement in all decision-making	33%	13%	10%	7%	24%	26%
% who collaborate with fishers from outside the village	10%	3%	14%	13%	21%	17%
% who see the government as having a dominant role in management	60%	57%	64%	77%	34%	67%
% who see the community as having a dominant role in management	7%	0%	3%	0%	59%	30%

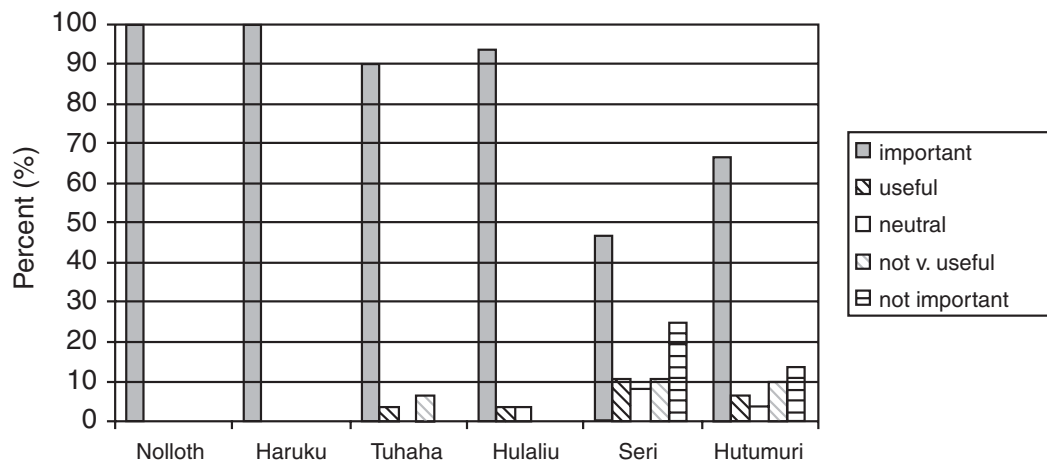


Figure 16.1. Fishers' opinions of sasi in case study villages.

16.6 Significant Differences in Performance Indicators and Correlations between Indicators and Other Factors

16.6.1 Equity

Role of fishers in management

Perceptions of fishers in the six villages varied significantly in some ways when analyzed by ANOVA (Table 16.11). Compared to the past, the role of the fishers in management has significantly increased in the *sasi* villages (Haruku and Nolloth), while in the other villages their role has decreased. This is a more dramatic difference than was detected in the comparison of *sasi* and non-*sasi* villages in the larger performance analysis (Chapter 8). Decline in the role of fishers is especially the case in Hulaliu. The role of fishers in management is perceived to be greater by fishers who are unwilling to change their job (Table 16.12). Other related factors are the fishers' attitudes towards changing the fisheries rules and bending the rules; fishers who are happy with the current rules and who feel comfortable asking for a dispensation to bend rules, feel they have a greater role in management. Finally, the perception on the role of fishers in management is positively related to the possession of more expensive gears, and negatively related to an elitist style of decision-making in the village.

Nolloth and Haruku fishers are generally more positive about their role in management, whereas Hulaliu and Hutumuri fishers are most negative (Table 16.11). Job satisfaction plays no role in the Nolloth score (Appendix 3), but Hulaliu fishers do have a greater tendency to change their job so this helps explain their low score. Neither Nolloth nor Haruku fishers possess expensive gear types; therefore, this does not explain their high scores. However, in interviews, fishers stated that richer fishers have more influence in decision-making, and this seems to be confirmed by this correlation between gear type and the way fishers perceive their role in management (Table 16.12).

Fishers who are happy with the existing rules have a more positive perception on their role in management. This holds true for Nolloth fishers of whom 57% do not want to change the rules. Their rules are *sasi*, so there is a linkage here. In Hulaliu, on the other hand, many fishers do want to change the rules (63%). These two villages are at the two opposite ends of the scale in terms of decision-making styles. Nolloth fishers have one of the highest proportions

of fishers who think the style of decision-making is an egalitarian process. Hulaliu fishers feel more dominated by the elite.

Hulaliu is the village where fishers also feel that issues are not openly discussed in the village (Table 16.25). The open discussion of village issues is correlated with the role of fishers in management (Pearson’s correlation, $p < 0.01$). Apparently, there is a serious lack of transparency, which has increased over the years, because Hulaliu fishers scored high for the role of fishers in management 15 years ago.

Rule benders are more positive about their role in management. In Nolloth, it was asked if they could seek a dispensation to fish in the *sasi* area. The pragmatic *sasi* fishers in Nolloth feel that they could do so and also feel that they have a bigger role in management. In Hutumuri, fishers have the opposite opinion. They strongly object to bending the rules, probably because they feel threatened by rule breakers who exploit their resources. Essentially, Hutumuri fishers want strictly enforced rules and good compliance. However, the village government is weak and unresponsive to demands from fishers to develop rules, so the fishers feel powerless in management.

Table 16.11. Differences among six villages in performance indicator “Role of fishers in management” as determined by ANOVA. Duncan’s test indicates ranking of the six villages (average descending from left to right). Lines connect villages that are not significantly different from one another. Hl=Hulaliu, Ht=Hutumuri, Tu=Tuhaha, Se=Seri, Ha=Haruku, No=Nolloth.

Role of fishers in management	Average for the six villages	Anova F	Probability	Duncan’spost-hoc test
Change over past 15 years	-0.08	3.369	0.006	Hl Ht Tu Se Ha No _____ _____ _____
Expected change (Prob.)	-0.22	3.990	0.002	Hl Tu Se Ht No Ha _____ _____ _____
Past condition	6.44	1.853	0.105	Ha Ht No Se Tu Hl _____ _____ _____
Present condition	6.35	6.215	<0.001	Ht Hl Ha Tu Se No _____ _____ _____
Future condition	6.13	5.213	<0.001	Hl Ht Tu Se Ha No _____ _____ _____

Nolloth has the highest score for the present condition. Haruku fishers had a low score in the past, but are positive for the future. Nolloth fishers are also positive about the involvement of fishers in the future. The expected increase in Haruku and Nolloth is significantly higher than that of Hulaliu. It is possible that the negative prospects of Hulaliu fishers are linked to the ongoing process of revitalization of *sasi* from which fishers feel largely excluded, and which, it is feared, will seriously affect the access of fishers to certain fishing grounds.

Access to marine resources

As was true for the larger sample of 28 villages (Chapter 8), the changes in the degree of access through time are negative (Table 16.13), and not significantly different from village to village. However, the scores of the individual villages for the degree of access in the past, present and future are significantly different (Table 16.13). In the past, Hutumuri and Seri had a high level of access to resources (open-access regime), while Hulaliu had the most restricted access followed by Tuhaha and Nolloth. At that time, all these villages had *sasi*. These three villages still perceive a low degree of access in comparison with Seri and Hutumuri. In Hulaliu and Tuhaha, there is no *sasi*, but access is limited for certain parts of the sea that are rented out. In the future, fishers in both Tuhaha and Hulaliu expect restricted access to resources and this coincides with the plans to revitalize *sasi*, which will include new access rules.

Table 16.12. Pearson's correlation coefficient for correlations between contextual variables and fishers' attitudes or performance indicators. Statistically significant correlations are marked by *= $p < 0.05$; **= $p < 0.01$, *= $p < 0.001$.**

Equity Indicators (change over past 15 years)	Member of fisher group	Positive opinion of <i>sasi</i>	Village has communal fishing rules changed	Villagers want fisheries	Acceptable to bend the rules	Elitist decision-making style in village
Role of fishers in management	-.001	+.015	+.138	-.243**	+.293**	-.169*
Access to marine resources	+.033	+.005	-.153*	+.064	-.194**	.203**
Fair distribution of fishing gears	+.094	-.139	+.287**	-.181*	+.151*	-.235**
Economic equality among villagers	+.156*	-.221**	-.182	-.036	+.068	-.185*
Equity Indicators	Villagers want stakeholder involvement in decision-making	Job satisfaction is high	Villagers willing to change jobs	Villagers own expensive gears	% income from fishing	Villagers have external income
Role of fishers in management	+.087	+.144	-.168*	+.161*	+.065	-.023
Access to marine resources	-.153*	+.059	+.069	-.064	-.009	+.190*
Fair distribution of fishing gears	+.050	+.270**	-.140	+.327**	-.042	-.322**
Economic equality among villagers	-.025	+.119	-.101	+.158*	-.016	-.010

A relatively positive perception of access is correlated with having an external income and being in a village that does not have much communal fishing activity (as in Seri and Hutumuri). Fishers who think their access is relatively greater also tend to have a rigid belief that rules should not be bent, as is commonly felt in Hutumuri. They also share a perception that village decision-making is dominated by leaders, as is the case in Haruku. Fishers with more access to resources also tend to have the feeling that decision-making does not necessarily need to be inclusive of all stakeholders (Table 16.12). Fishers holding this opinion were found in Seri, Hutumuri, Haruku and Tuhaha. Having more expensive gears is, interestingly, not positively correlated with perceived access.

The difference in current condition between Nolloth and Haruku, both *sasi* villages, is revealing. In Nolloth, where the rights to harvest are auctioned out, *sasi* is apparently perceived as a restriction. In Haruku, on the other hand, fishers do not see *sasi* as a major restriction, because they get to harvest directly. The harvest is communal and distributed amongst all villagers but this dilution of their access is not resented. In Seri and Hutumuri, access is also perceived to be relatively high. This conforms to the reality; there are few or no regulations in practice that limit access.

Table 16.13. Significant differences among villages in perception of access to marine resources as determined by ANOVA. Duncan's test indicates ranking of the six villages (average descending from left to right). Lines connect villages that are not significantly different from one another. Hl=Hulaliu, Ht=Hutumuri, Tu=Tuhaha, Se=Seri, Ha=Haruku, No=Nolloth.

Access	Overall average	Anova F	Prob.	Duncan's post-hoc test
Change over past 15 years	-1.34	0.921	0.469	Tu No Se Ha Hl Ht _____
Expected change	-1.00	1.201	0.311	Tu Se Hl Ht No Ha _____
Past condition	8.50	4.496	0.001	Hl Tu No Ha Se Ht _____ _____
Present condition	7.16	6.528	<0.001	Tu Hl No Ha Se Ht _____ _____
Future condition	6.16	3.807	0.003	Tu Hl No Se Ha Ht _____ _____

Distribution of fishing gears

The perceptions about the distribution of fishing gears through time are positive and not significantly different between the six villages (Table 16.14). This is the same result as was seen in the analysis of the larger database of 28 villages. The perception of the distribution of gears is more positive in fishers having higher job satisfaction, relatively expensive gear types, and who are happy with the fisheries rules (Table 16.12). It is also more positive in villages with communal fishing activities. The perception is more negative where fishers have an external income. Fishers who are in favor of bending rules have a more positive perception of the equity in the distribution of gears as do fishers who say that in their village, decision-making is by the majority.

Currently, the distribution is significantly fairer in Seri than in the other villages and they expect it to be even more so in the future. In this village, there has been a recent rapid expansion of the lift net and seiner baitfishery and associated infrastructure. Larger numbers of modern

Table 16.14. Differences among villages in perception of fairness of distribution of fishing gears, as determined by ANOVA. Duncan's test indicates ranking of the six villages (average descending from left to right). Lines connect villages that are not significantly different from one another. Hl=Hulaliu, Ht=Hutumuri, Tu=Tuhaha, Se=Seri, Ha=Haruku, No=Nolloth.

Distribution of gears	Average	Anova F	Prob.	Duncan's post-hoc test
Change over past 15 years	2.08	0.860	0.509	No Ht Ha Tu Hl Se _____
Expected change	0.63	0.922	0.468	Ha No Tu Hl Se Ht _____
Past condition	5.37	0.937	0.459	Hl Tu Ha Ht Se No _____ _____
Present condition	7.45	3.499	0.005	Ha Ht Tu Hl No Se _____ _____
Future condition	8.08	2.493	0.033	Ha Tu Hl Ht No Se _____ _____

gears, increased fishing efforts, and general improvement of people's income were reported by fishers. Seri fishers also have highest scores both for current income and degree of family well-being (Tables 16.21 and 16.23).

Economic equality

Disparities in income are not significantly different between the villages except for future expectations and future conditions (Table 16.15). As with the larger sample of 28 villages, there is no consistent relationship with *sasi* status. A perception of equality is higher amongst fishers who are members of a fishers' group (i.e., mostly IDT or KEP groups), fishers who have more expensive gear types, fishers who do not think *sasi* is important (mostly young fishers in Seri and Hutumuri), and fishers who believe that decision-making in their village is a process of majority or total agreement (Table 16.12). Village to village differences on opinion of *sasi* can be found in Figure 16.1.

Expected change is towards more equality in Hutumuri and Seri. In contrast, Tuhaha and Haruku expect decline. Currently, fishers in Haruku perceive the greatest disparity. Haruku has few fishers organized into groups and they do not own expensive gears (i.e., lift nets or FADs).

16.6.2 Efficiency

Communal decision-making

Compared to 15 years ago, partnership in fisheries rule design has decreased in Nolloth and Hulaliu; it remained static everywhere else (Table 16.16). As with the larger performance analysis, there is no clear division between the *sasi* and non-*sasi* villages. A higher level of communal decision-making is correlated with a high economic score, more expensive gear types and satisfaction with fishing rules as they are. The perception that decision-making is by elites is held more strongly by those experiencing a low level of communal decision-making (Table 16.17).

Table 16.15. Differences among villages in terms of perception of economic equality among villagers, as determined by ANOVA. Duncan's test indicates ranking of the six villages (average descending from left to right). Lines connect villages that are not significantly different from one another. Hl=Hulaliu, Ht=Hutumuri, Tu=Tuhaha, Se=Seri, Ha=Haruku, No=Nolloth.

Economic equality	Overall average	Anova F	Prob.	Duncan's post-hoc test
Change over past 15 years	-0.01	1.763	0.123	Ha No Tu Ht Hl Se _____
Expected change	-0.28	2.642	0.026	Tu Ha No Hl Se Ht _____
Past condition	6.59	1.625	0.156	Hu Ht Se Tu No Ha _____
Present condition	6.57	1.624	0.156	Ha Tu Ht Hu No Se _____
Future condition	6.29	2.611	0.026	Ha Tu No Hl Ht Se _____

Since Hutumuri has the highest economic score and the largest level of ownership of expensive gears, this may help explain their high score relative to the other villages. Hulaliu fishers are particularly dissatisfied with fishing rules and this appears to influence their perception on decision-making. The significant decrease Hulaliu fishers experienced may also be related to the decline of *sasi* and the implementation of the new village structure and elected leaders.

Hutumuri fishers also believe that decision-making in their village is by majority or total agreement. On the other hand, Hulaliu fishers think that decision-making is dominated by the elite. The only explanation for the relatively high score in Haruku is that it is a *sasi* village; none of the other factors can explain their positive perception! Hulaliu and Nolloth scored highest in the past. Currently, the situation in all villages is not significantly different and neither are future expectations.

Table 16.16. Perceived differences among villages in terms of ability in collective decision-making, as determined by ANOVA. Duncan’s test indicates ranking of the six villages (average descending from left to right). Lines connect villages that are not significantly different from one another. Hl=Hulaliu, Ht=Hutumuri, Tu=Tuhaha, Se=Seri, Ha=Haruku, No=Nolloth.

Decision-making	Overall average	Anova F	Prob.	Duncan’s post-hoc test
Change over past 15 years	- 0.41	2.987	0.013	Hl No Se Tu Ha Ht _____
Expected change	-0.32	2.148	0.062	Hl No Se Tu Ha Ht _____
Past condition	6.99	3.762	0.003	Ht Ha Se Tu No Hl _____
Present condition	6.58	0.985	0.428	Hl Ht Se Ha No Tu _____
Future condition	6.26	1.463	0.204	Hl No Se Ht Tu Ha _____

Ease of entry

There are no significant differences between the villages in the ease of entry into the fishery. All fishers perceive that fishing is getting more difficult to get into because of rising costs e.g., taxes, the need for better and more expensive gears, higher fuel costs related to the longer distances to good fishing-grounds, etc. This is consistent with the analysis performed on 28 villages. Fishers who are members of village development groups perceive more negative changes in the ease of entry, perhaps because they are older. Muslim fishers perceive entry into the fishery to be particularly difficult, whereas fishers with an external income perceive it to be less difficult (Table 16.17). A positive perception is correlated with a desire to change fisheries rules. The fishers who find it harder to enter (or stay in) the fishery are those who are less willing to bend the rules. Fishers who see entry into the fishery as being relatively easy also think that decision-making is elitist.

Table 16.17. Coefficients for correlations between contextual attributes, fishers' attitudes and performance indicators for efficiency. Significant correlations indicated with asterisks.

Efficiency Indicators	Member of village dev't group	Religion	Village has communal fishing	Villagers want fisheries rules changed	Acceptable to bend rules	Acceptable to sell harvest rights
Communal decision-making	+0.096	-.067	-.038	-.152*	+0.070	+0.087
Ease of entry into the fishery	-.200**	.153*	-.027	+.302**	-.325**	+0.120
Control over access to fishery	+0.108	+.027	+.197**	-.330**	+.401**	-.026
Compliance with rules	+0.095	+0.091	-.029	+.199**	-.001	+.231**

Table 16.17. continued

Efficiency Indicators	Elitist decision-making style in village	Villagers want stakeholder involvement in decision-making	Economic score	Villagers own more expensive gear type	Villagers have external income
Communal decision-making	-.182*	+0.012	+.210**	+.194**	+0.035
Ease of entry into the fishery	+.312**	-.034	-.096	-.127	+.190*
Control over access to fishery	-.183*	+.171*	+0.068	+.151*	-.099
Compliance with fishery rules	+.154*	-.294**	-.055	+0.010	+0.029

Currently, Hulaliu fishers perceive costs to be highest and Nolloth fishers, the lowest (Table 16.18). Nolloth fishers are generally happy with their fishery rules compared to Hulaliu fishers.

Table 16.18. Inter-village differences in perception of ease of entry into the fishery (i.e., negative change indicates increased costs and more difficult entry).

Ease of entry	Overall average	Anova F	Prob.	Duncan's post-hoc test
Change over past 15 years	-1.14	1.130	0.346	Ht Hl Se Ha Tu No
Expected change	-1.69	0.860	0.510	Se Hl Ha Ht No Tu
Past condition	8.35	0.899	0.483	Hl Se No Tu Ht Ha
Present condition	6.66	1.813	1.113	Hl Ht Se Tu Ha No
Future condition	5.52	1.359	0.242	Se Hl Ht Tu Ha No

Control over the fishery

Control of fishers over access to the fishery compared to 15 years ago increased significantly in Nolloth and Haruku, whilst in other villages it remained static (Table 16.19). In the past, the degree of control over the fishery was comparable for all villages. In Haruku and Nolloth, where fishers felt the increase in the control over resources, the *kewang* is controlling the resource. There was no significant difference amongst the villages.

Perceptions on control over access were related to gear type in that fishers with more expensive gears were more positive (Table 16.17). Fishers in villages having communal fishing activities are also more positive, whereas fishers seeking change in fisheries rules have more negative

perceptions of control. Fishers who perceived the most negative change in the level of control were those most adamant about not bending rules, those who felt that decision-making was by the majority and those who wanted inclusive decision-making.

Table 16.19. Village to village differences in perception of control over marine resources.

Control over fishery	Overall average	Anova F	Prob.	Duncan's post-hoc test
Change over past 15 years	0.53	1.876	0.101	Ht Hl Tu Se No Ha _____
Expected change	-0.03	2.878	0.016	Hl Tu Ht Ha Se No _____
Past condition	6.46	0.364	0.873	No Ha Tu Se Hl Ht _____
Present condition	6.99	2.361	0.042	Ht Tu Hu No Ha Se _____
Future condition	6.96	3.479	0.005	Hl Tu Ht Ha No Se _____ _____ _____

The current situation in Hutumuri is significantly different from Haruku and Seri where fishers feel there is control over the fishery, i.e., rules and regulations. However, in Seri there is no enforcement agent, making these replies curious. The *sasi* villages and Seri are most optimistic about the future and perceive an increase in control over the fishery by the government. In Haruku, fishers talked about the strong role of the *kewang* that enforces the rules, while in Seri, fishers referred to the village government. Fishers in the other villages, and especially in Hutumuri, complained about the village government and lack of both regulations and enforcers. In our eyes, an open-access system may seem favorable for the individual fishers, but apparently, the fishers think government control is important for the protection of the resources against outsiders¹.

In the future, Hulaliu fishers expect to lose control over access to resources. Apparently, fishers have little faith in the planned re-installation of *sasi*. This future expectation differs significantly from that of Seri, Nolloth and Haruku fishers who are relatively positive about the degree of control over the fishery. The fishers seem to relate their degree of control directly to the ability of the village government or *kewang* to enforce the regulations. In other words, the fishers feel that these institutions represent their interests. The finding of greater perceived control in the two *sasi* villages mirrors the result of the performance analysis performed in 28 villages.

Compliance

Compared to the past, Hulaliu, Tuhaha, Hutumuri and Haruku all perceive reductions in compliance, while Nolloth and Seri perceived compliance to be stable (Table 16.20). Perception

¹ According to Hardin (1968), on the short-term, fishers would have a natural preference for open access because it allows them to obtain maximum benefits from the resource. To avoid the tragedy of the commons, state or government, interference (i.e., rules, regulations and enforcement) is necessary to safeguard long-term benefits. Strikingly, in Maluku, open access is not valued by the fisher population and merely rated as a sign of a weak government which is unable to protect the resources against either over-exploitation, destruction, or outside fishers.

on the change in compliance was related to a fisher's desire to change rules (Table 16.17). Oddly, fishers who perceived the change in compliance to be least negative were those who wanted the rules to change. Another factor was the attitude towards the sale of harvest rights. Fishers with a negative perception of the change in compliance were those who most strongly disagreed with the sale of harvest rights to outsiders. Fishers recording the greatest reduction in compliance also tended to see decision-making as being by consensus or the majority, and also believed that all stakeholders should be involved in decision-making.

Over 40% of both Nolloth and Seri fishers favor selling harvest rights, while in Hulaliu 90% are against it. There is no apparent difference in the decision-making process that could explain their high scores, neither is there a difference amongst the villages in terms of the desirability of involvement in decision-making of all stakeholders. We are left with the fact that, in Nolloth, the key factor could be *sasi*. This conclusion is supported by the finding of greater compliance in *sasi* villages in the 28 village survey results.

In the past, compliance was highest in Hutumuri, Tuhaha, and Hulaliu (score >8), which are the villages where it has reduced most. The greatest reductions are in the villages where *sasi* was lost, i.e., Hulaliu and Tuhaha. In Hulaliu, compliance is also low because people neglect the regulations on blast fishing to express their dissatisfaction with the current village head. In Tuhaha, economic pressure or the lack of enforcement, or both, caused compliance to decline.

In Nolloth and Seri, where compliance is stable, the situation is different. Seri fishers explained that Seri has tighter rules, sanctions and control and the government plays an active role. In Nolloth, compliance was lower during the time of the former village head who is said to have used *sasi* for his personal benefits. But now with the new village head, the sanctions are severe and enforcement strict.

In Haruku, the current decline in compliance is influenced by conflicts between the village head and the *kewang*. Here also, the fishers who are against the current village head purposely neglect the rules. In the future, all villages expect compliance to decline, but Haruku, Nolloth and Seri fishers expect the least decline. In the *sasi* villages, an incentive for compliance is *adat* and enforcement. In Seri, the relative wealth could play a role.

Table 16.20. Differences in perception of compliance to fisheries rules.

Compliance	Overall average	Anova F	Prob.	Duncan's post-hoc test
Change over past 15 years	-0.96	7.283	<0.001	Hl Tu Ht Ha No Se _____
Expected change	-0.89	3.437	0.005	Tu Ht Hl Ha No Se _____
Past condition	7.70	3.097	0.011	Se No Ha Hu Tu Ht _____
Present condition	6.75	6.329	<0.001	Hl Tu Ht Ha No Se _____
Future condition	5.86	6.472	<0.001	Hl Tu Ht Ha No Se _____

All in all, the *sasi* villages (scoring 6-7 in the past) have remained most stable. In the future, all villages expect reduced compliance, but the villages that scored highest (Tuhaha, Hutumuri and Hulaliu) now score lowest and expect a further decrease in compliance. Nolloth, Seri and, to a lesser extent, Haruku fishers are most positive. Compliance, we can conclude, is directly linked to the presence of enforcement mechanisms and the appreciation that people have for the person in command of the village.

16.6.3 Social sustainability

Family well-being

In Hutumuri, Haruku, and Nolloth, family well-being has remained stable over the past 15 years, while in the other villages, well-being has increased (Table 16.21). As was true in the larger database, there is no clear-cut relationship with the presence or absence of *sasi*. The perception of family well-being was related to job satisfaction (Table 16.22). Fishers who were happy with their job thought their well-being had increased. Those involved with village development groups were also more positive. Interestingly, family well-being was not positively correlated with ownership of a motorboat, but it was related to the possession of expensive gears. The change in family well-being was more positive in villages which had communal fishing activities. Fishers who were willing to bend the rules perceived a greater increase.

Tuhaha, the village where fishers perceived the largest increase in family well-being, has also the highest score for the level of job satisfaction. Tuhaha has the largest number of fishers with no gear at all, while those in both Seri and Hulaliu have the largest number of hand liners. Seri and Hulaliu have the largest number of people who are members of a village organization. Hutumuri is significantly different from Tuhaha, Seri, and Hulaliu. It should be noted that Hutumuri had the highest score on family well-being in the past (score 7) which also makes the decline more apparent. In Hutumuri, there is the least communal fishing activity. Contrary to the general trend, it appears that the ownership of lift nets and other expensive gear has not contributed to their feeling of well-being. Hutumuri fishers are most adamantly against bending the rules, while the Hulaliu, Nolloth, and Tuhaha fishers are the most relaxed.

Table 16.21. Comparison of family well-being in case study villages.

Family well-being	Overall average	Anova F	Prob.	Duncan's post-hoc test
Change over past 15 years	0.80	2.724	0.021	Ht Ha No Hl Se Tu _____
Expected change	0.15	1.949	0.089	Ht No Se Hl Tu Ha _____
Past condition	6.17	1.547	0.178	Tu Ha Hl Se No Ht _____
Present condition	6.98	4.084	0.002	Ht Ha Tu No Hl Se _____ _____
Future condition	7.13	2.907	0.015	Ht No Ha Tu Hl Se _____ _____

Currently, Hulaliu and Seri perceive the highest level of family well-being (resp. 7.43 and 7.59) while Hutumuri and Haruku score significantly lower (score 6.20; $p < 0.002$). Generally, well-being is expected to increase (in Haruku) or remain stable, but Hutumuri fishers are most pessimistic.

Table 16.22. Factors correlated with social sustainability indicators. Significant correlations indicated with asterisks.

Social sustainability	Villagers have boats and motors	Villagers own more expensive gears	Villagers have external income	Years fishing	High job satisfaction	Acceptable to bend the rules	Elitist decision-making style
Tradition of collective action	-.011	+.029	-.008	+062	+.230**	+.082	.002
Family well-being	-.183*	+.163*	-.039	-.067	+.183*	+.288**	-.103
Income	-.111	+.043	-.177*	-.143	+.180*	+.162*	-.184*
Community harmony	-.038	-.041	+.026	-.053	-.063	-.037	.106
Discussion of village issues	-.034	+.168*	+.029	+.184*	+.090	+.095	-.094

Table 16.22. continued

Social sustainability	Community has management responsibility	Positive opinion of <i>sasi</i>	Village has communal fishing	Villagers want fisheries rules changed	Member of village organization	Age	Education
Tradition of collective action	-.032	+.155*	+.049	-.177*	-.047	.072	-.075
Family well-being	-.081	+.039	+.252**	-.082	+.219**	.018	-.018
Income	.206**	-.187*	+.123	-.059	+.175*	-.116	.108
Comm'ty harmony	-.137	+.157*	-.058	+.060	-.078	-.117	.173*
Discussion of village	-.008	+.163*	+.085	-.198**	+.061	.164*	-.112

Income

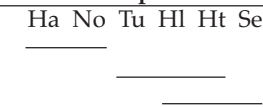
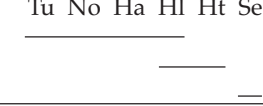
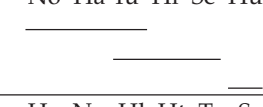
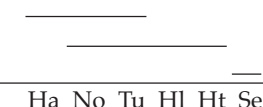
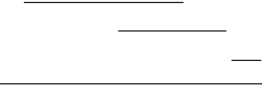
The changes in income over time are all significant (Table 16.23). Perception on change in income was positively related to job satisfaction and membership in organizations (Table 16.22). Fishers happy in their job and belonging to groups had a more positive perception. Where change in income was more negative, fishers were more likely to be receiving external income, believed strongly in the importance of *sasi*, and were less willing to bend rules. Fishers who were positive about change in income perceived decision-making in their village to be by consensus or by majority. They were also most likely to consider villagers as having the key responsibility in fisheries management. This last correlation helps to explain why Seri fishers have such a positive perception of income. Seri was the only village where more than half the fishers held this opinion, while in Haruku, no fishers shared this view. Nolloth was one of the three villages where fishers believed that the government held most or all management responsibility. It is difficult to imagine why these attitudes are related to perceived income.

Seri and Hutumuri fishers were least likely to receive external income. However, In terms of the amount of external income received per year, the two villages were on an average higher. Hutumuri fishers, as we know, are the least willing to bend the rules, but again, the relationship to income is obscure.

Compared to the past, the average income declined in Haruku and was static in Nolloth, Tuhaha, and Hulaliu. This is not surprising regarding the fact that the *sasi* villages did have a relatively high score in the past (7.2). In Hutumuri and Seri, where fishers noted an increase in income, the past score was lowest (5.6). The largest significant difference in changes in income is between the *sasi* villages and Seri. The difference with Hutumuri, Hulaliu, and Tuhaha is, although smaller, still significant. The decrease in the *sasi* villages also noted in the larger performance study (Chapter 8), may also be related to the collapse in clove prices or the fishers' ages.

At the moment, Seri fishers perceive the highest income (7.7) and, together with Hutumuri, they expect a further increase in the future. The *sasi* villages, together with Tuhaha and Hulaliu, are more negative about the future and expect no increase in income.

Table 16.23. Perceived differences in income in six villages.

Income	Overall average	Anova F	Prob.	Duncan's post-hoc test
Change over past 15 years	0.37	6.761	<0.001	Ha No Tu Hl Ht Se 
Expected change	0.12	4.293	0.001	Tu No Ha Hl Ht Se 
Past condition	6.36	4.548	0.001	No Ha Tu Hl Se Hu 
Present condition	6.73	5.806	<0.001	Ha No Hl Ht Tu Se 
Future condition	6.85	6.233	<0.001	Ha No Tu Hl Ht Se 

Tradition of collective action

All villages had a relatively high score for communal activities in the past (Table 16.24), and all villages, except Nolloth, perceived a decline. The difference between the villages is not significant. Change in the tradition of collective action was related to job satisfaction and opinion of *sasi*, in that fishers who were happy in their work and those who believed that *sasi* was important, had a more positive outlook (Table 16.22). This last correlation helps explain why the difference between *sasi* and non-*sasi* villages is significant in the larger (28 villages) performance study. Fishers who want a change in fisheries rules were the most negative regarding collective action.

With respect to the current level of communal activities Nolloth fishers score significantly higher (Duncan's test, $p < 0.020$) than those of Haruku, Hutumuri, and Seri and this trend is prolonged in the future. Haruku scores lowest (6.30), which reflects the political stress in the village. Financial interests, leadership, and loss of customs were mentioned as the main causes for decline.

All the villages, except Nolloth, expect a further decline. Seri fishers are significantly more negative (Duncan's test, $p < 0.013$) than Nolloth and Hulaliu fishers. The fishers noted modernization, individualism and competition as the main causes for the decline in communal action.

Table 16.24. Differences in tradition of collective action in case study villages.

Collective action	Overall average	Anova F	Prob.	Duncan's post-hoc test
Change over past 15 years	-1.56	0.992	0.424	Se Ha Hl Ht Tu No _____
Expected change	-0.96	1.671	0.144	Se Ht Tu Ha Hl No _____
Past condition	8.38	1.238	0.293	Ht Ha Tu No Se Hl _____
Present condition	6.82	2.756	0.020	Ha Ht Se Tu Hl No _____
Future condition	5.86	2.981	0.013	Se Ht Ha Tu Hl No _____ _____ _____

Discussion of village issues

Older fishers and fishers with longer experience in the fishery, and fishers who thought *sasi* was important, had a less negative perception of change (Table 16.22). Perceptions were also more positive when fishers had more expensive gears. Fishers wanting changes to fisheries rules had a more negative perception. Compared to the past, Nolloth and Hutumuri fishers noted no change in the discussion of village issues but all the other villages noted a decline, especially in Hulaliu (Table 16.25).

At the moment, Hulaliu and Haruku have the lowest score on discussion of village issues; Nolloth has the highest score. In Nolloth, most traditional structures are in practice through which the common villagers are represented and village issues discussed. Nolloth fishers are also happy with *sasi* and the existing rules, and they are older. Nolloth is politically the most stable village of the six. This allows the village leader to be more transparent compared to, for example, Hulaliu, where the village leader and his government have to operate carefully in order not to provoke the opposite parties in the village. This is also the case in Haruku. The only correlation from Table 16.22 that helps to explain the relatively negative perceptions of Hulaliu fishers, is that the Hulaliu fishers particularly want to change their fisheries rules.

Together with Nolloth and Hutumuri, Haruku fishers are optimistic about the future and they expect an improvement of open discussion in the village, which indicates that they perceive their political problems to be temporary. In all other villages, fishers expect a further decline. These results support the general conclusions of the larger performance analysis, i.e., that *sasi* villages have greater levels of discussion, at least in the absence of severe political stress.

Village harmony

All villages have a negative change in village harmony, except for Nolloth where it is stable (Table 16.26). The greatest decrease (most conflicts) is in Seri. The differences between the villages are significant in the Duncan's test, but not in the Anova. A negative perception of

change in harmony is related to a low level of formal education (Table 16.22). Education, however, does not explain the inter-village differences. Fishers who believe *sasi* is important are more positive about the change in community harmony. The main difference between Seri and Nolloth is in their opinion on *sasi* and, of course, in the very existence of the *sasi* institution. These results support the conclusion of the larger performance analysis, that harmony is greater in *sasi* villages.

Currently, Seri has the highest occurrence of conflicts and Nolloth the least. The present occurrence of conflicts in Hulaliu and Haruku is linked to political instability and the legitimacy of authority. In Seri, the drinking habits of the younger generation were mentioned as the main cause for conflicts. In Haruku, and especially in Seri and Hutumuri, nearly all respondents made comments on alcohol abuse. In the other villages, this was less of a problem and in Nolloth, it was hardly ever mentioned. Nolloth fishers are also most positive about the future. They expect no changes, while all other villages expect a further decline.

Table 16.25. Differences among villages in terms of discussion of village issues.

Discussion village issues	Overall average	Anova F	Prob.	Duncan's post-hoc test
Change over past 15 years	-1.04	6.869	<0.001	Hl Ha Se Tu Ht No _____
Expected change	-0.50	4.611	0.001	Hl Tu Se Ht No Ha _____
Past condition	7.95	2.021	0.078	No Tu Ht Ha Hl Se _____
Present condition	6.91	6.133	<0.001	Hl Ha Tu Se Ht No _____
Future condition	6.40	6.660	<0.001	Hl Tu Se Ha Ht No _____

Table 16.26. Differences among villages in terms of harmony.

Village harmony	Overall average	Anova F	Prob.	Duncan's post-hoc test
Change over past 15 years	-2.19	1.580	0.168	Se Tu Ha Ht Hl No _____
Expected change	-1.06	1.321	0.257	Tu Se Ht Ha Hl No _____
Past condition	7.88	1.085	0.370	No Hl Ht Se Ha Tu _____
Present condition	5.69	1.665	0.145	Se Hl Ht Ha Tu No _____
Future condition	4.63	1.720	0.132	Se Tu Ht Ha Hl No _____

16.6.4 Biological Sustainability

Marine resource health

In all villages, a significant (paired t-test, $p < 0.001$) decline in the state of the resource was noted (Table 16.27). However, Seri was least affected by the decline and here fishers perceive a higher score for the state of the resource than all other villages (Duncan's test, $p < 0.001$). Fishers willing to change their job, and those who want to change fisheries rules perceive the decline to be less serious than other fishers. A perception of more serious decline was expressed by fishers who did not think inclusiveness an important feature of decision-making (Table 16.28).

Seri fishers are the most likely to change their job and they are among the three villages with the highest tendency to change rules. They also have a less rosy picture of the state of resources in early days, possibly because they were significantly younger (ANOVA, $p < 0.05$) and less experienced.

Table 16.27. Inter-village differences in perception of the health of the marine environment.

Resource health	Overall average	Anova F	Prob.	Duncan's post-hoc test
Change over the past 15 years	-3.20	6.195	<0.001	Ht Hl No Tu Ha Se _____
Expected change	-1.84	1.154	0.334	Ht Hl Tu No Se Ha _____
Past condition	8.88	1.627	0.155	Se Ha Ht No Hu Tu _____
Present condition	5.69	5.290	<0.001	Ht Hl No Ha Tu Se _____
Future condition	3.85	4.813	<0.001	Ht Hl No Tu Ha Se _____

Table 16.28. Factors significantly correlated with indicators of biological sustainability. Significant correlations are indicated by asterisks.

Biological sustainability (change over past 15 years)	Villagers willing to change job	Elitist decision-making style invillage	Villagers want involvement of stakeholders in decision-making	Villagers want fisheries rules changed
Resource health	+0.178*	+0.069	-0.152*	+0.205**
Fish catch	+0.103	+0.185*	-0.103	+0.298**

Opposite to this are the Hutumuri fishers who perceive the state of the resource as significantly worse than the fishers in Seri. In this village, fishers complain of pollution from nearby factories and intense exploitation by lift net operators. They are also significantly more pessimistic about the future whereas the Seri fishers are the most optimistic. Apparently, the high economic score of Hutumuri does not influence the fishers' perception on the state of the resource.

As was seen in the larger performance analysis (Chapter 8), there is a correlation between perceived biological sustainability in the larger fishery and the existence of a *sasi* institution. However, this correlation may be indirect, i.e., the result of the relatively greater experience and age of the *sasi* fishers.

Fish catches

All villages perceived reduced fish catches compared to 15 years ago (Table 16.29). Again, Seri fishers perceived significantly less decline than Tuhaha, Hulaliu, Hutumuri and Nolloth fishers. The fishers who are willing to change jobs, who want to change fisheries rules, and who think decision-making is elitist in their villages perceive conditions to be relatively better. Seri fishers are relatively less pessimistic as they have significantly higher current catches than in most other villages.

As with the current perceived state of the resource, the explanation for the perception of Seri fishers is probably the age of the respondents. Older fishers can remember the days of abundance before the appearance of modern gears and intensification of the fishery. Also, it may be related to Seri's situation beside an upwelling area that is rich in nutrients and fish. Hutumuri's waters, by contrast, are polluted and over-fished.

Table 16.29. Differences among villages in perception of fish catches.

Fish catches	Overall average	Anova F	Prob.	Duncan's post-hoc test
Change over past 15 years	-2.80	2.643	0.025	No Ht Hl Tu Ha Se _____
Expected change	-1.74	2.397	0.041	Tu Ht No Ha Hl Se _____
Past condition	8.68	0.633	0.675	Se Ha Ht Hl No Tu _____
Present condition	5.88	3.101	0.001	No Ht Hl Ha Tu Se _____
Future condition	4.15	4.395	0.010	Ht No Tu Hl Ha Se _____

In all villages, significant future decline is expected. Tuhaha fishers, however, are most negative about the future (but had a high score of 9.13 in the past), followed by Hutumuri and Nolloth. Seri fishers are least pessimistic about the future.

16.7 Village Summaries

16.7.1 Villages with *sasi*

Nolloth is the village with the strongest *sasi* system. *Sasi* is strong and commercially-oriented, and vigorously enforced to generate income for the village government. In Nolloth, the village institutions which are important with regard to *sasi* or resource management in general, are present and functional, i.e., the government (including traditional leaders), *kewang*, church and KUD. *Adat* structures have melted into the new village structure, and Nolloth is the one village

that has been politically stable over time. Common villagers feel part of the system and perceive the centralized management as representing their interests. Although economically the situation is rather bleak compared to most villages – people have to work long hours and fish catches are declining – there is little intrusion in the *sasi* area and compliance with regulations is high. Nolloth still has resources under *sasi* which are fished elsewhere, i.e., top shells (*Trochus niloticus*) and sea cucumbers. Performance indicators on which Nolloth scores high in terms of equity and efficiency are the role of fishers in management, control over the fishery and compliance. Scores on social sustainability are high for collective action, discussion of village issues and village harmony. Although Nolloth fishers perceive serious restrictions in access and involvement in decision-making, they perceive the management system to be legitimate.

Haruku shows how *sasi* can evolve to be a management and conservation strategy that stimulates social equity. The *kewang* plays a major role in resource management. The village government, however, is in the process of re-organizing itself after the problematic election of the current village leader. Fishers perceive higher access to resources than Nolloth fishers (but less than the open-access fishery in Seri and Hutumuri) and they feel control over the resources is high. At the moment, Haruku scores low in communal activities, discussion of village issues, communal decision-making, and they note a decline in the role of fishers in management. Most low scores on these social variables may be related to the political stress in the village. Haruku fishers perceive a large decline in income, while family well-being has also decreased compared to the past. Even though *sasi* has a redistributive character, economic equality in the village scores low. Most other scores are average. The fact that, for many indicators, Haruku fishers are positive about the future (e.g., discussion of village issues and their involvement in fisheries management and partnership), indicates that most of the low scores are more likely to be related to political instability than with the general village structure and/or the presence of *sasi*.

16.7.2 Villages that are in the process of revitalizing *sasi*

Tuhaha is a village that is going through a period of political confusion. *Adat* leaders are trying to establish a position in the village government while trying to re-institutionalize their traditional authority. Through the revitalization of *sasi*, the village leader tries to secure a functional village government and generate revenues for the village. Possibly related to the change from open-access resources to government property rights and the general political instability, Tuhaha scores low on all equity indicators and compliance. Their future prospects are also rather negative. Fishers are very negative about their income. The economic score of Tuhaha is medium, but Tuhaha is highly dependent on fishing, and the generally older fishers we interviewed spent long hours at sea while the state of the resource and fish catches have declined. On most indicators for social sustainability, scores are average compared to the other villages, but all are declining except for family well-being which has increased strongly over the years. However, compared to the other villages, the current score is likewise medium. The relation between the fishers and the village government seems distant: fishers perceive partnership to be low as well as their role in management. Future prospects are generally negative. The re-establishment of *sasi* may have positive impacts, but currently, perhaps because most fishers are not aware of or included in the process of revitalization, expectations are low.

Hulaliu is politically in the same position as Haruku, i.e., politically divided. The village, however, is also in the process of revitalizing *sasi*. Hulaliu has an average economic score, while housing is good. The score of fishers for current well-being is highest (together with Seri), while their income has remained the same. Fishing is not that important in providing income, as people are farming-oriented and fishers spend less than six hours at sea each day. A large part of the catch is consumed and not sold. Indicators for social sustainability score rather low. It is

interesting to see the government's approach towards revitalization. Discussion of village issues, and the role of fishers in management currently score lowest of all villages. Fishers feel excluded from decision-making. Although more than 90% of the fishers feel that *sasi* is important, they expect a severe decline in access to resources. Together with the fact that the fishers interviewed preferred a communal harvest of *sasi* products over an auctioned one, it is not surprising that compliance, which is already very low, will decrease further in the future.

16.7.3 Villages with no *sasi*

The Hutumuri fishery is not regulated. Respect from the people for the village government in Hutumuri is low. Even though Hutumuri fishers have the highest level of education, the highest economic score, an average dependence on fishing and relatively short hours at sea, their perceptions are relatively negative and for many other indicators, they gave a low (or lowest) score. The fishers' assessment of the natural resources (state of resource and fish catches) is very negative and they expect further decrease in the future. Their family well-being score went from the highest to the lowest score. Their income, however, has not drastically declined and it is expected that this has to do with the fact that the fishery is an open-access system and control over the resources by the government is minimal. Large numbers of lift nets block the entrance to Baguala Bay and factories pollute the near shore waters. The lack of a management structure or strong government causes the fishers to feel powerless. Although there are few conflicts in the village and generally, scores for communal decision-making and discussion of village issues are good, it seems that aversion towards the village government causes negative assessments. Significant declines in the role of fishers in management, communal decision-making, and compliance underline this idea.

Seri is also an open-access regime and, in many respects, comparable to Hutumuri. Their assessment, in general, for most performance indicators is positive. Seri fishers have a high economic score, the highest income and their family well-being and future prospects are bright. They rate, for example, the state of the resource and fish catches as least in decline. The reason, however, is that respondents are relatively young and have the least numbers of years' experience in fishing. Also, these fishers had a less rosy picture of the past. In contrast to all other villages, the catches of some Seri fishers have increased, but this is a possible indicator that many of the fishers in our sample have no gear of their own and work on lift nets or seiners. Seri also lies close to rich fishing grounds. The fishers are also positive about the distribution of means of production in the village and economic equality. Fishers feel that government control is high and so is compliance. This all seems very positive. However, on the social level, village life is deteriorating. There is a significant decline in collective action, discussion of village issues, and the occurrence of conflicts is highest of all villages. Alcohol abuse is a major problem. Seri, in the proximity of Ambon, has to deal with increasing individualism, competition, and modernization, which have positive economic effects, but also cause social decline.

16.8 Conclusions

16.8.1 Socio-economic variables having an impact on local fisheries management

The socio-economic variables that have the strongest relationship with perceptions of fisheries management are the style of decision-making in their village and the fishers' own desire to be included in fisheries decision-making, the willingness of fishers to change jobs, the opinion that fishers have of *sasi*, their satisfaction with existing rules and attitude towards bending

the rules, and selling harvest rights. Fishers are also influenced by the type of gears they own, external income, and economic score (see Section 16.4.2), and whether or not they are part of village groups and/or are involved in communal fishing. Religious affiliation is related to the perception of ease of entry into the fishery. Fishers who are happy in their work and reluctant to change jobs are more positive about their role in management, gear distribution, collective action in the village, family well-being, and income levels.

Fishers who wanted rules to change felt it was difficult to enter the fishery, and gears were not fairly distributed. Further, they believed that decision-making was neither inclusive nor easy, that the tradition of collective action and discussion of village issues were fading and that control over the fishery was not tight enough. However, they did not perceive drastic reductions in compliance, nor were they particularly alarmed about the decline in resource health and fish catches.

Where control was least apparent, fishers were most adamant about not bending the rules. In contrast, fishers in Nolloth, for example, where control is high, felt comfortable approaching their local *sasi* institution to ask for permission to bend the rules. Nolloth fishers feel that they have a relatively greater role in fisheries management and are secure in the feeling that this will continue into the future. Potential rule benders felt the greatest restriction in access to resources and most difficulty in entering the fishery but, because they often had expensive gear types, they were content with their distribution. Their income and family well-being were relatively high.

The type of gears plays a role in the assessment of family well-being, economic equity, gear distribution, and role in management. Fishers with more expensive gears are the richer and more influential people in the village. It is natural that they feel that fishing gears are better distributed and economic equality high. Perhaps because they tend to get their way, they see decision-making as a relatively easy process, discussion of village issues as active and control over the fishery to be good. Fishers receiving external income had relatively lower total incomes. They perceived their access to resources as being good, and because of being largely artisanal and not faced with licensing fees, they thought that the fishery was still relatively easy to get into, but that the distribution of gears was unfair.

The existence of fishers' groups has positive effects in terms of the perception of economic equality, whereas members of community groups, who are also older fishers, perceive the cost of fishing to have risen dramatically. However, these fishers also have high scores for increased family well-being and income. Where a village has communal fishing activities, there are more positive perceptions of the distribution of gears, control over the fishery and family well-being.

A positive influence of the *sasi* institution on social sustainability is suggested by correlations between the positive opinion of *sasi*, which is strongly held by *sasi* fishers, and positive perceptions of economic equality, tradition of collective action, community harmony and discussion of village issues. Age was a factor in this in that older and more experienced fishers had the most positive perceptions regarding discussion of village issues, and these elderly fishers were usually from *sasi* villages. In Maluku, age commands respect, so these fishers may be relatively influential in decision-making processes in traditional communities.

Fishers find it important that the decisions in the village are made by the majority or by consensus, that all stakeholders are represented, and that fisheries benefits are directly shared. Where this is not the case, fishers felt less involved in management, and found the distribution

of gears and economic wealth to be inequitable. These fishers had lower incomes. They also noted the poor decision-making process and poor control over access to the fishery. In other words, for them, the current management system is seen to be inequitable and inefficient. In villages where the village head makes the decisions in isolation or with a few other leaders, this is accepted only if it is felt that the village head is representing the common good. This is only where a village head is strong and trustworthy, as in Nolloth.

For a management system to work, it is thus imperative that the decision-making process is one where people feel involved and which is inclusive. Where this is not the case, for example in Hulaliu and Tuhaha, fishers score low on their input in fisheries management, as well as control over the fishery, compliance, and communal decision-making. In these villages, which are both in the process of revitalizing *sasi*, the village government lacks full legitimacy and there is resistance to the idea of using *sasi* to collect government revenue.

16.8.2 Positive and negative aspects of *sasi*

Sasi is positively correlated with the number and type of local fisheries-related rules in practice, and other management-related attributes such as the input of fishers in fisheries management, control over the fishery, and compliance. The direct participation of fishers in decision-making is low, but in both *sasi* villages, the village leaders are legitimately making the decisions. The process is valued as one that is based on majority agreement, and generally, fishers who feel that decision-making is based on consensus have more positive scores on all performance indicators.

Where *sasi* benefits are generated to the village government without apparent or direct benefits to the larger community, fishers are made to feel that they have limited access to resources. As a result, compliance to fisheries regulations suffers.

People who appreciate *sasi* most are the villagers living in the *sasi* villages. These fishers also felt that there was a strong tradition of collective action. In this sense, *sasi* is important. Several indicators of social sustainability are highest in Nolloth, the most stable of the *sasi* villages. Discussion of village issues is higher in *sasi* villages, and the *sasi* villages are relatively harmonious, even though Haruku is under political stress.

Political instability is linked to a weaker tradition of collective action and less open discussion of village issues. In both Haruku and Hulaliu, there is a large degree of mistrust between the villagers and the village government. However, whereas in Hulaliu this leads to neglect of existing fisheries rules, in Haruku the activities of the *kewang* temper potential offenders.

A comparison of the *sasi* institutions of Nolloth and Haruku shows that they are different. Each, however, offers attributes for local resource management. In Nolloth where formal and traditional structures collaborate closely, and where leadership is highly legitimate, there is a stronger support base to enforce rules vigorously. Haruku demonstrates that a strong enforcement agent can function independently from the government and still play an important role in resource management. The Haruku *sasi* system also shows the appreciation by the people for a system which is redistributive and communal.

16.8.3 Relevance of *sasi* in non-*sasi* villages

Seri and Hutumuri-Toisapu are open-access regimes with little local government control over the fishery, which is dominated by commercial large-scale fishers. Hutumuri is an example of

a village where the installation of a strict resource management system has increased the well-being of the fishers who want control and exclusive rights over their resources. The inability of the village government to enforce the rules and lack of a local enforcement agent, however, demands assistance from formal enforcers or the establishment of an institution similar to the *kewang*. Large villages such as Seri and Hutumuri, affected by urbanization, modernization, competition, and a large-scale fishery, demand a different management system. Traditional *sasi* has little meaning for a relatively heterogeneous, young fishing population. In such cases, fisheries management has to be executed by modern village institutions. However, these institutions still have to be based on, or include, elements that we find are important to the success of *sasi* e.g., a transparent and inclusive decision-making process, mechanisms to change and enforce rules, direct benefits for the fisher-managers, extra income (which could be generated by village organizations), and a stable management construction that includes, but is not dependent on, the village government.

Chapter 17

Institutional Resilience: Loss and Revival of *Sasi*

Sasi is an important institution in the Lease Islands in Ambon Indonesia. Even though *sasi* has survived over approximately 400 years, it is in the process of dying out in various parts of the Moluccan Province. In a number of villages on Saparua, Haruku, Nusa Laut, Seram and to a lesser extent Ambon, *sasi* is still practiced. In many others, the institution is no longer active. This chapter tries to analyze when *sasi*, or aspects of *sasi*, disappeared and what factors cause its decline or contribute to its resilience.

17.1 Institutional Resilience Defined

According to Kloos (1981), an institution is an acknowledged set of actions with regard to an object of social value in a particular society. The structural-functionalist theories describe a social institution as consisting of all the structural components of a society (patterns of behavior) through which the main concerns and activities are organized and social needs are met (Goddijn et al. 1980; Marshall 1994). *Sasi*, as such, is an institution that regulates natural resources in order to meet the needs of the local population.

Resilience is an important characteristic of a management system. “Resilience is the ability of the system to cope with change without collapsing” or “The ability of a system to absorb perturbations by actively adapting to an ever changing environment” (Folke and Berkes 1995). Pollnac (1994) adds that the degree of adaptability depends on the specific circumstances of a system. The reduction in resilience means that vulnerability increases, with the risk that the system reaches a threshold and collapses (Folke and Berkes 1995). Change is inherent to institutions. Community management institutions should be understood as dynamic, social interventions, shaped by local experience and influenced by external factors (Bailey and Zerner 1992). Yet, if adaptability to changing conditions is insufficient, institutions can break down, leaving the fishery unregulated.

In studying institutional resilience, it is important to distinguish the formal and informal constraints, enforcement characteristics (see Section 7.4), the different levels of rules and whether they function on the formal or informal level, and the objective or function of the management system.

17.2 Institutional Resilience Operationalized

The resilience study is based on information from the inventory, the comparative case study including demographic information, and the contextual attributes (political, economic and socio-cultural). Additional key informant interviews covered questions on 1) the objective of *sasi*, 2) the rules and regulations, 3) the role of the village government and traditional authorities, 4) leadership, 5) boundaries, 6) compliance and enforcement, and 7) external factors having an impact on the management institution. Detailed information on each of these aspects is described in the individual case studies. The data from the inventory show the process of decline while the additional information was used to explain the mechanism behind this process.

17.3 Patterns of Loss of *Sasi* since the 1940s

17.3.1 Loss of the entire *sasi* institution

Of the 63 villages studied, in 19 villages the entire *sasi* institution was lost (see Table 17.1). Most losses occurred in the 1990s and on Ambon and Saparua. On Haruku Island, by contrast, some form of *sasi* has survived in every village.

Table 17.1. Attrition of *sasi* institution (i.e., total loss of all forms) on each island. Note one village in Ambon never had *sasi*.

<i>Sasi</i> institution lost (n=19)	Seram (n=1)	Ambon (n=11)	Haruku (n=0)	Saparua (n=6)	Nusa Laut (n=1)	Total (n=19)
Lost in 1990s	5%	16%	0%	16%	5%	42%
Lost in 1980s	0%	11%	0%	0%	0%	11%
Lost in 1970s	0%	16%	0%	5%	0%	21%
Lost earlier	0%	16%	0%	10%	0%	26%
Total lost	5%	58%	0%	32%	5%	100%

Table 17.2. Attrition of entire *sasi* institution in villages of various sizes and religion. Note the village that never had *sasi* is a village of Butonese immigrants, sizes Class 4.

<i>Sasi</i> institution lost (n=19)	Class1 (n=5)	Class2 (n=6)	Class3 (n=7)	Class4 (n=8)	Muslim (n=9)	Christian (n=10)
Lost in 1990s	11%	16%	5%	11%	21%	21%
Lost in 1980s	5%	5%	0%	0%	5%	5%
Lost in 1970s	5%	0%	0%	16%	5%	16%
Lost earlier	5%	5%	0%	16%	16%	11%
Total	26%	26%	5%	43%	47%	53%

Losses have been steady in both Muslim and Christian villages (Table 17.2), but there is a distinct difference when village population is considered (Class 1= \leq 1,000; Class 2=1,001-2,000; Class 3=2,001-3,000; and Class 4= $>$ 3,000 people). As can be read in the table, losses have been greatest in the Class 4 size and much less in the Class 3 size. Apparently, there is an optimum size for villages with regard to *sasi*.

17.3.2 Loss of *adat sasi*

Where some form of *sasi* persists, there has often been a partial loss or a change in the type of institution. For instance, *sasi* dominated by *adat* leaders (*adat sasi*) may be transformed into a church-dominated institution, or even privatized. Out of 48 recorded losses of *adat sasi*, over half occurred before the 1960s (Table 17.3). Losses were moderate in the 1970s and 1980s but have become more severe in the 1990s. The differences among islands are not significant.

Recent losses, i.e., in the 1990s, of *adat sasi* have occurred in both Muslim and Christian villages (Table 17.4), but concentrated in villages of Class 2 sizes (1,000-2,000) on Saparua and Haruku. Since Law No. 5, 1979 was passed to restructure the village level administration, small villages were given the status of a *dusun* (sub-village) without an independent village government to execute *sasi*. This played a role in the loss of *adat sasi*, for instance, in Seri and Airlow.

The 1940-70s saw losses of *adat sasi* focused on large villages (Class 4) on Ambon Island. Population statistics from that period are, unfortunately, not available but it is possible that Ambonese villages started to reach some critical threshold of population during those decades. *Adat sasi* persists mostly in intermediate-sized villages.

Table 17.3. Loss of adat sasi. Note one village in Ambon never had adat sasi.

Adat Sasi lost (n=48)	Seram (n=5)	Ambon (n=19)	Haruku (n=7)	Saparua (n=11)	Nusa Laut (n=6)	Total
Lost in 1990s	2%	2%	6%	13%	0%	23%
1980s	0%	4%	3%	0%	4%	11%
1970s	0%	4%	0%	4%	2%	10%
1940-1970 or uncertain	8%	30%	6%	6%	6%	56%
Total lost	10%	40%	15%	23%	12%	100%

Table 17.4. Patterns of loss of adat sasi in villages of different sizes and religion. Note the one village that never had adat sasi is in Class 4.

Adat Sasi lost (n=48)	Class 1 (≤1,000) (n=11)	Class2 (≤1,001-2,000) (n=13)	Class3 (2,001-3,000) (n=9)	Class4 (>3,000) (n=15)	Muslim (n=16)	Christian (n=32)
Lost in 1990s	2%	13%	4%	4%	8%	15%
1980s	6%	2%	2%	0%	2%	8%
1970s	4%	2%	0%	4%	2%	8%
1940-1970 or uncertain	11%	10%	13%	23%	21%	36%
Total	23%	27%	19%	31%	33%	67%

17.3.3 The erosion and loss of marine sasi

Active marine *sasi* institutions are difficult to detect. Out of 63 villages inventoried, only 17 have some form of marine *sasi*. Before, marine *sasi* was much more prevalent. We documented 18 villages where officials described marine *sasi* being lost in living memory (Tables 17.5 and 17.6), meaning that at one time, at least 35 villages (i.e., 56%) had this institution. In four more villages (Seith, Ouw, Seri, Rutah), one or more fishers interviewed thought *sasi* was either in force or had been practiced at one time. In the other 24 villages, either marine *sasi* never existed or it has been totally forgotten.

In over half the cases where marine *sasi* has been lost, the loss occurred prior to 1970 (Table 17.6). Since then, marine *sasi* has been relatively stable compared to other forms of *sasi*. Most losses in the 1970s to 1990s have been in either the smallest (Class 1) or largest (Class 4) villages, and in the 1990s, the only recorded loss was on Ambon Island.

17.3.4 Factors influencing activity of sasi

The level of activity of land *sasi* was measured using indicators for presence, closures, consistency of application, and local effort (see Section 2.2.3). Similarly, marine *sasi* was scored using indicators for presence, closed areas, written rules, and monitoring. We assume that less active *sasi* is in decline.

Table 17.5. Attrition and persistence of marine sasi in relation to village size and religion.

Marine <i>Sasi</i> lost	Class 1	Class 2	Class3	Class4	Muslim	Christian	Total
1990s	0	0	0	1	1	0	1
1980s	3	0	0	0	0	3	3
1970s	2	1	0	1	0	4	4
Lost earlier	2	4	1	3	3	7	10
Sub Total: lost	7	5	1	5	4	14	18
Number still Existing	0	4	10	3	5	12	17
Never had marine sasi	6	7	6	9	11	17	28
Total	13	16	17	17	20	43	63

Table 17.6. Attrition of marine sasi per island.

Marine <i>Sasi</i> lost (n=18)	Seram (n=1)	Ambon (n=6)	Haruku (n=2)	Saparua (n=4)	Nusa Laut (n=5)	Total
1990s	0%	6%	0%	0%	0%	6%
1980s	0%	11%	0%	0%	6%	17%
1970s	0%	5%	0%	11%	6%	21%
Earlier	6%	11%	11%	11%	17%	56%
Total lost	6%	33%	11%	22%	28%	100%

The persistence of marine *sasi* is linked to the fate of land *sasi*, in that villages with marine *sasi* usually have relatively active land *sasi*. Land *sasi* is significantly more active in Class 3 villages (ANOVA, $p=0.01$), which helps explain the resilience of marine *sasi* in this size class. Where marine *sasi* has been lost for some reason, the land *sasi* institution that is left behind is also weak (Table 17.7).

Table 17.7. Relation between marine sasi status and activity of land sasi. Land sasi score (average \pm S.E.).

Village status	Average land <i>sasi</i> score
Village with marine <i>sasi</i>	12.2 \pm 1.02
Village that never had marine <i>sasi</i>	10.8 \pm 0.73
Village where marine <i>sasi</i> has been lost	8.3 \pm 0.87

In Maluku, fishing villages are most often overwhelmingly Christian or Muslim. The seven villages where marine *sasi* was most active (score 10-12, see Table 17.8) were all homogeneous i.e., with at least 95% of the population being of the dominant religion. Out of 17 cases of marine *sasi*, three were effectively dormant (score=3) and another three were weak (score 6-7). One of the cases of dormant marine *sasi* occurred in a relatively non-homogeneous village and a second case was in a Christian *dusun* attached to a predominantly Muslim village. Cultural homogeneity can thus be important to the resilience of this traditional institution.

Resilience of marine *sasi* is also linked to the interplay among governing authorities. *Sasi* has been stable in the Muslim villages where the institution is neither *adat* nor church (Table 17.9). In a number of cases, *sasi* on marine resources was abandoned (e.g., Akoon, Ameth, Leinitu) or weakened (e.g., Haria, Ulath) when *adat sasi* was taken over by the church. Compared to marine *sasi* that is of the *adat* or "other" type, marine *sasi* in villages with church *sasi* is significantly less active ($p<0.05$). Where *adat sasi* has survived, losses of marine *sasi* are fewer compared to losses in villages where only church *sasi* remains (Table 17.9).

Table 17.8. Factors related to activity of marine sasi in central Maluku. Homogeneity status: 1: 95-100% is of dominant religion; 2: 60-80% is of dominant religion. Size Class 1=population≤1,000; Class 2=1,001-2,000; Class 3=2,001-3,000; Class 4=>3,000. For an explanation of the activity scores see Chapter 2. * Sasi moved to church in 1992; ** Sasi moved to church in 1995.

Village	Dominant religion	Homo-geneity	Administrative Status	Size Class	Activity score for <i>sasi</i>	
					Land	Marine
Nolloth	Christian	1	<i>Desa</i>	3	12	12
Haruku	Christian	1	<i>Desa</i>	3	11	12
Pelau	Muslim	1	<i>Desa</i>	4	12	12
Siri Sori	Muslim	1	<i>Desa</i>	3	n.a.	12
Morela	Muslim	1	<i>Desa</i>	3	11	12
Itawaka	Christian	1	<i>Desa</i>	3	11	10
Amahai	Christian	1	<i>Desa</i>	3	12	10
Kabau	Muslim	1	<i>Desa</i>	3	n.a.	9
Ihamahu	Christian	1	<i>Desa</i>	2	12	9
Tengah-Tengah	Muslim	1	<i>Desa</i>	3	12	9
Hatusua	Christian	2	<i>Desa</i>	2	9	9
Porto	Christian	1	<i>Desa</i>	4	10	7
Paperu	Christian	1	<i>Desa</i>	3	9	6
Ulath	Christian	1	<i>Desa</i>	2	6*	6*
Makariki	Christian	2	<i>Desa</i>	2	12	3
Rohua	Christian	1	<i>Dusun</i> in a Muslim <i>desa</i>	3	12	3
Haria	Christian	1	<i>Desa</i>	4	8**	3**

Table 17.9. Type of sasi in villages that have or had or never had, marine sasi.

Current status of village	<i>Adat sasi</i> village (n=15)	Church <i>sasi</i> village with no <i>adat sasi</i> (n=21)	Muslim <i>sasi</i> village (n=6)
Has marine <i>sasi</i> to date	10 (67%)	4 (19%)	3 (50%)
Lost marine <i>sasi</i> in living memory	2 (13%)	7 (33%)	0 (0%)
Historical occurrence of marine <i>sasi</i> (had existed)	12 (80%)	11 (52%)	3 (50%)
Never had marine <i>sasi</i>	3 (20%)	10 (48%)	3 (50%)
Percentage of loss in relation to occurrence	17%	64%	0%

17.4 Reasons for Loss of *Sasi* Between 1940 and 1997

During the inventory, we asked whether our informants could remember when some aspect of *sasi* changed or was lost, and why this had happened. Explanations were often quite explicit and included contextual information pertaining to the evolution of socio-political systems in Maluku (see Appendix 4 for details). The comments (Table 17.10) came from villages where *sasi* was actually lost or transformed. The numbers represent the number of comments, not the number of villages.

Weak leadership and conflicts are key elements in the erosion of *sasi*. In the opinion of villagers, conflicts within the village government, between the village chief and *adat* authorities, among churches, and over land, all resulted in partial or complete loss of the institution. Conflict between *adat* leaders and village government leading to the erosion of *sasi* was reported only in Christian villages and never on Nusa Laut.

Confusion over land rights was, in some cases, due to changes in government unit boundaries. Changes in administrative boundaries and the effects of World War II were most prevalent on Ambon and Nusa Laut. Pressure from worsening economic conditions, for instance, the collapse of the clove price in the early 1990s, crop failures, and decline of resources were also mentioned as causing *sasi* to collapse.

The lack of effective enforcement, in combination with economic needs, political turmoil, and urbanization provided the incentives for people to non-comply. Compliance and enforcement problems seem more prevalent in Christian villages, and particularly on Ambon Island. The village government often delegated the authority over *sasi* to the church, and in many cases, *sasi adat* and marine *sasi* declined at the same time. As of 1997, political or religious conflicts were documented as affecting 13 of the remaining *sasi* villages. In other words, in about a quarter of remaining *sasi* villages, the institution is under strain.

Table 17.10. Reasons causing *sasi* to become (partly or completely) non-functional.

Cause of decline of <i>sasi</i>	No. of Comments
Take-over of <i>adat sasi</i> by church	13
Poor leadership led to decline in enforcement and compliance	11
Economic pressures led to non-compliance	4
Conflict over leadership (<i>adat</i> and formal government)	3
Change in administrative boundaries	3
Conflict between church and <i>adat</i> or between churches	2
Conflicts over land rights caused compliance problem	1
Urbanization and degradation of resources	1
Collapse of clove prices increased fishing pressure	1
Others (moral disintegration, outsider interference, more heterogeneous population, war)	4

17.5 Results of the Comparative Case Study

The findings, from the in-depth interviews conducted as part of the case studies in the six villages, underscore the link between the different components (objectives, rules), the players, and the external context of the *sasi* institution, and illustrate the interactions among these through time.

Although both the Nolloth and Haruku villages having a strong *sasi* institution, the cases are distinct. Whereas Nolloth can be described as a system designed primarily to provide resource rent for the village government, Haruku's *sasi* has more to do with the fair distribution of fish resources and conservation. Nolloth is a stable village, with legitimate leadership and the strong representation of traditional authorities. The *kewang* is functional and, together with the village head, serious in the prosecution of offenders. The harvest rights of *sasi* are reserved for the village cooperative (KUD) and income accrues to the village government and the harvesters. Other villagers benefit indirectly through village development. In Haruku, a more important role is ascribed to the *kewang* and relatively less to the village head, except when he is also a *raja*. *Kewang* members feel a strong responsibility towards *sasi*. The harvest is communal and distributed among the villagers. Recently, the villagers in Haruku have become divided as a result of the installation of a new village head. This leader, elected with a slender majority, supports *sasi* but also favors mining development that threatens the resources under *sasi*. This has led to confusion and a dysfunctional village government, a situation that in turn poses a threat to *sasi*.

In Hulaliu, conflicts between the village head and *kewang*, and, in particular, problems with accountability for the use of resource rents in the past, lie at the root of the decline of *sasi*. The current leader is trying to revitalize *sasi* but his position is unstable because he lacks the support of a large part of the village population. The revitalization process is thereby threatened. In Tuhaha, there have been problems in the past between formal and traditional authorities. There is also a tendency to revitalize *sasi*, but the relationship between the village government and traditional authorities first needs to be restored. The village government, which is only partly functional, has to be reorganized before a *kewang* can be installed.

In Toisapu-Hutumuri and Seri, *sasi* is lost and fisheries management is minimal or lacking. Traditional village structures are, to a large extent, replaced by formal structures at the *desa* level, although less so at the *dusun* (sub-village) level. Artisanal fishers have to compete directly with large-scale fishers. Both villages are located on Ambon and close to regional markets and hence are more in contact with modernization and urban processes.

In the remainder of this chapter, we describe the various elements of *sasi* and provide an analysis of how *sasi* functions and persists under different conditions.

17.5.1 Objective of *sasi*

The general objective of *sasi*, as articulated by villagers, is to protect resources from theft and destruction. Theft is prevented through active monitoring and enforcement. To maximize yields, immature shellfish and fish are protected, and to ensure sustainable yields, there are access and harvest restrictions. In Nolloth for example, there are lengthy closed seasons and a minimum legal size for top shells (*Trochus niloticus*). In Haruku, destructive and overly efficient gear types are banned. Thus in these cases, *sasi* does have a conservation objective. In addition, Haruku *kewang* leaders expressly identify the equitable distribution of fish, particularly the support of village poor, to be an objective of their revitalized *sasi* institution. In a 1995 study, von Benda-Beckman et al. wrote: "Throughout history the objectives of *sasi* have changed from limiting access and the regulation of power, to defining social conduct and the increase of economic benefits." The use of *sasi* for economic purposes, which has a long history in Maluku (von Benda Beckmann et al. 1995), is also illustrated by Nolloth. Top shells were formerly important as a food source. When in the 1960s the shells became commercially interesting, the village government of Nolloth replaced the communal harvest with a system that allowed the village government to auction the harvest rights. This was to the dismay of some villagers who saw their personal direct benefits decrease.

A shift from communal harvests to the sale of marine harvest rights occurs in most villages where *sasi* is revitalized by a local government with commercial interests. Although in most villages the principle of *sasi* is valued and *sasi* is perceived as a "good thing", a majority of fishers we interviewed object to the auctioning of marine *sasi* harvest rights, especially to outsiders. Both Tuhaha and Hulaliu village heads plan to auction the harvest rights and use *sasi* revenues for village development. Yet, fishers declared that they would respect *sasi* only if they would get direct benefits from a communal harvest. Villagers may be kept satisfied with village development projects, but there may also be problems because village income and expenditures are not transparent. For example, at one point in the 1980s, when profits appeared to be being used for the village head's personal benefit rather than the public good, *sasi* in Nolloth nearly broke down.

17.5.2 Rules and regulations

In order to regulate the harvest, certain rules have to be practiced. Nolloth, Haruku, and Hulaliu have written *sasi* regulations (see Appendix 6 for Nolloth rules). The operational rules specify the products and marine species under *sasi*, gear restrictions, the timing of the harvest, etc. These operational rules are the base on which the fishers make their day-to-day decisions over compliance. The operational rules are nested in a set of collective rules which define the decision-making process regarding the opening and closing of seasons, how to regulate access, how enforcement is arranged etc. On the third level – the constitutional level – the structure of the *sasi* institution is defined through *adat*. *Adat* prescribes who are involved in the process and what their roles are, e.g., which clans and persons are responsible for decision-making, conflict resolution, execution of ceremonies and enforcement (also see Ostrom 1990).

The process of decline involves non-compliance to operational rules but this in turn is directly dependent on the effectiveness of the collective-choice rules. In Hulaliu, a conflict between the village head and *kewang* in which the *kewang*'s rights were neglected, i.e., a collective-choice level problem, was the root cause for *sasi* to decline. Subsequent problems with compliance (operational level) were secondary, i.e., the result of lack of *kewang* enforcement. *Adat* as part of the village culture, however, persisted, and thus the constitutional rules remained intact.

Over the last decades, operational rules have been modified. Boundaries of *sasi* areas, frequency of open and closed seasons, division of benefits, restrictions on gear use, etc. all may and do change. In practical management terms, this affects the function of *sasi* but does not threaten its continued existence. On the other hand, where the constitutional rules were challenged, e.g., a shift of authority from the *kewang* to the church, the loss of the *kewang*, the introduction of police as enforcers, the promulgation of national fisheries legislation, the structure or legal basis of the *sasi* institution then changed and this can lead to the disappearance of part or all of a local *sasi* institution. Adaptation of constitutional rules may also, however, strengthen *sasi*. For example, in Haruku where *sasi* on marine resources is enforced by the *kewang*, there is also *sasi* on coconuts and cloves that is enforced by the church. The reason why these commodities are under church *sasi*, is because the people asked the church to become involved at a period when theft was significant. Since then, the church has had a role that is distinct from, but supportive of, that of the *kewang*.

Because operational and collective rules may be lost more easily, they as particular entities are less resilient than constitutional rules. However, the fact that operational rules and to a lesser extent, the collective-choice rules, can be changed or abandoned and then revived, is an important feature contributing to adaptiveness and resilience of the larger institution.

Some *sasi* operational rules overlap and support national fisheries law on destructive gear types. In Haruku and Nolloth, formal regulations on mesh size, and the use of poisons, blast fishing and lift nets are included in the *sasi* rules. As is typical of non-*sasi* villages, Seri has only a few informal rules, while Toisapu-Hutumuri has no local fisheries regulations at all. A lack of effectively enforced government rules has provided an incentive for fishers in Hutumuri to push for local management that can protect their fishing grounds against outsiders. Under national law, local *adat* institutions and village governments are allowed to pass local rules as long as they do not contradict national or provincial law. What is lacking is the motivation for village leaders to act in the absence of direction from a higher level.

17.5.3 Role of traditional institutions

Restructuring of local government through Law No. 5, 1979 is expected to have caused confusion in the village. In fact, in the perception of ordinary villagers, it had no dramatic and immediate impact. The fact that the traditional village structure was no longer acknowledged posed the village government with a dilemma as to how to meet the demands from Jakarta without violating the traditional social structure. Apparently, the requirements of the law, i.e., replacement of the traditional government structure by a formal one, were often implemented at a pace and in a manner suited to the local situation. In most cases, the local government basically incorporated the traditional structure into the formal one, and thus change was not clearly visible.

Some villages have been rather successful in melding the formal and traditional government structures. In Nolloth, for example, the LMD is nearly fully overlapping with the traditional *saniri negeri*. The village head is also elected according to traditional guidelines. In other villages, the introduction was less smooth and was a cause for conflicts. Traditional authorities became marginalized in Tuhaha. Where newcomers entered the village government through elections, villages became politically unstable. In all villages, there is some degree of overlap between formal and traditional authorities, but the way in which the traditional authorities are represented varies.

Our study shows that the degree of overlap is decisive for the continuation and stability of *sasi*. In Nolloth, where the traditional authorities function within the new system, the *sasi* institution is strong. The villages where *sasi* ceased to function had problems with village leaders who did not successfully collaborate with traditional authorities. In Tuhaha, where the traditional authorities were not acknowledged but had to modify their role according to the new structure, *sasi* has disappeared. Now the new village leader has to honor the traditional authorities and enable them to take a place in the village government before *sasi* can be revitalized. In Hulaliu, the village government neglected the *kewang's* rights and caused *sasi* to decline, and now has to reconcile their differences in order to reintroduce *sasi*. Haruku is a different case. The introduction of the new government structure took place in a period when *sasi* were just about to be re-institutionalized. The revival and reconstruction of *sasi* was an initiative of the *kewang*, with support from the village head at the time, Om Bertie Ririmasse, who was also a *raja*.

Knowledge of *sasi*, or rather the body of knowledge, is passed on from father to son within certain lineages and persons, i.e., *kepala kewang*, *kepala adat*. The rituals and knowledge are secret and involve an almost extinct indigenous language (*bahasa tana*). In order to preserve traditional *sasi*, the process of passing down of knowledge must be perpetuated. However, as the younger generations leave to study in the city of Ambon where *adat* is regarded as a superstitious belief, many youngsters lose interest in *sasi*. This is true even in villages where *sasi* is strong (i.e., Nolloth). There is a risk that when the older generation or “the keepers of *sasi* knowledge” die, they will take their knowledge with them.

The support and participation of the younger generation is, however, necessary for the success of *sasi* as a viable management institution (Figure 17.1). Especially in the villages where *sasi* is weak or has ceased to function, the inability to preserve the knowledge of *sasi* is a threat to its continuation. Of all the case study villages, Haruku is the only one where knowledge of *sasi* is actively communicated to the new generation through the mini-*kewang* where they learn about *sasi* and the role of *sasi* in resource management.



Figure 17.1. Are these young people going to continue sasi?

17.5.4 Leadership

In some cases, LMD members appointed as section heads lack the appropriate knowledge and skills to carry out their tasks. In other cases, village officials appeared poorly informed about village issues and the activities and programs of village organizations. In such cases, government decision-making may rest almost exclusively with the village head. Thus, the modern village head may hold a very powerful and authoritarian position. As such, he is a key decision-maker in the *sasi* institution.

Before 1979, the position of village leader was hereditary through the royal *raja* line. Nowadays, the village head is elected by the people and, in theory, the elections are open to anyone. Yet Nolloth is a fine example of a situation where the village head was selected because he is the *raja*. He was inaugurated by both the village government and the *adat* leaders, and thus assumed the sacred function of *kepala adat*. This allows him to lead the formal village government as well as also be fully and legitimately involved in traditional ceremonies.

Our results support those of Riedel (1886) and Volker (1921) who maintained that compliance to *sasi* rules depended largely on strong and tactful leadership. The village head must be honest and respected or *sasi* is undermined. This was illustrated by stories from Hulaliu and Nolloth where former leaders confiscated *sasi* profits and so caused *sasi* to weaken. Local legitimacy of the village head is extremely important and still stems largely from his being part of the *raja* family. Thus in some villages, formally elected leaders are not legitimate because they are not from the right family. Yet, even in cases where the village head is from the right family, legitimacy can be undermined if people think a different member of the *raja* line would be more competent or more attuned to the villagers' aspirations. In Hulaliu, the initiative of the village head to revive *sasi* is hampered by a lack of legitimacy apparent from the level of local political opposition. In Haruku, the formally elected leader is said to be of the *raja* line, while others doubt his descent. He is not a long-term village resident and is said to represent

the interests of the pro-mining lobby. Hence, he lacks the local legitimacy to play a guiding role in *sasi*. This situation, wherein the village head and the *kewang* each represent the two opponent groups in the village, seriously undermines the *sasi* institution.

Under the Indonesian system, all candidates for local elections must be screened and approved by the government. Hence, elections can be manipulated either in favor of or against traditional leaders. Popular candidates may be disqualified at this stage, or some votes may simply be neglected during the election process. On one hand, lingering *adat* structures may make nonsense of the concept of democratic elections. On the other hand, traditional leaders with broad popular support may also be vulnerable. Cases from Haruku and Hutumuri show that external interests may influence the election of a village head and thus the functioning of *sasi*.

17.5.5 *The boundaries*

Marine *sasi* is generally applied to shallow inshore areas. Outside the *sasi* area, other parts of the village territory, including the deep waters beyond the fringing reef, may also be rented (as in Tuhaha and Hulaliu). Generally, the boundaries of the *sasi* and other rented areas are clearly defined, and have remained largely the same over the years. The boundaries are generally accepted. Even though fishers may accept such restricted access without complaint, they often have reservations. In Tuhaha, a lack of legitimacy is compensated by a strong enforcement mechanism. Acceptance of boundaries of restricted areas requires legitimacy of the leaders, direct benefits for the excluded users, and/or a strong enforcement mechanism.

17.5.6 *Enforcement and compliance*

Enforcement of *sasi* regulations is carried out by the *kewang*, the police, and/or village government. In both Nolloth and Haruku, the *kewang* is strong and plays an important role in the enforcement of regulations. In coastal villages, there is still a firm belief that ancestral spirits and God guard the *sasi* regulations. Even in cases where the village government is responsible for enforcement, traditional sanctions can still play a role. "The offender can be lucky and escape from the *kewang* or police, but he still may get sick," explained Abraham Pattypelu, a fisher in Tuhaha. "Before long, he will seek either the church minister or *tuan negeri* (in more traditional villages) to confess his mischief because only a prayer or ceremony can relieve him from his burden."

The traditional *kewang* is highly legitimate and not in the least because it enforces the law without showing favoritism. Police personnel have the formal authority to implement the rules, but act arbitrarily and are not trusted by the people. Their effectiveness is also hampered by the fact that they reside far from the village and when they are needed, they take too long to arrive. In villages that have no active *kewang*, as in Tuhaha and Hulaliu, enforcement is, therefore, difficult.

In villages where *sasi* is gone and/or where the *kewang* has been abolished, authority has shifted from the traditional enforcers to the formal village government. In Christian villages, the government may have enforcement support from the church. In Haruku, Hulaliu, and Tuhaha, the church is only involved in *sasi* on coconuts, while in Nolloth, the church minister closely collaborates with the village head and the *kewang* and is present at *adat* ceremonies, including those of marine *sasi*. In non-*sasi* villages, the church has not been seen to play a role in supporting enforcement of fisheries rules although it may, as in Seri, be called upon to bless fishers and their boats. The church is only directly involved in land *sasi* and not in marine *sasi*. This is because fishing is economically too important and people will always

violate the rules if they need to. If the church is involved in marine *sasi*, the offenders would not only risk punishment by the village authorities, but also from God, and that would be too severe. Therefore, the church does not want to be responsible for marine enforcement.

Where *sasi* is functional, compliance with fishing rules in general (both *sasi* and other regulations) is higher than in non-*sasi* villages. Non-compliance by local villagers is not usually a threat to the *sasi* institution, but is a sign of decline which is likely based in problems at the collective-choice or constitutional levels. Non-compliance may also be directed at an authority figure rather than at the *sasi* institution *per se*. In Hulaliu, the use of destructive fishing techniques by a contra group was meant to undermine the authority of the village leader. Non-compliance by either locals or outsiders which threatens the very existence of local resources and is not effectively controlled by the *kewang* is, however, a threat to *sasi* because it is an incentive for people to abandon local management. Usually, however, intrusion in *sasi* areas is low (an offender is caught two to three times a year). Yet, in times of economic and political stress, the rate of non-compliance can increase.

17.5.7 Externalities

The minimal levels of in- and out-migration and tourism have no impact on village demography and, so far, appear to pose no threat to traditional institutions. Tourism in Haruku, stimulated by *sasi* ceremonies, may even help support the institution. Compared to Ambon, the infrastructure, communication, and transportation links on the islands of Haruku and Saparua are limited. Seri and Hutumuri on Ambon Island are heavily influenced by their proximity to the city. Apparently, the greater involvement of people in the process of modernization and globalization affects their appreciation for *sasi* and traditional structures. In the non-*sasi* villages, only 70% of fishers thought *sasi* was important (see Section 17.6). It is here that the loss of *adat* ideology and tradition is largest. The tradition of collective action and other indicators of social sustainability are also relatively weak. This is an important aspect to take into account when re-institutionalizing *sasi* or developing a comparable management institution that must be widely applicable.

Pollution and resource degradation resulting from modern development also pose a challenge to local resource management. The villages on Ambon see their resources decline due to pollution from fish and plywood factories. The environmental impacts of these operations are such that they would be beyond the control and influence of a traditional style village *kewang*. Revitalized local institutions require information management, networking and lobbying skills, and links to government departments having jurisdiction in environmental protection.

A related issue is that of the impact of large-scale development. Haruku is the one village that is influenced by mining exploration for copper and other base metals, as well as silver and gold. This enterprise seriously affects the political stability in the village and also emphasizes the limits of a village-based management institution that is not linked to higher levels of government. The *sasi* institution does not offer villagers the ability to intervene in regional development planning and licensing of mining operations. The *kewang* is powerless to prevent pollution from mining activities affecting *sasi* resources, and there is no provincial or national management body to which the villagers can appeal.

National laws and programs are implemented through the provincial, district and sub-district government offices but information on fisheries and environmental law rarely reaches the village level. Knowledge of fisheries regulations is fragmented and generally, fisheries

regulations are poorly implemented. There are no government patrol boats in the area, and where it comes to protection of fishing rights, the villages are left to their own devices. This may motivate people to work together in defense of local resources. On the other hand, if *sasi* as an institution remains disconnected from governmental power centers, people may give up local operational rules because they are ineffective against externalities.

17.6 The Revival of *Sasi* in Central Maluku

At this moment, fisheries management is not yet a burning issue in most villages because reduced catches are compensated by high fish prices. Few village respondents have any clear idea of what fisheries management would entail, and rather think that the answer to declining catches is to upgrade their boats and gears. Nevertheless, in *sasi* villages, all fishers said that *sasi* is useful and important, as did 90% of fishers in villages where *sasi* is being revived and 70% of fishers in non-*sasi* villages. In 14 villages, respondents expressed their desire to reintroduce *sasi* (land, marine or both), or strengthen existing *sasi* practices. Plans for revitalization were found in villages of all sizes and on every island (Tables 17.11, 17.12). In some cases, definite plans with timelines had already been developed; in other cases, the indication to revitalize *sasi* was based on wishful thinking. Most of the villages interested in revitalization were Christian (Table 17.12).

Table 17.11. Occurrence of plans to revive *sasi* in villages of different sizes. In some cases revival of both land and marine *sasi* is planned in the same village; thus numbers add up to more than 14.

	Village Size Class 1	Village Size Class 2	Village Size Class 3	Village Size Class 4	Total
Land <i>sasi</i> revival	1	2	1	2	6
Marine <i>sasi</i> revival	4	2	3	3	12

Table 17.12. Occurrence of plans to revive *sasi* in each island.

	Ambon	Seram	Haruku	Saparua	Nusa Laut	Muslim	Christian
Land <i>sasi</i> revival	1	2	1	2	0	1	5
Marine <i>sasi</i> revival	3	1	2	4	2	1	11

The tendency to revitalize *sasi* is fed by the appreciation of *sasi* by the people, not just as a management system but also as a cultural phenomenon. In Nolloth and Haruku, where *sasi* is still alive, people explained: “*Sasi* has a spirit, and everybody carries it because it is *adat* and part of our culture.” The constitutional rules of *sasi* are based on, and are part of *adat*, and because they cannot be separated from the local culture, it is at this level that *sasi* as an institution has its strongest resilience. This explains why *sasi* is still spiritually and ideologically significant, even where the practical execution of *sasi* has vanished.

Two villages that are seriously attempting to revitalize *sasi* are Hulaliu and Tuhaha. In both cases, it is not fishers but village elites (government staff with partial involvement of *adat* leaders) who are pushing the process forward. The reason for revitalizing *sasi* has less to do with its spiritual significance than with the possibility of controlling common property resources to generate government income. In considering revitalization processes, it is rewarding to look back to what caused the loss of operational *sasi* in the first place.

The main reasons for the collapse of *sasi* in both Tuhaha and Hulaliu were political problems, lack of trust among village leaders, and the subsequent withdrawal of the *kewang*. The practical execution of *sasi* was abolished, but *sasi* remained part of the village ideology. The process of revitalization builds on this cultural base and re-establishment means re-installation of the traditional authorities and re-activation of collective-choice and operational rules. *Kewang* members have to be chosen and inaugurated, tasks delegated between the formal and traditional authorities, and operational rules designed. To be successful, the proponents of *sasi* renewal will have to pay attention to history and be careful to avoid past practices that led to breakdown.

In recent years local NGOs, such as Yayasan Hualopu, have been working in the Lease Islands. They provide villagers with information on sustainable fisheries development and encourage local leaders to embark on the management of village territorial waters. Yayasan Hualopu, for example, is currently engaged in a program of mapping village marine territories and facilitating the development of local management plans. Here, they hope to capitalize on the basis that *sasi* provides by encouraging the re-installation of *kewangs* and the revival of the island-level institutions (*latupati*) with an emphasis on conflict resolution and management planning. In this work, they are supported by a number of academics from Ambon-based universities, some Fisheries Agency staff, and others from the government research institute LIPI, based in Ambon. Legal experts affiliated with both Pattimura University and the government planning office (BAPPEDA) are also involved. The general plan is to promote development of a new law at the provincial level (*Perda* or *Peraturan Daerah*) which will give legal recognition to the right of villages to enter into marine resource management and erect *kewang*-style management organizations. The aim of these supporters of *sasi* is clearly resource management and conservation.

Thus, in the process of revitalization, there are three streams of thought that must be reconciled: the wish of the village fishers to preserve *adat* culture and share in the benefits from fisheries resources while protecting their territories from outsiders; the desire of local governments to extract resource rents; and the push by academics, environmentalists and managers to develop viable local fisheries conservation and management.

17.7 Synthesis

As can be concluded from the inventory, before the 1970s, a large number of villages lost *sasi* due to post-World War II social, administrative and economic change, internal village conflicts and other reasons that were difficult to trace. The more recent breakdown of *sasi* has occurred in two distinct periods and villagers are able to articulate reasons for decline in their village.

The 1970s witnessed the introduction of the new formal government structure; it was a period of decline for *sasi*. This decade was one of rapid economic growth, poverty alleviation programs in the villages, and social change. A fundamental factor in the loss of *sasi* was confusion or conflict in the village or between village authorities, which undermined the legitimacy of the village leader or the institution itself. Political instability and/or a dysfunctional *kewang* invited non-compliance and led to the abandonment of operational rules. *Sasi* being taken over by the church, either because of such conflicts or in an attempt to improve compliance, was a common scenario. The church, interested only in land *sasi* on coconuts, did not get involved in marine *sasi*, which in some cases then declined.

The 1980s was a period of relative stability. Villages where *sasi* was alive and functioning remained stable. In some villages, there was a tendency to revitalize *sasi*. The 1990s is a period of the further decline of *sasi*. The period between the 1970s and 1990s covers one generation. Modernization and commercialization, as a result of improved communication infrastructure and education and the expansion of market relations, have influenced the local culture and especially the younger generations. The generational change, together with the rapid rate of social, economic and political change in Maluku in the 1990s, is most likely the reason why *sasi* is currently suffering such relatively rapid losses.

The case studies underscore the inventory evidence that contemporary decline of *sasi* often stems from conflicts. Conflicts can in some cases be related to the social change that resulted from the introduction of the new village structure by the national government. Also, the election system has opened up possibilities for opportunists with vested interests to resume the position of village leader. On the other hand, where traditional authorities (*saniri negeri*) merged into the new government (LMD), *adat* and *sasi* have remained a significant aspect of village life. Overlap between the traditional and formal government proved to be essential in the prolongation of *sasi*.

The continuing presence of *sasi* is affected by village size and proximity to a large urban center. This is clearly illustrated by the early and rapid losses of *sasi* recorded on Ambon Island, which historically has been the government center and most densely populated island in the study area. Ostrom (1990) writes that the likelihood of users designing successful common property institutions will be improved if the group is relatively small and stable, and if it is relatively homogeneous. Our research confirms this, for *sasi* is most resilient in homogeneous villages of fewer than 3,000 people. Villages close to the capital, where *sasi* no longer functions, have exceeded a critical size, become heterogeneous and shifted from subsistence fishing and farming to large-scale fishing and urban employment.

Of all the forms of *sasi*, marine *sasi*, though less generally prevalent, appears to be relatively robust. Whereas *sasi* has generally suffered severe losses in recent years, marine *sasi* has been relatively stable and even shows signs of revitalization in the 1990s. This revival comes basically out of the heartfelt attachment of people to *adat*, in general, and *sasi*, in particular, but also the commercial value of marine products such as *Trochus niloticus*, other shellfish and sea cucumbers for foreign markets is an important incentive to keep or re-institutionalize *sasi*. The process is further being facilitated and reinforced by intervening NGOs, government, and academic supporters who see the potential value of *sasi* as a resource management system.

Where the people do not expect to benefit directly, they do not seem interested in the revitalization of *sasi*. A lack of transparency in distribution of benefits further hampers the process. There is a risk that in villages where *sasi* is being used as a tool to extract resource rents that *sasi* then turns into “a government thing” controlled by local elites. This is a disincentive for fishers to follow the new *sasi* rules.

Church *sasi* is the most common type of land *sasi* in Christian villages. The church also has the potential to play an important role in marine *sasi*. Church *sasi* derives its strength from the strong religious beliefs of rural villagers. The church is more stable than the ever-changing village governments. Church *sasi*, currently applied only to coconuts, provides direct individual benefits to the people and so is valued. Past shifts of authority over land *sasi* from *adat* to the church helped to increase the effectiveness of the institution when the *kewang* lost its enforcement capacity. In many cases, villagers believe that the threat of sanction by God is a more powerful deterrent than the sanctions imposed by the *kewang*. As seen from the

inventory, where *sasi* is taken over by the church, *adat sasi* as well as marine *sasi* may be lost. However, Haruku and Nolloth provide examples where introduction of church *sasi* actually strengthened the local institution. Therefore, in *sasi* systems that are being revitalized, the church can play an important supporting role.

In some Muslim villages, *sasi* has evolved away from *adat*. Ceremonies and inherited positions have been abandoned, and religious leaders have also not developed a direct role in the institution. *Sasi* has become more of a commercial transaction between the village government and whoever wins the auction for resource harvesting rights. Nevertheless, this also appears to be a stable and resilient institution. The benefits and drawbacks of this form of *sasi* require further investigation, but our performance analysis did show that this type of arrangement leads to problems in compliance when local fishers see benefits accruing only to elites.

It was clear that *sasi* flourishes where the village leader is legitimate (*kepala adat*) and where he collaborates harmoniously and honestly with *adat* leaders and the church. Ostrom (1990) mentions reciprocity and trust as important conditions for successful common property institutions. From our study, we would add legitimacy as another key factor for success. Apparently, the discrepancy between the theory of formal administrative structure and the *de facto* power structure that involves traditional authorities, makes village politics susceptible to manipulation and instability. Amendment of the law on village government (No. 5, 1979) may be required to accommodate the need for legitimate *adat* authority figures in rural villages and increase the stability of the local government.

Because the constitutional rules are part of *adat*, and “*adat* is something that cannot be changed” as village officials in Nolloth stated, the process of revival concerns the re-establishment and adaptation of operational rules (harvest regulations, access rules) and collective-level arrangements (re-establishment of the *kewang*). *Adat* still forms the basis of *sasi*, but a redefinition of responsibilities and involvement of non-*adat* institutions, i.e., the church, the police and higher government levels, is possible. Such adaptation of the constitutional rules carries certain risks and must be advanced with care and tact.

17.8 Conclusions

Berkes and Folke (1998) claim that institutional resilience is a built-in mechanism to react to external influences. Various social-ecological practices they mention are found in *sasi*, e.g., the temporal restrictions of harvest, inter-generational knowledge, the role of stewards, taboos and regulations, sanctions, and ceremonies etc. However, our study shows that these are not the mechanisms, but the components of the institution itself and, as a consequence, apt to change. What makes the institution, including all these components, strong (and thus resilient) is that which links these components i.e., legitimacy, trust, collaboration, transparency, etc. Relations between those who benefit from the institution and those who manage it must be sincere and transparent. A shared notion of the relevance of the institution stimulates a common objective to maintain it, in spite of external influences and in a situation where the temptation to abuse the system for personal benefits is strong.

The extent to which external factors affect the social structure in the village depends on the feedback mechanisms, i.e., the degree to which the local institution itself can mitigate the effects of external perturbations. Holling (in Berkes and Folke 1998) speaks in this context of adaptive management. *Sasi* has already outlived repeated predictions of imminent demise (Volker 1925, Cooley 1962) and is clearly both adaptive and resilient. There is, therefore,

hope of rebuilding the institution in the form of a modern element in co-management, in which the needs and aspirations of the various proponents (fishers, local governments, *adat* leaders, environmentalists, fisheries managers) can be successfully accommodated.

From our study, we identified the following factors (components and linkages) that contribute positively to the resilience of *sasi* as a local institution and, therefore, should be considered during the process of revitalizing and modernizing the institution.

1. If the village head descends from the *raja* line and if he is *kepala adat*, his position is more legitimate than in villages where this is not the case. This legitimacy contributes positively to the execution of his authority with regard to *sasi*.
2. Where the village head is elected with only a small majority, this results in fragile leadership and subsequent political instability. This seriously hampers *sasi* as well as any revitalization process.
3. A large overlap between the traditional and formal authorities in the village government (LMD) is a strong indicator that *sasi*, as part of the traditional structures, will be prolonged.
4. Vital for the process of revitalization is acknowledgement of the traditional village authorities within the local government.
5. Where traditional institutions such as the *kewang* and *tuan negeri* are acknowledged, the enforcement of *sasi* regulations is more effective. If collaboration with the police or other formal institutions is required, a clear definition of rights and mandates should be developed and approved by higher government levels.
6. It is important that the formal and traditional institutions collaborate closely with religious institutions, which are generally stable and not involved in village politics. Where there are strong bonds among these institutions, *sasi* is highly resilient.
7. It is necessary to define the *sasi* structures, powers, and responsibilities within the framework of provincial and national legislation, to provide local institutions with more capacity to deal with external threats and enable them to become involved in development planning, execution, and evaluation.
8. In newly to be installed *sasi* systems, *sasi* regulations are considered more legitimate if the villagers profit directly. In villages where *sasi* rights are auctioned and people have no control over the revenues, there is no incentive to comply with the *sasi* regulations and the institution lacks resilience.
9. Collaboration requires a shared value system, in this case, *adat*. Where through modernization the younger generation develops new values, the institution must adapt. The support and participation of the younger generation is necessary for the survival and effective operation of *sasi*.
10. Collaboration, trust and legitimacy are a function of a village size and homogeneity. When the population exceeds 3,000 people and / or the village becomes heterogeneous, the cohesive mechanisms break down. In these villages, another type of management institution, i.e., not traditional *sasi*, must be established.
11. While revamping the institution to increase functionality in resource management, it will be useful to retain traditional titles and structures as well as elements of ceremony, to provide a strong spiritual and cultural basis. However, care must be taken not to alienate new generations of fishers.

In order to perpetuate the cultural core of *sasi*, the sacred knowledge and rituals in the indigenous language must be passed down before they are forgotten. Loss of interest among younger generations and the subsequent loss of *sasi* knowledge linked to *adat* are threats to *sasi* as a cultural institution and could, therefore, undermine its effectiveness as a resource

management structure. Berkes and Folke (1998) mention TEK (traditional ecological knowledge) as the basis of management practices. *Sasi*, although it limits resource use, is in most cases not explicitly a management system i.e., a conscious effort to manage and conserve the resource. Detailed knowledge of the resource base and related natural systems are lacking, whereas non-scientific and magical explanations for resource decline are still current. Although villagers do have a notion of over-exploitation, harvest restrictions are mainly based on tradition and aim to maximize yields. In this case, it is the loss of traditional knowledge concerning *sasi* ritual, not local loss of ecological knowledge, that is a threat to the resilience of the *sasi* institution.

The trend towards the loss of *adat*-related knowledge was already clear decades ago when Cooley (1962) wrote: "Christianity and education were the primary forces which caused the local language to die out. The loss of the language was a direct blow ... to *adat* for two reasons. First, it is widely held that to be valid *adat* must be performed in the indigenous language." Secondly, he maintained, without the language, "it is already doomed for even though it may be continued for a time, the ceremonies are devoid of content and seem purposeless". Cooley concluded that *sasi* "as part of the *adat* system ... seems completely doomed in the very near future". It is interesting that 35 years later, we are witnessing not just stability but resurgence in at least one form of *adat* institution: marine *sasi*.

This raises the question: just how important are language and ritual, and how much needs to be incorporated into a revitalized institution? If proponents insist on returning to traditional style and ceremony, this could strike a patriotic chord in these times of national turmoil replete with calls for regional autonomy if not outright secession. On the other hand, too much emphasis on *adat* could alienate younger generations of fishers and inhibit the introduction of science-based management tools.

The 1990s appear to be a critical decade, i.e., *sasi* must adapt to modern society or it may, at the operational level, cease to function. According to Ostrom (1990), well-functioning local management systems are dependent on the enforcement, protection, and legal recognition of local rights by higher levels of government. As a village organization active in enforcement, the *kewang* is more functional than the police. However, the *kewang* has never obtained formal enforcement powers. In cases where the *kewang* is being revitalized, its mandate has to be formalized, and the *kewang* and police have to collaborate within a legal construction under provincial law. One possible model is that of Itawaka, where as a result of a village proclamation in 1995, the *kewang* became part of the official government. On the other hand, an arm's length relationship with the local government also has certain advantages. Various models need further investigation. Wherever the local institution is placed, it will still require legal recognition and support from higher government levels.

Chapter 18

Overall Discussion and Conclusions

18.1 *Adat* and the Definition of Access Rights in Inshore Waters

In the Maluku province, certain marine tenure rights and management responsibilities are a part of culturally-embedded institutions and traditions known as *adat*. Coastal villages typically claim *de facto* rights of access and withdrawal over fairly extensive areas of both land and sea, collectively called the *petuanan negeri* (village territory). Whereas some or all of the land territory is divided among local clans, the marine area is communally owned. Marine territories abut the land territories. In the Lease Islands, they usually extend out to the edge of the reef slope but in southern Maluku's Kei Islands, the marine village territory, in some cases, extends out to the farthest limits from which the land can still be discerned. Access and withdrawal rights in the marine territory are usually restricted to and shared among community residents i.e., the resources are common property. However, exclusive rights of access and withdrawal for particular areas or species may also be sold or auctioned by the village government to individuals or companies, i.e., converted from common property to private goods. Control over the marine village territory is, in some cases, vested in an organization called the *kewang*, which is part of a traditional institution known as *sasi*.

Even where the marine territory extends only to the reef slope, the area beyond this but still within sight of land may also be under a degree of local control. For instance, lift net operators wanting to catch fish offshore of a village on Ambon Island usually have to pay a fee to the village government. These fees are not official, nor are they legally enforceable, but they are usually paid because the lift net operator knows that local fishers will vandalize his nets and craft if he does not pay (J. Sohouwatt, Toisapu, *pers. comm.* 1997; H. Wattimena, village head Seri, *pers. comm.* 1998). In this case, the fish caught by the lift nets are a type of toll goods.

A third level of *de facto* fishing rights may extend far out to sea, where several villages on one or more islands have recognized fishing grounds. These constitute common pool goods that may or may not be entirely open access. Fishers who exploit the fishing grounds may be subsistence fishers in sail-powered outrigger canoes, or commercial fishers in larger motorboats with a crew. The small sailing canoes (*perahu*) travel surprising distances, and may fish side by side with industrial vessels. Vessels over five GT are in theory restricted to waters three miles or more from shore. However, they are also known to enter and exploit inshore waters traditionally claimed by coastal communities. Indeed, villages may lay claim to waters more than three miles offshore. In other words, the boundaries of inshore and offshore areas are not clearly evident or agreed upon by either the small-scale or industrial fishing fleets.

18.2 Need for Better Marine Resources Management in Maluku

The *sasi* institution is in decline and in many villages has disappeared, but the need for local management is more urgent than ever. The majority of villagers are still directly or indirectly dependent on the fishery. In the study area, there is an overall decline in social interaction and cooperation, compliance to fisheries rules, fish catches, and environmental health. Because of bleak prospects, fishers do not urge their children to be fishers, putting at risk the fishing culture of Maluku. Collapsing inshore fish catches have driven subsistence fishers ever farther

out to sea. Their fishing grounds now overlap the area utilized by commercial and industrial fishers and future conflict between the sectors is inevitable if management and conflict resolution arrangements are not set in place. Recent research indicates that several key commercial stocks are being over-fished and the region is losing productive and diverse coral reefs because of destructive fishing practices.

NGO and academic researchers, noting these trends, have begun to push the government to look for ways to revive or establish local management, with *sasi* as the basis. At the village level, the incentive for considering local management is most often the potential for the village government to collect resource rents, which is already an established feature of *sasi* as currently practiced in Maluku. For fishers themselves, the incentives are more linked to culture than to a consciousness of the need for management. In what ways is *sasi* a suitable model or basis for future fisheries management arrangements?

18.3 *Sasi* as a Management Institution in Maluku: Patterns of Interaction

Management institutions have commonly been discussed in the literature in terms of a game that has defined players, constitutional rules, collective-choice rules and operational rules (Gardner and Ostrom 1991). Patterns of interaction among stakeholders of the resource under management can be discussed in terms of the institution as operationalized in its cultural, physical, biological, and economic contexts. Stakeholders will be motivated to comply or cooperate with the institution according to the incentives and options inherent in their situation. The outcome of these interactions can be assessed in terms of the contribution to social and biological sustainability, and the efficiency and equitability of management.

18.3.1 *Constitutional rules*

The constitutional rules of the *sasi* institution stem directly from *adat* and are, therefore, rather complex and philosophical as compared to, for instance, a scientifically-based modern management institution. *Adat* defines the *sasi* institution and lays down the basic ethics and codes of conduct. The constitutional rules thus form an intrinsic part of Maluku culture. They are generally known by the populace, but are not written down. One example is the concept of the unity of man with nature and the belief that to destroy nature is to invite the wrath of the ancestors. Others include such things as the inheritance of leader status through the male *raja* line, the responsibility of the *tuan negeri* and *ketua adat* to preserve sacred words and knowledge for use in ceremonies, and the names of founding families who have the right to hold certain positions such as *tuan tanah*, *tuan negeri*, *kepala kewang*, *marinyo*, etc. The status of the village territory as the common property of village residents, where outsiders must obtain permission for access and withdrawal rights, is also a constitutional rule embedded in *adat*.

18.3.2 *Collective-choice rules*

Collective-choice rules define how the players in *sasi* work together. For instance, they include the rules which define how clan leaders, *kewang* members and other traditional leaders are selected, and also how they subsequently perform tasks such as the amendment of existing operational rules. In strong *adat* villages, these collective-choice rules are dictated by *adat* tradition. One such rule is that decision-making should be by consensus. Nowadays, such collective-choice rules may be written down together with *sasi*'s operational rules.

In some villages, modern innovations intermingle with tradition. For instance, there are villages where *kewang* members are chosen on the basis of residence in recently invented administrative units instead of on the basis of clan affiliation (Lokollo et al. 1996). Also, because of the central role of the village head (*kepala desa*) in modern *sasi*, rules for selection of the village head must also be listed as collective-choice rules for *sasi* as an institution. Closer to the operational end are the rules which state when and how often the *kewang* will meet, how decisions regarding the opening and closing of *sasi* will be made, and how *sasi* rules can be reviewed and revised or new rules adopted. The smaller the village, the less formalized the structure. In a small village having only church *sasi* on coconuts and no *kewang*, there may be no written collective-choice rules but there are persons with authority to call meetings etc. as they see fit.

A basic principle involved in the resource management aspect of *sasi* is one of closed and open seasons. Areas of land and sea, particular crops or marine species are placed under a harvest prohibition for varying lengths of time (Ellen 1978; Kriekhoff 1991; Bailey and Zerner 1992). While “under *sasi*”, these areas or resources may not be harvested without the express permission of the *kewang* and the village head. The *kewang* does grant exemptions, usually in cases of dire economic need or to provide resources to support a local cultural or religious celebration. How and when exemptions may be granted is another example of a collective-choice rule.

Resource exploitation rights in the village territory are based on residency status and clan, which is an example of an unwritten collective-choice rule. In some cases, the village government, either alone or with the *kewang*, defines rights of access and withdrawal that may be purchased by payment to the village government. This form of *sasi* (*sasi lelang*) has a long history of application to land resources but may be a relatively recent innovation (i.e., in the past 20-40 years) in terms of controlling marine resources (Zerner and Thorburn, *forthcoming*). Collective-choice rules concerning sale of harvest rights are usually written down. Time-limited access and withdrawal rights are either sold for a set price or auctioned. The sale or auction may be open only to residents or also to outsiders. Funds raised go into village government coffers (e.g., Pelauw, Kabauw, Nolloth, and the Itawaka village) and may be shared with the *kewang*, church and/or mosque. The degree of accountability and transparency surrounding the deal and the level of benefits distributed among community members is highly dependent on the character of one key figure: the village head.

18.3.3 Operational rules

The operational rules of marine *sasi* specifically regulate day-to-day activities in the marine village territory and/or that part of the village territory designated as the *sasi* area. The timing of the imposition and removal of the harvest prohibition are operational rules that may be determined by the village head alone, especially in cases where resource rights are sold to provide money for village administration. In other cases, other village leaders (*kepala kewang*, *tuan negeri*, church leaders and representatives of other village institutions) take part. Areas under *sasi* may be marked using physical markers such as wooden stakes crowned with coconut leaves and driven into the sea bed to demarcate a fishing area. The other common way of advertising the imposition of operational rules is the public pronouncement of rules during ceremonies to open and close *sasi*. Nowadays, in many cases where rules are rather elaborate and have been modernized, they are written down. Operational rules define, for example, the boundaries of the *sasi* area and species under protection, the type of fishing gears that are prohibited, prohibitions on cutting trees on the river bank etc. These operational rules may be indigenous to the community or borrowed. An example of a rule borrowed

from national legislation is the prohibition on blast fishing and use of poisons. People often refer to the national gear ban as a *sasi* rule even though it is not formally written down in the *sasi* rules. In other villages (e.g., Porto, Itawaka), operational rules under *sasi* have been adopted as formal village law. Operational rules are also subject to revision to respond to changes in technology and new social problems, as seen in Haruku (Kissya 1994).

18.3.4 *The players in sasi*

People having a decision-making role in marine *sasi* include *adat* leaders, *kewang* members, the village head and, to a lesser extent, religious leaders. The role of fishers themselves is often passive in terms of decision-making but they are key players in that their willingness to comply with or break *sasi* rules has a direct impact on the institution. Women and, to a large extent, youths, are not involved except as indirect supporters.

In many cases, the character and legitimacy of the village head are the key to the successful function of marine *sasi*. Under modern government structure, the village head has great power and this often results in decision-making that is highly centralized and efficient. LMD members appointed as section heads may lack appropriate skills or be poorly informed about village issues and the activities and programs of village organizations. In such cases, government decision-making may rest almost exclusively with the village head. Thus, the modern village head may hold a much more powerful and authoritarian position than the *raja* of former times, who was obliged to take counsel from his constituency. Officially, the people elect the village head and, in theory, anyone could be elected. However, Nolloth is a fine example of a situation where the village head was selected as the legitimate village leader because of his lineage, i.e., he is the *raja*. His LMD members are also all traditional authorities. In *sasi* villages, the village head has to be of the royal (*raja*) line in order to be fully acknowledged. If this is the case, he will be inaugurated not only by the village government but also by the *adat* leaders, and will assume the sacred function of *kepala adat*. This allows the village head to be involved in both formal village programs and traditional ceremonies.

External interests may influence the election of a village head, as was reported in Haruku and also in Hutumuri. Elections can be manipulated either in favor of or against traditional leaders. Under the Indonesian system, all candidates must be screened and approved by the government. Popular candidates may be disqualified at this stage, or some votes may simply be neglected during the election process. On one hand, lingering *adat* structures may make nonsense of the concept of democratic elections. On the other hand, even traditional leaders with broad popular support may be vulnerable.

The other key players in *sasi* are the *kewang* members, who patrol *sasi* areas, and catch and prosecute rule breakers. In one village, there may be one or more *kewangs*, divided along the lines of family affiliation (see the Nolloth case study) or an area of jurisdiction i.e., land or sea, as in Haruku. *Kewang* members, aside from the head of the *kewang* who inherits his position, may be selected in a variety of ways. For instance, there may be one *kewang* member per founding family, or one for each subdivision of the village land, or one per village administrative unit, etc. (Lokollo et al. 1996). The number of members in a traditional village *kewang* varies but often exceeds 20 people. In villages where *sasi* has evolved into an almost purely commercial transaction stripped of *adat* ceremony, the *kewangs* are no longer traditional-style village police, but the hired hands of the person who has purchased resource extraction rights (see Kabauw and Pelauw villages, Appendix 7).

18.3.5 Enforcement

All community residents have the duty to report violations of *sasi* to the *kewang* or village head. The rules are regularly publicized through *kewang* rituals as well as through the church. In the past, compliance depended on local beliefs that the rituals around opening and closing harvesting areas are witnessed by ancestral spirits. These witnesses were believed to punish those who violate *sasi* prohibitions by inflicting illness or even death (Bailey and Zerner 1992). The introduction of modern religions has influenced *sasi* practices. For instance, traditional *sasi* rituals are often followed by prayers in the church. This is done to ask the protection of God, and to reinforce the concept that people who do not obey the rules will be punished not only by the *kewang*, but also by God.

The *kewang* meets at intervals to consider cases of rule violations, and interrogates the accused before deciding on sanctions. Sanctions in the past often involved public shaming; today, they can be monetary. In Itawaka, if family members of the *kewang* are found disobeying the law, the sanctions are doubled. *Sasi* regulations apply not only to local community members but also to outsiders; however, enforcement is much more difficult if outsiders are the rule breakers, because the *kewang* has no legal powers of enforcement.

Other enforcers who may be involved in marine *sasi* are the police. Their role has increased since the 1979 law on village government left the *kewang* outside of the formal government structure. However in most cases, the police are too distant to be of assistance. They usually get involved only when asked by a village head to take away someone apprehended by the *kewang*. Police involvement is only appropriate in cases where the *sasi* regulation coincides with a formal village, provincial or national law. The navy also have jurisdiction in such cases (for instance, in enforcing a blast fishing ban) but we never heard of any instance where the navy personnel were sighted in a village territory. In general, villagers have much more respect for the *kewang* than for the police. The *kewang* has greater legitimacy and is seen as being more fair and reliable.

18.3.6 Revision of rules

Sasi rules are not static. Both the rules and the reasons for applying them have changed through time (Zerner 1992). In Haruku, for example, *sasi* rules were formally revised in 1985, in part to move *sasi* more in the direction of resource conservation (Kissya 1995). The rules were drawn up during a meeting of the customary council (*dewan adat*), which is equivalent to the traditional *saniri* of clan chiefs. The rules were then made official when they were signed by the *raja*, the head of the land *kewang*, and the head of the sea *kewang*. At that time, the *raja* was also the village head.

Sasi rules have also been formally written down, with or without revision, in Ihamahu (in 1995), Nolloth (in 1990), and Itawaka (1995) (Appendix 6). In both of the latter cases, the village government played a prominent role, whereas in Ihamahu and Haruku, the process was more *kewang*-driven.

18.3.7 Revitalization

Because the constitutional rules are embedded in *adat*, *sasi* never really “dies”. However, operational and collective-choice rules can and do cease to function. Revitalization of a local institution therefore mainly involves re-installing the collective-choice decision-making bodies and processes and reviving or rewriting operational rules. In some cases where there is a

power shift from *adat* leaders to the church or government, adjustment of constitutional elements also occurs.

18.3.8 Compliance

In the eyes of fishers, compliance to fisheries rules is significantly better in villages with marine *sasi*. Although written records of violations are not kept at the village level, verbal testimonies by village leaders indicated that intrusions into guarded *sasi* areas were not common. When they did occur, they were usually attributed to outsiders rather than locals and in many cases, fishers from particular non-*sasi* villages were named as the likely or known perpetrators. Where the *sasi* area was not guarded or the enforcers not respected, intrusions were reputedly more common. In general, fishers are expected to comply with, or violate fisheries rules, depending on the set of incentives and options available to them.

18.4 Incentives to Cooperate and Comply

To influence the success or failure of local fisheries management is to influence the perception of fishers regarding the management system, for fishers either comply and cooperate with management or do not, based on their perceived reality. When fishers choose not to comply with rules, there is no effective management. In the course of interactions among marine resource stakeholders within the historical, cultural, and economic context of Maluku, incentives and disincentives to cooperate and comply with resource management have developed.

18.4.1 Incentives related to enforcement of *sasi*

Enforcement power

Enforcement capacity is very limited whether one considers *sasi* practitioners (*kewang*) or government authorities (police and navy). *Kewang* members are generally well motivated but lack equipment such as speedboats, communication devices, etc. The police may be useful as a backup for an active *kewang* but are rarely on the spot to patrol or arrest offenders. Neither police nor navy are well-equipped to deal with the vast expanse of sea in Maluku, and their managers have little motivation to improve the situation.

Fear of retribution from God or of being socially outcast does appear to constitute a powerful incentive for fishers to comply with local rules within their village territories. Even so, *sasi* fishers are pragmatic. In times of need, they reserve the right to apply for exemption to the rules and expect leniency in enforcement because “we have to eat fish”. This pragmatism is also exhibited in the form of resistance to the idea of placing any essential food or commercial fish under *sasi* and especially under church *sasi*, where sanctions can include sickness and death.

The risk of being caught by *kewang* or police, or punished by God, often does not deter outside fishers from using illegal gear types or stealing *sasi* products. The *kewang* has no legal right to impose the kind of large fines or jail terms that might discourage those less spiritual members of society such as the blast fishers and non-Mollucans.

Legitimacy of enforcers

There are times when the enforcement efforts of the *kewangs* fail, in which case they may appeal to the village head who will either punish the offenders directly or call in the police.

Because of their impartiality, the *kewang* members are respected enforcers. Police, on the other hand, are commonly perceived as more distant, less legitimate and less trustworthy. A fisher's personal perspective on the legitimacy of the enforcer influences the rate of compliance. For instance, we noted in Hulaliu that fisheries rules were broken as a form of political statement against the local "enforcer", the village head.

18.4.2 Incentives related to feedback loops between the *sasi* institution and the community

Spirit of *sasi*

Sasi is based on *adat* and in traditional villages, it is indissolubly connected with the ancestral spirits and conventional codes of behavior. In both Nolloth and Haruku, for instance, people explained: "*Sasi* has a spirit, and everyone carries it because it is *adat* and part of our culture". In other villages, the spiritual significance was rarely mentioned but people denied that *sasi* had died. The church tends to take over the spiritual role in *sasi* but it can never completely replace *adat*. *Sasi* may have different shapes and practices, and rules may even cease to be applied, but the basic principles are still retained in village consciousness. Thus, *sasi* is appreciated in *sasi* and non-*sasi* villages alike.

The importance of ceremony

For strong *adat* communities, the physical acts of *adat* ceremony attached to *sasi* are important to village self-image and pride, and help reinforce the institution. In more modern societies, however, there is less willingness to spend time on such physical manifestations of local culture. Transformation of ceremony into a tourism product, such as the public festival around *sasi* in Haruku, provides economic incentives to uphold the institution.

Property rights

Village tenure over a defined area of both land and sea is strongly entrenched in the culture and recognized as legitimate by fishers even though it is not formally supported by law. This legitimacy of traditional tenure is an incentive to cooperation and compliance within *sasi* if it is accompanied by a degree of security of access or guaranteed benefits for local people. Tenure under *adat* law is, however, insufficient. A comprehensive management system that sought (among other things) to ensure equitable access for local needs would require legal recognition of community access and withdrawal rights.

Leadership and legitimacy

Respect for *adat* and elders plays a large role in the legitimacy and popularity of *sasi*. It is, therefore, an incentive to comply with *sasi* rules, as long as the village government has either incorporated or acknowledged traditional leaders. Village leaders who are from the *raja* line have a powerful incentive to cooperate and participate in *sasi* because of the social prestige and legitimacy factor. A village head from outside of the "royal family" can also benefit from the legitimacy conferred by association with *adat* authority, through incorporation of traditional leaders into his LMD and LKMD. In fact, not paying attention to traditional structures can lead to a paralyzed government (see the Hutumuri case study). Participation in *sasi* ritual or showing interest in reviving *sasi* is also very good for the image, and can be used as a tool to stabilize leadership (the Hulaliu case study). The church also seeks to increase its role in *sasi*, in part to counter the legitimacy of *adat*. The church, by cooperating with and supporting

adat leaders, enhances its own positive image as a useful, practical player interested in improving the community well-being through *sasi*.

Social approbation

The enhanced status granted to *kewang* members is clearly an incentive for them to continue to volunteer their time to management tasks. Along with this, these men also have a sense of responsibility rooted in *adat*. Whether this will continue to be an incentive for the next generation is a topic of discussion among current traditional authorities. Only in Haruku has the *kewang* taken positive steps to groom village youth for taking their place in the institution by devising a youth *kewang* group.

Flexibility and local adaptation

“*Sasi* is not a collection of rigid *adat* regulations. It will continue to be dynamic, responsive to the changing times, as long as its spirit, soul or life is maintained and does not change” (Kissya, 1994). The fact that *sasi* rules are developed locally is an incentive for local fishers to support *sasi* compared to an institution controlled from some distant urban center. In every village, the rules are different. In some cases, respect for *adat* or traditional mores, is very strong; in other cases, it is the church or the village government that plays a leading role. Resources subject to *kewang* rules or seasonal closures may be harvested by individual fishers living in the community (e.g., Ihamahu), by the whole community in a single communal harvest (e.g., Haruku), or by individuals from within or outside the community who have paid for the privilege of access and withdrawal (e.g., Nolloth, Pelauw, Kabauw). Different species are regulated in different villages, depending on the available resources, market price and fishers’ preferences. *Sasi* has the potential to provide management that is closely tailored to local needs and priorities.

The negative side to this flexibility is that there is no common minimum standard of resource management nor any recognized standard of conservation associated with management rules. In some cases even where there is *sasi*, management is virtually absent. *Sasi* rules may or may not be written down and the *kewang* and other players may be active or dormant. In Seram, for instance, we found a nominal form of *sasi* under which the closed area applied only to outsiders, while local residents had unlimited access to the resource.

Clarity of objectives

The diversity of *sasi* as applied in Maluku is at once its strength and a weakness. When asked, people can rarely elucidate any coherent or compelling reason for supporting *sasi*. *Sasi* simply “is”, and “*sasi* is good”. There are no clearly defined and widely recognized resource conservation and management function that are directly related to identified needs. Thus, *sasi* as an institution is unlikely to mobilize strong support for resource management or conservation in the face of, for example, economic distress or political chaos. In other words, it is easy to generate lip service to *sasi*’s cultural value but more difficult to stimulate active participation, because people lack a strong shared vision of *sasi* as a relevant and action-oriented institution.

Social benefits

Sasi is generally perceived to be useful and beneficial, even in villages that no longer have the institution. Fishers in *sasi* villages perceive benefits in terms of higher levels of cooperation

and social harmony. This perception that *sasi* is a good thing for society, in general, is an incentive to compliance.

Source of government revenue

Village governments have an incentive to develop and support *sasi* as a way of collecting resource rents. However, as seen in Nolloth and Hulaliu, this must be approached with some sensitivity as a majority of fishers strongly object to the sale of access and withdrawal rights to outsiders or to village elites. There is also resistance to any scheme that replaces direct benefits to harvesters with indirect benefits provided through local government. To be successful, this type of *sasi* must be directed by a highly respected and legitimate leader.

Environmental benefits

There is some evidence that sea cucumbers and top shells (*Trochus niloticus*) are protected by *sasi*, and *sasi* areas patrolled by *kewang* may, in some cases, be relatively protected from the use of destructive gear types. There is also evidence that the protected marine mammal, the dugong, is also largely restricted to the marine territories of *sasi* villages (de Longh *pers. comm.* 1998). Lack of general recognition of such environmental benefits probably means that they do not as yet constitute incentives, except in particular cases such as Nolloth (see the Nolloth case study). However, the value of *sasi* in resource conservation is not lost on NGOs and academics (Yayasan Hualopu 1996, Evans et al. 1997), who use the example of *sasi*'s time-limited "no-take" reserves for top shells as a reason to promote revitalization of the institution for management and conservation.

There is evidence that people in Maluku are beginning to become aware of environmental issues and this could lead to environmental concern being an incentive in future. For example, fishers in these small villages often pointed to water pollution, garbage, modern fishing gears and blast fishing as contributors to a generally perceived decline in environmental health and fish catches in the region. As yet, there are no signs of people acting to deal with environmental threats except in the case of the environmental NGO and village environment projects (mangrove planting, endangered bird program) started by *kewang* members in Haruku. Elsewhere, environmental consciousness tends to be limited to sweeping litter up from roads and yards – litter that often is disposed of in a river or the sea.

18.4.3 Incentives related to biophysical, political and social context

Dependence on fisheries

Villagers in Maluku are very much dependent on fisheries for primary and secondary employment. When land crops fail or prices slump, the fishery is the employer of the last resort which non-fishers depend upon as a form of insurance. For instance, the intensity of use of marine resources increased in the aftermath of the 1990-91 collapse of clove prices in Indonesia. Before, a large part of the village income was derived from the spice trade, and the Lease Islands and Ambon were prosperous. Between 1991 and the price revival in 1998, many people who formerly harvested cloves for a living turned to the sea as a source of income.

This dependence and the basic love of fishing expressed by villagers are incentives to cooperate in management and/or conservation efforts if/when fishers recognize a clear and immediate threat to their fishery and also appreciate that management options are available. This can be seen in the case studies of Seri and Hutumuri, where artisanal fishers are trying to interest

the local government in developing a management strategy to protect their interests in the face of competition from large-scale operators.

For artisanal fishers, lack of education seriously limits their job prospects, making the fishery even more crucial to their survival. Our results reveal that where fishers feel pressured to use destructive gears or break rules because of economic need and a lack of alternatives, this incentive is more powerful than the rather empty threat of being caught and punished.

Recognition of resource depletion and management options

We found that fishers clearly recognize that inshore and pelagic fisheries resources in Maluku are in decline and their livelihoods are threatened. Few would encourage their children to enter the fishery even though they themselves find it to be a fulfilling occupation. However, the realization of declining resources cannot as yet be considered an incentive to cooperate in management because fishers, in general, do not perceive that management options are available to redress the situation. They still consider ocean resources to be unlimited, even though local resources may be depleted. Their solution lies in increasing their fishing power (bigger boats and motors). In this, they are supported by the Fisheries Agency, national development initiatives, and various community development programs.

Trust

Rural Maluku fishers have a very low opinion of the police and little regard for local government which does not have legitimacy conferred by association with *adat*. They also feel cut off from higher levels of government and the Fisheries Agency. While these are incentives to cooperate with *sasi* at the village level, they are disincentives to involvement with any higher level of management institution.

Social structure

The social classes are clearly defined and separate in these Maluku villages. Fishers are usually among the poorer class and outside of the *sasi* power structure. This class structure is a disincentive for poorer fishers to participate in management. However, because non-participation and obedience to authority is the cultural norm, fishers rarely perceive this to be a problem. This may change as Indonesia works through the current political and economic crisis, but change will not come quickly to these conservative *sasi* communities.

The individualism of fishers and the predominance of family-centered culture in Maluku are strong disincentives to cooperation with outsiders within a resource management framework. Because of their inferior position in areas of public policy and community decision-making, women fail to participate in resource management, even though they are very active in the fishery.

Political support

Enlightened staff in regional government offices and in the Fisheries Agency have for years recognized the benefits of local management rules. While not entrenched in formal law, *sasi* is often allowed and encouraged to flourish because of the recognition that official means of enforcement of fisheries law are not sufficient to control Maluku's huge marine territory. Local *kewangs* provide a service to government without cost, have intimate knowledge of the local area and the character of the fishers being regulated, and live next to the resource being guarded. This is therefore, from the government perspective, a highly efficient and cost-

effective arrangement. In addition, the fact that many regional officials were born in island villages provides them with a sentimental attachment to *adat* tradition. However, problems arise when there is a power struggle or turf dispute between the *kewang* and the police.

Centralization and Pancasila

The government-promoted national ethic of non-questioning obedience to central authority is a powerful disincentive to village leaders who otherwise might institute reforms or introduce new village-level management structures. When all actors down a hierarchical chain wait for some higher authority to take responsibility for decisions, very little gets done outside of the official, centrally programmed activities. A second disincentive arising from the centralized national policy is the complete lack of approval for any non-governmental, grassroots fishers' organization. In the post-Suharto era of reformation, this may change.

Political instability or dissatisfaction

Non-compliance to *sasi* and other fisheries rules may constitute a political protest. Political turmoil at the village level is, therefore, a negative incentive.

18.4.4 Incentives related to the structure of the fishery and its markets

Infrastructure development

It was pointed out that improved transportation links to city markets in Nolloth and Seri spurred an explosion in the number of fish traders as well as an increase in fishing efforts. In Nolloth, this was in turn connected to local inshore resource depletion. The strong urge to take advantage of any new market opportunities is a disincentive to participation in management where compliance with regulations demands a reduction in fishing pressure.

Resource conflicts

One of the more commonly reported resource conflicts involved intrusion by outsiders into *sasi* areas. Loyalty to the village territory is an incentive to report and deal with intrusions from outside. In our study area, there have been instances of spontaneous vigilante groups traveling to other villages to punish fishers seen stealing *sasi* products.

Competition in the larger fishery leads to conflicts between the artisanal sector and commercial enterprises with seiners, FADs, lift nets and compressor divers using poisons. In the future, conflict among sectors may well be a critical point in encouraging the artisanal fishers to organize themselves and demand clear access and withdrawal rights on pelagic fishing grounds. This is an issue that, unlike intrusion into *sasi* areas, directly affects family incomes. Currently, national law theoretically restricts access of larger vessels to inshore waters. In practice however, large boats do operate close to shore and there is no institution to which artisanal fishers can successfully appeal for relief or compensation.

Profit sharing in the fishery

Where fishers work together such as in the small-scale net fishery, lift net fishery, purse seiners and the pole and line boat crew, there are financial incentives built into the profit-sharing mechanisms that encourage maximal exploitation. At the same time, there are no effective catch limits or enforcement of mesh size restrictions. These systems of profit-sharing, which

may be long-standing traditional agreements among fishers and have widespread legitimacy, constitute disincentives for cooperation with any management regulation limiting catches.

Market structure and competition

The great majority of fishers work alone or in family groups. Many service only local markets where the price givers are predominantly female small traders. These traders, often fisher's wives who trade in both fish and agricultural products, in turn operate within price ranges determined by the powerful fish brokers running the city markets. Fishers hired as crew on larger vessels are in an even weaker market position. They receive very small proportions of the catch value. Neither they nor their more wealthy masters have much economic power relative to the fish brokers and fish companies who determine prices. This leaves fishers and small traders operating in a climate of intense competition and makes collaboration in management of the wider fishery more difficult.

18.4.5 Incentives related to relationships with external agents

NGO and university intervention

The attention of researchers and NGOs is a source of pride to *sasi* villagers and an incentive to retain the institution.

Interaction with sub-district, district and provincial fisheries management bodies

The government is preoccupied with intensification of the fishery and, therefore, provides no incentives or direct support for conservation or other management tasks. Enforcement by higher levels is patchy or non-existent at the village level and communication among the various departments and between them and the village is also limited.

18.5 Outcomes

Outcomes are measured in terms of equity, efficiency, social sustainability, and biological sustainability.

18.5.1 Equity and efficiency of management

Equity in terms of access to resources regulated under *sasi* is not a major issue because *sasi* covers few species and small areas, while fishers freely exploit the larger pelagic fishery. *Sasi* has also no effect on the distribution of fishing gears or economic disparities. However, fishers are not neutral about equity issues in cases where harvest rights are sold or auctioned (either *sasi lelang* or *lelang* that occurs outside of *sasi*). Fishers prefer a system where direct benefits are shared and they find the sale of harvest rights to people outside the village to be particularly objectionable. The degree of accountability and transparency surrounding resource rental (*lelang*), and the level of benefits distributed among community members, is highly dependent on the character of one key figure: the village head. If benefits are not seen to be fairly distributed or if they accrue to outsiders, this can lead to non-compliance. On the other hand, where the decision-makers are respected, this arrangement can be very efficient and also reasonably equitable in that the profits are used for the benefit of all through community development (the Nolloth case study). Where marine resources under *sasi* are harvested as a communal crop and distributed equitably among the population (for example, the Haruku

lompa fishery), fishers accept this as fair and do not complain about restrictions to their individual rights of withdrawal. Control over resource management is perceived by fishers to be tighter in *sasi* villages, and compliance to fisheries rules is greater. The communal decision-making process is also stronger and more stable. The level of bureaucracy in the *sasi* institution is minimal, making it potentially very efficient.

Although decisions affecting the marine village territory, for instance, gear type restrictions, are said to be made “by the community”, the voices of fishers may or may not be heeded, and women are excluded from decision-making. *Sasi* is, therefore, not equitable in this sense. However, the hierarchical structure makes decision-making very efficient. The level of democracy and representation of interest groups varies from village to village. Our research reveals *sasi* to be fundamentally male-dominated and paternalistic, with the general populace in most cases not questioning that all is being arranged for the greater public good and according to traditional law and culture.

18.5.2 Social sustainability

Sasi has significant positive impacts on social sustainability. *Sasi* villages have higher levels of interaction around community issues, a stronger tradition of collective action, and less conflict. Fishers in villages practicing *sasi* enjoy the same standard of living as fishers in other villages. There is no demonstrable economic benefit to them but neither do they suffer economically from *sasi*.

18.5.3 Biological sustainability

Sasi rules that restrict access and limit harvest times clearly have the potential to provide ecological as well as social and economic benefits. It is clear in the case of top shells (*Trochus*), that this specific species, currently on Indonesia’s endangered species list, could easily be extinct in Maluku were it not for *sasi*. When several *Trochus* habitats were surveyed, the shellfish were only found inside or close to the Nolloth *sasi* area where they are under local protection. None were found in the suitable habitats in non-*sasi* villages, where, according to local informants, there had been a commercially exploited resource in the past. Likewise, sea cucumbers, also protected under *sasi*, had the same pattern of distribution.

Biological surveys in northern Saparua Island suggest that where the marine village territory is rented out and therefore guarded, there may be some protection of coral reefs from blast fishing. However, blast fishing is a problem even in villages where the *kewang* tries to enforce the prohibition, as in Haruku and Ihamahu. Protection efforts are hampered by the *kewang*’s lack of legal status, equipment and financial support.

The possible impact of *sasi* on the broader (pelagic) fisheries resource is not clear. In seeking to document the impact of the *sasi* institution on fisheries, one significant problem is the general lack of “fit” between the *sasi* institution and the modern fishery that is geared to deep-water pelagic fish. The fishers’ perceptions of declining stocks pertain to the impact of all forms of resource management as it exists in Maluku and not specifically to *sasi*. Fish catches of artisanal and small-scale fishers are in decline throughout the study area, signaling the failure of centralized fisheries management regulations, such as they are, to conserve resources and fairly allocate resource withdrawal rights in Maluku.

It is unlikely that, through protecting small areas of coral reefs and sea grass beds, the *sasi* institution provides even an incremental and indirect benefit to the larger fishery, unless these inshore areas happen to be critical spawning or nursery habitats for pelagic fish. However,

the ethic underlying *adat* and *sasi*, and the example of management provided by functional marine *sasi*, may well have positive psychological impacts on fishers. Through their familiarity with *sasi*, fishers of all kinds are introduced to fundamental and important management concepts packaged in a culturally acceptable way.

18.6 The Potential of *Sasi* as a Model for Local Management in a Co-Management Structure

As fisheries were developed over the last four decades, most countries increased the role of the national government in managing fisheries. National governments, however, typically failed to develop an adequate substitute for, or complement to, traditional, local resource management regimes. In many cases, what is needed now is a more dynamic partnership using the capacities and interests of the local fishers and community, complemented by the ability of the state to provide enabling legislation, enforcement, and other assistance (Pomeroy and Williams 1994). This includes a renewed appreciation for locally-developed sea tenure practices (Ruddle and Johannes 1985; Manghanas 1994). This approach to fisheries management will require a shift away from a centralized, “top-down” form of management to a new strategy in which the fisheries managers and the fishers jointly manage the fisheries. This sharing of responsibilities and/or authority between the government and local resource users to manage the fishery or resource (e.g., coral reef, mangrove shoreline habitat) is called “co-management” (Pomeroy and Williams 1994).

18.6.1 Co-management in a centralized society

The organizational structure in Indonesia is centralized (Dauvergne 1997). Through the government structures, village organizations are directed and controlled. Development planning as well as development of fisheries law and policy, is largely controlled from the center. Ordinances and decrees are passed through provincial, district and sub-district levels to the villages. Communication from the villages back to higher political levels is difficult. Development schemes focus on intensification of resource exploitation. If a village wanted to consider sustainable development options, for instance, the possibilities for adapting a national program could be limited. If we talk about co-management, we have to take these structures into account.

Within the village, the situation is similar. The centralized structure discourages input from the general population. In most cases, the people passively trust the village head to do what is best. It is difficult in this context for a village government to develop resource management and conservation programs tailored to local needs and aspirations. The village leader has a relatively powerful role and management of the fisheries depends for a great deal on whether he has the motivation and dedication to be proactive.

There is also strong segregation and poor communication between the rich and poor and between men and women. There are no formal structures that allow ordinary people to participate in political matters, but even if they were encouraged to, they are not used to expressing an opinion. Issues of concern are discussed informally within families. If necessary, people contact a village elder or official they trust to express their needs, but their chosen representative may have little influence on village matters.

How can we achieve functional and stable cooperation within the village and between the village and the various government levels? One obstacle is the lack of awareness at various

political levels that a problem in fisheries exists. Secondly, policy concerning fisheries management, where it exists, is not communicated to village level, let alone implemented. The centralized political and social structure obstructs co-management efforts in the region and also hinders effective participation of all the stakeholders.

Obviously, co-management efforts should be adapted to the local situation. Instead of trying to change local structures, we have to find a way to use them, keeping in mind the various incentives at work in the region. Existing or revitalized institutions, such as *sasi* and the *Latupati*, could be tools to promote exchange of information among the various levels of management. To combat the lack of awareness of fisheries and management issues requires extension work and discussions on all levels. Here, NGOs and universities as well as government departments have important roles to play. Once there is agreement on the need to manage the resources, it could still be difficult to unite the fishers and other villagers for collective action and participation in management. There are no village structures that allow a high level of participation.

One option would be to play it according to current norms and that would mean that the village head plays a key role. The risk is that with re-elections or political instability, the quality and consistency of management would be adversely affected. A second approach would be to base the institution on a more stable authority, such as the church or an *adat* institution such as *sasi*, or some amalgam of the two. In such cases, leadership would remain stable regardless of election terms of the village government. The management institution could either be formally nested in the village government, as has already been instituted in the village of Itawaka, or be more autonomous and strongly *adat*-based, as in Haruku. If kept truly at arm's length from the village government, the institution would require independent legal standing and authority. Otherwise, turf disputes with the village government and other enforcement agencies could jeopardize its function.

18.6.2 Legal basis

Legal researchers have pointed out that, under various national laws, the village head has a responsibility to ensure that local resources are managed to provide an optimal level of income for his community. *Sasi*, an institution that combines the authority of the village head with the legitimacy and ethics of *adat*, is seen (Lokollo et al. 1996; Brouwer, *forthcoming*) to be the logical institution for the management and conservation of inshore coral reefs that lie within village territories.

Our results show that the villages, and in particular villages with a *sasi* institution, already perform many management functions (Table 5.2), including, in some cases, the collection of resource rents. This key role is, however, not acknowledged through any explicit legal right of tenure or management. Formal recognition and support of local community rights and responsibilities would help to ensure a solid base for building more competent local resource management institutions.

There are various options for providing a legal basis for local management bodies, including decrees by the Governor, *Bupati* or *Kotamadya* and promulgation of a provincial law (*Perda*). Another option, previously discussed by Zerner (1992), is through the amendment of the national Fisheries Act No. 9, 1985 together with an amendment of Law No. 5, 1979 on the local government.

Once provided with a defined legal mandate, villages could formally delegate management duties to a local *sasi* institution and *kewang*. The perpetuation of *sasi* (as opposed to the introduction of a totally new institution) would be an asset in that compliance would be encouraged. Participation of religious leaders would also be an asset. With a local institution involving respected traditional and religious leaders, resource users would feel secure. Some mechanism to encourage participation of all stakeholders would have to be developed so that control would not rest entirely in the hands of local elites, as this is unlikely to be acceptable to new generations of Mollucans. The management of inshore resources would be even more effective if local institutions were involved not only in local monitoring and enforcement but also as partners in development planning and implementation, stock assessment and allocation, licensing etc. This would lead to a situation in which inshore marine resources were managed under a system of co-management.

18.6.3 Strengths of *sasi*

Basic management concepts

Although taking many forms, the *sasi* institution does typically involve concepts and structures that are important in any management regime, including many that have positive implications for conservation. This accepted set of norms provides an efficient base for the development of a modernized co-management system. Concepts and activities central to *sasi* include:

1. The concept of open and closed areas/open and closed seasons.
2. The concept of community tenure rights over a marine area.
3. The concept of limiting access to resources.
4. Controlled harvest and distribution of benefits.
5. Locally developed and agreed-upon regulations. These may be specific to the village, (limitation of gear types, size of fish or shellfish harvestable) or may reinforce national laws (prohibition of blast fishing, poisons).
6. Local wardens or enforcers (the *kewang*) who have defined rules of process as well as prescribed sanctions to impose.
7. A responsibility shared by all residents to report violations of *sasi* rules.
8. Methods in place for advising all residents at regular intervals of the substance of *sasi* rules.
9. An overall goal of improving or maintaining community welfare which, being rooted in *adat* or the concept of the unity of man with nature, is consistent with modern concepts of sustainable use.
10. A hierarchical institutional structure wherein various tasks are divided among clearly defined bodies (i.e., the village government, *kewang besar*, marine *kewang*, land *kewang*, a *kewang* for land dispute settlement, etc.)
11. Low or no financial cost to the formal government i.e., *kewang* members and church leaders involved are not paid, and local government offices may, in fact, receive income from the controlled harvest and sale of communal resources.
12. Resiliency and the ability to evolve.

Efficiency and legitimacy

Sasi based on *adat* provides an efficient base on which to build co-management because important management concepts are already in the minds of the people and have cultural validity. Also, there are demonstrable social and environmental benefits to *sasi* as a local management institution, and a clearly identified need to reinforce inadequate centralized management.

Pressure from religious leaders (the church and to a lesser extent, the mosque) plays an important role in compliance to *sasi* rules, reducing enforcement costs. Religious leaders should not be left out of future management institutions as they are important supporters.

Traditional enforcers (*kewang*) are respected and have more legitimacy in the eyes of villagers than do the police, who may be seen as arbitrary and distant. However, it is important that a local enforcement body (*kewang*) be able to act independent of the village head (i.e., hold positions that do not change with each new leader). Its members also need appropriate tools/ infrastructure and access to training to allow them to do their job.

The role of the village head is the key to the success of *sasi* as well as other local marine management efforts. However, he must be a true choice of the people, respected and trusted. His power must also be balanced by a management institution that has some independence. Otherwise, our evidence suggests that compliance will suffer and management will not succeed. The local government should be formally allowed and encouraged to incorporate traditional structures (including, but not necessarily limited to, the *kewang*).

If there is a collective fishing effort, it works as long as the benefits are shared among the participants according to accepted tradition. Similarly, the harvesting of collective village resources under *sasi* works as long as the benefits are seen to be shared or used for the common good. If not, the regulations are undermined. In the Indonesian context, the power of a respected village head to command and use resource rents is often accepted because he is assumed to be working for the general good. However, because in some cases the village head lacks legitimacy, his power must always be balanced by transparency in financial management and development planning. Under the right conditions, *sasi* offers a model for income generation for the local government.

Resilience

Sasi has declined through time since at least the 1940s. Losses of part or all of the institution in individual villages were related to a wide range of contextual factors. When confusion, uncertainty, or conflict weakened the leadership, problems with enforcement and compliance often followed and the people abandoned *sasi*. It went through a critical period of challenge in the late 1970s and early 1980s, when village government structures were, in theory, separated from traditional *adat* leadership. The fact that many villages succeeded in integrating traditional and modern styles of leadership allowed *adat* leaders and their institutions to thrive in some quarters. However, the 1990s appear to hold another serious challenge: a general decline in social cohesion and the passing away of the generation of elders that holds the sacred knowledge base of *sasi*. This valuable institution could be seriously impaired but *sasi*, like *adat*, will never die. It is firmly entrenched in the hearts and minds of Moluccan islanders. Both in those villages where it is actually practiced as well as in some villages that have had no *sasi* institution in living memory, *sasi* was perceived as a positive and helpful element for increasing income and security. No newly developed institution erected on modern management principles could ever attain the spiritual dimension that gives *sasi* its essential resilience. It is, therefore, important that determined and well co-ordinated efforts are made by village leaders, NGOs, and others to resurrect and modernize marine *sasi*.

18.6.4 Weaknesses of *sasi*

The drawbacks of flexibility

It must be remembered that, as Zerner (1992) asserts, “Attempts to create or strengthen such institutions (i.e., *sasi*) must be based upon a realistic assessment of the motives, ethics, interest, and cultural conceptions which drive local actors”. On one hand, co-management arrangements developed in future should, like *sasi*, be adaptive and flexible so as to increase resilience. On the other hand, there are increasing demands for income, both by individuals and governments, and the temptations of emerging international markets. In this context, the flexibility of *sasi* can be seen as risky. The resources could end up being efficiently, or even ruthlessly exploited for the benefit of local or outside elites. For that reason, flexibility must be counterbalanced by introducing some minimum standards so that all villages enjoy some reasonable level of resource protection and management.

Lack of financial resources

One problem facing *sasi* as an institution is lack of funding to support *kewang* work. *Kewang* members are volunteers whose incentives are social standing and a sense of responsibility. While this is good in terms of sustainability of the institution, the problem arises when the *kewang* tries to do its job. Rarely does the group own any enforcement equipment. Members do receive the proceeds from fines and may be granted occasional sums of money from the village to facilitate meetings. However, they have no access to support for training and networking, except when their village is involved in some NGO or government project.

Limited access to new information and alternative technologies

The lack of communication along formal fisheries management channels, weak or non-existent environmental education, lack of access to new technologies and technical information, and dearth of valid catch statistics and stock assessment data all inhibit progress toward fisheries co-management both within and outside of *sasi*.

Limited scope

Sasi is currently applied only to a few species and positive effects in terms of habitat protection are often accidental rather than planned. *Sasi* has also disappeared from many villages. The question remains whether *sasi* can be successfully built upon and extended to cover more species and perhaps even entire fishing grounds, and be workable regardless of the size, economic condition, heterogeneity or religion of the fishing community.

Management of the pelagic fishery, which is the key fishery for most villages, requires a management institution that is much broader in scope than *sasi* currently is. *Sasi* applies only to the village territory, or inshore waters. The deep-water fishery involves not only villagers but also a range of stakeholders that does not have ties to local fishing villages. The village level institution requires a place in negotiating access and withdrawal rights for artisanal fishers in offshore waters, but to date, no *sasi* practitioners have ventured into this area. If/when they do, they will need to engage or be nested in a larger institution operating on regional, provincial and higher levels. Presently, there is no identifiable lead agency dedicated to coastal and fisheries management.

The influence of urbanization, population growth and modernization

Possibly the least effective and most eroded forms of marine *sasi* can be seen on Ambon Island, close to the largest regional urban center and a rapidly developing consumer culture. Here, out of 22 villages checked, we documented only two villages with marine *sasi*. Evans et al. (1997) gathered information from a further five villages, and from these five, there was only one incidence of marine *sasi* in one *dusun* of the town of Tulehu. Thus the known incidence of marine *sasi* on rural Ambon Island (not more than 11%) is much lower than on the Lease Islands, and would be even less if the urban satellite villages were included in the computation. Towns and satellites of urban centers are more likely to have lost the institution compared to small rural villages. There also seems to be a correlation between the persistence of *sasi* and the size of population, with *sasi* being most prevalent and active where village population is between 2,000 and 3,000 persons.

People in the suburbs of Ambon, where there is no marine *sasi*, are no longer primarily occupied by farming and fishing. Farmland has been built up and the inner Ambon Harbor, formerly a rich fishery, is now degraded and polluted to the point that fishers are rarely seen on its waters. Whereas the isolated coastal villages of Lease Islands are typically dominated by either Christian or Muslim inhabitants and by a small number of founding clans, the urban suburbs and satellite villages around the inner harbor are highly mixed in terms of religion and cultural heritage. It seems that an *adat*-based institution such as *sasi*, with its structure linked to hereditary family lines, cannot survive under such heterogeneous urban conditions. The impact of urbanization as seen in patterns of loss of *sasi* seems to have set in early on Ambon Island, which has historically been the seat of government.

Powerful externalities affect fishers and their resources over time, including new world-market demands for marine resources, collapsing clove prices, monetary and political instability, and climate change. Such conditions have lured or driven Maluku people to increase pressure on marine resources in the past. Thus there are incentives to over-fishing and destructive fishing which are direct challenges to *sasi* or any other management institution. Increasing consumerism has followed the introduction of electricity and mass media to the villages. Changing values and priorities of the younger generation are seen by *sasi* practitioners and villagers, in general, as a threat to social stability and in particular, to *adat* institutions.

Vulnerability of *sasi* to externalities

The turbulent cultural and social history of Maluku and the impact of national development policy (i.e., industrial fisheries expansion, mineral exploitation on small islands) add further layers of complexity. Because it has no basis in law, *sasi* is very vulnerable to these externalities. However, because of its resilience, the institution has so far withstood the pressures.

A major development such as base metal and gold mining proposed for the Lease Islands is the type of external threat that has the potential to destroy *sasi*. For example, Haruku is one of the best examples of active and evolving community-based environmental management. Here the *lompa* fish resource, normally protected under *sasi* rules, is under threat from mining exploration in the upper watershed. Even though the villagers claim the land is being explored, they have no power whatsoever to control the exploration. If the mine goes ahead, the villagers will probably have to be moved and the traditional culture and institutions will be gravely challenged if not wiped out.

18.6.5 Relevance of *sasi* in the context of Maluku's changing demography

In our sample of 508 Maluku fishers, we noted that the profile of fishers is changing. Older generations are predominantly Christian: the younger generation includes more Muslims, often Butonese immigrants, with no links to the traditional power structure of Maluku villages and, therefore, lacking the incentive to comply with *sasi* on the basis of its association with *adat* tradition. *Sasi* has survived in a larger proportion of Christian villages, but where it still exists, marine *sasi* in Muslim villages is strong and often functions as a mechanism to retrieve resource rents from the village territory. The question is whether a management institution designed for the future, but based on marine *sasi*, can be made relevant to the increasing numbers of immigrants entering the fishery.

18.7 Applicability of *Sasi*

Co-management is defined as a sharing of responsibility and/or authority between the government and the resource users at local levels, in order to manage a certain kind of resource. Co-management should not be considered as the only strategy for resolving all conflicts and issues of fishery management, but rather as one set of management alternatives that may be suitable for a certain region and certain conditions. Considering the history and relative success over time of *sasi* in Maluku, as well as the reality of the jurisdictional rights of the national government, co-management with a strong local component seems to be particularly suitable for those fisheries resources currently claimed under *adat* law (*hak ulayat*) by coastal communities.

In other words, *sasi* seems best suited for its current role, which is management of resources within the marine village territory i.e., inside the boundaries of the coral reef slope. Of particular interest are the monitoring and enforcement functions that are currently beyond the ability of police, navy and the Fisheries Service to provide. Devolution of appropriate formal powers to the village level would greatly increase the effectiveness and efficiency of these aspects of fisheries management in Maluku. This devolution would have to be a gradual process involving trials at pilot sites because there is not yet local capacity for habitat monitoring, stock assessment or effective enforcement, nor is there a general appreciation for management or conservation efforts as options to redress issues of resource decline and sectoral conflict.

In seeking to apply *sasi* to a broader range of species, practitioners will have to confront resistance to any move that restricts access to essential food fish. Fishers of central Maluku are heavily dependent on marine resources for their livelihood, and have a pragmatic attitude towards rules. Therefore, if the need arises, they expect rules to be bent to allow them to survive. To be acceptable, a management system must, like *sasi*, allow applications for exemptions to harvest bans. Otherwise, fishers will simply non-comply and the system will break down in times of economic stress.

Higher-level institutions, that have research capacity and access to scientific information, need encouragement to serve the communities as well as national needs. In addition, a clear lead agency for fisheries management is needed. Community participation in co-management of offshore reefs and fishing grounds that are important to local food security requires facilitation. Higher-level bodies could support village institutions, coordinate local enforcement efforts and facilitate decision-making among villages and between sectors. However, to gain respect and cooperation from artisanal fishers, any such higher institution must acknowledge *sasi* and *adat* leaders. One strategy would be to look for ways to build on the traditional, island-wide institution, the *Latupati*.

We have noted that the traditional *sasi* style of resource management, involving ceremony, volunteerism and inherited status, works best in homogeneous villages in the 1,000-3,000 population range. Larger and more culturally mixed municipal units probably require a different management approach, although this could still be developed under the *sasi* "banner". Practitioners seeking to revitalize or re-invent *sasi* must pay attention to the demographic shift in fishing communities and the different cultural ethos of new generations.

18.7.1 Support for revitalization of sasi as an element in co-management

The recent evolution of *sasi* in the direction of marine resource conservation, such as implementation of gear restrictions in Haruku and Ihamahu, can be linked to interventions from Pattimura University and Ambon-based environmental NGOs (particularly Yayasan Hualopu) active in marine conservation work in Maluku. Recently, a government program (COREMAP) has also begun several projects aimed at conserving coral reefs through local level management strategies. These outsiders enter villages with external funding and stimulate debate and change through research, mapping, and public education.

NGO efforts to support and revitalize local level resource management are still limited in scope and effect. Because of the general suspicion of NGO activities in many government circles, NGO interventions must be very careful not to alienate government staff. In eastern Indonesia, NGOs are few in number, their level of regional, national and international networking is still limited, and advocacy in government circles has only just begun. Advocacy by NGOs has always been difficult in the political climate of Indonesia but this may change if the current push for democratization and decentralization is successful.

18.7.2 Recommendations for government support of sasi

A recent document prepared by policy and law specialists (Sopacua et al. 1998) recommends that the government acknowledges existing *sasi* systems and revitalizes *sasi* where it has been lost, or establishes new co-management systems. Specifically, the recommendations are:

- Recognize and formalize *sasi* and *kewang* as components in a national co-management structure. *Sasi* should not be limited to a few commercial species, but should be extended to maintain the biodiversity of resources, especially indigenous, endemic species and key habitats (i.e., mangroves, sea grass and coral reefs).
- Provide local/traditional institutions with knowledge and skills to improve their capacities and increase networking for information exchange. Workshops and training that cover technical, management, scientific and technological aspects could be facilitated by government agencies, research institutions and NGOs.
- Development of the co-management concept is a collective responsibility. The government should support the community in managing resources by providing infrastructure and technical capacity. NGOs should also support the process by offering their technical assistance, knowledge and skills as needed.
- Together with villagers, establish zoning of marine areas (open access, limited use and protected zones) for management and conservation purposes.
- Define and control fishing zones for both large-scale and traditional fishers, and renew efforts to stop the use of destructive fishing gears.

- Regional spatial planning concepts should be developed with an integrated socio-economic, cultural, geographical and ecological approach. *Sasi*, as an *adat* institution and component of co-management, already encompasses these factors.
- To develop and promote the concept of co-management, involve communities in biophysical monitoring, for instance, through recording fish catches, use of other resources, and sea water quality. The data collected could be used to develop and modify local fishery regulations which are consistent with the higher regulations at provincial and national levels.
- Replace the “top-down” approach which has been used by the government in implementing development projects with a process of dialogue which places the community at the center of the objectives of the development projects.
- In all planning and management of development, local institutions should be empowered to collaborate effectively with other institutions through the sharing of roles and responsibilities.
- Take steps to increase the ability of local institutions to deal with exogenous factors such as mining on small islands, or the escalation of national large-scale fishing fleets. This is an important consideration when drafting the legal framework for allocation of rights and responsibilities to various levels. In the absence of adequate local power, such exogenous pressures can nullify local management efforts.

18.8 Lessons from *Sasi* that can be Applied Outside of Maluku

What have we learned from *sasi* that could help in the design of local management systems elsewhere in Southeast Asia? *Sasi* is an institution embedded in local culture and therefore not transferable as a unit to other cultural contexts. However, it provides a valuable example for the development of local management systems. *Sasi* has proven that local rules pertaining to gear types, access, closed areas, seasons, etc. can be successfully developed and applied at the local level by villagers who have relatively low levels of formal education. In fact, these villagers also have only a hazy concept of resource management *per se*. In the absence of a science-based rationale for management, there has nevertheless evolved a resilient and, within its narrow scope of application, a demonstrably effective institution. This has resulted from an ethic of working together for the benefit of the community, attachment to a cultural tradition, and the tendency to comply with sanctions based in religious beliefs. New generations of Mollucans may require more modern and materialistic rationales for participating in the institution. For this and other reasons, flexibility and the power to tailor operational rules to local needs and priorities are essential. In developing modern systems, it seems that an optimal population size for a local management unit could be in the order of 1,000-3,000 people.

Sasi also provides an alternative to the western idea that local management must be highly democratic and inclusive. In a culture such as Indonesia's, highly participatory democratic structures are unknown and untested. Fisheries stakeholders are passive but not uncritical. They accept a centralized, male-dominated and elitist decision-making body only if it has credibility and is seen to function for the general good. This paternalistic model is potentially very efficient and cost-effective, putting little demand on the time of busy fishers, farmers and women, and is also culturally acceptable. People usually resist change and are more likely to cooperate with a system that is familiar to them. What is important is not to further entrench

current elites by allowing the system to become inflexible and non-transparent. Should democratic ideals one day become the norm in Asian coastal villages, the management institution must be able to evolve to accommodate increased need for participation by stakeholders.

18.8.1 Recommendations for future research

The *sasi* institution has sufficient benefits that can and should be used as the basis for building local level management institutions. *Sasi*, however, takes many forms and it requires further study to determine the optimal configuration. Issues to be addressed include:

- The relative costs and benefits of *lelang* (auction or sale of resource extraction rights) as opposed to communal or individual harvesting.
- The position of *kewang* relative to village government and religious leaders.
- Optimizing collaboration among enforcement bodies (*kewang*, village head, church, police, navy).
- Potential for local monitoring and evaluation of resource health and management performance.
- Pros and cons of hereditary versus selected or elected leadership in different situations.
- Optimal level of ceremony and *adat* tradition.
- Developing collaborative structures with higher government levels.
- Raising consciousness and knowledge levels both among villagers and government staff with respect to resource management principles and options.

Pilot projects to test a number of alternative models for such local co-management institutions are needed. Before starting a pilot project, additional information would be useful, as there may well be indigenous management practices not yet documented which could be usefully incorporated into a revitalized marine *sasi* institution. To date, only limited portions of Maluku have been investigated. Extension of the inventory to cover all of Ambon, Seram, Buru and the Banda Islands, followed by investigation of the Maluku Islands to the north and south, would provide a better picture of how widespread *sasi* and other village-level management efforts are.

During this study, it was noted that blast fishing is almost always blamed on “outsiders”. It would be instructive to see who blast fishers are and explore their motivations since this activity is an immediate threat to fisheries resources. It would be interesting to look at the degree of overlap of blast fishers and *sasi* villages.

More detailed biological assessments inside and outside of guarded *sasi* areas would be extremely useful in quantifying the impact of different forms of *sasi*. Is a habitat better protected by private guards (*lelang* situation) or by the *kewang*? Which fisheries rules directly or indirectly protect fisheries habitats and to what degree? Biological research should also be performed, comparing *sasi* areas of different sizes to investigate impacts on fish numbers and diversity. Is there an optimal size for a protected area? Would “no-take” zones located in or near *sasi* areas increase productivity?

In this study, we focused on Christian villages but there is evidence that *sasi* as practiced in Muslim villages is different. Case studies to clarify the role of *adat* and religious leaders, to identify key contextual factors and incentives, and to study resilience in Muslim villages, are needed. This is particularly important in the light of the changing demography (i.e., increasing proportion of non-indigenous Muslims) of central Maluku.

There is also a need to follow up on progress of revitalization in Hulaliu, Tuhaha, and other sites identified in the inventory.

Once more information is available, a small number of alternative *sasi*-based institutions could be devised, combining what appear to be the best attributes of the wide range of forms of *sasi* practiced currently. These alternatives could then be tested at pilot sites and the results be used as a guide in the formulation of fisheries policy and legal reform.

Glossary

Adat	Customary law and ritual practices
Anak Kewang	The persons employed by the kepala <i>kewang</i>
Akar tuba	Poisonous plant (used to make poison for fishing)
Bagan	Lift net
Borok	Fish broker, middleman
Buka	Open
Dagang	Trade
Dusun	Literally garden; also subdivision of village (traditional hamlet)
Jaring	Fishing net
Kampung	Village
Kapitan	Traditional war leader
Kebun	Forest gardens
Kelapa	Coconuts
Kepala soa	Traditional clan leader
Kepala desa (kades)	Village head
Kepala kewang	Head of the <i>kewang</i>
Kepala soa	Hereditary clan leader
Ketua adat	Chief <i>adat</i> authority
Kewang	Traditional law enforcers in the village
Latupati	General assembly for village leaders
Lelang	Auction
Lola	Top shell (<i>Trochus niloticus</i>)
LMD	Formal village council
LKMD	Implementing organization of the LMD
Matakau	Curse or sign that something is placed under a taboo
Marga	Family name
Mauweng	Shaman, religious expert
Meti	Inshore waters
Negeri	Village
Nelayan	Fisher
Papalele	Small-scale fish trader (retailer)
Pegawai	Government staff
Pendeta	Church minister
Petuanan	Village territory
Petani	Farmer
Raja	Village leader descending from the "royal" clan
Rumpon	Fish aggregating device (floating)
Saniri besar	Legislative village council
Saniri negeri	Traditional village government (executive body)
Sasi	Sets of rules which regulate resource use and social behavior
Sasi lelang	Auctioned <i>sasi</i> (harvest rights)
Sasi darat	<i>Sasi</i> on land (terrestrial resources)
Sasi gereja	Church <i>sasi</i>
Sasi adat	Village <i>sasi</i>
Sasi laut	<i>Sasi</i> in the sea and rivers (marine resources)
Sewa labuhan	Rented harvesting rights
Soa	Clan
Tohor	Juncture of coral reef and drop-off
Tuan Negeri	<i>Adat</i> leader (literally lords of the land)
Tuan Tanah	Clan leader from one of the founding families
Teripang	Sea cucumber
Tutup	Closed
Uku	Tribal group

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Appendix 1: Manta tow survey data

Appendix 1A: Survey of Nolloth village marine territory, 14 October 1997, from south to north.*

Tow #	Dead corals	Live hard corals	Soft corals	Sand	Rubble	Fish	Bomb craters	Note
1	3	3	4	-	+	+	yes	Wailesi Bay, at south edge of sasi area.
2	2	3	3	—	-	+	yes	Wailesi Bay.
3	2	3	3	-	+	+	no	Reef crest about 200 m out from rocky beach.
4	2	3	3	+	+	+	no	In front of sandy beach near Tanjung Wailalone.
5	2	3	3	-	—	+	no	Some sandy bottom between corals.
6	2	3	3	-	—	+	no	Wailalone at kewang guard house. Mixed corals and sand; beach sandy.
7 - 8								No data: sharp drop to deep water. North of Wailalone.
9	3	3	2	-	-	+	no	Start of the best trochus harvesting area.
10	1	4	1	—	—	+	no	Tinauw, part of best trochus harvesting area, at guard house.
11	3	3	2	—	0	+	yes	Tinauw, near Tanjung Hatiwan. Mixed sand/coral bottom. Part of best harvesting area.
12	3	2	2	—	—	+	no	Reef edge 300 - 400 m off beach. Lots of sandy bottom. Good trochus area.
13	3	3	2	+	+	+	yes	Hatiwan area. Mixed bottom. End of best harvesting area.
14	2	3	2	++	—	+	no	Hatiwan/Batu Goyang. Large sandy bottom.
15	1	4	1	—	—	+	no	Hatiwan. Diverse corals; 2 - 4 m deep.
16	2	3	1	-	-	+	no	Hatiwan, wide exposed reef shelf, few trochus.
17	0	0	0	+++	0	-	no	Sandy bottom; no coral reef.
18	2	3	1	++	++	+	yes	Last tow in sasi area.
19	1	3	1	++	-	+	no	Non-sasi area at Umisini, reef slope close to shore.
20	2	3	2	+	+	+	no	From Hatule kaslekano to Hatusun; narrow reef close to shore.
21	2	3	3	—	+	-	no	From Hatusun to Asal.
22	1	3	3	—	—	-	no	Asal area. North of here are rocks and dead intertidal reef flats, no living coral reef. Rocky shore with cobbles.

* Numbers refer to coral cover categories, i.e., 0 = no hard bottom for corals, 1 = <10% living cover on hard bottom, 2 = 11 - 30%, 3 = 31 - 50%, 4 = 51 - 75%, 5 = 76 - 100%. Abundance indicators: 0 = absent, — = rare, - = uncommon, + = common, ++ = abundant, +++ = superabundant.

Appendix 1B: Manta tow data from Ihamahu territory, south of Nolloth sasi area.*

Tow	Dead corals	Live hard corals	Soft corals	Sand	Rubble	Fish	Bomb craters
1	3	3	1	-	++	+	Yes
2	4	3	1	-	++	n.d.	Yes
3	4	3	1	-	++	n.d.	Yes

* Numbers refer to coral cover categories, i.e., 0 = no hard bottom for corals, 1 = ≤10% living cover on hard bottom, 2 = 11 - 30%, 3 = 31 - 50%, 4 = 51 - 75%, 5 = 76 - 100%. Abundance indicators: 0 = absent, — = rare, - = uncommon, + = common, ++ = abundant, +++ = superabundant.

Appendix 1C: Survey data from marine territories of Haruku and Sameth.*

Tow	Dead corals	Live hard corals	Soft corals	Sand	Rubble	Fish	Bomb craters	Notes
1	3-4	3	1-2	-	+++	+	yes	Start at north end of Sameth petuanan.
2	3-4	3	2	-	++	++	yes	
3	3-4	1-2	1	++	++	-	no	
4	4	2	1-2	-	++	-	yes	Site of butterfly fish count.
5	4	2	3-4	++	++	-	yes	Off a rocky point.
6	3	1	4	+	+	-	no	Facing sandy beach.
7	3, then none	1 then 0	4 then 0	+ then +++	-	-	no	Bottom sandy. No survey over sand to south of here.
8	0	0	0	++	-	-	no	In front of Sameth graveyard.
9	0	0	0	+++	-	-	no	Haruku territory, seaward of rock groin.
10	2	1	1	+++	-	-	no	Sea grass bed.
11	1	1	1	+	-	-	no	<i>Sasi</i> area, sand and sea grass.
12	1	1	1	+++	-	-	no	<i>Sasi</i> area in front of kewang house, almost at river.
13	3	1	1	++	-	-	no	River mouth; corals covered in sediment. A few porites, fire corals and soft corals are alive.

* Numbers refer to coral cover categories, i.e., 0 = no hard bottom for corals, 1 = $\leq 10\%$ living cover on hard bottom, 2 = 11 - 30%, 3 = 31 - 50%, 4 = 51 - 75%, 5 = 76 - 100%. Abundance indicators: 0 = absent, — = rare, - = uncommon, + = common, ++ = abundant, +++ = superabundant.

Appendix 1D: Survey results for Toisapu to Hutumuri.*

Area	Tow #	Dead corals	Live hard corals	Soft corals	Sand	Rubble	Fish craters	Bomb	Notes
Toisapu	1	3	3	2	+++	+	+	yes	Start on south edge of Toisapu cove.
	2	2	3	1	++	-	+	yes	Sand between rocks and corals; 2 - 4 m deep.
	3	1	3	1	+	-	-	no	Rocky bottom with sand patches; few corals; no beach.
	4	1	2	1	+++	-	-	no	Hard bottom.
Lapaut	5	1	3	2	-	-	++	no	Cliff shore. Depth 2 - 3 m.
	6	1	3	2	-	-	+	no	Rocky bottom, 3 - 5 m deep, sand patches. Sandy beach.
	7	1	3	2	-	-	++	no	Sandy bottom, then rocks.
	8	1	2	3	-	-	+	no	4 - 8 m deep.
Hutumuri Head land	9	3	2	1	-	-	+	no	Depth 5 - 10 m. Bottom hard with sand patches.
	10	3	2	1	-	-	-	no	Mostly rocky bottom.
	11	3	2	1	-	-	-	no	Hutumuri Bay. Mostly hard bottom.
	12	3	3	1	-	+	+	yes	Water more shallow. Rock with sandy strips.
Hutumuri Village	13	2	3	2	-	+	+	yes	Mostly hard bottom.
	14	2	3	2	++	-	+	no	1 - 3 m deep.
	15	2	2	3	-	-	+	no	Bottom rocky. 5 m deep.
	16	3	2	2	-	-	+	no	Rock with sand patches. End in middle of Bay.

* Numbers refer to coral cover categories, i.e., 0 = no hard bottom for corals, 1 = $\leq 10\%$, 2 = 11 - 30%, 3 = 31 - 50%, 4 = 51 - 75%, 5 = 76 - 100%. Abundance indicators: 0 = absent, — = rare, - = uncommon, + = common, ++ = abundant, +++ = superabundant.

Appendix 1E: Survey results for Dusun Airlow in front of Kampung Wemi.*

Tow #	Dead corals	Live hard corals	Soft corals	Sand	Rubble	Fish	Bomb craters	Notes
1	2	2	3	—	—	+	no	Pintu Kota area. Steep cliff with fringe of barnacles and seaweed drops to 10 m depth. Rocky bottom.
2	3	2	3	—	—	+	no	Cliff with a narrow intertidal strip. Bottom mixed rocks and sand. 5 - 10 m deep.
3	3	2	3	-	—	-	no	Bottom mixed sand and rocks. 4 - 5 m deep.
4	2	3	1	-	-	+	no	Bottom rocks, sand and massive corals.
5	2	3	1	-	-	+	no	Intertidal flat more extensive. Corals more varied.
6	2	3	1	-	-	+	no	

* Numbers refer to coral cover categories, i.e., 0 = no hard bottom for corals, 1 = ≤10%, 2 = 11 - 30%, 3 = 31 - 50%, 4 = 51 - 75%, 5 = 76 - 100%. Abundance indicators: 0 = absent, — = rare, - = uncommon, + = common, ++ = abundant, +++ = superabundant.

Appendix 1F: Seri cove survey data from boundary with Wemi to Tanjung Vanahu.*

Tow #	Dead corals	Live hard corals	Soft corals	Sand	Rubble	Fish	Bomb craters	Notes
1	2	2	3	—	-	+	no	Depth 4 m. Bottom mixed rocks and sand, with corals.
2	3	2	2	-	-	-	no	Depth 4 - 5 m. Mostly hard bottom.
3	4	1	3	-	-	—	no	In front of main path/road into village.
4	4	1	3	-	-	—	no	Half way point along the intertidal flat.
5	2	2	2	-	-	+	no	Deep water off cliff face at end of transect, with depth over 10 m.
6	3	1	3	-	-	+	no	Depth 5 - 10 m; hard bottom.
7	3	2	3	-	-	-	no	Depth 5 - 10 m, hard bottom, corals few. Narrow fringe of boulders along shore.
8	2	3	2	-	-	+	no	Cliff steep into deep water. Over 10 m deep, less than 25 m from shore. Narrow boulder beach. Bottom hard, boulders.
9	2	2	1	-	-	-	no	Bedrock beach. Depth 5 - 10 m, 25 m from shore.
10	1	1	1	-	-	-	no	Steep bedrock shore plunging to 10 m. Hard bottom.
11	0 (rocks)	0	0	0	0	0	no	Cobble and sand beach. Deep water 10 m from shore.
12	2	2	1	—	-	-	no	Depth 2-4 m. Rocky bottom.
13	2	2	3	-	-	—	no	As above.

* Numbers refer to coral cover categories, i.e., 0 = no hard bottom for corals, 1 = ≤10%, 2 = 11 - 30%, 3 = 31 - 50%, 4 = 51 - 75%, 5 = 76 - 100%. Abundance indicators: 0 = absent, — = rare, - = uncommon, + = common, ++ = abundant, +++ = superabundant.

Appendix 2: Overview of 28 villages in performance study

Village		Economic score *	Sasi any kind	Marine sasi status	Dominant religion	Average age	Average years of education
Nolloth	Mean	8.1000	yes	yes	Christian	47.47	6.20
	N	30	30	30	30	30	30
	Std. Deviation	1.9001				11.80	.76
Haruku	Mean	8.3333	yes	yes	Christian	50.47	7.10
	N	30	30	30	30	30	30
	Std. Deviation	2.3391				11.33	2.29
Kabau	Mean	8.8182	yes	yes	Muslim	52.00	6.00
	N	11	15	15	15	15	15
	Std. Deviation	2.4008				10.97	3.00
Pelaup	Mean	7.9167	yes	yes	Muslim	48.38	5.81
	N	12	16	16	16	16	16
	Std. Deviation	2.0207				14.23	3.37
Makariki	Mean	8.9231	yes	yes	Christian	50.27	6.40
	N	13	15	15	15	15	15
	Std. Deviation	2.1394			.26	14.17	1.06
Ihamahu	Mean	8.2667	yes	yes	Christian	54.13	6.20
	N	15	15	15	15	15	15
	Std. Deviation	2.4044				8.88	.77
Siri-Sori Islam	Mean	9.2143	yes	yes	Muslim	45.73	8.40
	N	14	15	15	15	15	15
	Std. Deviation	1.8472				7.68	2.03
Itawaka	Mean	8.3333	yes	yes	Christian	51.20	6.60
	N	15	15	15	15	15	15
	Std. Deviation	2.4398				13.47	1.68
Paperu	Mean	8.1333	yes	yes	Christian	46.67	8.13
	N	15	15	15	15	15	15
	Std. Deviation	2.0307				12.12	2.72
Porto	Mean	8.5333	yes	yes	Christian	51.20	7.40
	N	15	15	15	15	15	15
	Std. Deviation	2.0999				12.23	2.23
Morela	Mean	9.2000	yes	yes	Muslim	42.93	7.47
	N	15	15	15	15	15	15
	Std. Deviation	1.6125				9.92	2.72
Seith	Mean	7.2000	yes	no	Muslim	37.47	6.20
	N	15	15	15	15	15	15
	Std. Deviation	1.9712				11.58	.77
Tengah-Tengah	Mean	8.2667	yes	yes	Muslim	64.80	6.40
	N	15	15	15	15	15	15
	Std. Deviation	1.5337				5.57	1.06
Rutah	Mean	9.5385	no	no	Muslim	46.36	6.79
	N	13	14	14	14	14	14
	Std. Deviation	2.0662				10.95	2.22
Soahuku	Mean	9.6364	yes	lost	Muslim	40.86	8.14
	N	11	14	14	14	14	14
	Std. Deviation	1.5015			.43	13.81	2.74
Batu dua	Mean	8.4000	no	no	Muslim	46.40	6.40
	N	15	15	15	15	15	15
	Std. Deviation	1.2984				12.43	1.06
Hitu	Mean	8.5385	no	no	Muslim	39.93	7.80
	N	13	15	15	15	15	15
	Std. Deviation	2.3315				9.22	2.73
Tiow	Mean	7.4667	no	lost	Muslim	40.80	7.20
	N	15	15	15	15	15	15
	Std. Deviation	2.3563			.35	9.37	2.21

Village		Economic score *	Sasi any kind	Marine sasi status	Dominant religion	Average age	Average years of education
Eri	Mean	9.2500	no	no	Muslim	41.47	7.00
	N	12	15	15	15	15	15
	Std. Deviation	1.5448			.26	10.99	2.17
Seilale	Mean		yes	no	Muslim	45.80	6.80
	N		15	15	11	15	15
	Std. Deviation				.50	9.01	3.84
Iha	Mean	7.7143	no	lost	Muslim	44.53	8.40
	N	14	15	15	15	15	15
	Std. Deviation	1.7728				13.33	2.59
Ouw	Mean	9.4545	no	no	Christian	45.60	6.40
	N	11	15	15	15	15	15
	Std. Deviation	1.5076				7.91	1.55
Booi	Mean	8.2308	no	no	Christian	41.93	6.40
	N	13	15	15	15	15	15
	Std. Deviation	2.0064				11.83	1.06
Saparua kota	Mean	8.1538	no	lost	Christian	45.93	8.87
	N	13	15	15	15	15	15
	Std. Deviation	2.4099				11.16	3.04
Tuhaha	Mean	8.7333	yes	lost	Christian	52.87	7.17
	N	30	30	30	30	30	30
	Std. Deviation	1.9989				11.06	2.20
Hulaliu	Mean	8.7000	no	lost	Christian	47.27	7.60
	N	30	30	30	30	30	30
	Std. Deviation	2.1034				13.50	2.19
Seri	Mean	8.6429	no	lost	Christian	42.41	7.14
	N	28	29	29	29	29	29
	Std. Deviation	1.4198				9.18	3.25
Hutumuri	Mean	9.7407	no	no	Christian	47.23	7.20
	N	27	30	30	30	30	30
	Std. Deviation	2.2633			.50	13.14	2.31
Total	Mean	8.5696				47.08	7.06
	N	460	508	508	504	508	508
	Std. Deviation	2.0478				12.20	2.35

* = Considering boat, gear, house and land ownership

Appendix 3: Comparative information/ statistics of six case study villages

Appendix 3A: Types of fish most commonly caught in each case study village.

Fish type	Local name	Latin name	Nolloth	Haruku	Tuhaha	Hulaliu	Seri	Hutumuri
Coral	Balobo	<i>Hemiramphus japonicus</i>		X				
	Batu-Batu	<i>Apogon niger</i>	X			X		X
	Bobara	<i>Caranx melampygus</i>	X	X	X	X	X	X
	Bulana	<i>Mugil cephalus</i>				X		
	Gaca	<i>Lutjanus sp</i>		X	X	X		
	Garopa	<i>Epinephanus merra</i>	X	X	X	X	X	X
	Gora	<i>Holocentrus sp</i>	X					X
	Gorara	<i>Lutjanus basmira</i>		X	X		X	
	Gotana	<i>Acanthurus sp</i>						X
	Hiu	<i>Carcharinus spp</i>	X					
	Kapas-kapas	<i>Gerres macrosoma</i>		X		X		
	Lalosi	<i>Caesio spp</i>			X	X		
	Mata Bulan	<i>Taractes sp</i>	X					
	Merah/kakap	<i>Lutjanus spp</i>	X		X	X	X	
	Piskada	<i>Sphyraena spp</i>					X	
	Salmameti	<i>Upeneus spp</i>			X	X		X
	Samandar	<i>Siganus fuscescens</i>		X	X	X	X	
	Sikuda	<i>Lethrinus spp</i>		X	X			
	Tatu	<i>Balistapus spp</i>		X				
	Pelagic	Bae	<i>Etelis carbunculus</i>		X			
Cakalang		<i>Katsuwonus pelamis</i>	X	X	X	X	X	X
Julung		<i>Hemiramphus sajori</i>		X	X			
Kawalinya		<i>Selar cryonophthalmus</i>		X	X		X	X
Komu		<i>Auxis tharsard</i>	X	X	X	X	X	X
Layar		<i>Histiophorus sp</i>		X				
Lema		<i>Rastrelliger kanagurta</i>	X				X	X
Lompa		<i>Thryssa baelama</i>		X	X			
Make		<i>Sardinella sp</i>		X	X	X	X	
Momar		<i>Decaptherus macrosoma</i>	X	X	X		X	X
Puri / pura-pura		<i>Stolephorus sp</i>			X	X		
Saku		<i>Albennes anastomella</i>		X				
Sardencis/		<i>Amblygaster sirm</i>		X			X	X
Sardinya								
Silapa		<i>Pristipomoides sieboldi</i>			X			X
Tatihu		<i>Thunnus corrdyla</i>		X	X		X	X
Tenggiri		<i>Gymnosarda unicolor</i>		X				
Tongkol		<i>Thunnus tonggol</i>	X		X		X	
Tola/patola		<i>Caranx leptolepis</i>		X		X		
Tuing-tuing/								
terbang		<i>Cypselurus sp</i>	X				X	X
Tuna		<i>Tuna sp</i>	X					X
Bia Duri babi		<i>Acanthopleura spinosa</i>		X				
Bia Makii		<i>Conus sp</i>				X		
Bia Mata Bulan		<i>Turbo chrysostroma</i>		X			X	
Bia Mika		<i>Tridacna gigas</i>		X				
Bia Warna Putih		<i>Cypraea sp</i>				X		
Gurita	<i>Octopus sp</i>				X			
Moluska	<i>Mollusca</i>	X						
Sontong	<i>Sepia spp</i>		X		X	X		
Udang	<i>Panulirus sp</i>					X		

Note: ikan terbang = tuing-tuing; kakap = merah.

Appendix 3B: Demographic information for case study villages.

Indicator	Nolloth	Haruku	Tuhaha	Hulaliu	Seri	Hutumuri (Toisapu)
Inhabitants	2546	2122	2202	2122	1991	3285 (1400)
Households	530	480	417	359	425	692 (264)
Avg. members	5	6	5	5	4 - 5	5
Christian pop.	100%	95%	90%	94%	90%	95%
Muslim pop	0	5%	10%	6%	10%	5%
Fishers*	40%	150	200	18	75	<15
Farmers	n.d.	295	*	797	150	85%
Traders (<i>toko</i>)	18	16	few	24	20	45
Artisans	few	89 incl.				
laborers	n.d.	n.d.	n.d.	n.d.		
Laborers	few		2	34	n.d.	> 50
Government staff	44	42	>50	79	160	10%
Migration	no data	70/year	25/year	n.d.	none	n.d.
Tourism	yes	yes	none	none	few	few
Primary school	3	1	2	2	1	1
Junior high school	none	1	—	1	none	1 (-)
Senior high school	none	1	---	none	none	1 (-)
Gas station	2	no			no	No
Food market	1	no	—	—	no	No
Drug store	2	no	no	no	no	No
Bank	yes	no	no	no	no	yes (no)
Health center	no	yes	no	yes	no	yes (no)
Water provision	private and public wells	fresh, pipe	fresh, pipe	water pumps	public water supply	public water supply
Septic tank	yes	yes	yes	yes (95)	yes	yes
Transportation	bus, boat	boat	bus, motorcycle	mini-bus, speed boat	bus, motorcycle	bus, motorcycle
Communication	radio	mail	walky-talky	mail	telephone	mail telephone
Electricity	yes	yes	yes	yes	yes	yes

* Most people combine fishing and farming. In Nolloth 30% fish part-time; of the registered fishers in Haruku, only 20 fish full-time; in Tuhaha, most villagers fishing and farming.

Appendix 3C: Socio-economic data for case study villages.

Average age of respondents

Village	Average years \pm Std. Deviation (n)
Nolloth	47.47 \pm 11.80 (30)
Haruku	50.47 \pm 11.33 (30)
Tuhaha	52.87 \pm 11.06 (30)
Hulaliu	47.27 \pm 13.50 (30)
Seri	42.4 \pm 9.18 (29)
Hutumuri	47.23 \pm 13.14 (30)
Total	47.98 \pm 12.04 (179)

Average years of education of respondents

Village	Average years of education \pm Std. Deviation (n)
Nolloth	6.20 \pm .76 (30)
Haruku	7.10 \pm 2.29 (30)
Tuhaha	7.17 \pm 2.20 (30)
Hulaliu	7.60 \pm 2.19 (30)
Seri	7.14 \pm 3.25 (29)
Hutumuri	7.20 \pm 2.31 (30)
Total	7.07 \pm 2.29 (179)

Fishers related to ruling elite (soa besar)

Nolloth	Haruku	Tuhaha	Hulaliu	Seri	Hutumuri	Total
46.7%	73.3%	33.3%	53.3%	20.7%	6.9%	39.3%

Religion of respondents

	Nolloth	Haruku	Tuhaha	Hulaliu	Seri	Hutumuri	Total
Islam	0%	0%	0%	0%	0%	40%	7%
Protestant	100%	100%	100%	100%	100%	60%	93%

% Fishers who are members of fishing organization / group

Nolloth	Haruku	Tuhaha	Hulaliu	Seri	Hutumuri	Total
10%	3.3%	3.4%	20.0%	10.3%	0%	7.9%

% Fishers who are members of church/government groups

Nolloth	Haruku	Tuhaha	Hulaliu	Seri	Hutumuri	Total
20.0%	20.0%	0%	33.3%	41.4%	23.3%	23.0%

Fishers' opinion of sasi

	Nolloth	Haruku	Tuhaha	Hulaliu	Seri	Hutumuri	Total
Important	100%	100%	90.0%	93.3%	46.4%	66.7%	83.1%
Useful	0%	0%	3.3%	3.3%	10.7%	6.7%	3.9%
Neutral	0%	0%	0%	3.3%	7.1%	3.3%	2.2%
Not very useful	0%	0%	6.7%	0%	10.7%	10.0%	4.5%
Not important	0%	0%	0%	0%	25.0%	13.3%	6.2%

% Respondents satisfied to be a fisher

Nolloth	Haruku	Tuhaha	Hulaliu	Seri	Hutumuri	Total
86.2%	83.3%	96.7%	80.0%	86.2%	89.3%	86.9%

% Fishers who would change job if possible

Nolloth	Haruku	Tuhaha	Hulaliu	Seri	Hutumuri	Total
20.0%	43.3%	31.0%	50.0%	53.6%	20.0%	36.6%

Job desired for children

	Nolloth	Haruku	Tuhaha	Hulaliu	Seri	Hutumuri	Total
Fishery	17.9%	7.1%	6.7%	10.3%	3.6%	8.0%	8.9%
Farming	10.7%	0%	0%	0%	0%	0%	1.8%
Trade	0%	3.6%	3.3%	0%	0%	4.0%	1.8%
Civil service	61%	68%	73%	72%	75%	25%	64%
Wage labor	10.7%	0%	6.7%	6.9%	0%	16.0%	6.5%
Others	0%	21.4%	10.0%	10.3%	21.4%	44.0%	17.3%

% Fishers who collaborate with outsiders in fishing activities

Nolloth	Haruku	Tuhaha	Hulaliu	Seri	Hutumuri	Total
10.0%	3.3%	13.8%	13.3%	20.7%	20.7%	13.6%

% Fishers owning a boat

	Nolloth	Haruku	Tuhaha	Hulaliu	Seri	Hutumuri	Total
None	30.0%	20.0%	30.0%	26.7%	21.4%	10.0%	23.0%
Outrigger canoe	63.3%	53.3%	63.3%	70.0%	78.6%	73.3%	66.9%
Motor boat	6.7%	26.7%	6.7%	3.3%	0%	16.7%	10.1%

% Fishers owning each gear type

	Nolloth	Haruku	Tuhaha	Hulaliu	Seri	Hutumuri	Total
None	23.3%	23.3%	26.7%	23.3%	17.9%	3.6%	19.9%
Hand line / spear	33.3%	30.0%	33.3%	40.0%	57.1%	32.1%	37.5%
Trap / cast net	0%	0%	0%	3.3%	0%	3.6%	1.1%
Set net	43.3%	46.7%	30.0%	23.3%	21.4%	35.7%	33.5%
Lift net / FAD	0%	0%	10.0%	10.0%	3.6%	25.0%	8.0%

Who buys fish and from what % of respondents?

Buyer	Nolloth	Haruku	Tuhaha	Hulaliu	Seri	Hutumuri	Total
Consumer	73.3%	70.0%	73.3%	96.6%	51.7%	46.7%	68.5%
Large trader / borok	3.3%	3.3%	0%	3.4%	0%	26.7%	6.2%
Retailer	16.7%	3.3%	23.3%	0%	44.8%	20.0%	18.0%
Wholesaler	6.7%	20.0%	3.3%	0%	0%	0%	5.1%
Others	0%	3.3%	0%	0%	3.4%	6.7%	2.2%

Where are fish sold?

	Nolloth	Haruku	Tuhaha	Hulaliu	Seri	Hutumuri	Total
Local market	72.4%	76.7%	65.5%	96.6%	3.4%	17.2%	55.4%
Town market	17.2%	10.0%	20.7%	0%	93.1%	82.8%	37.1%
Regional market	3.4%	10.0%	3.4%	0%	3.4%	0%	3.4%
Foreign market	0%	0%	0%	3.4%	0%	0%	.6%
Others	6.9%	3.3%	10.3%	0%	0%	0%	3.4%

Average external income per year (thousand Rp)

Village	<i># respondents with external income</i>	<i>Average external income</i>	<i>Std. error</i>
Nolloth	8	264	76.27
Haruku	10	344	88.60
Tuhaha	8	596	230.31
Hulaliu	11	486	296.57
Seri	2	775	725.00
Hutumuri	4	1585	1473.17
Overall average	43	548	160.12

Primary source of respondents' income

	Nolloth	Haruku	Tuhaha	Hulaliu	Seri	Hutumuri	Total
Fishing	83.3%	70.0%	80.0%	53.3%	86.2%	73.3%	74.3%
Farming	13.3%	30.0%	3.3%	26.7%	6.9%	10.0%	15.1%
Forestry	0%	0%	3.3%	0%	0%	0%	.6%
Civil service	0%	0%	6.7%	10.0%	3.4%	3.3%	3.9%
Wage labor	0%	0%	3.3%	3.3%	3.4%	0%	1.7%
Handcrafts	0%	0%	0%	3.3%	0%	6.7%	1.7%
Trade	0%	0%	0%	0%	0%	3.3%	.6%
Others	3.3%	0%	3.3%	3.3%	0%	3.3%	2.2%

Secondary source of income

	Nolloth	Haruku	Tuhaha	Hulaliu	Seri	Hutumuri	Total
Fishing	22.7%	27.6%	21.1%	46.2%	10.7%	23.1%	25.3%
Farming	45.5%	51.7%	63.2%	34.6%	71.4%	61.5%	54.7%
Livestock	0%	0%	5.3%	0%	7.1%	11.5%	4.0%
Forestry	0%	6.9%	0%	0%	0%	3.8%	2.0%
Civil service	0%	0%	0%	3.8%	0%	0%	.7%
Handcrafts	0%	0%	0%	3.8%	0%	0%	.7%
Trade	9.1%	6.9%	5.3%	3.8%	3.6%	0%	4.7%
Others	22.7%	6.9%	5.3%	7.7%	7.1%	0%	8.0%

Tertiary source of income

	Nolloth	Haruku	Tuhaha	Hulaliu	Seri	Hutumuri	Total
Fishing		20.0%	16.7%	15.4%	10.0%	18.2%	13.5%
Farming	28.6%	40.0%	16.7%	7.7%	10.0%	9.1%	15.4%
Livestock	14.3%	20.0%	0%	23.1%	80.0%	45.5%	34.6%

% Fishers engaging in communal fishing activities

Nolloth	Haruku	Tuhaha	Hulaliu	Seri	Hutumuri	Total
80.0%	66.7%	73.3%	80.0%	48.3%	33.3%	63.7%

% Fishers opinion on need to change fisheries rules

	Nolloth	Haruku	Tuhaha	Hulaliu	Seri	Hutumuri	Total
Strongly agree	30.0%	10.0%	21.4%	33.3%	17.2%	20.0%	22.0%
Agree	3.3%	40.0%	17.9%	30.0%	34.5%	16.7%	23.7%
Neutral	10.0%	20.0%	10.7%	10.0%	10.3%	16.7%	13.0%
Disagree	26.7%	6.7%	10.7%	0%	34.5%	30.0%	18.1%
Strongly disagree	30.0%	23.3%	39.3%	26.7%	3.4%	16.7%	23.2%

% Fishers who feel that all stakeholders should be involved in decision-making

	Nolloth	Haruku	Tuhaha	Hulaliu	Seri	Hutumuri	Total
Strongly agree	72.4%	76.7%	82.8%	83.3%	37.9%	56.7%	68.4%
Agree	27.6%	20.0%	13.8%	16.7%	55.2%	36.7%	28.2%
Neutral	0%	3.3%	3.4%	0%	0%	0%	1.1%
Disagree	0%	0%	0%	0%	6.9%	6.7%	2.3%

% Who believe it acceptable to bend rules or ask for dispensation of sasi rules

	Nolloth	Haruku	Tuhaha	Hulaliu	Seri	Hutumuri	Total
Strongly agree	33.3%	20.0%	34.5%	31.0%	6.9%	6.7%	22.0%
Agree	20.0%	20.0%	10.3%	24.1%	24.1%	6.7%	17.5%
Neutral	0%	3.3%	3.4%	0%	13.8%	10.0%	5.1%
Disagree	20.0%	30.0%	27.6%	17.2%	31.0%	50.0%	29.4%
Strongly disagree	26.7%	26.7%	24.1%	27.6%	24.1%	26.7%	26.0%

% Who believe it acceptable to sell harvest rights

	Nolloth	Haruku	Tuhaha	Hulaliu	Seri	Hutumuri	Total
Strongly agree	23.3%	0%	16.7%	0%	6.9%	0%	7.9%
Agree	20.0%	10.0%	6.7%	6.7%	34.5%	13.8%	15.2%

Perceptions of village decision-making style

Decision-making style	Nolloth	Haruku	Tuhaha	Hulaliu	Seri	Hutumuri	Total
All agree	53.3%	44.8%	50.0%	43.3%	55.2%	58.6%	50.8%
Majority agree	23.3%	17.2%	10.0%	20.0%	13.8%	20.7%	17.5%
Head man decides	0%	0%	16.7%	10.0%	6.9%	3.4%	6.2%
Village gov't decides	23.3%	37.9%	23.3%	26.7%	24.1%	17.2%	25.4%

Respondents' perception of involvement of local groups in village decision-making

	Nolloth	Haruku	Tuhaha	Hulaliu	Seri	Hutumuri	Total
Always	73.3%	53.3%	60.0%	62.1%	34.5%	43.3%	54.5%
Sometimes	16.7%	20.0%	23.3%	20.7%	58.6%	43.3%	30.3%
Never	10.0%	26.7%	16.7%	17.2%	6.9%	13.3%	15.2%

Respondents' perception of involvement of outsiders in village decision-making

	Nolloth	Haruku	Tuhaha	Hulaliu	Seri	Hutumuri	Total
Always	0%	0%	0%	3.3%	0%	0%	.6%
Sometimes	13.3%	16.7%	23.3%	13.3%	31.0%	17.2%	19.1%
Never	86.7%	83.3%	76.7%	83.3%	69.0%	82.8%	80.3%

% Respondents who agree that women are involved in decision-making

	Nolloth	Haruku	Tuhaha	Hulaliu	Seri	Hutumuri	Total
Always	33.3%	13.3%	10.0%	6.7%	24.1%	20.0%	17.9%
Sometimes	56.7%	56.7%	66.7%	70.0%	72.4%	63.3%	64.2%
Never	10.0%	30.0%	23.3%	23.3%	3.4%	16.7%	17.9%

Perceptions of who has responsibility for fisheries management

	Nolloth	Haruku	Tuhaha	Hulaliu	Seri	Hutumuri	Total
Govt. (all)	33.3%	26.7%	36.7%	30.0%	3.4%	10.0%	23.5%
Govt. (most)	26.7%	30.0%	26.7%	46.7%	31.0%	43.3%	34.1%
Shared equally	33.3%	43.3%	33.3%	23.3%	6.9%	16.7%	26.3%
Mostly community	6.7%	0%	3.3%	0%	58.6%	30.0%	16.2%

Economic factors in each village

	Economic score**	% income from fishing	% having external income	Years' fishing experience
Nolloth	8.47	80.57	70.33	27.07
Haruku	8.70	66.04	114.50	29.77
Tuhaha	9.27	74.58	159.00	33.90
Hulaliu	9.10	56.45	178.10	25.47
Seri	8.81	65.00	53.45	19.07
Hutumuri	10.35	64.26	211.33	28.00
Total	9.09	67.56	131.55	27.30

** = Boat, gear, house, land + TV ownership

Appendix 4: Reasons for loss of *Sasi* between 1940 and 1997

Village	Type of <i>sasi</i> lost or modified	Reasons given by local respondents (not respondents)	Comments (from local necessarily the whole story)
2 Haruku	Institution lost twice and revitalized in 1930s then again in 1979.	Reasons not given at this time (for full information please see case study).	Rules rewritten in 1930s in the original language (<i>bahasa daerah</i>). Renewed and rewritten in Indonesian in 1979.
3 Kabauw	Land <i>sasi</i> lost in 1990s. land rights.	Compliance problems rooted in conflict over	Clan territories mixed up with land claimed by Rohomini clans.
9 Paperu	Land <i>sasi</i> lost in 1970s. Marine <i>sasi</i> no longer functional by 1994 - 95.	Lack of compliance caused <i>sasi</i> to be abandoned.	Marine resource rules were re-introduced as village government regulations (still called <i>sasi</i>) in 1996.
10 Porto	Marine <i>sasi</i> almost non-existent by 1994.	Increased pressure on fishery, intense competition among fishers and moral disintegration.	More people entered fishery after clove price collapsed in 1990-91. Land and sea <i>sasi</i> being revived.
13 Tengah-tengah	Village <i>sasi</i> non-functional.	No reason given.	
14 Rutah	Land <i>sasi</i> lost in 1991.	Compliance dropped when enforcement lapsed due to political strife in village (pro and contra raja; government unstable).	<i>Sasi</i> worked well from at least 1967 till 1989. Coconuts now harvested and sold when green; dry coconuts difficult to find in village. Revitalization of <i>sasi</i> is planned.
15 Soahuku	Marine <i>sasi</i> lost by 1956.	Theft by outsiders who have no <i>sasi</i> in their village. All villages should have the same rules.	Marine <i>sasi</i> lost, some fishers still believe there is <i>sasi</i> on various resources.
17 Hitu Lama	Land <i>sasi</i> lost in 1940s.	Confusion over change in administrative boundaries.	Village split into two <i>desas</i> but land owned by clans in each new <i>desa</i> was still mixed together.
18 Tiouw	<i>Sasi</i> lost in 1950s.	Conflict between church and <i>adat</i> .	<i>Sasi</i> knowledge has died with the elders. Fishery now dominated by newcomers (Butonese).
19 Eri	Land <i>sasi</i> lost before 1970s.	Poor leadership i.e., lack of coordination and poor sharing of information, led to compliance problems.	
20 Seilale	<i>Sasi adat</i> lost.	<i>Sasi</i> taken over by the church.	
21 Iha	<i>Sasi</i> lost sometime in 1900s.		Rules never written down, now lost because elders with knowledge have died.
22 Ouw	Land <i>sasi</i> lost in 1996.	Lack of interest by <i>kepala desa</i> , who is often absent and does not work together with <i>adat</i> leaders.	Uncontrolled theft followed lapse in enforcement.
23 Booi	Land <i>sasi</i> lost in 1990s.	Price of <i>sasi</i> product (cloves) collapsed.	
24 Saparua	Marine and land <i>sasi</i> lost in 1970s.	Urbanization caused farmland to disappear, water to become polluted.	<i>Sasi</i> abandoned at time of declining harvests on land and sea. Marine rules were written down but are now lost.
25 Tuhaha	Marine <i>sasi adat</i> lost in 1977.	<i>Raja</i> position taken by unsuitable person : conflict with <i>adat</i> leaders. (For fuller information please see case study).	Land and marine <i>sasi</i> now being revived.

Village	Type of <i>sasi</i> lost or modified	Reasons given by local respondents (not respondents)	Comments (from local necessarily the whole story)
26 Hulaliu	Marine <i>sasi adat</i> lost in 1992.	<i>Kewang</i> stepped down during dispute with <i>kepala desa</i> . (For fuller information, please see case study).	Land and marine <i>sasi</i> being revitalised.
27 Seri	Village <i>sasi</i> lost in 1940s. Church <i>sasi</i> on land gradually disappeared in 1996.	Village is <i>dusun</i> of larger <i>desa</i> ; jurisdiction with respect to <i>adat</i> law unclear and <i>kepala desa</i> not on site.	Some people continue to say there is church <i>sasi</i> for individuals. <i>Kewang</i> persists but its job unclear.
28 Hutumuri	<i>Sasi adat</i> (land and village) lost in 1960s. Church <i>sasi</i> lost 1989.	<i>Sasi adat</i> taken over by church.	
29 Kariu	<i>Sasi adat</i> lost 1993.	<i>Sasi adat</i> taken over by church.	Marine <i>sasi</i> never existed because marine territory very limited.
30 Kailolo	Marine <i>sasi</i> lost.	Gradual evolution into commercial system lacking <i>adat</i> ritual.	Old marine <i>sasi</i> was rental system. Rental still goes on but not called <i>sasi</i> anymore.
31 Rohomoni			Wants to start marine <i>sasi</i> .
32 Oma	<i>Sasi adat</i> (land) modified over time.	Village <i>sasi</i> (<i>adat</i>) and church <i>sasi</i> now combined to implement wishes of church leaders (<i>jemaat</i>).	<i>Kewang</i> present but non-functional.
33 Wassu	<i>Sasi adat</i> (land) modified over time.	<i>Sasi</i> taken over by church.	<i>Kewang</i> present but non-functional. People now unsure whether to call their <i>sasi adat</i> or not.
34 Aboru	<i>Sasi adat</i> (land) lost 1979 - early 80s.	<i>Sasi</i> taken over by church.	<i>Adat</i> ceremonies have ceased. <i>Kewang</i> present but non-functional.
35 Sepa			Plans to strengthen marine <i>sasi</i> as part of <i>adat</i> heritage.
37 Waisamu			The population is mixed with Butonese newcomers for whom <i>sasi</i> (<i>gereja</i>) is less relevant.
38 Amahai			Marine <i>sasi</i> revived in 1990.
40 Airlow	<i>Sasi adat</i> lost in 1950s.	Regulations not clear. Village has only <i>dusun</i> status.	Church <i>sasi</i> survived amalgamation of this <i>dusun</i> with <i>desa</i> Nusaniwe because church and government are separate.
41 Amahusu	Land <i>sasi</i> and <i>laut</i> lost in 1970s.	Poor leadership : <i>raja's</i> rules not clear.	Plans to revitalize marine <i>sasi</i> . <i>Kewang</i> already reinstalled in 1994.
42 Rutang	1986 - 87 marine <i>sasi</i> was tried.		Saniri negri accommodated in LKMD.
43 Leahari	<i>Sasi adat</i> (village and marine) lost after 1979.	<i>Sasi</i> moved to the church.	Had written rules in past. Plans to revive marine <i>sasi</i> .
44 Latuhalat			<i>Sasi</i> under pressure because of poor economy.
45 Hila	Land <i>sasi</i> (church) lost in 1990s.		Some say church <i>sasi</i> still functional.
47 Haria	<i>Sasi adat</i> lost in 1995.	<i>Sasi</i> taken over by church.	Marine <i>sasi</i> inactive: revitalization is planned.
48 Wakal	Land <i>sasi</i> (resource rental system) in place 1993 - 1994; abandoned in 1995.	Theft of coconuts not controlled i.e., lack of enforcement mechanism.	

Village	Type of sasi lost or modified	Reasons given by local respondents (notrespondents)	Comments (from local necessarily the whole story)
49 Ulath	<i>Sasi adat</i> lost in 1992.	Conflict between <i>kepala desa</i> and <i>kewang</i> caused <i>kewang</i> to give up <i>sasi</i> to the church.	Marine <i>sasi</i> at risk due to sale of access rights to outsiders (Madurese).
50 Kulur	Land <i>sasi</i> lost in 1990s.	Crop failure.	No process in place for reintroducing <i>sasi</i> to the younger generation. <i>Sasi</i> is cherished only by the elderly.
51 Akoon	<i>Sasi adat</i> and marine <i>sasi</i> lost in 1970s.	Village leader not respected no sanctions, rules not clear, low compliance. <i>Sasi</i> moved to the church because people were more afraid of religious sanctions.	Rules not written down.
52 Ameth	Marine <i>sasi</i> lost in 1940s. <i>Sasi adat</i> lost in 1987.	Marine <i>sasi</i> lost during war. <i>Sasi adat</i> moved to the church.	
53 Abubu	Marine <i>sasi</i> lost in 1980s.		
54 Leinitu	Marine <i>sasi</i> lost in between 1940 and 1960. <i>Sasi adat</i> (village) lost 1983.	No <i>kewang</i> to enforce rules of marine <i>sasi</i> . <i>Sasi adat</i> moved to the church.	

Appendix 5: Government Agencies involved in fisheries management in Maluku province.

Results of interviews with various agencies involved in marine resource management and development in Maluku. Management functions as follows: 1) information gathering and provision, 2) project planning, 3) project implementation, 4) evaluation of projects (physical and legal aspects), 5) enforcement of fisheries law, 6) funding of projects, 7) routine fisheries policy implementation and monitoring, and 8) licensing and collection of taxes and fees.

INSTITUTION	LEVEL	MANAGEMENT FUNCTION								STRENGTHS	WEAKNESSES
		1	2	3	4	5	6	7	8		
BAPPEDA (Planning Board)	Provincial	*	*	*	*	*	*	*	*	<ul style="list-style-type: none"> The only coordination body at the provincial level 	<ul style="list-style-type: none"> Limited capacity for cross-sectoral impact assessments Focus on large development projects Limited capacity for cross-sectoral impact at the district level assessments Focus on large development projects
	District	*	*	*	*	*	*	*	*	<ul style="list-style-type: none"> The only coordination body 	<ul style="list-style-type: none"> Limited capacity for cross-sectoral impact assessments Focus on large development projects Limited capacity for cross-sectoral impact at the district level assessments Focus on large development projects
Fisheries Agency (Dept. Agriculture)	Provincial	*	*	**	**	*	*	*	*	<ul style="list-style-type: none"> Human resources available 	<ul style="list-style-type: none"> Limits of authority not clear Means and operational budget limited Staff not highly skilled
	District (<i>Kotamadya</i>)	*	*	**	**	*	*	*	*	<ul style="list-style-type: none"> Human resources available 	<ul style="list-style-type: none"> Authority unclear; not autonomous from provincial office
	District (<i>Kabupaten</i>)	*	*	**	**	*	*	*	*	<ul style="list-style-type: none"> Autonomous (in theory) Human resources available 	<ul style="list-style-type: none"> Authority unclear Budget and means limited Scientific data limited
	Sub-district	*	*	*	*	*	*	*	*	<ul style="list-style-type: none"> Close to the field programs and projects 	<ul style="list-style-type: none"> Authority limited Means limited Budget limited Human resources limited (quantity and quality) "Top-down" system Staff motivation poor
Police	Province and District				*	*	*	*	*	<ul style="list-style-type: none"> The only investigation body (KUHAP) Human resources available 	<ul style="list-style-type: none"> Limits of authority unclear relative to navy Motivation low Means limited Operational budget small Authority unclear Motivation low Means limited Operational budget small
	Sub-district				**	*	*	*	*	<ul style="list-style-type: none"> The officers are available at the village level 	<ul style="list-style-type: none"> Operational budget small

INSTITUTION	LEVEL	MANAGEMENT FUNCTION								STRENGTHS	WEAKNESSES
		1	2	3	4	5	6	7	8		
Navy	Provincial	*			**	*		*		<ul style="list-style-type: none"> Human resources available Full authority (SK Pangab) Means available Budget available Good reputation in the community 	<ul style="list-style-type: none"> Operate only at the provincial level Patrol deep water areas, not inshore Collaboration and coordination with police are weak
Dept. of Transport (Perhubungan Laut)	Provincial	*	*	**	**	*		*		<ul style="list-style-type: none"> Human resources Operational budget available Authority (supported by law) Authority 	<ul style="list-style-type: none"> Motivation poor Supporting means limited
	District	*	*	**	**			*		<ul style="list-style-type: none"> Motivation poor Means limited Operational budget small Human resources weak Authority insufficient Money and means limited Human resources inadequate 	<ul style="list-style-type: none"> Motivation poor Supporting means limited Means limited Operational budget small Human resources weak Authority insufficient Money and means limited Human resources inadequate
	Sub-district	*	*	*	*				*	<ul style="list-style-type: none"> Close to the activities 	<ul style="list-style-type: none"> Motivation poor Supporting means limited Means limited Operational budget small Human resources weak Authority insufficient Money and means limited Human resources inadequate
Environment Bureau	Provincial	*		*						<ul style="list-style-type: none"> Human resources inadequate Weak laws No role in coordination Jurisdiction and authority unclear Relationship with environment section of BAPPEDA is unclear 	<ul style="list-style-type: none"> Human resources inadequate Weak laws No role in coordination Jurisdiction and authority unclear Relationship with environment section of BAPPEDA is unclear
Dept. Forestry (Resource conservation section)	Provincial	*	*	*	*	*		*		<ul style="list-style-type: none"> Direct authority under CITES to protect endangered species 	<ul style="list-style-type: none"> Budget and means limited Motivation weak Jurisdiction unclear Limited to protected species and national parks; no input into fishing quotas
Law Bureau	Provincial	*	*							<ul style="list-style-type: none"> Works well with Fisheries Agency and other agencies 	
Regional and district government head offices	Provincial (Governor) District (Bupati) Sub-district (Camat)	*		*	*	*		*		<ul style="list-style-type: none"> Human resources available Motivation Close to the activity 	<ul style="list-style-type: none"> Authority unclear relative to provincial offices of national departments Budget and means limited Extremely busy
Village government offices	Village (Kepala desa)	*	*	*	**	*		*		<ul style="list-style-type: none"> Motivation Direct access to fishers Traditional institutions in place (partial) Social and cultural legitimacy 	<ul style="list-style-type: none"> Authority unclear Budget and means limited Heavy workload "Top-down" system Adat institutions lack legal standing

Appendix 6: Translated *Sasi* rules from three villages (Nolloth, Ihamahu, and Itawaka)

Appendix 6A: Nolloth Village *Sasi* Rules

POSITION, DUTIES AND FUNCTIONS OF THE NOLLOTH'S KEWANG

In accordance to its role among the village community, also as an institution that developed from the community's awareness, and as assistance to the village government, the *Kewang* holds the following position, duties and functions:

1. The *Kewang* or the Forest Police holds a position as an organization in the village, which in this case has to do the following tasks:
 - a. To look after, maintain or develop all of the properties (forest or sea) belonging to the community and the village within the village territory.
 - b. To perform as instructed by the *Kepala Desa* (Village Chief) in order to keep the continuation of the environment and to defend it.
2. In order to perform the above mentioned tasks, the *Kewang* or *Polisi Hutan* has the function to carry out all kind of activities that bring happiness and welfare to the community through the environment with an approval and monitored by the *Kepala Desa*.

RIGHTS, AUTHORITY AND OBLIGATION OF THE KEWANG

I. RIGHTS

1. Every *Kewang* member has the right to give ideas in the *Kewang* meeting.
2. Every *Kewang* member has the right to wear the *Kewang* uniform/clothing.
3. Every *Kewang* member has the right to accept *sasi* harvested coconuts shared among the *Kewang* members and coconuts of their own effort.
4. Every *Kewang* member who is on duty at the time when certain conflicts occur within the community and therefore need to resolve it, has the right to receive transportation fee.

II. AUTHORITY

1. Controlling for safety within the village territory (forest and sea).
2. Decide on every barrier that brings disadvantages to the community.
3. Review on all of the accomplishment and make effort for improvement.
4. Giving advice/suggestions to the *Kepala Desa* according to their duties.

III. OBLIGATIONS

1. Attend the *Kewang* meetings.
2. To keep the meeting under control and functioning smoothly/politely.
3. Maintain the *Kewang* privacy.
4. Support every village governmental policy.
5. To accept and decide on every trespassing of the *sasi* regulation.
6. Rejecting any conflicts that occur due to civil cases or criminal cases.
7. To keep actively in touch with all governmental components and congregational servants.
8. To report to the *Kepala Desa* all conflicts and development that occur within the village which are related to the *Kewang's* tasks.

Stated in: N o l l o t h
On: January 1, 1990
Kepala Desa

NOLLOTH'S SASI REGULATIONS

CHAPTER I S E A

Section 1.

1. As of January 1, 1990, the territory of covers an area of 125,000 m₂ starting along the 2.5 km long coastal line, from Umisin beach (Batu Berlubang) to Wailessy beach (border with Ihamahu) and further to the sea, to a depth of 25 m.
2. No one, either the Nolloth community nor any other villagers is allowed to do any activities at all within the *sasi* territorial waters, i.e.,
 - a. The hauling of fish nets if swimming is required to do so,
 - b. Diving for hunting fish,
 - c. Swimming, except for tourists who have a permit from the *Kepala Desa*.
3. No one is allowed to take any marine products from areas within the *sasi* territorial waters, such as:
 - a. Trochus spp.,
 - b. Turbo spp.,
 - c. Bia caping-caping,
 - d. Sea cucumbers of any species,
 - e. Corals.
4. For those who intend to take stones, sands or gravel for private use, they should ask for a permit from the *Kepala Desa*, and this should be acknowledged by the *Pakter* or *Kewang Besar* or the *Kewang's* Secretary.
5. It is forbidden to sell stones, sand and gravel to any other villagers.
6. It is forbidden for anyone at all to fish using toxic matters, including traditional medicines such as "tuba" roots etc.

CHAPTER II L A N D

Section 1: Wood

1. Any community member is forbidden to take wood for fuel from other people's property/farmland.
2. Wood for household purposes can be taken from other people's farm property if permitted by the owner.
3. The community are not allowed to cut off:
 - a. *Langsat* offspring to make spears/weapons, etc.,
 - b. *Manggis* offspring to make spears/weapons etc.,
 - c. Durian offspring to make sailing masts etc.
4. All kinds of *manggis* stems are not allowed to be peeled off.
5. The community members are not allowed to climb and take young durian fruit from the tree.

Section 2: Coconuts

1. No one is allowed to pick up any fallen off coconuts if these do not belong to them.
2. Those who do not have a house within their farm property (*dusun*), are not allowed to bring home his coconuts by passing through other people's farm property.
3. Those who are taking their coconuts from their farm property home at the same time when *sasi* closes, should have a permit from the *Pakter* or *Kewang Besar*.
4. Coconut owners who intend to make coconut oil within the coconut plantation, may only do so when *sasi* is opened.
5. When *sasi* is closed, it is forbidden for anyone at all to collect and eat young coconuts, even if it is from his own plantation.
6. When *sasi* is closed, it is not allowed to take home coconut oil from the plantation.
7. Those who have picked and collected their coconuts during the time when *sasi* is opened but did not have enough time to take all of them during that time, must report to the *Pakter* or *Kewang Besar* to get permission to take the coconuts home during the time when *sasi* is already closed. If not, the coconuts cannot be taken home.
8. Every community member who intends to cut down a coconut tree for housing purposes, should have a permit from the *Pakter* or *Kewang Besar*. They also have an obligation to plant or exchange one tree for every tree cut down.
9. No one is allowed take young coconut leaves when *sasi* is closed, except when it is for public/ congregation use, through deliberation with community leaders.
10. Every head of the family that takes a coconut fruit during the time when *sasi* is opened, must bring in a "sasied" coconut.

Section 3: Sago

1. Anyone who cuts down the sago tree for processing must not leave the stem to stick out for more than 30 cm long.
2. Before cutting down the sago tree, the cutter must first have cleaned the area around the sago tree within a minimum radius of twice the length of the sago stem.
3. Besides cleaning down the area around the sago tree, the edges of the tree should be cut down first, so that the other plants around the sago tree will not be destroyed when the sago tree is cut down.
4. When cutting off sago palms for roofing or for “tumang”, the process of cutting should be the same as the process when cutting down the sago tree.
5. When cutting off sago leaves from a tree, the leaves should not be cut off from more than one branch.
6. Cutting off sago leaves should be done at one’s own plantation and if done at others, then the cutter should have a permit from the plantation owner.
7. Sago leaves for “tumang” use, should only be taken from one stem and not more than that.
8. Anyone who processes sago in the area of Seram is not allowed to cut sago leaves from trees within the territory of Nolloth.

Section 4: Sugar Palm

1. When *sasi* is closed, no one is allowed to cut off the stem to make brooms (*sapu lidi*).
2. When *sasi* is opened, no one is allowed to cut/take sugar palm from other people’s plantation, except if permitted by the owner.
3. It is forbidden to cut off “gemutu” at other people’s plantation, unless permitted by the owner.

Section 5: Areca Nut (Pinang)

1. No one is allowed to take young areca nuts except when permitted by the *Pakter/Kewang Besar*.
2. The stem of the areca nut is also not allowed to be cut off, except when permitted by the *Kewang Besar/Pakter*.

Section 6: Pineapples

1. No one is allowed to take a young pineapple fruit.
2. It is also forbidden to have other people’s pets or cows eat or destroy the pineapple plants.
3. Cow owners are not allowed to feed either old or young pineapples to their cows.

Section 7: Bananas

1. No one is allowed to cut down young banana trees.
2. Only one stem per tree is allowed to be taken for use.

Section 8: Jackfruit/Cempedak

1. No one is allowed to take young *cempedak* fruits.
2. It is also forbidden to cut down young *cempedak* stems or which still bear fruits.

CHAPTER III GENERAL

Section 1: Salele/Etang

1. No one is allowed to open or break the “salele/etang” that has been put on a certain thing without permission from the one who puts it there i.e.,
 - a. “Salele/etang” in front of houses’ doors,
 - b. “Salele/etang” at trees or plants,
 - c. “Salele/etang” at “goti”, etc.

Section 2: Foreigners

1. Every newcomer/foreigner is not allowed to enter the village territory without first having a permission from the *Kepala Desa*, *Pakter* and *Kewang Besar*.
2. The foreigner who has already obtained a permit must obey all of the regulations within the village territory.
3. Foreigners who arrive with boats/vessels are not allowed to leave their boats along the territorial coastline.

Section 3: Identification marks

1. No one – either the community member or foreigners – are allowed to wear clothes or attributes that belong to the *Kewang*.
2. No one is allowed to use the sound instrument usually used by the *Kewang* (shell).

Section 4: Problems/Difficulties

1. No community member is to take justice into his own hands when he is still within the village territory.
2. No one is allowed to do things that may bring uneasiness to others.
3. When a problem arises that needs resolving by the *Kewang*, the one involved should pay the costs for:
 - a. Getting people to come or be present or keeping them away,
 - b. Keeping the cloves safe at harvest time,
 - c. The plantation commission,
 - d. Counting the plants/trees and deciding on the borders.

Section 5: Others

1. When *sasi* is closed, no one is allowed to wear a hat, white towel, white shirt and use an umbrella.
2. When *sasi* is closed during the months February to August, no one is allowed to turn on the gasoline light, “lobe” or torch within the forest at night, unless permitted by the *Pakter* and *Kewang Besar*.
3. Sounds from chain saws, tape recorders, drums, etc. are also not allowed.

Section 6: Additions

1. These *sasi* regulations are adapted to *Kewang* regulations.
2. Anyone who breaks these regulations will have to pay a certain fee as stated hereafter.
3. If sometime in the future there seems to be any error or mistake in these regulations, it will be corrected.
4. The *sasi* regulations are valid from the day they are decreed.

Decreed in: N o l l o t h

On: January 1, 1990

Acknowledged/ Legalized:

1. *Pakter*

Appendix 6B: Sanction/Penalties for Trespassing *Sasi* in Nolloth

CHAPTER I SEA

Section 1.

1. Quite clear
2. a. b. c. - Pay a fine of Rp25,000 per person
3. Pay a fine of:
 - a. Rp7,500 per individual big/small
 - b. Rp25,000 per individual big/small
 - c. Rp2,500 per individual big/small
 - d. Rp1,000 per individual big/small
 - e. Rp5,000 per plant big/small
4. Pay a fine of: Rp5,000 for rocks per m_
Rp7,500 for sand per m_
Rp10,000 for gravel per m_
5. Pay a fine of: Rp10,000 for rocks per m_
Rp12,500 for sand per m_
Rp15,000 for gravel per m_
6. Pay a fine of Rp100,000 or undergo further prosecution by higher authorities according to the regulations

CHAPTER II LAND

Section 1: Wood

1. Pay a fine of Rp5,000
2. Pay a fine of Rp10,000
3. Pay a fine of Rp12,500
4. Pay a fine of Rp25,000
5. Pay a fine of Rp1,000 for each fruit

Section 2: Coconuts

1. Pay a fine of Rp500 for each fruit
2. Pay a fine of Rp250 for each fruit
3. Pay a fine of Rp500 for each fruit
4. Pay a fine of Rp250 for each fruit
5. Pay a fine of Rp500 for each fruit
6. Pay a fine of Rp2,500 for each bottle of oil
7. Pay a fine of Rp250 for each coconut
8. Pay a fine of Rp10,000 for each tree
9. Pay a fine of Rp5,000 for each coconut "tumbak"
10. Pay a fine of Rp5,000 / family or remove weeds from the lawn appointed by the *Kewang* with an approval from the *Kepala Desa*

Section 3. Sago

1. Pay a fine of Rp5,000 for each tree
2. Pay a fine of Rp10,000 for each tree
3. Pay a fine of Rp10,000 for each tree
4. Pay a fine of Rp10,000 for each tree
5. Pay a fine of Rp2,500 for each branch
6. Pay a fine of Rp5,000 for each plantation
7. Pay a fine of Rp2,500 for each stem
8. Pay a fine of Rp10,000

Section 4: Sugar Palm

1. Pay a fine of Rp500 for each stem
2. Pay a fine of Rp250 for each stem
3. Pay a fine of Rp1,000 for each "lirang"

Section 5: Areca Nut

1. Pay a fine of Rp1,000 for each tree
2. Pay a fine of Rp2,500 for each tree

Section 6: Pineapples

1. Pay a fine of Rp1,000 for each fruit
2. The cow owner has to pay a fine of Rp1,500 for each fruit
3. Pay a fine of Rp1,000 for each tree

Section 7: Bananas

1. Pay a fine of Rp5,000 for each tree
2. Pay a fine of Rp500 for each stem

Section 8: Jackfruit/Cempedak

1. Pay a fine of Rp5,000 for each fruit
2. Pay a fine of Rp10,000 for each fruit

**CHAPTER III
GENERAL**

Section 1: Salele/Etang

1. Pay a fine of: a. Rp10,000
b. Rp5,000
c. Rp5,000

Section 2: Foreigners

1. Pay a fine of Rp5,000 per person
2. Pay a fine of Rp2,500 per person
3. Pay a fine of Rp10,000 per boat

Section 3: Identification marks

1. Pay a fine of Rp5,000 per person or clean the streets within the village, as appointed by the *Kewang* after having reported to the *Kepala Desa*
2. Pay a fine of Rp5,000 per person or the same as 3.1

Section 4: Problems/Difficulties

1. They are sentenced to gather and carry 25 baskets of sand after reporting to the *Kepala Desa*
2. They are sentenced to gather and carry 20 baskets of sand after reporting to the *Kepala Desa*
3. The cost that they have to pay are as follows:
 - a. Each *Kewang* member gets Rp1,000
 - b. Each *Kewang* member gets Rp2,500
 - c. Each *Kewang* member gets Rp1,500
 - d. Each *Kewang* member gets Rp1,500

Section 5: Others

1. Pay a fine of Rp2,500 per person
2. Pay a fine of Rp2,500 per person or pulling out weeds at places as appointed by the *Kewang* after reporting to the *Kepala Desa*
3. Pay a fine of Rp5,000 per person or the same as point 5.2 above

Section 6: Addition

Points 1-4 are quite clear

Decreed in: N o l l o t h

Acknowledged / Legalized:

On: January 1, 1990

Appendix 6C: Ihamahu Village *Sasi* Rules

Ihamahu's *Kewang* Board

Consultant	: Bapak Raja (Upu Latu/Ketua <i>Adat</i>) M.R. Lilipaly
Chairman	: Mr. Justhinus Siauta
Vice Chairman	: Mr. Daniel Pattinaya
Secretary	: Mr. Zefnath Nendissa
Treasurer	: Mr. Selwanus Hitipeuw

The board also contains the following divisions:

Funding	: Mr. Fredy Sopacua
Security	: Mr. Petrus Leatemia
Reforestation	: Mr. Jermias Pattinaya
<i>Adat</i> Law	: Mr. Onesimus Sahetapy
Public Relations	: Mr. Jusuf Paliama

Ihamahu's *Kewang* Regulations

Ever since the Ihamahu *Kewang* Corps (*Korp Kewang* Ihamahu) made their comeback and started functioning again, the previous regulations are re-established along with other, new regulations which are considered necessary, such as regulations related to the Environmental Concept of the National Development. All the regulations are still maintained and upheld. The community also lives by and acknowledges them.

Those regulations are as follows:

1. Before cutting down a sago tree, one must climb the tree and cut down the branches first.
2. The cutting down of a sago tree should not bring about destruction to other sago trees.
3. When squeezing the sago debris (*ela*) to get the extract, the waste water (*air goti*) should not flow into the river.
4. The stem and mid-rib (*sahani*) used for getting the extract (*goti*), should be taken from the sago tree to be cut down, and not from other sago trees.
5. When cutting sago leaves for the purpose of making a roof, at least five whole branches should be left on each tree and should not be cut off.
6. Women are prohibited to do the washing at the upper course of the river when someone is extracting sago at the lower course.
7. When cutting down the tree to get wood for household purposes, the branches should be cut down first before the tree itself. This intention should be reported to the *Kewang* Chief (*Kepala Kewang*) or the Vice Chief two days before the activity takes place.
8. Other villagers from outside Ihamahu who wish to enter the sago woods to work on getting sago extract or getting wood for household purposes, must report to the *Kewang* Chief and must possess a Work Permit as well as receive guidance and pay a certain amount of fee to the Village Treasury or *Kewang* before they are allowed to enter the woods.
9. Those who enter the woods at the time when the trees are budding and blooming should not make any noise.
10. Walking in the woods with an open umbrella is prohibited.
11. Throwing at the durian tree bearing fruits is prohibited.
12. Climbing a durian tree when the fruits are still unripe is prohibited.
13. Taking the mangrove's bark for reinforcement of fishing nets is prohibited, unless permitted by the *Kewang*.
14. Taking the young mangroves for any ceremonial purposes at all is prohibited unless permitted by the *Kewang*.
15. Picking unripe fruits from the trees is prohibited.
16. Using explosives for fishing is prohibited.
17. Destruction or harvest of coral reefs, sea cucumbers, trochus, tridacna for certain purposes or export out of the village is prohibited.

18. Other villagers are prohibited to take sand or stones from areas within the Ihamahu territory unless permitted by the *Kewang* or the Land Owner (*Tuan Dusun*).
19. Other villagers are prohibited to take “*tali kamatol*” from areas within the territory of Ihamahu unless permitted by the *Kewang*.
20. Roofs (*gaba-gaba*) are not to be sold to other villages.
21. Sago plantation owners who wish to put their plantation for lease should report to the *Kewang* 2 x 24 hours beforehand in order to arrange for the *Kewang* to supervise the leasing.
22. Land owners who wish to open up their piece of land for plantation use such as corn plantations, should first report to the *Kewang*. The *Kewang* will then consider whether this is feasible (in terms of fertility and environmental/natural resources maintenance perpetuation).
23. Embedded “*bagan*” which destroys coral reefs is prohibited.
24. Fishing using small mesh size nets is prohibited.
25. Fishing with nets during the day is prohibited, except for schooling.
26. Littering along the coastal area is prohibited.
27. Destroying/cutting off mangroves is prohibited.

Special Regulations about *Sasi*

Sasi is an effective way of managing or preserving natural resources, which has basically been put into practice by the previous generations until now. Some of the *sasi* regulations are also confirmed by the *Kewang* regulations. Those regulations are as follows:

1. When *sasi* is closed, taking coconuts either from the tree or the ones fallen from the tree is prohibited.
2. When *sasi* is closed, taking coconut shoots for any purpose at all is prohibited.
3. Taking dry coconut trunks for fuel wood is prohibited unless permitted by the *Kewang*.
4. Cutting down coconut trees for household purposes is prohibited unless permitted by the *Kewang*.
5. Taking palm leaves for making brooms is prohibited unless *sasi* is opened or announced so by the *Kewang*.
6. When the *sasi* is opened, all the coconut plantations should be cleaned of undergrowth.
7. Before the *sasi* is closed, every coconut plantation owner should give some of their harvest to the *Kewang* members and non-native governmental officials who work for the village, including the priest.
8. The processes of taking palm leaves are also arranged with *sasi*. Two or three days after *sasi* on coconuts is opened, *sasi* for taking the palm leaves is also opened.
9. *Sasi kelapa* for coconuts in the trees is opened once every three months for the people to climb the trees. However, if many coconuts have fallen off the trees, *sasi* for fallen-off coconuts is also opened for three days.

Sasi is a traditional (*adat*) way of management that should be perpetuated. The closing and opening of *sasi* is done with a special ceremony according to the *adat*. However, the church is also involved and through its prayers, it supports all the crops which we believe are the Almighty’s gift for us.

Any transgressions are resolved according to the *adat*, followed by paying a fine which depends on the type of transgression made by the community member. When the transgression made is minor, it can be resolved by giving guidance and counseling only.

Types of Transgressions and the Penalties

In the 1960s, anyone who practiced a transgression towards the *Kewang* regulations had to pay a penalty/fine. The types of penalty/fine that they had to pay are as follows:

Table 1. Concerning sago wood

No.	Types of Transgressions	Fine
1.	Cutting down the sago tree without first sweeping the lawn.	Rp1.000
2.	Cutting down the sago branches, only leaving four whole branches.	Rp5.000
3.	Cutting off sago branches for roofing purposes without sweeping the lawn.	Rp1.000
4.	Cutting down the sago tree without first cutting down its branches.	Rp1.000
5.	Destructing young sago trees when cutting down a sago tree.	Rp5.000
6.	Cutting down a young sago tree.	Rp5.000
7.	Taking/cutting off sago leaves to make sago extract (<i>tumang</i>) without using a sickle.	Rp1.000
8.	Cutting off young sago branches to make a fence.	Rp1.000
9.	Stealing one unripe durian.	Rp5.000
10.	Stealing one unripe coconut.	Rp5.000
11.	Stealing one unripe pineapple.	Rp5.000
12.	Stealing or cutting off unripe bananas.	Rp5.000

Table 2. Concerning coconut wood

No.	Types of Transgressions	Fine
1.	Cutting of coconut shoots.	Rp1.000
2.	Taking coconuts when <i>sasi</i> is closed.	Rp5.000
3.	Stealing one unripe coconut.	Rp5.000
4.	Taking coconut branches when <i>sasi</i> is closed.	Rp1.000
5.	Cutting down coconut trees that bear fruits.	Rp5.000
6.	Cutting down the woods.	Rp10.000
7.	Cutting down or destructing mangroves.	Addressed to related institutions for further processing
8.	Burning down forests especially parts containing clean water sources.	- As above
9.	Destroying coral reefs, stealing sea cucumbers and trochus and any other marine biotas.	- As above

Appendix 6C: Itawaka Village *Sasi* Rules

THE GOVERNMENT OF ITAWAKA KECAMATAN SAPARUA

THE KEWANG ORGANIZATION OF ITAWAKA THE STATUTE AND BYLAWS

A. Base

1. The Itawaka's LMD Decree dated March 14, 1995 about the establishment of the Itawaka's *Kewang* statute and bylaws.
2. The Itawaka *Kewang* members' resolution for the establishment of the statute and bylaws, dated May 22, 1995.

B. Home Affairs

1. Aim and objective
The aim and objective of the Itawaka's *Kewang* statute and bylaws establishment is to provide work guidelines for implementing the tasks carried out by the LMD in a responsible useful and successful way.
2. The duties and responsibilities of the *Kewang*
 - a. The duties and responsibilities of the *Kewang* are to monitor over all the land and marine resources that are sources of income to the village, within the territory of Itawaka.
 - b. To monitor over the area and borders of the Itawaka territory.
3. The *Kewang* Organization structure of Itawaka

Chief	- Nikodemus Papilaya
Vice Chief	- Paulus Sakalessy (<i>Pakter</i>)
Secretary	- Izac Papilaya
Treasurer	- David Sopacua
Public Relations	- Abraham Sahetapy
	- Matheos Sopacua
<i>Kewang</i> chief for the forests	- Pieter Papillae
<i>Kewang</i> chief for the <i>Tanah Iha</i>	- Alfari Siahaya
Advisors/Patron	- The head and staff of the LMD
4. The *Kewang's* regulations
 - a. On land, during the *sasi* period:
 1. It is prohibited to climb the coconut trees.
 2. It is prohibited to pick up coconuts that have fallen on the ground.
 3. It is prohibited to pick/cut off young coconuts.
 4. It is prohibited to take/cut off young coconut leaves (*daun ketupat*).
 5. It is prohibited to cook coconut oil within the plantation area.
 6. It is prohibited to bring in young coconut leaves (*daun ketupat*) from other villages.
 7. Villagers who are not members of the *Kewang* body, are not allowed to wear the red handkerchief (*lenso berang*) when entering the plantation area.
 8. It is prohibited to cut off/chop down young wood and bamboo (*loleba*) within the territory of the *Iha* land (*tanah Iha*).
 9. During the period when *sasi* is closed, at least after 40 days, there is a possibility for the community to pick/gather coconuts when required, by asking for a permit letter from the *Kewang* chief (*Kepala Kewang/Pakter*) and by paying an administration fee of Rp2,000 (two thousand rupiahs).
 10. Those who own ornamental coconut trees within the territory of Itawaka do not have to have *sasi* applied to their coconuts, unless the owner himself proposed to do so.
 11. Those who own coconut plantations within the territory of Paperu, must ask for a permit from the *Kewang* when intending to pick/gather their coconuts to bring back to Itawaka. Those who break this regulation must pay a fine of Rp1,500 (one thousand and five hundred rupiahs).
 - b. At sea, during the *sasi* period:
 1. It is prohibited to dive for marine resources such as trochus, sea cucumbers and others within the territorial waters of Itawaka.
 2. People from outside the village are prohibited to catch fish at sea using nets.

3. It is prohibited to catch and sell ornamental fish in a way that can disadvantage the village.
- c. At the closing and opening time of *sasi*:
1. It is prohibited to cut off leaves for roofing at other people's plantations without permission from the owner.
 2. It is prohibited to take the *manggis* skin without permission from the owner.
 3. It is prohibited to let cows enter into other people's plantations without permission from the owner.
 4. It is prohibited to make *ketupat* for sale.
 5. The Itawaka and other villagers are prohibited to catch fish using explosives or other destructive materials.
 6. It is prohibited to chop down sago trees before first cutting off the branches.
 7. It is prohibited to destruct young sago palms. Those who break this regulation must pay a fine of Rp25,000 (twenty-five thousand rupiahs).
 8. People from outside the Itawaka village are not allowed to take gravel and *rocks (batu itam)* along the coasts within the Itawaka territory without having a permit to do so. A fine of Rp50,000 (fifty thousand rupiahs) must be paid by those who break this regulation. Itawaka villagers themselves who intentionally take gravel or *batu itam besar* to sell to people outside the village without carrying a permit, should pay a fine of Rp10,000 (ten thousand rupiahs).
 9. People from outside Itawaka who used wood for housing purposes and other purposes by using sensorial machinery within the territory of Itawaka without carrying a permit must pay a fine of Rp10,000 (ten thousand rupiah).
 10. People from out of the Itawaka village who enter the village to work, must carry a permit and pay the following charges:

10.1	To process sugar palms	Rp25,000
10.2	To pick cloves	Rp10,000
10.3	To pick nutmegs	Rp5,000
10.4	To cut wood to make a boat	Rp2,500
10.5	To chop down fuel wood	Rp1,000
- d. On land, during the *sasi* opening period:
The community members are allowed to pick/gather substantive young coconuts.
- e. At sea, during the *sasi* opening period:
The opening ceremony for *sasi* on marine resources, such as trochus and sea cucumbers, is performed by the *Pakter/Kepala Kewang*, and then reported to the LMD for auctioning to the Itawaka community and people from outside the village.
- f. Other matters that are not included in the *Kewang's* regulations will be studied further and later added on as part of the statute and bylaws.
5. The obligations and responsibilities of the *Kewang*
1. The obligation of the *Kewang* is to monitor the land and marine resources of the village which are sources of income for the village and to process them so that they become money. The *Kewang* deposits the money to the treasurer with an acknowledgment from the Head of the LMD/Village Head (*Kepala Desa*) along with a receipt from the *Kewang's* treasurer.
 2. The income from the village's land and marine resources are fully used for carrying out the governmental job in supporting the development program of the village, according to the community's desires/aspirations.
6. The work period of the *Kewang* board
1. Each *Kewang* board has a work period of 8 (eight) years, as decreed through the *Kewang* meeting and approved by the LMD.
 2. When the work period of the *Kewang* board is over, the *Pakter* holds a meeting to end the work period of the board and elect new personnel for the new board of the *Kewang*. Members of the former board can be re-elected as members of the new board; those who are not re-elected will function as regular members of the *Kewang*.
7. The *Kewang* job division
- a. Since there are 26 members of the *Kewang* (not including the *Kewang* board), it has been decided to have four to five members of the *Kewang* to be on duty each month. This was decided by considering the condition and the total area of the Itawaka territory.
8. Rules for the *Kewang*
- This statute and bylaws include the following rules for the *Kewang* to be obeyed:
- a. A *Kewang* member who intentionally or unintentionally neglects his duty without a reasonable excuse during his month of work, will be taken action against by the board during the *Kewang*

- meeting.
- b. During his month of work, if community members or people from outside the village who intentionally or unintentionally break the regulations stated in the statute and by laws, during the closing or opening period of *sasi*, the particular *Kewang* member who is in charge at the time must report directly to the Kepala *Kewang* and to have action taken against the rule breaker, without any discriminatory feelings.
 - c. If the *Kewang* member or LMD member himself breaks the regulations stated in the statute and bylaws, then he must pay a fine twice as much as what a normal community member or other villager pays.
 - d. All *Kewang* members must attend the *Kewang* meetings unless they are sick, or for family reasons or any other hindrances such as being out of the village.
 - e. Every member who attends the *Kewang* meeting must sign the attendance list.
 - f. The *Kewang* members are those who are Itawaka villagers living in the village.
 - g. The members of the Itawaka's *Kewang* are those who are not involved in any political organizations forbidden by the government.
9. Juridical sanctions
Those who intentionally or unintentionally break the *Kewang's* regulations mentioned above, have to undergo the following sanctions:
- a. The community members who climb old or young coconut trees, cut off young coconut leaves, chop down wood and bamboo within the territory of *tanah Iha*, catch trochus and sea cucumber, and cook coconut oil within the plantation area, must pay a fine of Rp25,000 (twenty-five thousand rupiahs).
 - b. The community members who does the following without carrying a permit: cut off other people's roofing, peeling off *manggis* skin, taking fruits, allowing cows enter other people's plantations, must pay the following:
 1. A fine of Rp5,000 (five thousand rupiahs) to the *Kewang*.
 2. Compensation to the owner according to the disadvantages he has caused.
 - c. If those who break the regulations do not comply with the sanctions applied to them, they are taken to the LMD for further action.
10. The obligations of the *Kewang* (special notes)
1. Each *Kewang* member must have a red uniform and a red handkerchief (*lenso berang*).
 2. At the opening and closing ceremony of the *sasi*, the *Kewang* members must wear their uniform and the *lenso berang*.
 3. Every *Kewang* member, when carrying out his monthly work within the plantation area, must carry along with him the *lenso berang* and the work instruction letter signed by the *Pakter/Kepala Kewang*, as a trademark, to prevent other community members from intentionally acting as *Kewang* members.
 4. The Itawaka's *Kewang* has a special *Kewang* stamp for organizational use.

C. Closing

This statute and bylaws of the Itawaka's *Kewang* are established to provide working guidelines for the *Kewang* to carry out its job, assist the Itawaka village government in maintaining and monitoring the area and borders of the Itawaka village as well as its land and marine resources which are sources of income for the village in supporting the development of this loveable Itawaka village.

Therefore, we would ask for the goodwill of the Itawaka village head (*kepala desa*) as the head of the LMD to examine it, and if approved, to please endorse it.

Itawaka, May 22,
1995

THE KEWANG BOARD OF ITAWAKA

Secretary,

Chief,

PAPILAYA

N. PAPILAYA

Pakter

Kewang Chief of the forest

SAKALESSY

P. PAPILAYA

Kewang Chief of Tanah Iha

A.SIAHAYA

Browsed and approved by
Itawaka Village Head (Kepala Desa)

I. L. WATTIMENA

Appendix 7: Fisheries rules in lease villages, Ambon and part of Seram.

Sasi and non-*sasi* rules pertaining to the fishery in 63 central Maluku villages. Information compiled from inventory and augmented wherever possible by information from interviews, performance surveys and written *sasi* rules. List not necessarily comprehensive. Doubtful or unconfirmed reports indicated by (?).

Map # Village	<i>Sasi</i> fisheries rules	Non- <i>sasi</i> fisheries rules	Notes
1 Nolloth	Harvest of top shells, sea cucumbers, <i>Turbo</i> shells and <i>japing-japing</i> shells in the <i>sasi</i> area prohibited except in open season. No gill netting or swimming in <i>sasi</i> area. Use of poisons banned. No sand/rock/coral taken without permission. Written <i>sasi</i> rules. Hereditary <i>kewang</i> patrol area. Sanctions for stealing <i>sasi</i> resources applied by <i>kepala desa</i> (Rp100,000 fine) and police.	Non-residents must have permission to fish in territory. Harvest rights for top shells and sea cucumbers outside of <i>sasi</i> area also sold. Gill net use by permit only. Blast fishing prohibited.	Village government, <i>kewang</i> and church get share of profits from top shells and sea cucumbers sales. Decision-making dominated by village government. Compliance high because <i>kepala desa</i> is firm.
2 Haruku	<i>Lompa</i> and make harvest prohibited in <i>sasi</i> areas (river and sea) except in open season. River <i>lompa</i> harvest communal. Rotation of marine harvest rights for <i>lompa</i> and <i>make</i> fish and division of catch prescribed. Non-residents must ask permission to fish in territory. <i>Bagans</i> , <i>karolo</i> nets and <i>jala</i> nets prohibited. No motorboats in river when <i>lompa</i> are there. Written <i>sasi</i> rules. Sanctions by <i>kewang</i> .	No coral mining, blast fishing or use of poisons allowed in territory.	All rules enforced as much as possible by <i>kewang</i> members but they lack fast boats and cannot get timely assistance from higher authorities. <i>Adat</i> strong, but conflict in village and poor economy encourage non-compliance.
3 Kabauw	Harvest rights in <i>sasi</i> area (<i>labuhan</i>) auctioned for <i>bagan</i> fishery and sea cucumbers. Only buyer (<i>tuan sasi</i>) is allowed to use nets in area. He decides harvest times. <i>Ketua adat</i> sets up <i>sasi</i> signs in the sea. <i>Sasi</i> rules not written down. Sanctions by village government.	Blast fishing prohibited. Harvest of ornamental fish by permit only, after paying fee of Rp20,000 per day.	<i>Sasi</i> auction fee shared by village government, Muslim meeting house and mosque. <i>Sasi</i> area patrolled by <i>tuan sasi</i> 's men (= <i>kewang</i>). Profits to <i>tuan sasi</i> , <i>bagan</i> crew and net owner. Decision-making dominated by village government
4 Pelauw	Harvest rights auctioned (<i>lelang</i>) 2x a year in 3 <i>sasi</i> areas. Buyer (<i>tuan sasi</i>) controls harvest times and hires guards (called <i>kewang</i>). Net fishing only by <i>tuan sasi</i> or by his permission, after payment. Hook and line fishing permitted. Rules written down. Sanctions by <i>kepala desa</i> .	Blast fishing and use of poisons prohibited.	Decision-making dominated by village government, which collects fees. Blast fishing ban not effectively enforced: fishers say village staff are involved. Economic downturn and lack of respect for local leaders reduce compliance.
5 Makariki	Whether <i>sasi</i> area is open or closed, locals have free access. However, some fishers believe there are bans on sea cucumbers, top shells and ornamental fish. Outsiders may fish in the territory only in open season and then they must pay a portion of catch to village. Area may be closed to outsiders if deemed necessary (i.e., if signs of damage or over-fishing). Decision made by <i>kepala desa</i> and the villagers. <i>Sasi</i> rules written down including sanctions.		<i>kewang</i> present but role in marine management unclear. Some fishers reluctant to report violations. Economic pressures and new immigrants reportedly undermine rules. Strong leadership key to compliance and enforcement.

Map # Village	Sasi fisheries rules	Non-sasi fisheries rules	Notes
6 Ihamahu	Sasi rules prohibit harvest of corals, sea cucumbers, top shells and giant clams in the territory. Small mesh <i>karolo</i> nets, poison and blast fishing, <i>bubus</i> and other traps prohibited. Catch of schooling pelagic fish on the sea grass bed is regulated: season open 1-2 x a year. Mangroves protected. No taking sand or stones without permit. No littering on the shore. Written <i>sasi</i> rules. Patrolled by <i>kewang</i> with help from fishers. Sanctions by <i>kewang</i> unless it is a police matter (destructive gears or mangrove rules).	Ban on catching ornamental fish (?).	Territory in two parts: Tuhaha Bay and eastern shore. No <i>sasi</i> signs in the sea because area is known. Thefts of top shells from eastern shore area by outsiders is a problem. Both land and sea <i>kewang</i> under one hereditary <i>kepala kewang</i> . Village in process of strengthening <i>sasi</i> . <i>Sasi</i> fish catches used to support community celebrations. <i>Adat</i> ceremonies supported by prayer. Perceptions of fishers' role in decision-making are varied. Compliance seen as high.
7 Siri sori	Sasi area auctioned by village government for harvest of top shells and sea cucumbers. Harvest rights currently held by government research institute (LIPI). Season opened every one or two years. Income shared by mosque (5%), <i>kewang</i> (10%) and village government (85%) Written <i>sasi</i> rules. Sanctions applied by <i>kewang</i> . <i>Kewang</i> members selected from each RT.	LKMD has developed fisheries rules. Blast fishing prohibited.	Control over access seen as strong and stable; fishers cooperate with <i>kewang</i> . Perception among fishers is that they have increasing role in decision-making.
8 Itawaka	Sasi on entire <i>territory</i> . Harvest rights auctioned to locals for all species including top shells, sea cucumbers and <i>japing-japing</i> (shellfish). Season opens every one or two years, as agreed by <i>kewang</i> and <i>kepala desa</i> . Size of top shells harvested must exceed 8 cm. <i>Kewang</i> has 30 members and is official village government body as of 1995. Villagers help patrol the <i>sasi</i> area. No diving permitted in <i>sasi</i> area. No net fishing by outsiders. No removal or sale of ornamental fish. Rules are written down. Sanctions from <i>kewang</i> include fines and hard labor.	LKMD has recently developed fisheries rules. Blast fishing and use of poisons prohibited.	In past (1970s), Butonese, Makassar and people from Tuhaha purchased access rights but this has been prohibited since 1980 in the belief that locals would take better care of the resource and also to keep profits in the village. Perceptions mixed regarding participation in decision-making. <i>Sasi</i> products marketed in Saparua. <i>Sasi</i> ceremony includes prayers.
9 Paperu	In theory, there is <i>sasi</i> on sea cucumbers in a small <i>sasi</i> area but recently this has not been enforced. Rules are written down. <i>Kewang</i> not functional.	LKMD in 1996 drafted new village fisheries rules modeled on old <i>sasi</i> rules. Still called <i>sasi</i> . Blast fishing and use of poisons prohibited. Net fishing by outsiders requires permit. Villagers report infractions; sanctions by LKMD.	Perception of fishers' role in decision-making is mixed; depends on the person's status. Village cooperative may have role as intermediary.

Map # Village	Sasi fisheries rules	Non-sasi fisheries rules	Notes
10 Porto	Harvest rights in <i>sasi</i> area sold for top shells, sea cucumbers, giant clams, <i>bia piring</i> (shellfish) and <i>batu laga</i> . Locals harvest the <i>sasi</i> area but outsiders may share the harvest with written permission of the <i>kewang</i> and <i>kepala desa</i> . Hand line fishing is always allowed. <i>Sasi</i> rules are written down. <i>Kewang</i> has 40 members, for both land and sea. <i>Sasi</i> signs are set up on the beach. Sanctions by <i>kewang</i> .	There is an effort being made to reinforce <i>sasi</i> rules with formal village regulations. Blast fishing and use of poisons prohibited. <i>Bagans</i> from Haria that fish in the territory must have permission and pay a fee.	Proceeds of resource rental divided between village government and <i>kewang</i> . Drop in clove price forced many people to intensify fishing effort and <i>sasi</i> broke down. Theft of top shells is a problem.
11 Morela	Top shells and sea cucumbers under <i>sasi</i> (<i>lelang?</i>). <i>Kewang</i> imposes sanctions.	<i>Nonae</i> fish may not be captured by persons from outside the village unless they pay fee. to <i>kepala desa</i> . Blast fishing forbidden	Very harmonious village with strong tradition of collective action.
12 Seith	None. Land <i>kewang</i> controls access to marine area. Some fishers believe there is marine <i>sasi</i> .	No outsiders allowed to fish in the territory without payment. Compressor diving using poisons is forbidden.	Land <i>sasi</i> resource rent is divided among village government for development (60%), <i>kewang</i> (15%) and mosque (15%).
13 Tengah-tengah	Rights to <i>sasi</i> area (inshore to edge of reef) may be sold by <i>kewang</i> for net fishing of pelagic fish (<i>lema</i> and <i>lalosi</i>) and sea cucumbers harvest; otherwise, area is closed except for hand lines. Rental for pelagic fish Rp75,000 a month (or half value of catch?). Can be rented to locals or outsiders. <i>Kewang</i> chosen annually by villagers from candidates selected by village government. All household heads eligible but, except for the <i>kepala kewang</i> , members can serve only once. Chosen members pay village Rp7,500 and can then control <i>sasi</i> income.	Blast fishing prohibited. No fishing on Friday.	<i>Kewang</i> supported also by shares of coconut (20%) and nutmeg (10%) harvest.
14 Rutah	None. <i>Sasi</i> lost (?); some fishers think there is <i>sasi</i> on top shells and sea cucumbers.	None.	
15 Soahuku	None. Marine <i>sasi</i> lost. However, some fishers say there is restriction on ornamental fish, top shells and sea cucumbers.	Outsiders not allowed to fish in territory except by permission of <i>kepala desa</i> . Blast fishing and use of poisons prohibited. Rules not written down.	Land <i>sasi</i> harvest divided among owner, village and church. No sanctions imposed by <i>kewang</i> .
16 Batudua	None.	Blast fishing prohibited.	<i>Dusun</i> of Waai settled by Butonese fishers. No <i>sasi</i> tradition. Fish in Pulau Pombo marine reserve. Gear types: <i>bagan</i> , hand line, fish traps (<i>bibu</i>).

Map # Village	Sasi fisheries rules	Non-sasi fisheries rules	Notes
17 Hitu Lama	None.	Blast fishing and use of poisons prohibited. Outsiders allowed to fish in territory (but must pay?). Catching <i>make</i> with lamp and <i>jala</i> net is prohibited.	Economic pressures high.
18 Tiouw	None. Marine <i>sasi</i> lost.	None.	<i>Kepala desa</i> interested in revitalizing <i>sasi</i> . Fishers mostly Butonese immigrants.
19 Eri	None.	Blast fishing, use of poisons and coral mining prohibited by village law after village worked together with Fisheries Agency and Mining Department. Up to 2 m_ of rocks for building materials may be taken by locals after payment to village.	<i>Dusun</i> of Nusaniwe. Never had marine <i>sasi</i> .
20 Seilale	None.	Blast fishing, use of poisons and coral mining prohibited.	Land <i>sasi</i> by the church: no sanctions.
21 Iha	None. Marine <i>Sasi</i> lost.	Blast fishing and use of poisons prohibited.	
22 Ouwo	None.	Blast fishing and use of poisons prohibited. Outsiders must ask permission to fish in the territory.	Ouw fishers suspected of stealing from Ihamahu and Nolloth <i>sasi</i> areas.
23 Booi	None.	Blast fishing and use of poisons prohibited. Outsiders must ask permission to fish in the territory.	
24 Saparua	None. Marine <i>sasi</i> lost.	New prohibitions on blast fishing and use of poisons by LMD/LKMD, enforced by police.	Old marine <i>sasi</i> rules were written down, now lost.
25 Tuhaha	None. Marine <i>sasi</i> lost but being revived.	<i>Bagan</i> fishery by district government permit. <i>Lelang</i> areas auctioned for net fishery.	Perception that access to decision-making depends on status. Economic needs may lead to non-compliance.
26 Hulaliu	None. Marine <i>sasi</i> lost but being revived. New rules will prohibit cutting mangroves, collecting corals, taking sand from beach. Will have three <i>sasi</i> areas where harvest rights for top shells, sea cucumbers and <i>japing-japing/mancado</i> will be auctioned. Auction limited to current village residents.	<i>Bagan</i> fishery by district government permit. Blast fishing and use of poisons prohibited. Part of territory rented out by village government for harvest of top shells, sea cucumbers (Rp40,000/d) and ornamental fish (Rp50,000/d).	Land <i>sasi</i> products shared with church. Fishers feel not involved in decision-making. Compliance low due to economic pressures and lack of enforcement.

Map # Village	Sasi fisheries rules	Non-sasi fisheries rules	Notes
27 Seri	None. Opinions vary, but may have had a form of <i>sasi</i> on top shells and sea cucumbers in the past.	<i>Bagan</i> fishery regulated by district government permits. Borders of fishing area defined. Since 1970s, commercial fishers must pay contributions to village to operate <i>bagans</i> and large nets or fish for sea cucumbers and top shells. Outsiders also must hire local labor. Blast fishing and use of poisons banned.	Rules perceived as tight, well known and well respected but enforcement capacity limited. Decision-making dominated by government.
28 Hutumuri	None.	<i>Bagan</i> fishery regulated by district government permits.	Most fishers live in <i>dusun</i> of Toisapu (see below).
29 Kariu	None.	Blast fishing prohibited; enforced by police.	Land <i>sasi</i> products shared with village government. Never was marine <i>sasi</i> .
30 Kailolo	None. Used to be <i>sasi</i> on top shells.	Area of territory rented out for <i>bagan</i> fishery: Rp500,000 / 3 months.	<i>Sasi</i> on <i>maleo</i> bird eggs collected from beach: rental income shared between village and mosque. <i>Tuan lelang</i> shares egg income with his <i>kewang</i> or guards.
31 Rohomoni	None.	None.	Considering having <i>sasi</i> in form of renting out the territory. Rohomoni fishers suspected of blast fishing in Haruku.
32 Oma	None.	None. <i>Kewang</i> non-functional. No sanctions.	Land <i>sasi</i> income shared with church.
33 Wassu	None.	None. <i>Kewang</i> non-functional. No sanctions.	Land <i>sasi</i> income shared with church. Never had marine <i>sasi</i> .
34 Aboru	None.	None. marine <i>sasi</i> .	<i>Sasi</i> income share to church. Never had
35 Rohua	Outsiders not allowed to harvest top shells, sea cucumbers, reef fish, shellfish, or take sand. Villagers may harvest them if they get permission. <i>Sasi</i> area can be closed to net fishing.	Blast fishing and use of poisons prohibited.	<i>Dusun</i> of Sepa. Want to strengthen marine <i>sasi</i> .
36 Hatusua	None.	Blast fishing prohibited. Outside fishers must report to <i>kepala dusun</i> . No fishing allowed on Sunday. Outsiders must report to <i>kepala desa</i> for permission to fish. Rules not written down. No fishing on Sunday before 5 p.m.	<i>Sasi</i> area not closed because economy poor.
37 Waisamu	None.	Blast fishing and use of poisons prohibited. Outsiders must report to <i>kepala desa</i> for permission to fish. Rules not written down. No fishing on Sunday before 5 p.m.	

Map # Village	Sasi fisheries rules	Non-sasi fisheries rules	Notes
38 Amahai	Cutting mangroves forbidden. Mining corals restricted and fee must be paid to village government. Sasi area (out to edge of reef) can be closed for fishing pelagic fish, sea cucumbers, and top shells.	Blast fishing and use of poisons forbidden. Fish trap (<i>bubu</i>) not allowed on corals. Karolo nets forbidden. Small fish (<i>puri nasi</i>) may be caught only with scoop net (<i>tunggu</i>).	Sasi area not closed because economy is poor. Marine sasi revitalized in 1990.
39 Tial	None.	Blast fishing and use of poisons forbidden. Rules developed by village government together with <i>kewang</i> and villagers. Parts of territory rented out for net fishing (using <i>bobbo</i>) to catch pelagic fish (<i>moma, lalosi, lema</i>). Rights to catch ornamental fish and sea cucumbers also sold, usually to outsiders.	Resource rental goes to village government. Land sasi has 25-member <i>kewang</i> drawn from leading families. <i>Kewang</i> , government, church and mosque receive shares of land harvests. <i>Kewang</i> members must be approved by villagers, not just government.
40 Airlow	None.	Blast fishing prohibited. Fish traps (<i>bubu</i>) and <i>jaring batu</i> , a type of net, are also prohibited.	<i>Dusun</i> of Nusaniwe. Church sasi has survived here but not in the other <i>dusun</i> (Eri). Never had marine sasi.
41 Amahuusu	None. Lost sasi rules forbade use of traps (<i>bubu</i>) and had seasonal closure for nets.	None.	
42 Rutang	None. Once tried sasi on top shells and sea cucumbers in 1986-87.	None.	Traditional leaders (<i>saniiri</i>) hold positions in LMD.
43 Leahari	None. Used to have sasi on top shells, sea cucumbers. Net mesh less than 1 inch used to be forbidden under sasi. Was controlled by <i>kewang</i> who levied fines and used physical punishment. Rules were written down.	Blast fishing and use of poisons forbidden. Fishers from outside must get permission and pay fees to fish within sight of shore.	
44 Latuhalat	None.	Blast fishing forbidden. Throwing garbage in the sea is forbidden. Rules not written down.	Fishing seasonally restricted by wind and waves.
45 Hila	None.	None.	
46 Mamala	None.	Blast fishing and use of traps (<i>bubu</i>) on corals are forbidden. Pelagic (<i>nomae</i>) fishery not open to outsiders without permission.	
47 Haria	Top shells, sea cucumbers and ornamental fish under sasi (inactive). Forbidden to cut mangroves. Net fishing forbidden over corals or beside the wharf.	None.	
48 Wakal	None. Marine sasi lost.	Intertidal area of territory auctioned for two years at a time (Rp550,000). Area rented about 60 sq. m, to edge of reef. Rented only to locals, for harvest of fish. Blast fishing prohibited.	

Map # Village	Sasi fisheries rules	Non-sasi fisheries rules	Notes
49 Ulath	Top shells and sea cucumbers harvest rights rented out, often to Madurese. Because of trouble between <i>kewang</i> and <i>kepala desa</i> , <i>sasi</i> moved to church in 1992 and marine <i>sasi</i> area was closed indefinitely.	Blast fishing and use of poisons prohibited.	Many young people starting to go after marine resources.
50 Kulur	None.	Blast fishing and use of poisons prohibited.	
51 Akoon	None. Used to be <i>sasi</i> on pelagic fish, with closed season most of the year and open season one month depending on abundance of fish. Offenders fined.	Blast fishing and use of poisons forbidden. Outsiders must pay fee to fish in territory (Rp25,000 per deployment of net) to catch reef fish and pelagic fish (<i>lalosi</i>).	
52 Ameth	None. Used to be <i>sasi</i> on top shells, sea cucumbers and seaweed (<i>cinao</i> , a source of carageenan)	Tourists pay fee to village to dive in the territory. Outsiders pay to use nets in the territory. Blast fishing and use of poisons forbidden (traditional poison is allowed).	<i>Kewang</i> was hereditary. Used to have communal fishery i.e., <i>sousoki</i> .
53 Abubu	None. Land <i>kewang</i> guards territory from outsiders. Used to have <i>sasi</i> on top shells and sea cucumbers. Sanctions psychological (public shaming).	Blast fishing and use of poisons prohibited. Outsiders not allowed to fish in territory. <i>Rumpon</i> owners must pay fee to use territory (Rp50,000/year).	<i>Sousoki</i> lasted until 1990s.
54 Leinitu	None. Used to be <i>sasi</i> on pelagic fish (<i>momar, lalosi</i>), top shells and sea cucumbers. Psychological sanctions.	Blast fishing, use of poisons and coral mining prohibited. No fishing on Sunday. Territory not open to outsiders. Sand and rocks may be taken by locals for building, but not for sale. Stripping bark from mangroves prohibited. Blast fishing and use of poisons prohibited. Sand sold by village government.	Land <i>sasi</i> crop shared with <i>raja</i> , church and schoolteachers. LMD made up of clan leaders.
55 Sila	None.		Church (land) <i>sasi</i> rules not written; no sanctions. <i>Kewang</i> are volunteers. <i>Kepala desa = raja = ketua adat</i> .
56 Nalahia	None.	Cutting mangroves and coral mining prohibited by written village law. Violators fined. Blast fishing and use of poisons prohibited. Since 1970s, harvest rights rented out for top shells and sea cucumbers (Rp25,000/day) and fees collected from outsiders fishing in territory.	Used to have communal fishery: <i>sousoki</i> . Lost in 1980s. Church <i>sasi</i> on coconuts has no written rules or sanctions.
57 Titawai	None. Used to have <i>sasi</i> on top shells, sea cucumbers and one other species of shellfish. In past, <i>kewang</i> used hard labor as sanction.	Blast fishing and use of poisons prohibited. No fishing on Sunday.	There is evidence of blast fishing in the territory.

Map # Village	Sasi fisheries rules	Non-sasi fisheries rules	Notes
58 Hitu Messing	None. Used to be <i>sasi lelang</i> for pelagic fish (?).	Blast fishing forbidden.	
59 Mamoa	None. Sea cucumbers, top shells and some fish may have been under <i>sasi</i> in the past. No written rules.	Blast fishing and use of poisons forbidden.	<i>Dusun</i> of Hila.
60 Waitomu	None. Marine <i>sasi</i> lost.	<i>Bobo</i> nets regulated. Blast fishing and use of poisons prohibited.	<i>Dusun</i> of Hila.
61	None. Toisapu	<i>Bagan</i> fishery requires government permits.	<i>Dusun</i> of Hutumuri. Fishers see fishery as unregulated. Low involvement of fishers in decision-making.
62 Sameth	No marine <i>sasi</i> . Village <i>sasi</i> forbids taking sand and rocks from beach.	Blast fishing and use of poisons forbidden.	Sameth people share <i>lompa</i> fish from <i>sasi</i> harvests in Haruku. <i>Kewang</i> not active because there are no descendants of <i>kepala kewang</i> line left in the village.
63 Sirisori Amalatu	None.	None.	Villagers (but not <i>kepala desa</i>) want to see <i>sasi adat</i> revived on land and sea.

Appendix 8: Exchange rate Rupiah/USD (1996-1998)

