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Socioeconomic Aspects of Artisanal Fisheries in Asia

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INTRODUCTION

The fisheries sector provides a valuable source of food protein and is one of the primary sources of livelihood and employment in Asian countries. However, it is also within the fisheries sector where extreme poverty continues to persist, particularly within the artisanal subsector—a situation considered to be a serious social, economic and political issue.

In recent years, there has been a growing concern among governments and international development agencies for the problems of artisanal fishers in Asia. Yet, compared to the agricultural sector, only minimal attention has been given to fisheries.

The emphasis of development efforts in South and Southeast Asia commencing in the period after World War II was on agriculture and industrialization. Not until the late 1960s and early 1970s was fisheries considered as a valuable extractive industry. As such, fisheries development policies in Asia focused primarily on the commercial fisheries sector. In part, the efforts were stimulated by the growth in export markets, particularly for various species of shrimp. The fisheries policies encouraged the use of modern fishing technologies and provided access to investment funds to support these innovations, even at subsidized rates. Between 1978 and 1984, the governments of Thailand, Indonesia, Malaysia and the Philippines received over US\$590 million in fisheries aid, 88% of which was for capital investment, primarily mechanization and modernization of fishing vessels and technologies (Christy 1986; Lampe 1991).

During this period, the dualistic structure which underlies the fisheries sector—an artisanal sector existing side by side with a commercial sector—continued to develop. The continued existence of artisanal fishers was considered to be just a passing attribute of fisheries development and was initially ignored. It was anticipated that the development process would open up employment opportunities and that the stagnating coastal fisheries communities would gain some of its beneficial effects.

By the late 1970s, it was realized that the dualism was not just a fleeting attribute of fisheries development, as artisanal fishers remained in existence

and socioeconomic conditions of the coastal fisheries communities continued to deteriorate. The expected "trickle down" effect of benefits did not materialize, resulting in further polarization, a pattern which has been a consequence of the rapid economic growth in many Asian countries.

The rapid growth of export-oriented fisheries in Asia posed serious threats for artisanal fisheries, especially in areas where commercial trawling for shrimp was introduced. The encroachment of commercial trawlers into artisanal fishing grounds negatively affected the catches and incomes of artisanal fishers, who found themselves unable to compete with the more effective trawlers. Subsequently, competition has given way to conflicts as artisanal fishers fight to retain access to local resources. The benefits received from the fishery were often skewed in favour of a relatively few trawler owners. Artisanal fishers are often competing on unequal technical terms for a declining resource. In addition, the continued conflict has become more intense as the boundaries for fishing are encroached upon and the area for fishing becomes more limited. With higher fuel prices, the commercial operators will find it more to their advantage to fish inshore. This threat to a vulnerable resource has serious implication for domestic consumers in Asia, where fish is the only affordable protein source for the majority of the population. The increasing number of fishers and of those fishers adopting mechanized fishing gear has resulted in a levelling off of the individual catch, as the productive capacity of the fishing resources approaches its limits.

With all of the advances in agriculture and increasing industrial development and with increased population growth there have come serious economic dislocations. The most obvious disruption has been the growth of rural migrants seeking opportunities when agriculture can no longer absorb them. A less obvious change has been the movement of families to the coastal zone and entry of many workers into the fisheries sector. The result has been a large increase in the numbers of artisanal fishers and in the number of people exploiting coastal resources, e.g., mangroves, coral reefs, estuaries.

The result of these economic and social changes is that many coastal resources and ecosystems are overexploited and degraded. In an earlier age there were pockets of overfishing and resource overexploitation near many communities. Increased mobility and range of artisanal fishers and coastal residents have allowed them to exploit fisheries and coastal resources in places once protected by distances too great to bridge.

Although such generalizations may not apply to all situations in Asia, there are many indications that poverty in artisanal fishing communities remains a persistent problem. Panayotou (1982) has identified three distinct but interdependent fisheries sector issues faced by Asian governments: (1) how to attain a sustainable improvement in the socioeconomic conditions of artisanal fishing communities; (2) how the resource can be managed on a sustainable basis; and (3) how the country's limited marine fishery resources can be

allocated between artisanal and commercial subsectors so that conflict can be minimized. While these three issues are not generally mutually compatible, proper management of fishery resources coupled with reduced internal conflict would contribute to an easing of the problems of poverty among fishers, simultaneous with maximizing the benefits from the fishery and coastal resources.

Two factors have reinforced the shift in attention to the problems of artisanal fisheries: (1) a general growth in awareness of the need to deal with problems of rural poverty and coastal resource overexploitation and degradation as a whole, and (2) an apparent change of perception of the fishery from that of an extractive industry to that of an economic activity based on a renewable but destructible resource. In attempting to improve the welfare of artisanal fishers, increased attention needs to be paid to fisheries and coastal resources management (as distinguished from fisheries development). Past and present coastal fisheries management strategies have not, for the most part, been successful in reversing the trend of poverty and the resource overexploitation, environmental degradation and escalating resource-use conflicts which have come to characterize artisanal fisheries in Asia (Pauly and Chua 1988).

Artisanal fisheries management policy in Asia has been based almost exclusively on advice derived from biological, resource-oriented studies and has had a fisheries sector-specific orientation. One result of this is that fisheries policymakers and managers ended up knowing little about the economic, social and cultural aspects of the fishers, and showed very limited understanding of the linkages among fisheries resource issues, on the one hand, and issues of development, on the other. Moreover, the resource-oriented disciplines were themselves also guided by Western fisheries management paradigms, which were, as it turns out, often misleading when applied to tropical Asian fisheries resources (Pauly 1987; Longhurst and Pauly 1987).

A much broader concept of fisheries management policy in Asia is warranted—one that includes not only policies relating directly to the fisheries sector but also to a vast array of those seemingly unrelated policies that may have beneficial or perverse impacts for the sector and overall sustainable resource use. The broader policy context involves an integrated approach to fisheries management, which includes restructuring institutions and making the process of management more participatory. In addition, intersectoral relationships between coastal resources and human activities must be fully recognized.

There is a growing consensus among fisheries researchers that solutions to the current problems in the artisanal fisheries sector rest outside its traditional realm. The underlying causes of fisheries resources overexploitation and environmental degradation are often of socioeconomic, political and/or cultural origins. The term *fisheries* connotes human use. The primary concern of fisheries management, therefore, should stem from the relationship of fisheries resources

to human welfare, both current and future. That is, the main focus of fisheries management should be on people, rather than fish per se. It would seem that policy interventions, if they are to bring about lasting solutions, must have the same origins. Fisheries management policies made without regard for the countervailing influences of concurrent policies relating to development and population have little chance of being effective (Panayotou 1982; Smith 1979). The challenge ahead for fisheries social scientists in Asia is twofold: first, to continue to provide information required for management, especially an understanding of human utilization of, and impact on, the resource(s) system(s); and, second, to develop new strategies and paradigms for coastal fisheries management.

STATUS AND OVERVIEW OF ARTISANAL FISHERIES IN ASIA

Definition

As an overview, this section builds on the economic importance of artisanal fisheries in Asia, the problems faced, and reviews past management interventions, thereby laying the groundwork for the development of nontraditional approaches to fisheries management.

Artisanal fisheries are characterized as being generally located in rural and coastal areas, lagoons, estuaries, and inland lakes and reservoirs; they typically overlap with rural activities such as agriculture, animal husbandry and aquaculture; they are highly labour intensive and use a minimum of mechanical power; they generally exclude mechanized gear; and retain primitive technology for handling and processing (Pollnac 1991). Smith (1979) provides a classification of fishers into commercial, industrial, traditional, artisanal and subsistence based on parameters that include, in addition to the variables above, the social condition, operator's economic standing, productivity and disposal of catch. We will adhere to the categorization developed by Smith (1979) wherein *artisanal* may mean either *traditional* or *subsistence*, with the former also being part of the market economy, i.e., commercial.

Moreover, we emphasize the exclusion of artisanal fishfarmers (as opposed to artisanal fishers) in the ensuing discussion because they do not face the same challenges in the physical and socioeconomic environment or the same institutional arrangements governing resource use. The major differences include the hunting nature of capture fishing as opposed to the farming nature of aquaculture. The latter is thus not subjected to the same degree of uncertainty and risk attributable to environmental parameters and inherent stock dynamics which influence fish catch. Perhaps the most important element that distinguishes fishfarmers from fishers is the fact the fishfarmers, while not necessarily owning the fishpond, may exclude other fishfarmers from using it, while artisanal fishers, especially in open access conditions, cannot do so.

In the real world, these categories are somewhat mixed. No such thing as artisanal fisheries exist in the Philippines, but there is an equivalent sector known as "municipal fisheries", being under the jurisdiction of the municipality. Municipal fishers use stationary gear or boats (whether mechanized or not) that do not exceed 3 Gt; moreover, they are "legally" entitled to the nearshore area¹. In Indonesia, all fishing units which do not employ boats, use boats without engines or use boats powered by outboard engines are defined as artisanal (Bailey 1987). In Thailand, Panáyotou and Jetanavanich (1987) classified fishing units with assets valued at less than 20,000 baht (approx. US\$800) in 1978 as artisanal as opposed to the Department of Fisheries, which defines scale according to vessel size. Artisanal fisheries in India are classified via the types of gear used, including drift/gill nets, shore and boat seines, hook and lines and set bagnets (RAPA 1989).

Economic importance of artisanal fisheries

Artisanal fisheries, as a proportion of total fishery output, contribute anywhere from 1% to 5% of national income and at least 30% of total fishery production (Table 1). While contributing minimally to national income, artisanal fisheries provide an important source of employment. The dispersed location, if not outright physical isolation of artisanal fishing communities, does not permit an accurate assessment of their sheer numbers, but in developing Asia it is estimated to range from 200,000 in Thailand to 10.8 million capture and culture fisherfolk in Bangladesh.

Employment absorption is seen as an important means of stabilizing rural populations as a counter measure to rural-urban drift (Lawson 1984). In the Philippines, for example, the failure of the industry and service sectors to attract labour out of the fishery has resulted in further resource exploitation (often with the use of destructive techniques) and declining incomes. However, the assumption of zero opportunity cost has resulted in labour earning pure profits as in the case of the Philippines small pelagics fishery (Cruz-Trinidad et al. 1993). In addition to the latter, the existence of consumer's surplus, mainly due to low fish prices, provides a sound basis for wealth redistribution measures.

The artisanal sector provides a major source of cheap protein for the developing countries in Asia where per capita consumption is among the world's highest (Table 1). The increase in demand caused by increasing populations, and on the supply side, the scarcity caused by overfishing, will ultimately lead to higher prices, which will make fish unavailable to impoverished sectors.

¹ defined as falling within 7 km or not exceeding 7 fathoms in depth.

Table 1. Characteristics of some Asian countries with important artisanal fishing sectors

Country	Population ¹	Fishery contribution to GDP	Average catch ³		Total employment/ Small-scale employment	Per capita consumption (kg)	Contribution to production
	Growth rate ² (%)		1971-80	1981-90			
India	853.4 2.08		2.15	2.94			37% ⁴
Thailand	55.7 1.53		1.73	2.41	470625 ⁴ 219090 ⁴	22.4 ⁵	<30% ⁶
Indonesia	180.5 1.62		1.33	2.45	1285448 ⁷	15.6 ⁵	
Malaysia	17.3 2.31	1.8 ⁸	0.5	0.6	107000 ⁸	21 ⁸	
Bangladesh	115.6 2.67	3.0 ⁹	0.76	0.77	10800000 ⁹		
Philippines	62.4 2.48	4.4 ¹⁰	1.39	1.94	990872 ¹⁰ 675677	40 ¹⁰	44% ¹⁰
Sri Lanka	17.2 1.32	2.8 ¹¹	0.13	0.19		14.5 ¹¹	

¹ as of 1990, in millions; ² average growth rate from 1985-1990; ³ FAO (1990); ⁴ No. of marine fishers in 1985 (RAPA 1989); ⁵ SEAFDEC (1990); ⁶ Panayotou and Jetanavanich (1987); ⁷ No. of marine fishers in 1985 (RAPA 1989); ⁸ Ishak (1988); ⁹ Ahmed (1992); ¹⁰ BAS (1992); ¹¹ Munasinghe (1985)

Issues in artisanal fisheries development

Despite their contribution to national income, production and employment, and in spite of various fishery development schemes, artisanal fishing communities remain afflicted by poverty. Fishers themselves have attributed this to resource overexploitation and the failure of government policy to effectively address their needs.

Pervasive poverty

Poverty and artisanal fisheries are synonymous. Studies indicate that average incomes of artisanal fishers in Asia are either below national averages, or worse, below poverty thresholds. In India, 98% of traditional fishers fall below the poverty line (Rao 1994). Librero, Catalla and Fabro (1985) estimated annual net household income (including nonfishing activities) of municipal fishers at P5000², which was above those of rice farmers, P3500, and slightly lower than coconut farmers, P5900. Nevertheless, the fishing household's income was considerably lower than the rural average of P6900 and the national average of P8500. In Indonesia, more than 60% of small-scale fishers live below the national poverty threshold, i.e., pegged at 320–480 kg of rice equivalent (Bailey 1987).

Thailand is an interesting case because although average incomes in four coastal villages were comparable to the national average of 8390 baht³, producer's surpluses were earned by coastal fishers from the profitability of nonfishing alternatives. Sri Lanka faces a similar situation in that incomes of fishers are higher than national average because access to the resource is restricted (Munasinghe 1985). A turnabout, however, is documented in the Gulf of Mawelle fishery whereby increasing control of outsiders in the ownership of beach seines resulted in conflict among fishers, and ultimately, resource dissipation (Alexander 1982).

Exploitation of resources

Fishers attribute their poverty to declining levels of catch. This is due to the overexploitation of nearshore resources that is caused by the increasing numbers of small-scale fishers and also the encroachment of trawlers. As a result, artisanal fishers are forced to use destructive methods such as cyanide and blast fishing to maintain their catch levels.

Marine catches in six ASEAN countries rose from 1.5 million t in the early 1960s to current levels of about 5.5 million. Pauly and Chua (1988) designate two distinct phases: one, from 1959–69 with a 10% increase per annum and the other, from 1969 to the mid-80s, with a 3.7% increase per annum. Although modest increases have been recorded in the last decade (Table 1), the increasing occurrence of less valued species, "trash fish", and incidence of smaller sizes

² PHP 7.40 = US\$1

³ Baht 24.08 = US\$1

of traditional species point to biological overfishing. Pauly (1987) lists some peculiar features of Southeast Asian fisheries that prove susceptible to overexploitation: (1) the coincidence of shrimp bycatch with demersal catch, and in particular, the overwhelming price ratio of shrimp to fish; and (2) the huge income disparity.

In the Philippines, harvests have reached the potential of most marine and inland water areas. The problem of overexploitation is believed to be more serious in inland waters and nearshore marine fishing grounds (Malig and Montemayor 1987). Similarly, nearshore waters in Malaysia, particularly in the west coast, and in Indonesia, especially in the Straits of Malacca and the north coast of Java, where 37% of all Indonesian fishers are found, are now overexploited (Ishak 1988; Bailey 1987). Overexploitation in the Gulf of Thailand is now well documented (Pauly and Chua 1988).

Impact of credit and technological change

The development trade-off between industry and agriculture is easily defended by the argument that agriculture is a traditional, backward sector that responds minimally to technological change, and that diverting resources from it would entail minimal cost. Parallel arguments can be made for policy issues that straddle artisanal fisheries vis-à-vis commercial fisheries. Thus, government policy has centred on credit schemes and technological innovation, both of which favoured the commercial sector.

In India, government policy to uplift the condition of artisanal fishers concentrated on mechanization, cooperatives and rural development programmes. The mechanization programme resulted in production increases, but only 10–15% of boat owners were actual fishers—traditional fishers served as labourers. This led to increased conflict and greater income inequality. The establishment of producers', credit and marketing cooperatives likewise benefited money lenders and big fishers but not the target beneficiaries, mainly due to their lack of participation. Lastly, the rural development programme appeared to have benefited farmers, labourers and artisans, again neglecting the fishers.

The Philippine government instituted credit programmes to enable municipal fishers to purchase and upgrade their boats and gears. However, results have been dismal due to low catch levels that are partly caused by the operation of trawlers. Thus, repayment rates have been very low (Malig and Montemayor 1987).

Indonesia has likewise initiated credit programmes for artisanal fishers via state banks and agencies such as the ADB and World Bank (Martosubroto 1987). Except for the Lombok scheme, which provided supervision not only for fishing gear but also on the financial management of the enterprise, most facilities yielded low repayment rates. A commendable move of the government which sought to address tension between artisanal fishers and trawlers was

the trawling ban in 1980. This ban curtailed trawler operations in all but the Arafura seas. As a result, sizes of demersal fish have improved to sizes preferred by consumers (Pauly and Chua 1988).

In Thailand, government policy is directed towards resolving issues that are mostly relevant to the commercial sector. Some suggestions have been put forward on how to restrict trawler operations in nearshore areas (e.g., by erecting physical barriers) to reduce conflict between coastal and commercial operators. However, enforcement remains a problem.

Management implications of special characteristics of artisanal fisheries

Christy (1986) lists several characteristics of artisanal fisheries including (1) the nature and limitations of the resources; (2) the diffusion of fishing communities; (3) opportunity costs of labour; and (4) the extraction of economic rents. All of these have critical implications for the type of management policies chosen.

The nature and limitations of resources

Because of the limitations imposed by artisanal gear, fishers are confined to the nearshore areas which are already overexploited. The exploitation is induced by the swelling numbers of fishers including new entrants and by the encroachment of commercial gear. It is worth considering that while commercial gear can be used in offshore areas, artisanal gear can not. The enforcement of fishing zones, as implemented in Indonesia via the trawl ban, appears to be an equitable arrangement.

Diffusion of fishing communities

A pressing problem in the study of artisanal fisheries is the absence of an accurate and steady source of information that is well integrated into the national fishery information system. This is because of the diffusion of artisanal fishing communities and their frequent physical isolation from urban centres. Except for some project studies, the absence of regular information prohibits a complete and accurate assessment of the conditions of artisanal fishing communities.

The diffusion of fishing communities also poses some problems for central management, given the likelihood that not all benefits can be dispersed efficiently. Devolution of authority seeks to address this feature of artisanal fishing communities.

More than the physical isolation, sociocultural and religious norms can serve as an impenetrable barrier; policies should accommodate this. For example, Rao (1994) observes that in India fishing is not allowed in peak fishing seasons when they coincide with festivals and religious ceremonies. In Sri Lanka, the type of boats used varies between Buddhists and Catholics

(Munasinghe 1985). Furthermore, in both countries, fishing is mostly confined to a particular caste.

Opportunity costs of labour

Opportunity costs of labour may be zero in isolated communities, but may take on a positive value in coastal areas which are well integrated into agriculture and rural services sector. However, real increases in opportunity cost require economic growth and in particular, an integrated rural development. The willingness of fishers to shift to other sources of employment (Bailey 1987) shows that the ethos is by and large economically driven. It thus becomes important to relax exit barriers and more especially, entry barriers, via investment in human capital. Given the premise that solutions to fishery problems are not found within the fishery itself, management policies should concentrate on integrated schemes, as will be discussed in a later section.

Redistribution of resource rents

Christy (1986) defines some situations in which resource rents are possibly extracted. For example, imperfect market conditions such as the monopsonistic structure identified by Pomeroy (1993) cause fishers to receive less than the free-market price. Tightly knit fishing communities have a system of extracting and of redistributing such rents, especially during lean months. Governments also extract rents via state marketing boards and/or price controls. Where price controls are used to depress consumer prices, urban consumers, as is often the case, extract some surplus from the fishery.

The critical relationship between fisheries management, property rights and resource rents have been identified by Cruz (1986) in the San Miguel Bay fishery, Camarines Sur, Philippines. The introduction of trawlers in the Bay radically changed both the overall catch and distribution of resource rents. Cruz (1986) states that while the exploitation of the coastal fishery would be better controlled with the introduction of common property approaches to management, the formal institutional structure for resource use does not recognize the common property attributes of the fishery. Government policy treats the resource management problem in much the same way as a conventional private property problem, which involves a mere enforcement of access rights. The result is that the management system fails to address the growing problems of fishery overexploitation, dissipation and redistribution of resource rents, and conflicts among different groups of resource users.

Redistribution of wealth can occur at the community level or at the government level. The disadvantage of the latter is the likelihood that further price distortions are introduced into the economic system as opposed to wealth redistribution at the community level, which is rather confined and is based on kinship patterns and mutual trust. The latter highlights an important advantage of devolution of authority.

CRITICAL SOCIAL SCIENCE POLICY ISSUES

The recently completed *Study of international fisheries research* (SIFR) report (World Bank 1992) and the associated mission reports on fisheries research needs in Asia (World Bank 1991a) and on small-scale fisheries (World Bank 1991b) identified the development of new fisheries management mechanisms to achieve sustainable development as the critical fisheries social science research issue in the short- and medium-term. The study concluded that "although past practices are being modified, they have not yet been fully adapted to the new requirements resulting from the changes (occurring both in the resource and in public awareness to resource issues)". More specifically, the reports stated that "no topic in fisheries research is more important, and studied less, than the interactions between people and the resources they use". This implies a new focus for research with greatly increased emphasis on the social sciences relative to biological and technological studies.

Fisheries management must be people based. The specific institutional and organizational context of fisheries production and coastal resource use must be understood before technological change, regulatory changes or market incentives are introduced. In addition, issues of property rights, control of access to the resource, fisher group behaviour, gender and equity issues, and the culture and institutions of fishers need to be understood. These issues have also been identified by others in Asia and worldwide as critical research issues (ICLARM 1992a,b; Chua 1992; Scura et al. 1992).

Two alternative fisheries management strategies have emerged as potentially new paradigms for coastal fisheries management in Asia. These are comanagement and integrated fisheries resource management. While differing approaches to fisheries management, the two strategies are not mutually exclusive. Further research is needed on both strategies to improve information and to gain more practical experience in implementation and impacts.

Comanagement

Asia, with its maze of islands, bays, peninsulas and shallow shelves, has a human population with a long historical relationship to the sea. The maritime parts of Asia are central to its identity and to the welfare of its people. Thus, the islands of what is now Indonesia and the neighbouring stretches of mainland were launching pads for sea-based westward migrations along the Indian Ocean coast to Madagascar and eastward across Polynesia, all the way to Hawaii and the Easter Islands and northeast to Japan. The sea provided food, income and a sense of identity for most Asian cultures and societies. The ancient Asians were not only explorers, traders, missionaries and raiders, they were also fishers. This is illustrated in elaborate traditional fishing boats and gear and records of ancient fishing lore (Ochotorena 1981). These fishing activities were regulated through an elaborate set of rules, enforced by the fishing communities

themselves. Remnants of these traditional management systems were documented by Johannes (1981) for a small group of Polynesian islands, and Ruddle and Johannes (1985) for the Pacific and Asia, including Southeast Asia.

In more recent times, many national governments in Asia have increased their role in the management of coastal artisanal fisheries (Smith, Puzon and Vidal-Libunao 1980; Panayotou and Jetanavanich 1987; Bailey 1987). The role of local control, through management and custom, has correspondingly diminished. Without denying that the traditional systems of coastal management can often be inequitable and ineffective, state interventions that have chosen to ignore them have seldom fared better. National governments have, for the most part, failed to develop an adequate substitute for, or complement to, these traditional management systems. In many instances, national governments have overestimated their ability to manage these same resources. The promotion of nationalization or privatization as routine policy solutions has not solved the problems of resource overexploitation, environmental degradation and escalating resource-use conflicts which have come to characterize artisanal fisheries in Asia and, in many instances, have deprived large portions of the population of their livelihood (Ruddle and Pomeroy 1993).

The effective capacity of government agencies to regulate what goes on in widely scattered fishing grounds is distinctly limited. Devolution of major resource management and allocation decisions to the local level may thus be more effective than management efforts which distant, understaffed and underfunded government agencies can provide.

There is a need for rapid and substantial evolution of existing coastal fisheries management systems to support sustainable resource use. It is unlikely that local communities can accomplish this change on their own. But neither can national governments accomplish it entirely through bureaucratic instruments. There must evolve a more dynamic partnership using the capacities and interests of the local community, complemented by the ability of the national government to provide enabling legislation and other assistance. This partnership can be called comanagement, where the national government and the community share authority for fisheries management. Community-based management is a central element of comanagement. The amount of authority that the national government and the community have will differ and depend upon country and site-specific conditions.

The devolution of fisheries management away from the national government to a local user group or community may be one of the most difficult tasks of comanagement. Fisheries administrators may be reluctant to relinquish their authority, or portions of it, and governments are often opposed to decentralization. National laws may not be structured to easily devolve management authority or to allow for the legitimization of community resource management. Determining the type and extent of authority that should be

allocated to user or community groups requires analysis of the different functions of fisheries management and then decisions as to which of those can be best handled at local as against national levels.

An essential ingredient for the success of any resource management system, whether community-based or centralized, is the system of incentives and sanctions—rights and rules—for influencing the behaviour of those who use and depend upon the resource. Thus, at the core of comanagement are the issues of property rights, resource management regimes and institutional arrangements. The existence or absence of property rights is a matter of fundamental importance in conceptualizing fishery management policy issues. In fisheries, problems of overexploitation generally are attributed to the lack of clear property rights and the consequent efforts of individual fishers, in an open-access situation, to maximize benefits even at the expense of resource sustainability and long-term societal good (Gordon 1954). In open-access systems, there are no effective boundaries around the resource, no limits are placed to the entry of individuals who wish to share in exploitation of the resource, and no restrictions on how the resource is to be exploited. In the absence of clear and enforceable property rights, resource competition becomes a mad scramble that often leads to resource depletion and local impoverishment. Governmental regulations to control levels of fishing effort are imposed to forestall the "tragedy of commons" (Hardin 1968).

Part of the problem has been conceptual: governments frequently fail to conceive of or recognize the existence of local community management institutions which may effectively manage access to local resources. The tragedy of the commons may not simply result from the fishers' inability or lack of desire to restrain themselves from overexploitation. The tragedy outcome may also result from a governmental failure to recognize local community institutions, rules and intentions to successfully manage resources. Specifically of interest in many situations are common property regimes. Common property regimes are forms of management grounded in a set of accepted rights and rules by a group for the sustainable and interdependent use of collective goods (Bromley 1991).

In the Philippines, comanagement is being implemented through the Local Government Code (LGC). The LGC of 1991 transfers substantial powers, functions and responsibilities from the national government to the local government unit, thereby allowing the impetus for change and development to originate from the local communities. The primary objectives of the LGC is to enable local government units to become more self-reliant and to transform them into active partners in the attainment of national goals. It seeks to do this through a system of decentralization. Among the powers to be devolved to the local government unit are those for management, development, exploitation and protection of fishery and aquatic resources (Tabunda and Galang 1992). The Philippines is in the very early stages of implementing the LGC and much

work is needed to resolve the conflicts and assess the repercussions of this devolution of authority.

There is a need in Asia to gain practical experience in comanagement and demonstrate its applicability as a sustainable, equitable and efficient resource management strategy. Research will need to address issues of comanagement at both the national and local levels. Research at the national government level should focus on both the legal, institutional and administrative conditions needed for the devolution of management authority and the impact of that devolution on local communities. Priority will need to be given to how best to involve fisher groups and associations so as to facilitate the operational management of the fishery.

Community-level research should focus on both the documentation of existing/traditional coastal fisheries management systems and the implementation of community-level management systems. Before initiatives in community management are begun, the existing systems of fisheries resource management and indigenous knowledge of natural resources in a country should be documented and understood. Whether formally endorsed by government or not or whether easily observable or not, most communities have established some form of resource management system. These management systems, once documented, can serve as the foundation for strengthening an existing system, learning how to extend the system into new areas, or of leaving the system alone and legitimizing it.

Based on the information and knowledge gained from documenting fisheries management systems, pilot sites should be identified to implement and evaluate comanagement strategies in a collaborative mode with fishers, scientists and fisheries managers from selected countries. Practical experience in comanagement under different social, economic, political and environmental conditions can, thus, be obtained (Pomeroy 1993).

Institutional analysis, which examines institutional arrangements, the set of rights and rules by which a community organizes activities and which affect user behaviour and incentives, can serve as the research framework for studying coastal fisheries comanagement institutions (Kiser and Ostrom 1982; Ostrom 1986, 1990; Oakerson 1992).

Integrated coastal fisheries resource management

Conventional unisectoral resource management has not been effective in addressing the complex management issues of coastal fisheries. These issues are often multisectoral in nature: the activity of one sector depends upon or adversely affects the activity of others. The coastal fisheries of Asia need to be managed in a more sustainable manner that generates optimally sustainable benefits, ensures equitable distribution of benefits among resource users, and reduces intra- and inter-sectoral conflicts (Chua et al. 1992). In the coastal area where the majority of artisanal fishers operate, fisheries are preferably managed

within the overall framework of integrated coastal zone management. This approach allows for a multisectoral evaluation of impacts on the aquatic resources and environment, and expansion of the scope for alternative management interventions.

The purpose of integrated management is to allow multisectoral development to progress with the fewest setbacks and long-run social costs. In contrast to a sectoral development plan, the focus of an integrated management plan is on mitigating measures to reduce social costs associated with sectoral activities accruing both inside and outside the sector in question. Hence, management of the fishery sector should address problems caused by development inside the sector as well as the externalities originating from other sectors. The policy options and management strategies formulated within this framework need to be well founded on information on the natural function of ecosystems, the assimilative capability of the environment, the motivations of and incentives faced by people using the resources, the economic setting, and the ways and means to bring private behaviour in line with social goals.

Effective fisheries management must embody two essential mechanisms: integration and coordination. That is, the planning process must be multidisciplinary and integrate all relevant issues. However, existing political and administrative realities make integrated implementation difficult, if not infeasible in some cases. Realistically, management actions will have to be implemented by various sectoral agencies. Therefore, coordination of these sectorally oriented agencies is essential to maintain the overall integrity of the management plan. In addition, the management process must be organized and well structured to allow for periodic updating of the plan itself and adjustments to its implementation.

The integrated, multisectoral approach allows for solutions to problems in the fisheries sector to be viewed in a broader context. Because fisheries problems in many Asian countries are problems of general economic development, their solutions are also of a general economic nature. The solutions lie in creating an economic environment in which the problem will be solved by people acting in what they perceive to be their own best interest. Integrated fisheries resource management, which looks beyond ineffective regulation of fishing effort and addresses key resource and human factors which influence progress toward sustainable development, provides a policy and management framework to find solutions to coastal fisheries problems.

Recent experience in integrated coastal zone management in Asia has been gained and documented through the ASEAN/US Coastal Resources Management Project coordinated by ICLARM. Working in six countries—Brunei Darussalam, Indonesia, Malaysia, the Philippines, Singapore and Thailand—the six-year project produced pilot-site specific, implementable management plans accepted by their respective governments and implementing agencies. The lessons learned through the experience of the project are related

to (1) management process, (2) development stage, and (3) institutional setting (Scura et al. 1992).

A wide range of information is required to promote conditions where sustainable fisheries and other coastal resource development can be achieved. Further research is needed to improve information and analysis, thereby leading to better input to priority setting and policy design. An interdisciplinary approach is essential in the formulation and implementation of a research agenda to ensure cost-effectiveness in generating the right information needed for resource management.

In terms of analysis for priority setting, the appropriate focus is the identification of the most socially costly management issues which need to be addressed. This will require explicit evaluation of the benefits and costs associated with the trade-offs among and between alternative fisheries and coastal resource activities. In addition, research is needed for (1) identification of a general typology relating occurrence of specific management issues with biophysical, socioeconomic and institutional and organizational factors; (2) valuation of social and environmental benefits and costs of sectoral activities; and (3) identification of management priorities through evaluation of the sustainable level of output, adverse impacts and associated net benefits and costs.

For policy design, further research is needed to provide guidance to policymakers for establishing policies and programmes and selecting policy instruments aimed at the resolution of specific coastal fisheries management issues. This research should include studies on the appropriateness and efficacy of various management strategies and institutional arrangements, both traditional and contemporary, to mitigate impacts and maximize human welfare benefits. The studies should focus on aspects related to the prerequisites for successful implementation of various strategies, the mix of strategies most appropriate under different country-specific conditions and the practicality and cost of implementation of the various strategies (Scura et al. 1992).

OTHER ISSUES FOR RESEARCH

Several other areas of research have been identified as important for artisanal fisheries management and development (Montalvo and Pomeroy 1993; World Bank 1992).

Not all fisheries problems can be solved with reference to the fisheries sector alone. Efforts to improve incomes and standard of living of people in fishing communities also involve development of alternative economic activities and strengthening the ability of individuals and the community to take advantage of these opportunities. Many project or policy proposals in the fisheries sector call for the development of alternative livelihood opportunities for fishers and fishing communities. Yet very few of these detail specific

alternatives. A large number and variety of alternative livelihood strategies have been tried in fishing communities worldwide, with varying success, depending on local conditions. There is a real need to evaluate and document these experiences, both successful and unsuccessful, so that development specialists and fisheries managers can have a source of information to use in designing and implementing projects and policies.

Research is needed on gender and equity issues as they relate to institutional and technological change and its impact on women and the family, nutrition and health, and access to education. Women have direct involvement in fisheries from production activities to postharvest activities. Their roles, and that of the family, have been examined less systematically than activities in which men predominate. Results of gender research should provide a stimulus to national institutions seeking guidance on how to be more responsive to the situation of women.

Continued research is needed on the microeconomic and social factors of fisheries systems, especially at the household and community levels. Research on the economics of production and factor allocations is basic for understanding production systems, including bioeconomic modelling. Research on sociocultural organizations, such as kinship and community linkages, will be crucial to understanding human interactions within fisheries systems. The output of this research will be both methodologies for evaluating and improving components and systems, and a greater understanding of the complex interactions and trade-offs in fisheries systems.

The analysis of the structure, conduct and performance of the markets for fisheries commodities and associated factors of production (human resources, natural resources and capital) is crucial for the understanding of existing incentive systems and the resulting human behaviour which underlies the rates and trends of resource exploitation in the sector. In addition, small-scale processing and distribution systems in the postharvest subsector are major employers of low-income people, especially women, and have potential to provide more employment opportunities.

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