



Fisheries Co-management in Africa

*Proceedings from a regional workshop on
fisheries co-management research*



18-20 March 1997
Boadzulu Lakeshore Resort,
Mangochi, Malawi

ICLARM
International Center
for Living Aquatic
Resources Management

Fisheries Co-management Research Project
Research Report No. 12

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Editors

*Anne Katrine Normann
Jesper Raakjær Nielsen
Sten Sverdrup-Jensen*

Institute for Fisheries Management & Coastal Community Development

Fisheries Co-management Research Project
Research Report No. 12

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PREFACE

Co-management as a form of resource management is gaining ground worldwide, so also in fisheries management. Co-management implies that the user-groups participate in the decision-making on how to protect and exploit the resources, and to some extent also in the monitoring, surveillance and control of the fisheries. Co-management is increasingly seen as an alternative to centralized fisheries management, because ideally, it integrates the experiences gained by user-groups with scientific advice and policy considerations at central level. Also it integrates biological, social and human aspects of fisheries.

The papers in this volume document cases of co-management in Africa. The papers were presented at the Second Regional Workshop in Africa on fisheries co-management research, which took place in March 1997 in Mangochi, Malawi. The workshop was inaugurated by the Honourable Esau Phiri, MP, Deputy Minister of Natural Resources, Malawi. The case study presentations were followed up by discussions among the workshop participants on the case study findings and the application in the field of the common research framework, that has been developed for this collaborative research project. It was agreed to publish the written presentations in the Report Series of the Collaborative Fisheries Co-Management Research Project and to include a synthesis article, which summarizes the project findings across the many different cases.

The funding of the workshop, as well as the Worldwide Fisheries Co-management Research Programme, was provided by the Danish International Development Assistance - DANIDA. The Danish Cooperation for Environment and Development - DANCED - also contributed to the workshop. We thank the Ministry of Natural Resources in Malawi for hosting the Second African Regional Workshop in Africa, and the Deputy Minister of Natural Resources, Hon. Esau Phiri, for inaugurating the workshop. Ariana Grimes has done a tremendous job in proof-reading. Kirsten Klitkou and Dorte Holmgaard Jensen have carefully prepared the manuscripts and layout.

Hirtshals, July 1998

Anne Katrine Normann

Jesper Raakjær Nielsen

Sten Sverdrup-Jensen

Introduction

Project origin

The ICLARM/IFM/NARS Collaborative Fisheries Co-management Research Project was initiated in 1994 with funding from the Danish International Development Assistance (DANIDA). The project partners are the International Center for Living Aquatic Resources Management (ICLARM) based in Manila, Philippines, the Institute for Fisheries Management and Coastal Community Development (IFM) based at the North Sea Centre, Hirtshals, Denmark and a number of research institutes, fisheries administrations, NGOs and projects in Asia and Africa involved with fisheries co-management R&D. These are frequently referred to as National Aquatic Research Systems (NARS).

Project activities in Africa took off from a regional workshop on research initiatives on fisheries co-management held in November 1995 in Kariba, Zimbabwe. On this workshop, organised by one of the African project partners, the Centre for Applied Social Sciences (CASS) at the University of Zimbabwe, the common research framework and methodology was discussed and ongoing and planned fisheries co-management R&D projects in Central and Southern Africa presented. Fisheries co-management initiatives in West Africa were briefly introduced based on reports prepared for the IDAF¹ Workshop on Participatory Approaches and Traditional Fishery Management Practices in West Africa which had just taken place in Conakry, Guinea.

At the Kariba workshop it was agreed to have a number of the fisheries co-management cases that were presented, as well as a few others, analysed and documented by application of the common research framework and methodology. It was also agreed to meet again in 1997 to discuss the research findings. Following upon the Kariba workshop project proposals were developed and these were successively approved for funding by the Project Steering Committee.

Common research framework

An institutional analysis research framework for the analysis of fisheries co-management arrangements has been developed jointly by ICLARM and IFM for the ICLARM/IFM/NARS Collaborative Fisheries Co-management Research Project. The framework is based on the work of Oakerson (1992), Ostrom (1990), Pinkerton (1990,1993), Hanna (1995) and Feeny (1994). This research framework was, as mentioned above, presented and discussed at the Kariba workshop in November 1995, and subsequently revised. The revised framework (Pomeroy et al. 1996) has served as the common research framework for the documentation and analysis of

¹FAO/DANIDA Project: Integrated Development of Artisanal Fisheries, IDAF, comprising 20 coastal countries in West Africa from Mauritania to Angola.

fisheries co-management arrangements in Africa and Asia. The framework enables comparison between case studies and allows generalizations to be made about conditions which facilitate or hamper successful fisheries co-management.

Co-management

Co-management is defined as some form of institutional arrangement between the government and user groups to effectively manage a defined resource. Lying between two policy prescriptions - centralised control and privatisation - co-management can cover a broad spectrum of management strategies as illustrated in Figure 1. The essence of fisheries co-management is that government and user-groups share responsibility and competence for managing the fish resource and the fisheries.

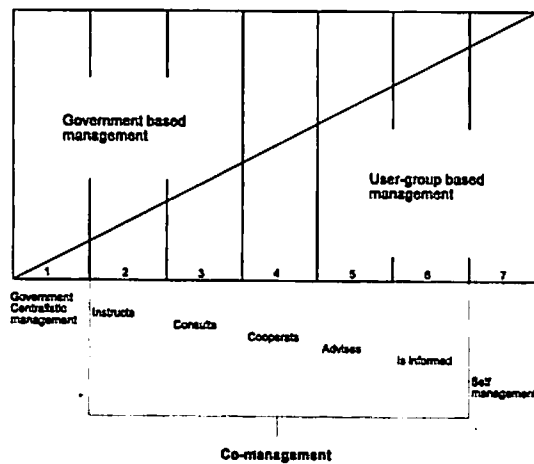


Figure 1: Spectrum of co-management arrangements (adapted from McCay, 1993 and Berkes, 1994)

Institutional analysis

Institutions are the rules which regulate conduct in a society. Institutions are affected by economic, social and political factors and can be both formal and informal, created or evolved. Any human interaction is governed by both formal rules (i.e. those that are written down, such as laws) and informal codes (i.e. those which everybody knows about but are not formalised in any way).

Organisations, on the other hand, are groups of individuals bound by some common factors to achieve particular objectives. The origin of organisations and how they evolve is influenced by the institutional framework and in turn organisations influence how institutional framework evolves. Organisations can be political such as a local council, economic such as a cooperative, social such as a church, or educational such as a school.

The purpose of institutional analysis is to separate the rules (institutions) from the strategy of the players (organisations). Institutional analysis examines how institutional arrangements affect user behaviour and incentives to coordinate, cooperate and contribute in the formulation, implementation and enforcement of management regimes.

A graphical representation of the research framework is given in Figure 2. The framework emphasises the relationship between the contextual variables of the "action arena" and the institutional setting, how these affect patterns of interaction amongst users and in turn, how this determines outcome in terms of efficiency, equity and sustainability. The process is continuous and dynamic.

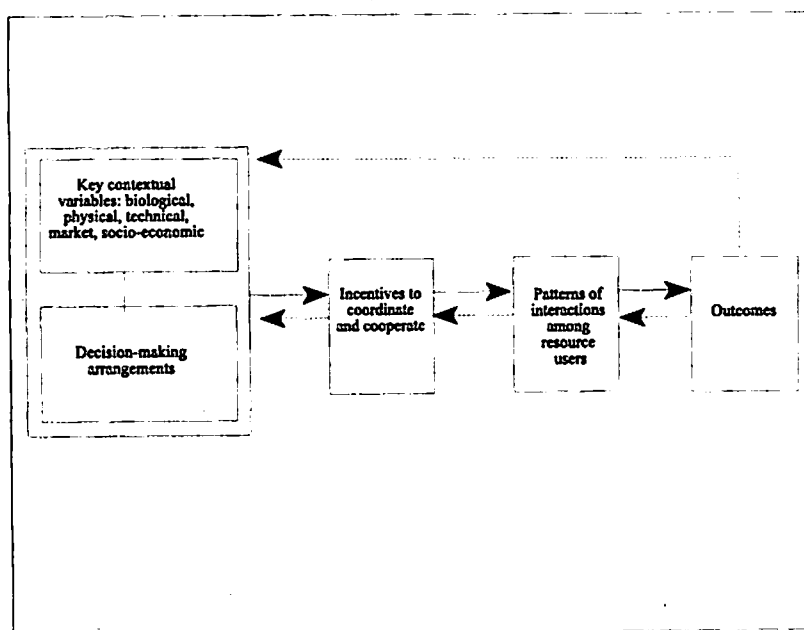


Figure 2: Draft Research Framework

As rights and rules are the basis of institutional analysis it is important to describe their relationship. Rights and rules are hierarchical in nature. There are rights to manage a fishery and rules which decide who has the right to do so. Rules give substance to rights as they structure how rights may be exercised and by whom. Rules also determine who has rights. The important aspect of rules in terms of institutional analysis is that they may create different incentives which affect cooperation among users.

Ostrom (1990) distinguishes three levels of rules:

Operational rules are those which determines when, where and how to harvest the resource, who should monitor and enforce rules and what information must be exchanged or withheld. Operational rules affect the day-to-day operation of users.

Collective choice rules are used by harvesters, officials or external authorities about how a common property resource should be managed and who has the right to set operational rules.

Constitutional choice rules determine who is eligible to make collective choice or operational rules and the type of rules which are permissible. Constitutional choice rules also determines who has the rights to make collective choice rules.

The key *contextual variables* of the "action arena" comprise socio-political, bio-physical, technical, market and socio-economic attributes which are considered critical factors providing incentives for resource users to cooperate. Socio-political attributes relates to the relation between the resource users and the government authorities - the resource owner; bio-physical attributes to the type and nature of the fish resource targeted, the status of the habitat/fishing ground and its boundaries; the technical attributes to the technical characteristics of the fisheries (artisanal/industrial, single/multi gear, dispersed/localised etc.). Market attributes comprise whether the fishery is mainly subsistence or commercial, the structure and orientation of the market and the value range of the produce. Socio-economic attributes relates, inter alia, to the degree of homogeneity of users, dependence on the fishery, attitudes towards risk, innovation and collective action and level of management relevant knowledge of the fish resources and the fishery.

The *decision-making arrangements* concern how institutional arrangements, rights and rules are made. The critical issues comprise user group power structure and legitimacy, the type and relevance of rules and their spatial applicability, decision making processes and representation and enforcement and sanctioning of rules and regulations.

The contextual variables and the decision-making arrangements will determine whether individuals have an incentive to cooperate, that is, engage in some form of collective action, and whether groups (users, stakeholders and government) have an *incentive to cooperate* with each other. Resources available for enforcement will also affect incentives. Whilst incentives to coordinate and cooperate might exist, this does not guarantee that stakeholders and users will cooperate. Much will depend on the way users interact with each other and their behaviour as individuals and as a group (Oakerson, 1992). There are some overlap between incentives and *pattern of interaction*. The purpose in separating them is to assist the analyst in determining the likely reason for a lack of cooperation when the incentives are thought to be in place.

The outcome relates to management objectives and the impact on the resources and its users. *Efficiency* means that co-management compared to centralised management reduce transaction costs (costs of information-gathering and processing, coordination of decision-makers/user groups and enforcement of decisions). *Equity* relates to representation (accommodation of the full diversity of interests), process clarity/transparency, homogeneity of expectations and the distributive effects implied. *Sustainability* relates to stewardship in terms of maintaining resource productivity and ecological characteristics and resilience, i.e. the ability of the system to absorb and deal with changes and shocks.

The research framework also comprises a set of indicators for the attributes, issues and outcomes mentioned above. Notwithstanding this, the field application of the common framework differs considerably from one researcher to the other. This is revealed in the way the individual cases have been documented. However, as the similarities in the analytical approach by far overshadow differences, comparisons between the cases can be made with some caution to avoid far reaching conclusions that may not be substantiated.

Status of and prospects for participatory fisheries management programmes in Malawi

U. F. Scholz¹
F. J. Njaya²
S. Chimatiro³
M. Hummel⁴
S. Donda⁵
B. J. Mkoke⁶

Abstract

Malawi, a landlocked country in Southern Africa, has developed a remarkable fishing industry as 20% of its surface area is covered by water. The highest landings comprised 88,000 t in 1987 - mainly landed at Lakes Malawi, Chilwa, Malombe and Chiuta - but dropped to 67,000 t in 1993. Apart from supplying fish as major source of protein for the population, the fishing industry creates direct employment for approx. 40,000 people and for approx. 20,000 in secondary sectors. The paper gives an overview of trends in the fishing industry, including commercial and artisanal landings, species taken and gear used. Special emphasis is given to the national fisheries policy and the status of fisheries legislation. Despite a clear legal situation and explicit fisheries laws (e.g. minimum takeable sizes of fish, closed seasons), the approach of a centralised management can be viewed as having failed. The Participatory Fish Stock Management Programme (PFMP) was launched in 1993 and is jointly implemented by German Technical Co-operation (GTZ) and the Fisheries Department of the Government within the framework of the Malawi-German Fisheries and Aquaculture Development Project (MAGFAD). The paper gives a detailed overview of experiences and the set-up of the programme; co-operation with user groups (Beach Village Committees), income generating activities, a credit scheme and the extension approach, in particular a fisheries radio programme, produced and presented by the Malawi Broadcasting Corporation. In conjunction with the PFMP, amendments to the Fisheries Act were made and gazetted in June 1996. Further amendments concerning community participation and the legal status of the user groups were drafted in February 1997. An initiative concerning a common

¹Malawi-German Fisheries and Aquaculture Development Project, P.O. Box 206, Zomba

²Regional Fisheries Officer, P.O. Box 47, Mangochi

³Regional Fisheries Officer, P.O. Box 206, Zomba

⁴Malawi-German Fisheries and Aquaculture Development Project, P.O. Box 206, Zomba

⁵Department of Fisheries, PMEU, P.O. Box 593, Lilongwe

⁶Director of Fisheries, Department of Fisheries, P.O. Box 593, Lilongwe

national approach was launched by the project and includes co-operation with the Department of National Parks and Wildlife and the Department of Forestry which are at present also implementing similar programmes in Malawi. With regard to fisheries co-management programmes, selected case studies from Lake Malombe, Lake Chilwa and Lake Chiuta are presented. Further information is given on the fishery at Mbenji Island (Lake Malawi), a unique traditional fisheries management scheme which for the last 45 years has been implemented by Chief Msosa, his elders and a local fisheries committee.

Based on the results achieved by the ongoing regional project, a national implementation of the PFMP is currently in the appraisal phase. Details of the proposed multi-sectoral "National Aquatic Resource Management Programme" are presented.

1. Introduction

Despite being a landlocked country, Malawi has developed a remarkable fishing industry. The maximum catch was 88,000 t in 1987 but dropped to 67,000 t in 1993. It is estimated that the number of fishermen includes approx. 40,000 people. The secondary sectors like fish trade and boatbuilding employ approx. 20,000 people. Considering the average household size in Malawi, about 250,000 to 300,000 people are dependent on the success or failure of the industry. The status of the fishing industry is on account of the fact that about 20% of the total area of the country (119,000 km²) is covered by water. Lake Malawi (27,000 km²) is the seventh largest freshwater lake in the world. Its fish fauna comprises more than 1000 species and is thus unique among freshwater lakes. Other major fisheries of very strong local importance are situated at Lakes Malombe (390 km²), Chilwa (0-2,590 km²) and Chiuta (113 km²) and in the Chire River system.

The products of the fishing industry play a significant role in the nutrition of the population, which is currently estimated at 11 million. Fish constitutes about 70% of the protein intake in the country. However, the high population growth rate of 3.2% p.a. will in future increase pressure on the sector. The national *per capita* supply of fish currently stands around 7.7 kg/year, a drastic drop from the 12-18 kg/year levels that were registered in the 1970s (Hara 1993).

2. Overview of the fisheries sector

2.1 Fisheries structure

The small-scale fishery exploits the inshore demersal resources; principal fish taken are mainly different Cichlid species, but also Cyprinids and various catfish species. The landings of the small-scale fishery comprise about 90% of the total catch. The latest nationwide frame survey made in 1994 revealed 10,600 gear owners and 32,600 assistants operating a fleet of 13,000 small craft, mainly dug-out canoes (78%) and planked boats. The fishing methods used throughout Malawi vary considerably. "Traditional" gear comprise gill nets, scoop nets, castnets, traps and hook-and-line. The more sophisticated and cost-intensive gear type, the seine net, has increased in number during recent years and is used as open water gear (Chilimila net, Nkacha net) or operated from beaches as Chambo beach seine or Kambuzi beach seine. Seine nets with a length up to 1,500 m and of 5 m in depth are very catch-efficient, in particular if operated with small

meshes like ½ and ¼ inch or mosquito netting at the bunt.

A *semi-commercial industry* was established in the southern part of Lake Malawi in 1968 and comprises today of 17 units of pair trawlers; and 20-26 foot boats, powered by a 2 cylinder diesel engine which operate in deeper waters (<50 m). The fleet comprises three stern trawlers and two lift net units which use light attraction systems (Kapenta rigs).

The production figures for the *aquaculture production* stands at approx. 200 t per year. Due to non-availability of suitable land and the erratic rainfall pattern, there is only limited potential for aquaculture and it will never become a substitute for the capture fishery. However, smallholder aquaculture, as it is practised in the southern region of Malawi by approx. 1,700 farmers, is of immense importance to the household economy. Since 1993 the extension work of MAGFAD has focused on the promotion of integrated aquaculture, a concept which is based on the construction of a reservoir and its management, plus the numerous benefits for the smallholder farming system, e.g. irrigation of crops with pondwater during the dry season. Production data has shown the benefits of the integrated farming approach, as for example a 650 sqm pond allows an annual surplus income of 1900 Kwacha (USD 130), an amount which is of great significance in a rural area where the farmers' average surplus income amounts to 310 Kwacha, USD 20 a year (Malawi Government, UNDP, 1993). Additionally, a pond allows a daily supply of fish for the household via hook and line fishing (Scholz and Chimatiro 1996).

The aquarium trade for the world-famous Lake Malawi Cichlids is in the hands of one entrepreneur operating off Senga Bay. Fish are caught with traps, small seine nets and divers, and are also bred in captivity.

2.2 Fishing process and marketing

The marketing pattern for fish in Malawi is dependent on the infrastructure which at present does not favour the fresh fish trade due to bad road conditions, uncertain availability, the high cost of vehicle transport and the existence of only two ice plants, both of which are located in Mangochi District at Lake Malawi. Thus, about 50% of the catch is sun-dried and 30% is smoked; the rest is either consumed fresh with approx. 10% entering the chilled/frozen fish trade (Hara 1993).

The 1994 Government economic report states that about 7 million tonnes of woodfuel are needed by Malawi *per annum*. 70% of this is consumed domestically, the rest by formal industries such as tobacco and tea and informal industries such as brick-making and fish processing. Deforestation is evident and is also a constraint to the fish processing industry in certain areas as traders are forced to buy from dealers (middlemen). An alternative to traditional processing methods was found by introducing of the "Chorkor" smoking technology in the Chilwa/Chiuta region in 1988. However, the technology never really took off due to high input costs, in particular chicken wire. A breakthrough was achieved at the Lake Malombe site, based on the work of a fishtrader and a fisheries extension officer. Their new "BENA" kiln is based on the "Chorkor" technology, but is round in shape and uses old bicycle rims and wire extracted from scrap tyres.

3. Management of fisheries resources in Malawi

The Malawi Government's official policy regarding fisheries resources aims to "...maximise the safe sustainable yield of fish stocks that can economically be exploited from the national waters; improve the efficiency of exploitation, processing and marketing, promote investment in viable rural aquaculture units and exploit all opportunities to expand existing, and develop new aquatic resources. Particular care will be taken to protect endemic fish fauna, not only because these are scientific and educational assets, but because they represent a particularly vulnerable major economic resource." (GOM 1988).

According to the current law, fisheries management, legislation and enforcement comes under the responsibility of the Department of Fisheries, a division of the Ministry of Forestry and Natural Resources. The Department has a staff of 566 officers, of which about 50% are fisheries assistants involved in field activities. In addition to its headquarters in Lilongwe, four regional headquarters and 27 district stations also function.

The current fisheries regulations are laid down in the 1977 Fisheries Act (Laws of Malawi, Cap. 66:05). Amendments were made in 1979, 1984 and 1996. The existing fisheries regulations permit sufficient measures for fisheries management and could have been used accordingly. These regulations are in particular: (a) closed seasons (Section 39), (b) the requirement of a fishing licence (Section 3), (c) prohibited methods of fishing (Section 38), (d) prohibited fishing gear, gear dimensions (Section 58, seventh and eighth schedule), (e) minimum takeable length of fish (Section 58, ninth schedule), (f) power of fisheries officers to arrest persons who commit an offence (Section 43) and (g) to check licences on demand (Section 44).

However, for various reasons, the centralised management approach by enforcement of regulations through Government institutions can be considered to have failed. Indicators are the declining national catch figures and local examples of overfishing as in the case of Lake Malombe.

4. Set up of the PFMP programmes in Malawi

In 1993 the Malawi Fisheries Department requested German Technical Cooperation to assist in the implementation of a Participatory Fisheries Management Programme (PFMP). Pilot activities were implemented in 1994 under the auspices of the Malawi-German Fisheries and Aquaculture Project (MAGFAD) in collaboration with the UNDP/FAO, the World Bank and ODA.⁷

The initial set-up included seven components (Bell and Donda 1993): (a) community participation, (b) change of the current fisheries legislation and policy, (c) research and monitoring, (d) public relations and extension, (e) licensing, (f) gear compensation and income generating activities (IGA) and (g) law enforcement. Within the implementation of the programme, certain components and sub-components had to be changed or were discarded and new components added.

⁷ A comprehensive study on the initial phase of the programme is published by Hara (1996).

4.1 Community participation

A central part of the programme is the foundation and training of local fishing committees - beach village committees - BVCs, who act as intermediaries between fishing communities and the Fisheries Department. They provide a two-way channel of communication, in particular concerning the discussion and adoption of fisheries regulations and extension work.

The groups are elected at community level, and the 10-14 members on each group are mainly fishermen, although efforts are made to include traders and fish processors on the committees. Traditional authorities such as local chiefs and village headmen are *ex officio* members in the area of their jurisdiction. It was proposed that funding of the groups be through the payment of sitting allowances (Bell and Donda 1993) and from the diversion of fisheries licence fees.

After an initial training session in group dynamics and leadership, and the adoption of a constitution, it is intended that groups be involved in management components such as (a) discussion and adoption of fisheries regulations, (b) licensing and record keeping of fishing gear and boats, (c) control of their beach and fishing area, namely gear and licence inspection, (d) organisation of extension sessions, and (e) participation in fisheries enforcement.

4.2 Legislation and policy

The implementation of the Participatory Fish Stock Management Programme entailed certain changes to fisheries legislation, namely gear dimensions (e.g. minimum mesh sizes) and empowerment of BVCs through provision of a legal basis in the Fisheries Act. Fisheries regulations, which were discussed and adopted in 1994/95, were gazetted in June 1996. Proposals concerning an incorporation of community participation into the Fisheries Act were elaborated by Prof. Tracy A. Dobson, Lecturer at Law, Chancellor College, Zomba (Dobson 1996).

Prof. Dobson's amendments to the proposed Fisheries Conservation and Management Act were in the field of (a) addition of new definitions (e.g. BVCs, regional fishermen's organisations); and (b) addition of entire new parts and sections:

Ownership of the Fisheries of Malawi (new part)

Section: as a critical natural resource, the fisheries of Malawi in its fishing waters shall constitute an integral part of the natural wealth of the people of Malawi and shall be conserved and managed for the benefit of the people of Malawi. It shall be the duty of every person to make use of the fisheries in ways which promote their health and conservation.

Local Community Participation (new part)

Section: Participation of fishing communities in conservation and management of the fisheries.

- (1) Members of the fishing community shall participate in the conservation and management of the fisheries of Malawi through beach village committees (BVCs) and regional fishermen's associations. The authority of BVCs shall extend to fishing and related activities within the fishing areas associated with them. Regional fishermen's associations' areas of authority may be identical to fishing districts as set out in Section 55(1) or may encompass larger areas.

- (2) Beach village committees may form and shall be recognised under this Act to participate on behalf of fishing communities in the conservation and management of the fisheries. Each BVC shall adopt a constitution that directs its operation. A model constitution shall be provided to BVCs by the Director of Fisheries. A constitution may provide for a BVC management sub-committee to manage the affairs of the committee on a daily basis.

Department of Fisheries personnel shall provide basic support services to BVCs, including but not limited to, clerical work and supplies and record maintenance.

- (a) BVC membership shall be drawn from persons engaged in all aspects of the fishing industry associated with a particular fishing beach, included but not limited to: fishing, processing, fish marketing and fish trading.
 - (b) BVC officers shall be selected from the members of the committee.
 - (c) The officers of the BVCs shall be honorary fisheries officers under Section 6.
- (3) Duties of beach village committees. Within their fishing areas BVCs shall share with the Department of Fisheries responsibility for the conservation and management of the fisheries. In particular, BVCs shall
- (a) register fishing vessels of small-scale commercial and subsistence fishermen under Section 10, and maintain records of vessels registered;
 - (b) issue fishing licences to small-scale commercial fishermen under Section 15, and maintain records of licences issued;
 - (c) in conjunction with the fisheries protection officers, enforce fishing regulations regarding:
 - fish species permitted to be caught
 - fish size
 - closed seasons and fish sanctuaries
 - requirements as to gear size, type, stowage
 - requirements as to methods of fishing;
 - (d) in conjunction with fisheries protection officers, enforce conditions specified in licences;
 - (e) in conjunction with fisheries protection officers, enforce Section 31(2) a,b,c,d,e, and f; and
 - (f) have the authority under Section 33(1)(c) and (d) to seize vessels and other items until the end of 48 hours after seizure, by which time either fisheries protection officers or police officers shall take charge of seizure actions.
- (4) BVCs may create regional fishermen's associations. The areas of regional associations may correspond to fishing districts as defined in Section 57(1) or may encompass larger areas.

- (a) Each regional fishermen's association shall adopt a constitution that directs its operation. A model constitution shall be provided to associations by the Director of Fisheries. Department of Fisheries personnel shall provide basic support services to regional fishermen's associations, including but not limited to clerical work and supplies and record maintenance.
 - (b) The officers of regional fishermen's associations shall be selected from the members of the association.
 - (c) Officers of regional fishermen's associations shall be honorary fisheries officers.
- (5) Duties of regional fishermen's associations:
- (a) Regional fishermen's associations shall represent the interests of the fishing population.
 - (b) They shall be responsible for conveying conservation and management recommendations developed by their association to the Director of Fisheries and/or the Fisheries Advisory Board on behalf of their constituent fishing communities.
 - At least 180 days in advance of final action, the Director of Fisheries shall provide the associations with proposed changes including, but not limited to draft management plans, regulations, statutes and statutory amendments related to fisheries conservation and management.
 - An association or group of associations may request meetings with the Director of Fisheries and/or the Fisheries Advisory Board to discuss proposals or provide written comments to the Director of Fisheries or the Board or both.
- (6) Any regional fishermen's association may sue and be sued in its own name.

The draft amendments were incorporated into the Draft Fisheries Conservation and Management Bill in February 1997 and are at present being revised by the Ministry of Justice in order to be presented to Parliament. So far, the Ministry of Justice has been extremely cooperative in the process. The new Act will not only include changes regarding community participation, but also a decentralisation of the power of decision-making from Ministry level to Department level. The proposed Act will be harmonised even further with the Land Acquisition Act, Deeds Registration Act, Water Resources Act and the National Parks Act.

4.3 Research and monitoring

Fisheries research and monitoring is conducted by the Fisheries Research Unit in Monkey Bay, and is supported by the ODA Aquatic Ecology Project. Monitoring is carried out through the Malawi Traditional Fisheries Assessment Programme and via special surveys such as the annual frame survey.

4.4 Extension

Fisheries extension is today a combination of different approaches and extension aids. A modified training and visit approach still exists in parts of the field extension programme, which includes two field meetings per BVC per month. A special event is the annual BVC Forum where three members per BVC plus traditional leaders discuss events of the past year. Special events are further inter-BVC visits to other regions, e.g. to the PFMP scheme of Chief Msosa. Extension aids used are leaflets and posters, video is used at a very limited level during meetings. A newsletter in the vernacular language distributed to decision-makers and BVC members is currently being drafted.

The programme is accompanied by the fisheries radio programme "usodzi walero" (Fishing Today), which is broadcast weekly. It is a forum for all kinds of fisheries-related matters and is presented in vernacular languages. The distribution of extension messages has been hampered by the fact that each fisheries extension officer in Mangochi District has to cover a coastline of approx. 70 km, a distance which required the use of motorcycles. The radio programme, however, reaches a much larger community, as the number of radios in Malawi is estimated to be 1 million.

4.5 Licensing

Licensing of fishing gear still comes under the responsibility of the Fisheries Department. However, an agreement between the Department and the BVCs is proposed to be amended in the Fisheries Act. Also pending is the flow-back of licence fees to the user groups, similar to schemes implemented in wildlife management. It is further proposed to limit the number of licences granted for certain areas or water bodies in order to limit access.

4.6 Gear compensation

In the initial study in 1993, a proposal was put forward to compensate gear owners in the form of grants/netting material (a) to convert existing nets to comply with new regulations, and (b) for removal of nets and boats. In this regard, the Fisheries Department was identified as being responsible for procurement, storage and replacement of net materials. The projected cost for the net replacement exercise of undermeshed nets with $\frac{3}{4}$ inch nets was identified to be USD 93.000.

Unfortunately, messages concerning the free handout of nets and net purchases through the project trickled down to the community before this under-development policy issue's critical point was properly discussed at project management level. Critical as such, as the question arises: do free inputs and donations facilitate understanding and acceptance? The promises made under the previous management still have a negative effect four years later.

4.7 Income generating activities (IGA) and credit

As the practice of gear compensation was discarded in 1995, a stronger emphasis was laid on IGA activities and credit for net replacement. Based on pressure exerted by the local community, which were still expecting the hand-out of free nets, a net replacement programme, implemented

by the Commercial Bank of Malawi, was launched in 1996. The scheme is also linked to commercial interest rates which were 50% p.a. in 1996. One of the pre-conditions to obtaining a loan was a payment of 10% of the requested amount into a savings account. During the initial phase, credit for the replacement of undermeshed nets was distributed, at a repayment rate of 87%. During the second phase the approach was changed as nets instead of cash were given.

The initial IGA programme was taken over by the UNDP in 1997. Apart from loans to fishermen's groups, women groups are a special target, in particular IGAs in conjunction with fish processing devices. It is the target of all programmes to link the groups to other existing lending schemes as was done with the 16 groups who received loans from the Malawi Rural Finance Programme. Further activities in this field will include literacy and numeracy classes plus teaching of simple business skills and book-keeping through resident schoolteachers.

4.8 Law enforcement

Law enforcement by Government institutions is still seen as necessary by the fishing community, and the demand for enforcement is expressed at various meetings. Today, the agreement is that the enforcement unit is called in by the BVCs e.g. during violation of the closed season or the use of undermeshed nets. Support of the fisheries enforcement unit comes under the responsibility of the World Bank Fisheries Development Programme.

4.9 Co-operation with other programmes

MAGFAD launched an initiative to coordinate and cooperate participatory management activities in the Departments of Fisheries, Forestry and National Parks and Wildlife which are all under one umbrella Ministry (Ministry of Forestry and Natural Resources). Malawi is currently at the stage of integrating more user groups into the management of their natural resources, e.g. a controlled use of the 75 forest reserves by the local community. In conjunction with the GTZ-funded Nyika Plateau/Vwaza Marsh Border Zone Management Programme (Department of National Parks and Wildlife), a flow-back of licence fees (revenue sharing) is proposed, as 20% of the generated income from the National Parks is supposed to be given to the surrounding communities for development projects.

The so-called NARMACO (National Resource Management Committee) meets at regular intervals to discuss common approaches in programmes, e.g. tackling the issue of sitting allowances and future ideas for revenue sharing.

5. Case studies

5.1 Lake Malombe

Lake Malombe, an inundation of the Shire River, is located south of Lake Malawi. It covers an area of 390 km² and has a mean depth of 4 metres (maximum 6 metres). The development of the fishery is well documented (FAO 1993) and represents a classic case of change of species abundance correlated to the use of inappropriate fishing gear. In 1988 the maximum total catch

comprised 15,500 t, but declined considerably in the 1990s.

Until the mid 1980s, the fishery was based on catch of a larger Chichlid, the "Chambo" (*Oreochromis spec.*). In 1982 maximum yield was 8,200 t from a total catch of 12,800 t. In 1994, less than 150 t were landed and more than 90% of the total catch of 5,600 t comprised of small (5-8 cm) haplochromid cichlid species, called "Kambuzi". The main reason for the decline of the landings and change in species abundance is correlated to an increased use of small meshed ($\frac{1}{4}$ inch and less) seine nets, which replaced the traditional gill net fishery. Another reason as seen by Banda and Hara (1994) is the destruction of the abundant macrophyte areas due to the dragging action of seine nets.

The change of species abundance also had an effect in economic terms. Bell and Donda (1993) estimated a loss of K28 million (USD 9 million in 1993) compared with the 1982 and 1990 catch figures, which were of similar tonnage, as an effect of the replacement of the Chambo fishery.

In 1997, a total of 18 user groups existed at Lake Malombe. They have adopted new fisheries regulations as follows:

- a minimum net mesh size of $\frac{3}{4}$ inch for Nkacha and Kambuzi species;
- a minimum mesh size of 3 inches for Chambo seines and gill nets;
- a maximum headline length of 250 m for Nkacha, 500 m for Kambuzi and 1,000 m for Chambo nets;
- to follow the recommendations for the closed season.

The proposed gear regulations were gazetted in June 1996. The adoption rate of $\frac{3}{4}$ inch increased from 17% in 1994 to 60% in 1995 and 85% in 1996. The remaining owners of unchanged gear are mainly fishermen from Lake Chilwa who do not come under the authority of the Malombe chiefs.

Today, the Lake Malombe program is at a stage where the regulations, management measures and cooperation with the local department have been accepted by the fishing community. Catch statistics and statements from fishermen reveal the first positive results of the approach. As an example, catch of Kambuzi increased from 800 t in 1994 to 1,900 t in 1995. Chambo catches increased from 79 t to 195 t during the same period.

During the last annual meeting in December 1996, the following pending matters were discussed and the appropriate measures adopted:

- Creation of fish sanctuaries including submerged obstacles to act as fish aggregating devices;
- The foundation of a Lake Malombe Fisheries Association to be elected by BVC members;
- A rescheduling of the closed season (Jan-March) to Nov-Jan as according to fishermen's observations, juvenile fish are most abundant during this period. They often block the bunt due to the large numbers taken. The observation matches with findings from Banda (1994).

In addition, management measures were discussed openly. Enforcement of the regulations entirely by traditional authorities and BVCs is still seen as not entirely workable, as the action

is not backed up by the laws of Malawi. Government involvement in this regard is still seen as essential and it is the fisheries enforcement unit which is called upon by user groups to enforce regulations.

Further recommendations from BVCs ranged from a total closure of the Lake for two years to a ban on Nkacha seine nets. However, the majority of fishermen opted for a three month closed season and no change to the minimum net mesh size of $\frac{3}{4}$ inch, which is in effect a decision to support the recovery of the Kambuzi fishery.

5.2 Lake Chilwa

Lake Chilwa is a very shallow lake (max. depth 4 metres). The water regime is dependent on rainfall and evaporation as there is no river drainage system. The size varies between a maximum area of 2,500 km² and almost nil, as it has dried out seven times this century, the last time in 1995. On average it has a mean water area of 750 km² of open water and 390 km² of associated wetlands (GOPA 1987). The maximum annual catch was 25,000 t taken in 1988, the main species being *Barbus*, Cichlid and *Clarias* species.

The development of the fishery is also characterised by the invasion of small meshed seine nets. Fishermen and traditional authorities approached the project team in 1994 to assist in respect of the future management of the Lake. So far, 18 committees have been formed and are functional. Management measures during the 1995 drought were centred around a ban on fishing in the few remaining water areas, e.g. river mouths. The ban was adhered to throughout except for a few cases of poaching close to the Mozambique border in the Mpoti lagoon, and the use of *Katupe* (*Syzigium cordatum*), a plant used traditionally as fish poison, mainly by women.

Even after the Lake filled again in 1996, the community agreed to close the fishery until further decisions could be made about its future exploitation. Experimental samples from December 1996 indicate about 20% mature fish in samples. Beach samples taken from hook and line and trap catches in March 1997 show a much higher figure of mature fish.

Nowadays the Lake Chilwa area is hit by abundant rainfall and flooding which has destroyed a large proportion of crops. The population is eager to start fishing as no alternative source of income exists, which during the drought for example was the catching of waterfowl. The opening of the Lake and new regulations will be discussed in March 1997, and the proposed fisheries regulations will include a ban on Nkacha nets, a minimum mesh of half an inch for shore seine nets and $2\frac{1}{4}$ inches for gill nets.

5.3 Lake Chiuta

Lake Chiuta covers an area of 113 km², with a mean depth of 5 m. The Lake is not capable of drying out, and the annual catch ranges from 700 t (1986) to 2,000 t (1984), mainly Cichlids and catfish.

Lake Chiuta is at present the most successful example of adoption of a co-management scheme by the local community. The demand for an improved management was first expressed in 1994 as the fishing activity of 300 non-resident Nkacha units caused a rapid decline in catches for resident fishermen, whose fishing activity was based on traps, gill nets and longlines. Discussions concerning the introduction of regulations led to the adoption of a minimum mesh

size of 2¼ inches for all types of gear used. The new regulations were announced by Chief Kawinga in June 1996 and led to the emigration of Nkacha fishermen as the local resident fishermen were not willing to change their position on this matter. The stocks have meanwhile recovered and sufficient catches are being achieved using traditional gear.

5.4 Mbenji Island

Mbenji Island is located in the central part of Lake Malawi, approx. 60 km north of Senga Bay. The fishery is mainly based on Utaka (*Copadichromis* spp.). Since the 1950s, a strict management regime has been conducted by Sub-Chief Msosa and his elders. It mainly comprises of a closed season from December to March to allow stocks to recover. During the closed season, no one is permitted to remain on the Island or to fish in the surrounding waters. The closing ceremony is marked by reports to the Chief, by the committee of elders and the fishing committee chairman, on events and any contravention of the regulations and disciplinary measures adopted during the previous season.

The opening ceremony begins with the Chief and the elders going to the Island early in the morning to offer their sacrifice (nsembe) to the ancestors, asking them to bless the coming fishing season. Events during both ceremonies mainly involve traditional dances and a public address by the Chief re-emphasising the importance of observing the regulations and the standing restrictions by the fishing community.

Further regulations comprise a ban on alcohol, gambling and marijuana (chamba). In addition to this, no women are allowed on the Island. Another regulation is the limitation of fishing gear types to those sanctioned by the committee. Fishing with light attraction, for example, is seen as destructive and hence, is not permitted.

The quality and quantity of the fish landed here has convinced many traditional leaders from other parts of the country to try community management, as regular visits to the Island, and invitations to speak in other areas, are a part of the extension programme.

6. Conclusion and prospects for the programme

6.1 Lessons learned

The implementation of the Participatory Fish Stock Management Programme was from the beginning shaped by various factors. In favour of the implementation of the programme was the critical stage which some local fisheries had reached and which raised the level of acceptance at the target group level. In addition, the participation programme coincided with the transition of Malawi from an autocratic one-party state to a democratic country. Therefore, the PFMP not only needed to undertake training and sensitisation of the user groups but also of fisheries extension personnel e.g. in participatory extension methods and sustainable project management.

However, Government officers at all levels, including decision-makers and field extensionists relied on the old state policy whereby the Government had overall responsibility including the ownership of resources and problem resolution from the 'top-down', all of which went against the principles of self-help mechanisms or decision-making by local communities. The policy of dependence on external help was also facilitated by various donor-funded relief

programs, donor aid and later, gifts and numerous promises by politicians during election campaigns. In the initial concept stage of the programme mistakes were made which still have an effect years later. In particular, these were:

- promises of sitting allowances for all BVC members of an amount similar to 1 US Dollar per meeting;
- promises of free replacement for undermeshed nets;
- promises of the purchase of nets by the Department/Project.

As these activities can be seen as contradictory to certain aspects of development policy and sustainability, they were cancelled in 1994 after long discussions with BVCs. As an alternative to replacing undermeshed nets, the project had to enter the troublesome field of fisheries credit, which was implemented through the Commercial Bank of Malawi. Loans from Government institutions are generally seen as a grant, as proven by numerous failed agricultural credit programmes.

With regard to the PFMP, some questions still need to be answered:

1. What convinces user groups to implement such long-term programmes, as it involves additional work, costs and actual losses, e.g. the increase in net mesh sizes entails, at first, a decline in catches? Additionally, if different groups operate in one area, any non-conformances (e.g. fishing during the closed season, fishing with small-meshed bunt), which are not tackled by the BVCs, traditional authorities or the Department, will cause jealousy and will convince other fishermen to follow suit because of the profits to be made.
2. Should a community participation programme not target community development programmes as well, as most of the problems encountered in natural resources management have their roots in rural poverty?
3. How far should the responsibility of the user group go? Is the target a handing over of all management issues to the population or to what degree should the Department remain involved?

6.2 Status of current programmes

Today, fisheries management in Malawi follows different paths, from total government-based management to a 100% user group-based management, using the classification by Sen and Nielsen (1996):

Lake Malawi: (Co-management, Type A)

The Lake, in particular the South East Arm, can be classified as Type A (Instructive) with trends towards Type B (Consultative). Regulations are existent but intensive fishing takes place without rigorous enforcement from the Government side. The catch, in particular for Chambo, is declining. The community in certain areas is sensitised, and cases have been reported where Nkacha open water seine nets from Lake Malombe and Lake Chilwa are chased off by local chiefs.

Lake Malombe: (Co-management, Type C)

The mistakes made during the initial phase of the programme, in particular the promise of free net replacement, gear compensation and a sitting allowance of USD 1 per day per BVC member still has an effect and needs increased extension efforts. Pending also is the legal status of BVCs through the Fisheries Act.

Lake Chiuta: (Co-management, Type D)

The Malawi Government, through the government gazette, endorsed the regulations which were adopted by three fishing communities, e.g. the ban on Nkacha nets.

Mbenji Island: (CBRM)

The management scheme of Chief Msosa is outstanding, although it does not comply with definition of the term 'co-management', as government has not been involved in the decision-making of the Chief.

6.3 Outlook/Prospects

The development of community-based regimes in Malawi is still quite recent and will only be successful if conducted in tandem with the national democratisation and decentralisation process. A nationwide extension of the programme was considered in 1996, as the creation of somewhat isolated programmes did not provide a solution to the overall problems affecting the fishing industry of Malawi. Fishermen are very mobile and migratory in their movements, for example Nkacha fishermen move to Lake Malawi during the Lake Malombe closed season. The introduction of new technology (small meshed seine nets), which the Nkacha fishermen use and which operate mainly in shallow waters, is today seen as one of the reasons for the decline of the Chambo fishery.

As data for the Lake Malawi fishery reveals a declining catch trend, a proposal was made to the German government to extend support for a management programme covering all Malawi's water bodies, based on the MAGFAD experience to date. The proposed "National Aquatic Resource Management Programme" will be conducted through all regional fisheries offices, and will take the form of support to extension staff, but fisheries research and enforcement units will also be considered if needs are identified.

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Fisheries co-management in Malawi: Case study of Lake Chiuta fisheries

S. J. Donda

*Fisheries Department
Lilongwe, Malawi*

1. Introduction

This research work has been inspired by the search for a better fisheries management system for the various fisheries of Malawi. The current management system has proved to be either inappropriate or ineffective. This conclusion has been reached because, despite the fact that the current management system has been implemented for more than twenty years (management regulations have been in force in Malawi since July 1974 (GOM, 1974)), indications of localised overfishing have been noticed in various water bodies (Tweddle, Alimoso & Sodzapanja, 1994; GOM/FAO/UNDP, 1993).

Knowing that fisheries management is more about people than it is about fish, to try and manage a fisheries resource without considering the people who harvest this resource is naïve. In response to this fact, an alternative fisheries management system was identified to either replace or supplement the current one, depending on its eventual success. This new system is known as the co-management approach which allows fishers to participate alongside the government in managing the fishery resource.

The purpose of this study therefore, is to assess the potential for fisheries co-management in the various fisheries of Malawi. This is the first in a series of three case studies to be carried out. The second and third case studies will be conducted at Lake Malombe, Mangochi, and around Mbenje Island in Salima district respectively.

1.1 The Lake Chiuta fishery

Lake Chiuta is a shallow lake whose waters are shared by both Malawi and Mozambique. It is located at an altitude of 620 m in the southern part of Malawi. The mean depth of the lake is 5 m, and it has a total surface area of about 200 km², of which 40 km² lie inside Mozambique. The southern part of the lake is more or less permanently covered with emergent vegetation penetrable only by small craft of the canoe type. The main inflowing rivers are the Lifune, Chitundu and Mpili. Lujenda River is the major outlet and links Lake Chiuta to Lake Amaramba in Mozambique.

This fishery which lies along the border between Malawi and Mozambique, is totally isolated from the Lake Malawi catchment area. However, Malawi claims total sovereignty over

the lake and although the Government of Malawi has formulated and enforced fishery regulations on all lakes in Malawi since the early 1970s, this particular fishery was not subject to any government regulations up until June 1996. The fishery has survived merely under communal control.

Of major interest to this study is to investigate the period during which this fishery has been managed by the communities themselves, with what appears to be little or no intervention by the government. Latest developments in fishery management on this lake indicate that there has been a change in this tradition, and that some form of collaboration between the government and the communities is taking place, hence the establishment of fishing regulations by the government in June 1996. It is also the wish of this study to map out the kind of collaboration that is taking place, to describe the type of co-management system that exists, and to identify areas for improvement. It is hoped that the information may eventually be used in the formulation and design of co-management systems for other fisheries.

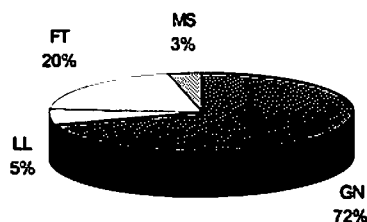
1.2 Fish production

The fishery is dominated by small-scale artisanal fishers who fish at both a subsistence and commercial level. Four main fish species dominate the catch: *Oreochromis shiranus* (Makumba), *Tilapia rendalli* (Chilunguni) *Burbus paludinosus* (Matemba), and *Clarias gariepinus* (Mlamba). The main fishing gear used are fish traps, gillnets and longlines.

In 1972 only 200 fishers were reported to be actively fishing on the lake. By 1990 the total number had increased to about 462 with 995 assistants, making a total of 1,457 fishers. By then the fishers had a total of 351 fishing craft, of which 282 were dugout canoes, 68 were boats without engines and only one boat with an outboard engine. However, the 1996 frame survey results revealed that the total number of fishers had decreased to 1,088, although the total number of gear owners had increased to 962. The overall decrease in the number of fishers has been due to the drastic fall in the number of assistants which had dropped to just 126 in 1996.

In line with the fall in the number of fishers has been the increase in the numbers of fishing gear and craft on the lake. Fishing craft numbers have increased from 351 in 1990 to 737 in 1996, with dugout canoes dominating. The main fishing gear used on the lake - fish traps, gillnets and longlines, - have increased respectively from 535, 1,916 and 144 in 1990, to 13,176, 2,697 and 384 in 1996. There has been the drastic change in fishing technology.

1990



1996

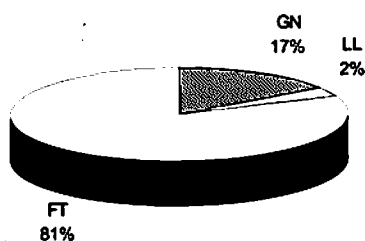
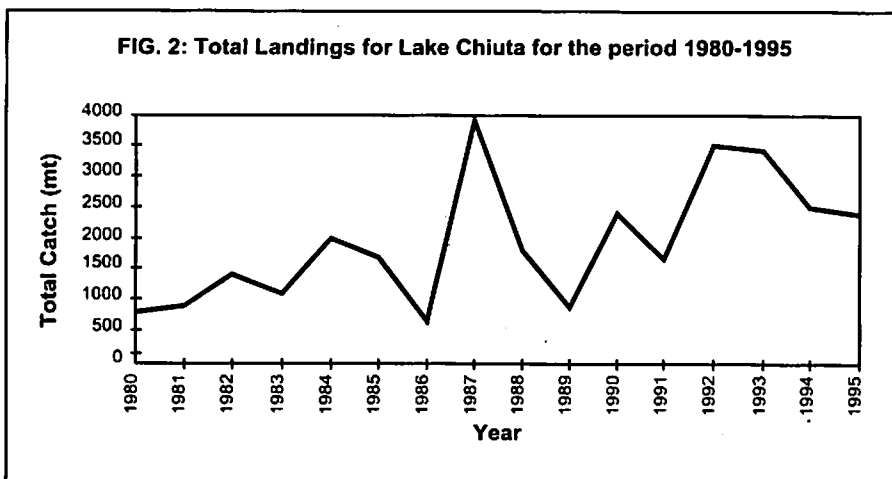


Figure 1: Types of fishing gear used on Lake Chiuta , 1990 (upper) and 1996 (lower)

In 1990, gillnets (GN) were the predominant type of gear, accounting for 72% of the total fishing gear employed on the lake, followed by fish traps (FT), which contributed about 20%. In 1996, the predominant type of gear were fish traps, making up 81% of the total, with gillnets only contributing 17% (see figure 1). It is evident that during this period, the fishery has shifted away from being a gillnet fishery to becoming a fish trap fishery. It is also interesting to note that during the same period, *matemba* seine nets (MS) have been phased out from the lake. In 1990, *matemba* seine nets accounted for about 3% of the total fishing gear on the lake and by 1996, there were no seine nets present.

This change in fishery technology explains why the number of assistants has decreased over the years, as the fish trap fishery does not require as much assistance from other fishers as the gillnet and *matemba* seine fisheries.

The total catches for the lake have fluctuated between 700 mt. (1970) and 3,589 mt. (1992). The figure below shows the total landings from the lake for the period 1980 - 1995.



(Fisheries Department, Malawi)

In the 1970s, the average annual fish production was estimated to be around 1,400 tonnes. Between 1980 and 1993, annual catches fluctuated between 700 tonnes (1986) and 4,000 tonnes (1987), giving an average annual fish production for the 1980s of 1,600 tonnes. By the mid-1990s, the average annual catch was 2,700 tonnes.

As observed earlier in figure 1, although there was a shift away from net fishery to trap fishery between 1990 and 1996, there has been a general trend of larger total landings from the lake. This increase in annual fish catches, and the increase in the numbers of fishers and in fishing gear, are indications of an expanding fishery, which therefore calls for a more strategic management system so as to avoid the over-exploitation of stocks.

2. Research findings

This section contains an analysis of the information collected from the communities, in addition to the researcher's own observations made during data collection.

2.1 Management of the fishery

Dissi and Njaya (1995) have documented that the management strategy for the Lake Chiuta fishery had initially been under customary tenure, whereby the regulations and the management of the fishery had been controlled by the chief and a fishers committee. To some degree entry into the fishery was limited as any newcomer had to consult with local institutions for permission to join the fishery. Although the Department of Fisheries had not been directly involved in the management of the Lake Chiuta fishery since 1975, due to a lack of regulations governing the fishery, the fishers relied heavily on the government to assist in enforcing regulations for fishing activities on the lake.

Traditional fisheries management

The traditional management systems that existed on the lake were based on myths and beliefs, and to some extent this still exists even today. In the lake are three small islands: Big Chiuta, Little Chiuta and *Phiri la Mtsatsi* (meaning a hill of castor oil as it is covered with castor oil plants). Big Chiuta is the largest and *Phiri la Mtsatsi* the smallest. It is on and around this smallest island that fishing has been prohibited in accordance with tradition because of fishers' beliefs and consciences. Interviews with fishers indicate that it is believed that if one fishes close to the island or lands one's catch on the island, then the fisher will never return to his home village. It would be the end of him, he will just disappear because the spirits on the island will take him away. This belief still exists today and fishers do not fish anywhere near this island. It has therefore remained a natural fish sanctuary within the lake, as the fish and the habitat around the island have not been disturbed.

The management of the Chiuta fishery was initially under customary tenure, and entry to the fishery was controlled, in such a way that one had to obtain permission to join the fishery. One would be tempted to conclude that the traditional fishery management system that existed was an informal Territorial Use Rights in Fisheries (TURF) system as in loose terms, it can be interpreted that the fishery resource was being controlled by an identified group (the chief and a fisher committee) who had the power to exclude others and to some extent, regulate its use. This observation is strengthened in section 2.3 where the history of the formation of FSMCs can be viewed as a revitalisation of the TURF system which had been weakened in the area by the then political regime. The political system that was in place between 1964 and 1994, under the rule of the Malawi Congress Party (MCP), gradually saw the powers of the traditional chiefs shrink and the powers of the local political leaders strengthen. This meant that the informal TURF system could no longer be effectively implemented.

2.2 Rules governing the fishery

Before Malawi became independent in 1964 and before colonisation, in the pre-colonial era the demand for fish around the lake was small due to the low population density and poor road conditions which made access to the lake by outside fish traders very difficult. As a result, most of the fishing which took place was primarily for subsistence. The prime rule governing the fishery, apart from the beliefs that people held, was that no one was supposed to join the fishery without first seeking the permission of the chief.

For the period between 1964 and 1994, before the formation of Fish Stock Management Committees, all fishers interviewed said that there were no formal rules governing the fishery. Any one was free to join or leave the fishery at will, although informally people were still expected to obtain permission from the chiefs in order to join the fishery and to reside in their villages while carrying out fishing activities.

With the formation of Fish Stock Management Committees, rules were formulated based on the objectives of the committees. These rules included the banning of seine nets on the lake, banning the use of nets with illegal mesh sizes and the prohibition of the catching of immature fish.

2.3 Formation of Fish Stock Management Committees

In the mid-1980s, Lake Chiuta was invaded by seine netters who came to fish for matemba (*Burbus paludinosus*). These seine nets were open water seines which are locally named *nkacha* with bunt meshes of about 0.25 of an inch or less. This fishing gear is non-selective and is known to catch all sizes of different fish species. Due to the good catches realised from the seines, more and more people joined the fishery from a neighbouring lake, Lake Chilwa. The situation got out of control and the seine netters had no respect for the other lake users. There were constant conflicts between these fishers and other fishers on the lake as the seine nets constantly damaged other gear types, and the water was repeatedly being disturbed. Other villagers, who had nothing to do with fishing, were also affected as the quality of water for domestic use was seriously affected. During the operations of the seine nets, the bottom soil became mixed with the water, making it turbid, and hence making the water dirty and not fit for either drinking or domestic use.

Fed up with the situation in mid-1990s, one of the leading fishers (name withheld on request), called for a beach meeting to sensitise his fellow fishers to the problem brought about by the seine netters, and the dangers such nets posed to the fishery and the community as a whole. All the other fishers were in accord and decided to report the issue to their Chief, and inform him as to their intended action against the seine netters, that they should no longer be allowed to fish in the lake and should be chased away from the area. The senior chief (Traditional Authority) appreciated the gravity of the situation but the other junior chiefs (Village Heads) disagreed with the decision to chase away the seine netters, as they were receiving fish and money from these fishers in the form of gifts or bribes. Seeing that things were not going the way they wanted with regard to support from the chiefs, the fishers decided to take the matter further, and to request assistance from the Fisheries Department. Consequently, the Fisheries Department staff, the District Commissioner for the area, the chiefs and other leading fishers held several meetings in an attempt to find acceptable ways of evicting the seine netters, but with no success.

Then the same leading fisher who initiated the sensitisation meetings decided to go from beach to beach, encouraging the formation of fisher groups, who were asked to ensure that the seine netters did not use their nets in the lake. This move was supported by many villagers, and this approach eventually succeeded in getting rid of the seine netters. These beach fisher groups later established the first organised beach fisher group committees around the lake. These committees are representative bodies of one or more fishing villages which share a fishing beach. Their main objectives include: protecting and controlling the exploitation of the fish stocks; ensuring that only agreed and accepted fishing gear types operate on the lake; and settling disputes among the fishers. Membership to these committees was open to all fishers provided they were elected to office at a fishers meeting.

After the seine netters had departed, the Fisheries Department continued to work with the same beach fisher groups, which became even better organised and which were later known as Fish Stock Management Committees (FSMC). In total there are nine FSMCs around the lake, and each has fourteen members. The involvement of the Fisheries Department in the activities of the FSMCs brought in a several changes, some of which are desirable within the community and productive with regard to the sustainability of co-management, while others are considered to be counter-productive to co-management.

Among the desirable changes were the training sessions in group leadership and dynamics that the Fisheries Department provided to the FSMCs. The provision of this service instilled a feeling of trust between the fishing communities and the Fisheries Department. Developments which have had a negative impact include: the disintegration of group cohesion, because the Fisheries Department had to reorganise the FSMCs by conducting elections to replace or supplement the original members; the introduction of new ideologies which created a culture of over-dependency on government, which had made promises it could not fulfil, for example, it promised to secure loans which fishers could use to purchase new fishing gear. As a result of this promise, fishers were requested to make an initial contribution of MK 5.00 in order to become a member of the FSMC group, and an additional fee of MK 25.00 in order to be eligible for the loan. At the time of conducting this study, which was about six months after the promise had been made, and after the fishers had contributed their money, nothing further had been heard as to whether the Fisheries Department had secured the loans or not. The failure of the Department to give such feed-back to the fisher groups, and the lack of response to other problems presented to the Department, meant that the trust that had been instilled in them slowly ebbed away.

With guidance and support, the beach groups could have managed the scheme themselves, taking control of the money contributed by its members, and using it to serve as a source of small loans to members. Unfortunately, this opportunity was missed as in the meantime everyone was waiting for the Fisheries Department to come up with large sums of money for loans.

These FSMCs are now in the process of forming what is to be known as the Lake Chiuta Fishers Association (LCFA), which will comprise of one representative from each FSMC. This Association will function as the main body governing and coordinating all the FSMCs around the lake, and among other issues, will be responsible for settling conflicts and problems raised by the FSMCs. The next task will be to gain the formal recognition of the Association by the government and to attain legal empowerment to function as an Association.

2.4 The socio-economic characteristics of the Lake Chiuta fishing community

The community is a mixture of two main tribes, the Lomwe and the Yao. These two tribes have co-existed for quite some time. The main religious faith in the area is Islam with small patches of different Christian faiths.

The average household size is relatively high, about nine members per household, although it can range from two people to fifteen per household. The education level among the fishers is very low, but there is a positive trend of sending their children to school.

The dependence on the fishery is very high, as most fishers earn much of their cash income from fishing and related activities. Most fishers came from a fishing background. However, their sources of start-up capital to buy the fishing gear often come from the sale of farm products. The range of fishing gear they possess has been influenced either by their past experience of that gear in their parents' time or the gear's good reputation for efficiency.

No direct relations or ties were traced between the fishing community and the fish traders. The fishers are at liberty to sell their fish to any trader of their choice, a practice which ensures them a complete sale of their day's catch. If there are no fish traders around, or the catches were so good that all the fish caught could not be sold, the fishers process the fish by either sun-

drying or smoking them for sale either at the local markets or to traders who come from distant areas. It is because of their itinerant lifestyle that fish traders are not accorded a high social status by the fishing community.

Women's participation in fish processing and trading is relatively low, and is mainly dominated by women from other areas far inland. The reasons for the low participation of women in fish trading is more a question of morality than tradition. The people on the lake consider the women who participate in fish trading to have loose morals. They cited most of the women who come to buy fish as being either widows, divorcees or single mothers. There is no woman fisher operating on this lake.

A fisher who is also a gear owner has a special social status in the community as he is regarded as an employer as well as the provider of daily fish rations to those who do not possess fishing gear and to other members of the local community. These fish rations, which are payments in kind to those who assist the gear owner to unload fish out of the boats and to extract fish from out of the nets, represent a significant benefit to the lives of those who live along the beaches. These fishers' helpers may go home with 1-3 kg of fish at no monetary cost if they assist several gear owners.

According to the traditional customs of this society and because the society is matrilineal, one can only inherit property which belonged to an uncle, or the uncle can only inherit property which belonged to a nephew, should he die first.

The nature and scale of the fishery on Lake Chiuta, which is dominated by the setting of gillnets and fish traps operated from dugout canoes, does not necessitate the employment of assistant fishers. Most fishers operate alone. Hence the banning of the use of seine nets in the lake resulted in a fall in numbers of assistant fishers. Following the general principle that fishers would like to maximise their earnings from fishing, most of the fishers interviewed expressed the desire to work individually, as opposed to working in a team. One of the prime reasons given was that, although teamwork was good, in the sense that people assist each other when the need arises, and share ideas, the problem was that no one can trust a colleague where money is involved. They reiterated that they would only work as a team when the benefits were expected to be higher than what they would make by working alone.

Among the existing community groups in Chiuta area are the Parent and Teacher Associations at each primary school, their main objectives being school development-oriented; Church organisations, which look after the affairs of different Church groups; and Primary Health Care groups, which function mainly for the public health of the community.

2.5 Bio-physical and technical attributes of the fishery

The Chiuta fishery is a multi-species fishery which has physical boundaries determined by the position of the lake. The resources are mainly sedentary although there is evidence of migrations (see note at the end of table 1). The technology for exploiting the resources is still traditional with the use of gillnets and fish traps in dug out canoes. The lake habitat is relatively speaking less degraded than most, with muddy bottom and submerged vegetation.

Table 1: Summary of bio-physical and technical attributes of the Lake Chiuta fishery

| Attributes | Indicators and explanations |
|------------------------|---|
| Resource boundaries | Physical |
| Type of fishery | Multi-species |
| Migratory or Sedentary | Sedentary, see note* |
| Species harvested | 4 major species: <i>Oreochromis shiranus</i> (Makumba); <i>Tilapia rendalli</i> (Chilunguni); <i>Burbus paludinosus</i> (Matemba); and <i>Clarias gariepinus</i> (Mlamba) |
| Fishing technology | Artisanal for both subsistence and commercial fishing. Mainly use dugout canoes and a few planked boats |
| Fishing Gear | Many types of gear; mainly gillnets, longlines and fish traps |
| Condition of Habitat | The lake has a muddy bottom with much submerged vegetation |

* Although there is a general belief that during the months of June to September, some species are less common in the northern part of the lake and quite abundant in the southern end of the lake (Nafisi), where there is much submerged vegetation. However some fishers believe these species migrate south during winter and come back when the waters are warm again. Others believe the differences in the catches are simply God's will.

Table 2: Market attributes

| Attributes | Indicators and explanations |
|-----------------------------------|---|
| Subsistence or commercial fishing | Mainly commercial. More than 90% of the catch is sold |
| Market structure | Many fish buyers who buy at wholesale prices and may sell the fish either wholesale or retail at their destination markets Fish trading dominated by men |
| Market orientation | Local and inland markets. Market network includes: Blantyre, Zomba, Thyolo, Balaka, Liwonde, Mulanje, Chiladzulu and Ntcheu |
| Market chain | Fisher, one to three middlemen before reaching consumer |
| Product value | Average to high. Product value depends on supply and demand |

Table 3: Socio-economic characteristics

| Attributes | Indicators and explanations |
|--|---|
| User homogeneity/heterogeneity | Mixed population of Lomwe and Yao tribes |
| Religion | Mainly Islam |
| Dependence on fishing for subsistence | Very high. Most cash income derives from fishing activities |
| Household size | Relatively high. Average of nine members per household |
| User motivation | Commercial fisheries |
| Attitudes towards: risk, innovation, collective action | Strong |
| Level of information and knowledge of the fishery and its management | Local indigenous technical knowledge available |

2.6 Power structure and decision-making arrangements

Each village has a village head whose main duties are to make sure that his subjects live together in harmony. Several villages grouped together are looked after by what is known as a group village head, and these in turn are under the control of one head who is called a Traditional Authority. The village head, or the group village head or the Traditional Authority can be either a man or a woman. Figure 3 illustrates these relationships.

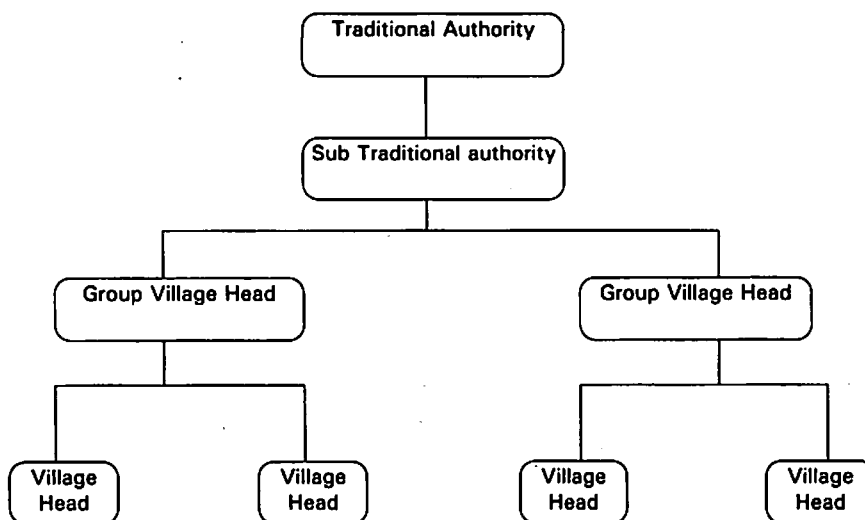


Figure 3: Relationships within and composition of a traditional authority structure

2.7 How one becomes a Chief

There are three alternatives:

- The first and most common is the one gained through maternal inheritance of the throne. The new chief is elected from the deceased chief's sister's children. However, first priority is given to the male children, but if none of the male children qualifies to become the new chief, depending to their record of behaviour, or if there is no male child available, then a female child is appointed to the throne.
- The second is when none of the deceased chief's sisters have any children in which case members of the chief's clan come together and elect a new chief.
- The extreme case is when no one suitable can be identified from the clan in which case a suitable and respected individual from the village is elected to the throne.

The chief's councillors are nominated by the chief himself, they are usually relatives or acquaintances. The power hierarchy in the community is structured as follows:

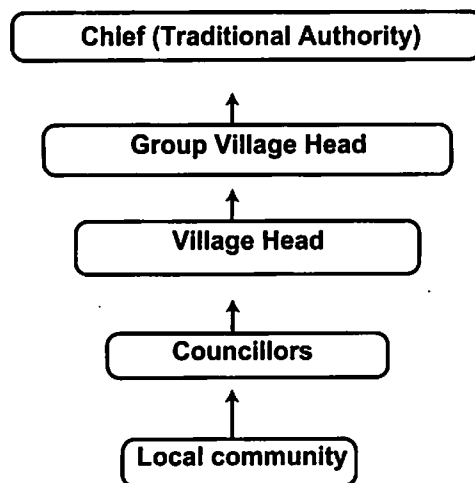


Figure 4: Hierarchical (power) structure within the Lake Chiuta community

In most cases, the councillors initiate actions after being approached by fellow members of the village. The councillors then advise the village heads who may either take a decision if the issue at hand is a minor one, or may take the matter to the Group Village Head. The Group Village Head may in turn either take a decision or refer the matter to the Chief who approves the proposal or makes the final decision. In cases where the Village Head or the Group Village Head has made the decisions on behalf of the Chief, they then notify their superiors of the decisions made on their behalf.

Village or community development decisions are taken during communal meetings which are called either by the Village Head or the Group Village Head. The process involved is democratic, the Head introduces the subject, the people discuss it and a decision is reached by consensus. This process gives a fair and even representation of all individuals in the community.

2.8 Attitude of community towards co-management

An analysis of individual fishers' comments revealed that the idea of co-management is welcomed by most fishers because of the objectives of the programme, which they feel will help stocks to recover. The groups of people to be involved in the co-management arrangements, who should be elected as FSMC members include both men and women who are non-fishers, provided they are interested in fishery activities, gear owners and crew members. The non-fishers are permitted to become active members of FSMCs as some have children who are fishers, and those some are influential, and can therefore effectively contribute towards the running of co-management arrangements. There was a mixed feeling as to whether representatives of political parties and local party leaders should be involved, as it was felt they may be biased towards serving their own party's interests or the interests of the party in power.

It was decided that fish traders were one group who should not hold any offices in co-management arrangements as the local community regard them as an itinerant group, and therefore, as their livelihood is not dependent on one area, they are unable to constructively contribute towards fisheries management in that area. This attitude towards fish traders contributes to their being accorded a low social status among the fishing community in the Lake Chiuta area.

However, a few fishers were in favour of including all interested parties; chiefs, business people in the community as well as political party leaders, as this would help in the sharing and development of ideas.

Fishers' reactions towards the current FSMC members were negative, as the FSMC members treat fishers harshly, and do not warn or advise fishers in advance if they do something against the regulations laid down by FSMC members. Instead the FSMCs are felt to be more like policemen, working against the fishers' interests, as enforcers rather than advisers. Fishers have therefore called for the need to improve the flow of information between the fishers and the FSMC members. The fishers expect the FSMC members to protect fishers' interests, treat them fairly and encourage transparency in the undertaking of their activities. In terms of enforcing fishing regulations formulated by the FSMCs, fishers prefer carrying out this activity hand in hand with the government.

Focused discussion groups, when consulted about which groups of people should be involved in co-management arrangements, provoked two lines of thought. One group, mainly composed of FSMC members who were non-fishers, held different views from others as to who should be involved in co-management arrangements at the FSMC level. The group strongly endorsed the opinion that the composition of the FSMC should not include the fishers themselves, as when formulating resource management regulations, as they were thought unable to accept the passing of resolutions which might be seen as acting against their interests. If they are included as part of an FSMC team, what generally happens is that they may say 'yes' to some resolutions because others are saying so, but when it comes to implementing them, they are among the first to violate the regulations. It was eventually recommended that the fishers

should form a separate fishers' group which should not be entrusted with full management powers, and that they should hold regular meetings with the FSMCs to exchange information and resolve any problems that may have arisen. This group also recommended that FSMC members and others be given loans to undertake other income generating activities to help with their day-to-day subsistence.

With regard to the sharing of co-management responsibilities, the group suggested that enforcement of fishing regulations should be the sole responsibility of the FSMC members and that the government should only provide, when necessary, back-up services and equipment to enable the FSMCs to carry out their duties. Shared responsibilities between the FSMCs and the government include the joint identification of funds for loans to fishers and non-fishers, to enable people to partake in other income generating activities, thereby easing the pressure on fishery resources.

The views expressed by this non-fisher FSMC revealed one important behavioural pattern by fishers in this community, that while the fishers may participate in the laying down of rules and regulations, they cannot be fully entrusted with the responsibility of abiding by or enforcing them. However, for maximum rule legitimacy, it is important that all fishers should participate in rule formulation as they will be the ones expected to observe them, and therefore they should not be excluded from the process.

The formation of non-fisher groups could be taken advantage of, by turning them into community fisheries enforcement teams, as long as they are given official recognition by both the community and the government.

Other opinions expressed by the discussion groups were relatively marginal, and more in line with individual fishers' comments, although there was evidence of bias towards the messages they had been receiving from fisheries extension staff in the area.

In summary, the strongest incentives for the fisher communities to co-operate were the fear of having their fish stocks over-exploited and of being deprived of good quality water for domestic use. Coupled with this, were the expectations of being assured a continued income and fish supply if the resources were sustainably managed. In addition, many fishers indicated that they had decided to participate in co-management because they had heard that the Fisheries Department was to dispense loans to fishers.

2.9 The role of Village Heads and Traditional Authorities

The general view of the role of the Village Heads and Traditional Authorities that emerged from the group discussions was that based on the traditional power hierarchy, these Heads should only play an advisory role in the co-management arrangements. The groups felt strongly that the Heads should not actively or fully participate in the village fisher level group discussions as they inhibit the degree of participation by the fishers. In addition, the groups agreed that the Village Heads should not be active members of the FSMCs. The reason given for their exclusion is that their presence during the discussions do not allow the active and full participation of fisher groups, as fishers feel they cannot openly oppose their local leaders in public, should the leaders express something that does not make sense. As a result, this would discourage the full representation of fishers' views. Therefore, it was suggested that fisher level discussions should be held in the absence of the Village Heads. They should also only become involved should disputes arise among the fishers and this would only be possible if the Heads are kept abreast of

what was happening in their areas. It was therefore opined that the Village Heads and the traditional chiefs, through the hierarchical structure, should only be informed as to what the fishers have agreed upon, and consulted to approve the fishers' decisions. The fishers further argued that the involvement of Traditional Authorities and other Village Heads at the fishers' discussions, only reduces the status and importance of these Heads within the fishing communities.

2.10 Participation of women in co-management arrangements

Women have a large degree of family responsibility in both the Malawi and African context. According to tradition, women are permitted to take part in almost all village meetings, with a few exceptions which are for men only. Fishery activities, which are part of community development activities, are open to all community members. Fishers feel that women should be encouraged to join the FSMCs and to actively participate in co-management because whatever affects the fishery has a direct bearing on the living standards of the household, of which women are at the centre. In this community, women are even allowed to make comments and suggestions during the village meetings. Although this was what emerged from the group discussions, it is still to be determined whether the suggestions and comments made by women are taken seriously and considered when the final decisions are being made.

Observations indicate that there was a low attendance rate for women at most discussion sessions. A simple explanation for this is that women have many household responsibilities which allows them very little time to participate in other village activities, especially if they are married. This also explains why in most FSMCs there were few or no women members, although some fishers said that because of the nature of work involved, they felt it was better suited to men and hence only a few or no women were elected to become FSMC members.

2.11 Institutional mapping

The institutional map (figure 5) was plotted based on the available information. As can be seen, the government side is more complete and established, whereas the user community side is incomplete. This poses a big problem as an ideal co-management arrangement is supposed to display equal bargaining powers at all levels.

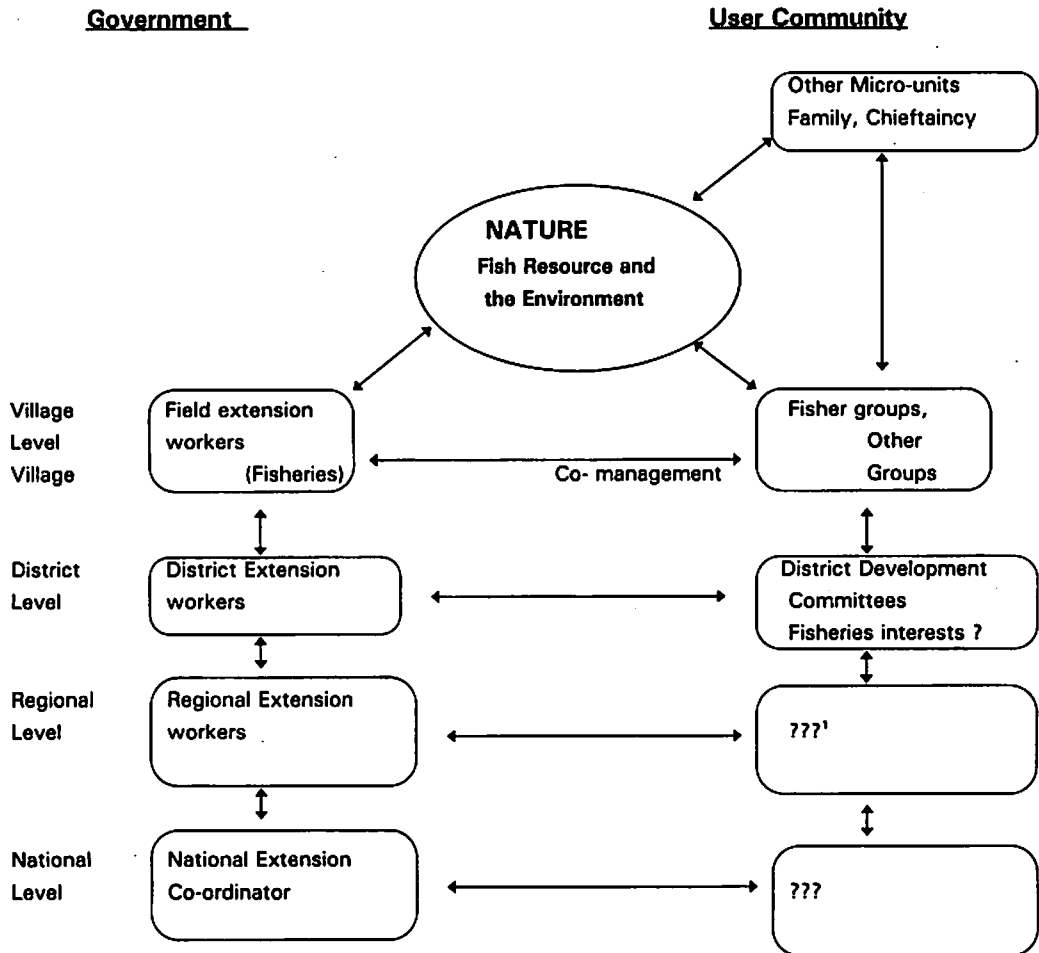


Figure 5: Co-management institutional map of Lake Chiuta

3. Discussions

3.1 Institutional analysis

There are several institutions that exist within the Lake Chiuta fishing communities. Almost all institutions identified in the area may be classified as social institutions. These can be categorised by ethnic group, religious faith, political affiliation and by occupation, such as gear owners, crew members, fish traders and farmers.

¹ The question marks indicate that there are no corresponding bodies among the user communities which represent fishers' interests.

Membership to some of these institutions is ascribed, for example, in accordance with an ethnic group or religious faith, whereby individuals derive their ethnic status or religious faith from the family into which they are born and acquire its cultural attributes as they grow up. An exception to this 'life-long membership' could be religious faith, as one may change religion later in life. Therefore, members of an ethnic group are more likely to associate among themselves long-term than with outsiders.

Membership affiliation to these institutions has an influence on one's behaviour as was observed among members of the Yao tribe and of the Islamic faith in the area. In some cases this also has an influence on one's decision making. One notable behaviour pattern was that the younger or junior members of the community were more loyal to and accorded a great respect to their elders and those with a higher social status. This results in a stronger social group cohesion. It can therefore be concluded that in this community, apart from an individual making his rational choice based decision, his institutional affiliation will undoubtedly exert an influence when he makes important decisions which may affect his interests and livelihood.

With all these different institutions present among the communities, why then did the fishers decide to create new ones, the Fish Stock Management Committees, instead of simply taking advantage of the existing ones? Basically, institutions and organisations are established to achieve certain objectives, but as there were no existing institutions responsible for the management of the fishery, the FSMCs were needed as an essential element of a successful co-management arrangement. Compared with the other institutions in the community, these FSMCs tend to be weaker, for the simple reason that in some of the beach villages, the people do not have the capacity to perform the duties required by these institutions. However, with reference to figure 5, these other institutions may be classified as micro-units, and hence the need for macro units such as the FSMCs.

3.2 Formation of the Lake Chiuta Fishers' Association (LCFA)

Associations are a unique type of social structure, and they are often characterised by a formal or bureaucratic organisation. These groups are established for the pursuit of specific interests, and members come together in limited contexts and for limited purposes (Chinoy, 1967). Associations are also formed to represent group efforts and to advance their common interests. This was the basis for the formation of the Lake Chiuta Fishers' Association, i.e. to represent the interests of fishers operating around the lake.

Associations are supposed to have clearly formulated rules governing the practices and responsibilities of members with regard to their field of activity. An assessment of the LCFA revealed that although it is called an association, it does not yet have these rules in place. Therefore, as a first step it is suggested that, as the FSMCs have, guiding principles and a constitution be developed.

Although the idea of having an association may be considered beneficial, this structure has its own attendant problems. Looking at the institutional mapping for the Lake Chiuta area (figure 5), where does this institution fit in? At what level in the government system does it correspond? Certainly it is not at village level, because the FSMCs operate at this level, so it may perhaps correspond with authority held at district or regional level. There is another problem: Does this association have any legal mandate to hold fisheries management discussions with the government at a level higher than village level? Whatever the level of

representation, there will be a need to develop the capacity of the LCFA in order for it to perform its functions properly. However, caution needs to be exercised in the performance of its duties, so that the hierarchical bureaucracy manifest in the government system does not spread, as it simply tends to slow down progress.

4. Recommendations of this study

For the successful implementation of and improvements in the current status of fisheries co-management in the area, the following issues need to be addressed by both government and the user communities:

- FSMC members should be encouraged to make membership to the committee open to every member in the community.
- FSMC members should encourage all fishers to participate in co-management activities.
- The government should be responsible for gear licensing.
- Limiting access to the fishery should be enforced by the FSMC, but the government should assist in putting in place the mechanisms for limiting entry.
- FSMC members should be elected by people in an open forum and not in secret.
- The improvement of management regulations to ensure that the stocks are not over-exploited.
- Fishery regulations should be formulated between the fishers, FSMCs and the government with the full participation of all community members who have an interest in fishery activities.
- The FSMCs and the government should cease making promises to fishers which they cannot fulfil, for example promising loans to fishers.
- The provision of incentives to fishers, for example by initiating development activities in the community which are geared towards assisting fishers and fish traders, such as the processing and transportation of their fish products so that they reach inland markets in good condition.
- Both government and the community should be responsible for drawing up plans for beach community development.
- The FSMCs should be responsible for clearing beaches and ensuring that cleanliness is maintained to prevent health hazards.
- For the survival and uniformity of activities carried out by FSMCs, there is need for the development of guiding principles, which could loosely be termed 'FSMC constitutions'.
- In line with the above, there is need to develop the capacity of these FSMCs to effectively undertake their responsibilities.

It should be noted, however, that a fisheries management system has several functions and not all can be delegated to fisher organisations (Nielsen et. al. 1995). Jentoft (1989) also wrote

that there are limitations as to what functions can or should be transferred to fisher organisations. For example, the following tasks; (i) formulation of fisheries policy objectives; (ii) resource estimation; (iii) formulation of regulations, and (iv) monitoring, control and enforcement; all of which cover the main aspects of fisheries management, cannot be fully delegated to user groups. Nevertheless, user group involvement must take place at all levels where management decisions are made.

5. Conclusion

From the information available to date, the formation of FSMCs and the responsive action of fishers in the Lake Chiuta fishery was the beginning of a community-based approach to the management of the fishery. However, the direct involvement of the Fisheries Department in settling any disputes that arose between the two parties and the laying down of fisheries regulations, turned the whole approach into one of co-management. Although in this instance the whole idea of community involvement in fisheries management emanated from the fisher communities themselves, there is still too high a degree dependency by the FSMCs on government for support and guidance.

As indicated earlier, by the time this study was being conducted this tendency to lean on government was becoming apparent. This represented a reversal of a 'bottom-up' approach to problem solving, to a more 'top-down' approach. This is precisely the situation to be avoided in any co-management arrangement, as the ideal co-management position should be centred around the user community.

What is evident in this case study is that the government has assumed too much power and responsibility over the fisher groups. This is clearly visible from the institutional map presented in figure 5, which shows a heavily structured bureaucratic system at all levels on the part of the government, and a less structured system on the user community side. Based on this, the government is advised to start taking corrective measures, so that the balance of power in the co-management arrangement is re-established and starts to move towards the right hand side of the diagram presented in figure 5.

This can only be achieved if the government delegates most of its responsibilities to the fisher groups, for example the fisher groups should be in a position to come up with meeting agendas and call for joint meetings between themselves and the Fisheries Department, actions which are currently the responsibility of government. The government, through amendments to the laws of Malawi, should legally empower the fisher groups to participate in the management of the fish resources. Finally, for all this to work effectively, there is a need for government to improve the institutional capacity of the user communities involved in fish resource management.

User communities' institutional capacity-building could be achieved through a series of training sessions in various fields, which could be identified through a process of conducting training needs assessments.

However, if the user community side (see figure 5) cannot be developed effectively, then possibly the next alternative to this kind of arrangement could be the decentralisation of fisheries management. This would mean that more powers are given to the regional and district government offices to hold discussions and make decisions in consultation with user community groups.

Participation analysis of the Lake Chiuta community in fisheries co-management, revealed that on the user side, the following groups of people are expected by the majority to become members of the FSMCs: Village or Group Village Heads and Traditional Authorities, because of their status and position in the community; Fishers, both gear owners and non-gear owners (crew members), because these are the people who are directly involved in fishing; businessmen and -women and any influential individuals who are resident in the community.

The following groups of people had very little support and in some cases none at all: Political party leaders, people did not wish them to participate in co-management as they are believed to be biased towards their own party interests or towards the party in power at any particular time; fish traders, people were not in favour of their participation because they were considered itinerants, with the exception of those that were resident in the community. This observation is in accord with what Halldórsson (1996: p.32) found at Lake Malombe.

An early assessment of the conditions at Lake Chiuta indicates that there is potential for successful co-management. The majority of the fishers and non-fishers appear to be willing to participate and are looking forward to working hand-in-hand with the Fisheries Department. However, there is still more work to be done with regard to the division of responsibilities between the Fisheries Department and the fisher communities. These include the commissioning of a further study to further an understanding of the functioning of local institutions within the communities; what factors influence decision-making by fishers and their community groups; and the joint setting of the rules and regulations which should govern and guide the management arrangement.

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Problems of introducing community participation in fisheries management:

Lessons from the Lake Malombe and Upper Shire River (Malawi) participatory fisheries management programme

Mafaniso Hara

*Centre for South African Studies, School of Government
University of the Western Cape, South Africa*

Abstract

In the last decade, the inadequacies of fisheries management strategies based on control and regulation by the state have highlighted the need to search for alternative strategies. Co-management is being seen as offering one alternative. However, the introduction of the co-management approach can be fraught with problems. More so if this involves the creation of new fishermen's organisations in communities with no recent history of self-regulation, in an area which has a narrow economic base with fishing as the main socio-economic activity, and the use of multi-sectoral programmes for delivery of some of the programme components.

In this article, I consider some of the problems being encountered in the introduction of co-management in the fisheries of Lake Malombe and the Upper Shire River in Malawi. The problems have been in the areas of institutional design and arrangements, delivery and timing of programme components being implemented by other organisations, division of responsibilities, sustainability issues and financial commitment by the government and communities to the programme. I discuss possible reasons behind these problems and how they are affecting or might affect the successful introduction of the new programme. Finally, I make recommendations for improving the weak areas of the programme.

1. Introduction

Over the last fifteen years the *Oreochromis spp* (locally known as Chambo) fisheries of Lake Malombe and the Upper Shire River have collapsed. The other fisheries are also in decline. The main cause for this decline is thought to be the widespread use of illegal small mesh size nets which capture immature fish and which destroy nesting and feeding habitats because of the way they are operated (Hara and Banda 1994). The recent history of the fishery typifies an open access fishery; by the early 1980s the highly profitable Chambo fishery was attracting great numbers of fishermen; as the catch rates started to decline, fishermen started reducing the mesh sizes of their nets and in general, the use of illegal nets increased. Within ten years, 1982 to 1992, the catch of Chambo had declined from an estimated height of 8,484 tons to

around 545 tons. The fishermen are now targeting the less valuable line, the *lethrinops* group of species, which are also in decline because of increasing use of fine mesh nets. The collapse of the more valuable Chambo fishery has resulted in greatly reduced incomes for fishermen and a decrease in the supply of the popular Chambo for consumers. The decline of the fishery has enormous implications for both consumers and those dependent on the fishery for their main source of income.

Up until the launch of the co-management programme, government had been the sole body responsible for management of the fishery. In its quest to manage the fishery, government has been using what Jentoft (1989) terms *indirect regulations*. These aim at controlling the fish population so as to make sure that the composition and size of the biomass is maintained at levels that would ensure biological viability at maximum sustainable levels. Thus the regulations had to be biologically justified. For Lake Malombe and Upper Shire River the regulations have included closed seasons (to allow fish to breed and spawn freely), mesh size and minimum fish size restrictions (to protect juveniles).

But increasingly, attempts to enforce the regulations have been largely unsuccessful for a variety of reasons, budgetary constraints being one of the most important of these. Malawi has just embarked on a Structural Adjustment Programme, and there is little hope that the budgetary situation will improve in the foreseeable future. In fact, the provision on the recurrent budget for Mangochi fisheries station has, since 1993, been further reduced in real terms by more than half. Thus there is little point in the Fisheries Department continuing with a strategy which it cannot afford financially and which, in any case, has so far proved ineffective.

An alternative approach could have been to give absolute control to the communities. Although this would have offered the greatest financial savings to the government, it was seen as unfeasible in the immediate future as communities were not yet ready to assume total responsibility for the management of fisheries in their areas (Fisheries Department, 1993).

Between these two opposing approaches, management by central government and community self-management, lies an approach which could make use of traditional leaders, local communities, resource users on the one hand, and government on the other, all working together (Fisheries Department, 1993). This is what is termed *co-management*. The co-management approach proposes a dynamic relationship and the sharing of authority and responsibilities between national government and the local communities in the management of fisheries resources. In theory this means that government has to be willing to relinquish some of its powers under the former arrangement, while local communities must be willing and capable of assuming new responsibilities.

2. Theoretical issues on co-management, community-based fisheries management and international experiences

2.1 Co-management

2.1.1 The argument for co-management

Fisheries management has been influenced by the western concept of the need for a centralised administrative authority. The argument for a centralised administration is based on

two assumptions. The first is that the seas are open thus access to them and the resources therein ought to be open and free to all. The other is based on Hardin's (1968) so called *tragedy of the commons* which argues that any common pool resource will be characterised by intense competition which will inevitably lead to over-exploitation and the eventual dissipation of profits. Thus it is argued that management authority for such resources must reside with government because it is the only institution which can ensure economic efficiency, equity and effective administration. In the past colonialism, and more recently the influence of western concepts tied to development aid, led to the wholesale transfer of these concepts to developing countries.

But the practice of management by central government as a routine policy mechanism has not resolved the problem of degradation and over-exploitation of fisheries. In practice access to fisheries under state management has been left unregulated and *de facto* the resource is held in open access (Feeny 1994). The result in most such cases has been the *tragedy of the commons* phenomenon that the state had in the first instance set out to avert. There is increasing evidence that this approach is often not suited to developing countries with limited financial means and expertise to manage fisheries resources in widely dispersed fishing grounds (Pomeroy 1994). Pomeroy further argues that in this light, devolution to the local level of major resource management and allocation decisions may be more effective than the efforts of distant, understaffed and under-funded government agencies.

2.1.2 What is co-management?

By definition, co-management means that government agencies and fishermen, through their co-operatives or fishermen's organisations share responsibility for management functions (Jentoft, 1989). The concept is premised on the fact that fisher-communities cannot successfully carry out all the management functions on their own. It proposes use of the capacities and consideration of the interests of the fisher-communities, and complementing these with the government agency's efforts. The latter should also provide enabling legislation and other assistance. Hersoug and Rånes (forthcoming) argue that the concept of co-management as described in most literature (on co-management) is paradoxically both too widely and too narrowly defined; too widely to be analytically meaningful because it usually includes all types of management in which central government has some form of interaction with user groups. Co-management, they argue, must imply that the user groups have some definite influence on the decisions made. The concept is too narrow in terms of its concentration on resource management only; co-management should deal with other basic issues concerning fisheries management including sales regulations, subsidies, credit and the development of infrastructure, issues which in the end have far-reaching consequences for the structure of the fishing industry, the pressure exerted on fishing resources and not least, on the distribution of catches and income.

2.2 Lessons learnt from international experiences

In the last decade anthropologists have documented the existence of functional, informal, locally organised management systems. Evidence has also been shown of those which used to

exist in North America, Europe, South East Asia and Africa. Ruddle (1994) and Jentoft (1989) stipulate that these were usually based on protection of local use rights.

2.2.1 Attributes of robust resource management institutions

Based on several studies of community-based systems that have been sustainable over very long periods, Ostrom (1994) compiled a list of what she terms "design principles" that characterise most of these robust Common Property Resource regimes. These are:

- *Clearly defined boundaries:* Individuals or households with rights to withdraw resource units from the Common Property Resource and where the boundaries of the Common Property Resource itself are clearly defined.
- *Congruence between appropriation and provision rules and local conditions:* Appropriation rules restricting time, place, technology, and/or quantity of resource units are related to local conditions and provision rules requiring labour, materials and/or money.
- *Collective choice arrangements:* Most individuals affected by operational rules can participate in modifying them.
- *Monitoring:* Monitors who can actively audit Common Property Resource conditions and appropriator behaviour are accountable to the appropriators themselves.
- *Graduated sanctions:* Appropriators who violate operational rules are likely to receive graduated sanctions (depending on the seriousness and context of the offence) from other appropriators, from officials accountable to the appropriators, or from both.
- *Conflict resolution mechanisms:* Appropriators and their officials have rapid access to low-cost, local arenas to resolve conflicts among appropriators or between appropriators and officials.
- *Minimal recognition of rights to organise:* The rights of appropriators to devise their own institutions are not challenged by external governmental authorities.
- *Nested enterprises:* Appropriation, provision, monitoring, enforcement, conflict resolution and governance activities are organised in multiple layers of nested enterprises.

2.2.2 Threats to community-governed commons

Ostrom (1994) states that it is important to recognise that not all community-governed Common Property Resources cope effectively with the array of problems they face over time. Some efforts at self-governance fail before resource users even become organised, others break down within a few years while still others survive for long periods of time but are destroyed as a result of a variety of conditions. One source of failure, she notes, is institutions that are not characterised by many of the attributes listed above. She lists eight threats to

sustainable community governance of small-scale Common Property Resources which she had come across in different contexts;

- *Blue printing*: This occurs whenever policy-makers, donors, citizens or scholars propose uniform solutions to a wide variety of problems that are clustered under a single name based on one or more successful exemplars.
- *Over-reliance on simple voting rules as the primary decision mechanism for making collective choices*: The presumption that certain voting rules, either simple majority or unanimity, are the only rules for making collective decisions. As soon as rules are seen as being imposed by a majority vote rather than generally agreed upon, the costs of monitoring and enforcement increase.
- *Rapid exogenous changes*: All rapid changes in technology, human populations; factor availability; substitution of relative importance of monetary transactions; or the heterogeneity of participants are a threat to the continuance of any self-organised system.
- *Transmission failures from one generation to the next of the operational principles on which community governance is based*: Rapid changes in population or culture may lead to a circumstance in which the general design principles of effective community-governed institutions are not transmitted from one generation to the next.
- *Turning to external sources of help too frequently*: A threat to long-term sustainability can be availability of funds from external authorities or donors. Furthermore, the design of projects is oriented more towards gaining the approval of those who release the money than providing systems that solve the problems facing current and future users.
- *International aid that does not take account of indigenous knowledge and institutions*: To obtain funds from external funding agencies the evaluative selection criteria by these agencies have to play a prominent role in project design. A central part of the message asking for external funds is that what has been accomplished locally has failed and massive external technical knowledge and funds are needed to achieve development.
- *Corruption and other forms of opportunistic behaviour*: Corruption is a form of opportunism that can destroy the ethos and trust within the community.
- *Lack of large-scale supportive institutions*: The absence of supportive large-scale institutional arrangements may be just as much a threat to long-term sustenance as the presence of pre-emptive large-scale government agencies. Support is essential in the areas of obtaining reliable information about the effects of different uses of resource systems, resource conditions and low-cost fair methods of conflict resolution.

2.2.3 Community-based management systems in fisheries

Pomeroy (1994) points out that, despite much activity in other areas of natural resource management, efforts in establishing or reviving community-based management systems in fisheries are still at a developmental stage. He argues that this is due in part to the complexity

of coastal and marine resource systems, the social and cultural structuring of fishing communities and the independent nature of fishers.

Notwithstanding its advantages, Pomeroy (1994) warns that Community-based resource management is not a panacea for all fisheries management problems. It may not be suitable for every fishing community. Many communities may not be willing to or capable of taking on the responsibility of community-based fisheries management.

3. The Lake Malombe and Upper Shire River Participatory Fisheries Management Programme (PFMP)

3.1 The importance of Lake Malombe and Upper Shire River fisheries

The traditional fisheries of Lake Malombe and the Upper Shire are important components of Malawi's national fishery. At their peak in 1988 they produced 15,535 tonnes of fish, approximately 19.7% of Malawi's total production. In 1988, approximately 2,500 fishermen were employed, seven per cent of the country's total with an estimated higher number indirectly employed. But since then, the most valuable fishery, the Chambo fishery, has collapsed and catches of other fish species are also in decline.

3.2 The Participatory Fisheries Management Programme (PFMP)

The Lake Malombe and Upper Shire River Participatory Fisheries Management Programme (PFMP) is a pilot programme for co-management of fisheries resources in Malawi. It was launched towards the end of 1993. The Programme groups all actions and activities that aim to redress the collapse of the Chambo and the continuing decline of the fishery as a whole in Lake Malombe and the Upper Shire River.

3.3 Components of the Programme

When the programme was drawn up, the following components were specified. These were: (a) policy and legislation, (b) research, monitoring and formulation of extension messages, (c) community participation, (d) public relations and extension, (e) licensing, (f) payment of compensation to fishermen to change to legal fishing gear and promotion of alternative and supplementary income generating activities and (g) law enforcement (Fisheries Department, 1993).

This article considers some of the problems and issues that have been encountered in five of the components mentioned above, namely a, c, e, f, and g. The article also discusses other aspects not falling under any of the components such as sustainability issues, self-help spirit and ownership of the programme.

4. Problems encountered in implementation to date

4.1 Institutional arrangements for community participation: Conflict between the BVCs (Beach Village Committees) and traditional leaders

One of the crucial aspects of the Participatory Fisheries Management Programme was the establishment of community level institutions to provide for two-way channels of communication between the fishing communities and the Fisheries Department. Apart from being channels of communication, it was hoped that through such institutions the communities could progressively assume greater responsibility for management of the fishery. Establishment of such institutions would also form a basis for granting special rights to the communities so as to turn the fishery into a communal access fishery as opposed to an open access fishery as it is now.

BVCs are elected community level institutions created for the functions mentioned above. They are mainly composed of fishermen although effort was made to include other interest groups like traders/processors and women. Local chiefs and village headmen are *ex-officio* members of the committees in their areas of jurisdiction. An umbrella organisation for all the committees, the Lake Malombe/Upper Shire River Fishermen's Association, was proposed. The existing Mangochi District Fisheries Office forms the government side of this co-management arrangement.

The problem encountered so far has been an underlying tension between some committees and traditional leaders (chiefs and village headmen) of their areas. The problem usually concerns the question of superiority over one another and whether one is subject to the authority of the other. Are the committees under the stewardship of the traditional leader of the area? Are they independent of the traditional leaders even though he or she is an *ex-officio* member of the committee? The case of Chief Kadewere and the Committee for his area typifies this conflict or misunderstanding. In May 1995, Chief Kadewere disbanded the committee of his area because it was allegedly a weak committee and elected another one in its place. In a similar case Village Headman Ukalanga tried to disband the committee for his area because it sanctioned him for allegedly giving permission to some fishermen to go fishing during the closed season of 1995. Only the intervention of the Fisheries Department through the area's Traditional Authority stopped him from doing so. In the case of Chief Kadewere there was no similar intervention on the part of the Department or the area's Traditional Authority because in the Department's view the Chief was in the right. In another area, Chizumbi, the BVC of the area is evidently weak but the community in question appears to see an advantage in retaining the committee because they can ignore its role and powers and so can continue to contravene regulations by which the rest of the Malombe community try to abide. The village headman of the area declares that he does not have the power to alter this state of affairs.

4.2 Acceptability of the BVCs and past political history

Another prevailing issue has been the acceptability by some fishermen of the BVCs and their role. Some BVCs like that at Chapola routinely express the complaint that fishermen do not obey their directives. It could be that the committees and their role are not seen as

representing the aspirations of some fishermen, although the majority of the fishing community appreciate and accept the essence of the programme. The effects of Malawi's past political history could also have a bearing on the way the committees and authority in general are viewed by some fishermen. Before democratic elections in 1994, Malawi had experienced thirty years of a harsh dictatorship. Under this former regime the local party operatives, the Malawi Congress Party (MCP) Youth League and the institutions they belonged to in the MCP's area and branch committees, wielded enormous dictatorial powers in almost all spheres of peoples lives. Government departments routinely used these structures to implement or enforce their unpopular policies or regulations.

4.3 Homogeneity and the influence of the money economy

The area covered by the programme contains approximately 450 fishermen who employ about 3,000 assistants to fish for them. These are spread around the lake and river with a total coastline of over 70 kilometres. Although the communities of the area are largely Moslem and speak the same language (Yao), pointing to cultural homogeneity, the economy of the area is closely linked to that of the nearby Mangochi township which acts as their main commercial centre, and also to the urban areas of Zomba and Blantyre which act as the main destination for the fish caught from the area. The minds of the people in this area are not closed to the influence of the money economy of these commercial centres. In fact a majority of the people do not grow their own food; they have to buy food and therefore need a source of income to survive.

4.4 External funding for the Programme: dependency and sustainability issues

Funding for the main aspects of the programme - fixed assets, operations, training and research - is derived from donors, namely Germany Technical Foundation (GTZ), United Nations Development Programme (UNDP), World Bank (WB) and the Overseas Development Administration (ODA) projects. In their current phases, these projects have a maximum lifespan of three years. Although government was supposed to contribute funds for everyday operations it has not been able to do so because of the financial problems experienced due to the suspension of foreign aid in 1992, aimed at forcing the democratisation process, and the start of the implementation of the Structural Adjustment Programme (SAP) soon thereafter. Malawi government's contribution so far has been in the form of salaries for staff working on the programme.

It is very likely that the programme will still need sizeable financial support for consolidation for a number of years after the projects phase out. Unless government and communities can work out means of funding the programme from their own resources, they will have to solicit funds from donors again and again.

4.5 Multi-sectorality of the Programme

Two components crucial to the success of the programme have been beyond the Fisheries Department's sphere of influence because other organisations have jurisdiction over their implementation. These are the passing of the revised *Fisheries Act* and the development of secondary small scale industries. The timing of delivery of the activities within these components has affected the overall performance of the programme.

4.5.1 Revision of the Fisheries Act

In order to legalise the role and functions of the new individuals and institutions created for user participation, the Fisheries Act has had to be revised. Four particular changes were essential in this revision: the introduction of flexibility to allow for a regular review of policy and regulations; transfer of property rights over specified fish resources to communities; permission to allow the plough-back of a percentage of the fees earned from gear licensing into the local level institutions to cater for their administrative costs and also as financial support for incentives; and lastly to provide for the transfer of management responsibility to local institutions when appropriate.

The responsibility for pushing the revised Act through Parliament falls under the Ministry of Justice. Although the draft revised Fisheries Act was completed and submitted to the Ministry of Justice more than two years ago, it has not been passed by Parliament even now, three years after the start of the programme.

Until the revised Act is passed, the community level institutions lack the legal recognition to carry out their management functions as formulated under the programme. Also, the flexibility to revise the regulations governing the fishery through consultation between the government and the communities on an annual basis, which is crucial to the programme of recovery of the fishery, will not be possible until the revised legislation is passed. As a result, the regulations which the Department and communities jointly revised at their joint annual consultative meeting in 1994 (concerning mesh size changes and the closed season), and other aspects of the revision such as limiting access, remain legally ineffective. Meanwhile the fishery continues to decline, putting the programme on an even steeper uphill course.

4.5.2 Alternative and supplementary economic activities

The basic problem facing the rural economy of Mangochi, and indeed that of Malawi as a whole, stems from the high population density and growth rate. This in turn leads to an imbalance between numbers of people and primary production (Bell and Donda 1993). In the context of Lake Malombe and the Upper Shire River, the fish resources of these areas will not be enough to satisfy the socio-economic needs of the local population in the long term. The best avenue for meeting these needs seems to lie in the development of other sectors especially those based on secondary production, marketing of products and in the service industries. There is a need to have a progressively greater proportion of the population de-linked from the fishing industry. Creation of employment opportunities outside the fishery

would serve three purposes; (a) absorb surplus labour, (b) promote mobility and (c) provide a supplementary/alternative source of living and hence security against uncertainty arising either from market or resource fluctuations. In Panayotou's (1982) view, this last point is particularly important since traditional self-management systems tend to break down when a lack of alternatives shortens the planning horizon and encourages exploitative behaviour for immediate, short term survival.

The main components for Alternative and Supplementary Income Generating Activities fall under the responsibility of the Development of Malawian Traders Trust (DEMATT) and the Industrial and Research Development projects. Their activities have got off to a very slow start, and as a result have not as yet had any measurable impact in the area.

Another negative aspect of Income Generating Activities (IGAs) is that most IGA projects taking place in the area usually choose fish processing as their area of activity because this apparently provides the highest and fastest returns. This is having a negative impact on the strategy of the programme as fish processing increases the demand for fish thus encouraging an increase in fishing effort, while the programme aims to encourage a reduction. For example the Promotion of Women in Rural Areas project, being run by the Department of Community Services in the Lake Malombe area, issues loans to women to enter into the market for buying and selling fish.

4.6 Granting of access rights and limiting access

The revised Act also proposes the introduction of limited access through licensing and the granting of special fishing rights (Fisheries Department, 1993). Because of problems of defining the criteria for choosing those to be granted access, it was agreed that all those who already had fishing gear in 1994 and had registered it by the beginning of the 1994/95 financial year, would form the cut-off point - provided legislation enabling implementation of the measure was passed by that time. The introduction of limits on the number of licences and the granting of rights would be fundamental to the success of the programme as it would provide the legal mechanism for converting an open access fishery into a communal access fishery. It would also provide the legal basis for the removal of illegal gear, since only specified approved gear types would be licensed.

Initial indications are that fishermen are ambivalent about the proposal to introduce limited access. Reducing the catching capacity to match it with the resource might be seen by government as a solution but for the highly vulnerable communities with few, if any, alternatives, this is a very difficult option. Partly, this perception has roots in the recent history of the fishery in that as far as the present generation of fishermen are concerned, everyone has been free to fish and they feel that this should remain so. The second reason given for this reluctance is that they risk being refused access to other areas to which they migrate annually, such as Lake Chirwa and Lake Malawi during the closed season, if they in turn refuse access to fishermen from other areas.

4.7 Law enforcement

It was argued that strong enforcement would be necessary especially in the early stages of the programme. The objective is to put in place a well equipped, trained and disciplined government Enforcement Unit at the Mangochi office to carry out enforcement operations. The operations would be carried out in liaison with the Beach Village Committees. It was hoped, though, that the enforcement duties would be progressively passed on to the local communities.

Committees express misgivings about becoming involved with arrests and prosecutions. Amongst other reasons, members say that they are afraid that they, or their families, would be physically abused by offenders who live in the same communities. They also express fears of being bewitched and consequently would like their role to be limited to the reporting of the problem areas needing to be patrolled by the Enforcement Unit.

4.8 Demand for financial inducements by Beach Village Committee members

The majority of people sitting on the BVCs, especially those who do not own fishing gear and thus do not have a steady source of income, feel that they ought to be paid for sitting on the committees. There is a strong conviction among the Committee members that they are carrying out duties on behalf of the Fisheries Department, not on their own behalf or that of their communities, and so should be paid to do it. Part of the reason for the demand for inducement money is the low level of self-help spirit within the communities. The historical reason for this could be that under the former government, people were coerced into participating in self-help projects. As a result people are very reluctant to participate in community self-help projects under the new political dispensation. The general feeling among fishermen seems to be that the programme is a government project like any other. The fact that management of the programme is undertaken by the government and that all the funding for the programme comes through government strengthens this impression and belief.

Although the revised Act has provision for ploughing back some money from fishing net licences into the fishery (such money could be used for the funding of incentives for sitting on Committees if the communities decided that the money could be used for this type of expenditure item) the money will not be enough given the low licence fees charged for the fishing gear (K20 which is approximately USD 1.33/year) and the large number of fishermen who do not actually buy licences.

5. Discussion

5.1 Conflict between BVCs and traditional leaders

The area in which the programme is being implemented has no history of self-management in fisheries in recent times (Bell and Donda 1993). In any case, the former government did not allow the formation of fisheries co-operatives. BVCs are thus a new institution superimposed on the existing traditional leadership structures. It is not easy to change the mind-set of people after thirty years of an all encompassing dictatorship, so the BVCs might be given to act like

the former MCP political bodies. At the same time, communities might view any institutions exercising power over them in the same light as the former MCP bodies. In such a case the BVCs might end up being alienated from the communities they are supposed to be representing. This points to the need for clear and unambiguous understanding of the role and functions of BVCs by all parties, which will help to enhance their status and ability to represent consensus within their communities.

Jentoft (1989) points out that when organisational formation becomes a component of the strategy, co-management becomes more ambitious, and certainly a more complicated process. The prospects of success of co-management will largely depend on whether or not such organisations can function as viable institutions. It is easier to introduce co-management in an area if there are existing fishermen's organisations which can then be used as an institutional vehicle. In Malombe/Upper Shire's case it is likely that traditional leaders feel that the BVCs are a threat to their own power bases.

These problems highlight three areas of institutional design and arrangements that need to be looked into: how to merge the BVCs into the existing local power structures to make them more acceptable to local leaders and thus enhance their effectiveness; the need for committees to have comprehensive constitutions to improve the way they conduct themselves and their business; and the urgent need for an umbrella association which could oversee the conduct and effectiveness of the BVCs. Presumably such an association would have powers to disband weak committees, conduct elections for replacements and routinely monitor the performance of committees.

5.2 Homogeneity and influence of the money economy

Although it was assumed that the communities of the area were culturally homogenous (if common language and religion can be assumed to be evidence of cultural homogeneity) and that this would play a positive role in the introduction of this new strategy, the influence of the money economy might override such factors. Because fishing is the main source of income in the area, economic factors will have a major effect on the ability and willingness of fishermen and their crew members to comply to regulations. Thus the influence of the money economy and the threat this presents to the programme should be taken seriously. A man is not going to starve his family just to make sure that he returns his sense of belonging to a grouping. Another aspect is the large number of fishermen operating independently. According to Hersoug and Paulsen (1996), a large number of participants in a fishery weaken the individual economic motive to comply with any restrictions because of the free-rider problem; each would believe that any individual fisherman's actions would have little effect on the total outcome. Marginal fishermen who enter the fishery, maybe as a result of unemployment in other sectors of the economy, are less likely to see the future benefits of regulation. Linked to this are the issues open access, lack of alternatives and lack of skills to move to other economic sectors.

5.3 External funding, dependency and sustainability issues

Ostrom (1994) points out that one of the threats to long-term sustainability of co-management is the availability of funds from external sources that appear to be 'easy money'. This can undercut the capability of the local institutions to sustain themselves over time. She further points out that when these funds are used, the financial connection between supply and use is non-existent.

Without long-term commitment to funding, the programme will collapse as soon as donor funds phase out. It is imperative therefore, that government and the communities demonstrate their long term commitment to the programme by starting to make financial contributions to the programme sooner rather than later. This will help develop their capacity and capability for a smooth take-over after the projects phase out.

The long-term plan has to involve government and communities in a process of working out mechanisms for making the approach operationally viable at a cost affordable to the two partners. According to the government, one of the main reasons for the failure of the past management approach, apart from lack of a voice from the communities, was inadequate funds for the Fisheries Department to carry out its management mandate. Unless the new approach helps to overcome the programme's dependency on financial assistance, which the government and communities cannot afford in the long run, it is also destined to fail. Unless such financial independence can be achieved, neither co-management nor community-based fisheries management, in Lake Malombe and the Upper Shire River, will become a reality. The question of financial self-sustainability of co-management is crucial to the management of artisanal fisheries throughout Malawi since there are plans to extend the practice to artisanal fisheries in the rest of the country. Thus, unless it can be demonstrated that the approach can be self-sustainable there will be no justification for extending the strategy to other areas.

5.4 Multi-sectorality of the Programme

The Department's lack of control and influence over the delivery of the programmes for which other departments have authority, is likely to continue to be a problem. As a result, the negative impact of the late deliveries or non-delivery of these other programmes is likely to continue affecting the programme. One effect of these delays is the community's increasing loss of faith in the government's ability to carry out its assignments on time, causing the programme to lose momentum. The work of extension officers working directly with the communities on the programme is made difficult and frustrating, as they have to bear the brunt of the perceived failures of government.

5.5 Access rights

Ostrom (1994) stresses that defining the boundaries and those authorised to use a resource can be thought of as a *first step* in organising for collective action. As long as the boundaries and the individuals who can use a resource remain uncertain, no one knows what they are managing and for whom. Without this, local appropriators face the risk that the benefits they

produce by their efforts will be reaped by non-contributing outside users. Whatever the solution to the current problems, there is a need to reduce capacity in order to ensure biological sustainability of the fish stocks. Thereafter it will be necessary to limit access so as to ensure that the benefits gained through reduction in capacity are not immediately dissipated by new entries that a recovering fishery is likely to attract.

A lesson from the CAMPFIRE (Communal Areas Management Programme for Indigenous Resources) programme in Zimbabwe could be useful here. One of the important aspects of the programme is the principle of recognising the *security of tenure* for users. This would, presumably, motivate them to invest in the resource which should lead to improved resource management. Thus, the inhabitants of the Lake Kariba shoreline are supposed to receive proprietorship over inshore resources in defined *exclusive fishing zones*. The management concept is to empower fishing communities to take over responsibilities of managing the resource and to implement their own regulatory measures necessary for its sustainable utilisation (Machena 1995). The fishing community will have to clearly define who may use the resource, who is excluded from the resource and how the resource should be used.

However, within the fishing communities in Malombe and Upper Shire this appears to pose a big problem. In an area where fishing represents the only real source of income, closing a fishery to others poses a moral dilemma such as the one Jentoft (1993) terms the *life-boat dilemma*:

What's to be done when the life-boat is full? Should one more be taken aboard at the risk of sinking, or should those aboard row hard to get away from all those crying to be saved?(Jentoft 1993:24)

The current state of the fishery calls for communities to make some hard choices sooner rather than later. They have to grapple with such important issues as who is going to be given the right to fish and who is to be excluded. They can avoid or evade these issues now, but this will only mean the postponement of making hard decisions. Indeed, the longer it takes to carry out the necessary drastic action, the deeper the fishery will decline. The further it declines, the longer it will take to recover. The dilemma posed by the situation in Lake Malombe and Upper Shire River is that for limited access to have any chance of being implemented successfully, the majority of the fishermen will have to understand and accept the necessity of the hardship it would entail.

5.6 Law enforcement

The Department had assumed that the BVCs would be able to assume very early in the programme most of the responsibilities under a system of co-management. This does not seem to be the case, especially on the crucial question of enforcing regulations and applying other sanctions locally on their own. Clearly there is need for analysing and defining the division of responsibilities between government and the BVCs in accordance with the immediate capabilities of the BVCs.

It will be a major problem if committees keep refusing to take on enforcement roles in future, as this will return the Department to the main problem that forced it to try co-

management in the first place: its inability to enforce regulations on its own without the co-operation of fishermen. Thus the issue of whether BVCs should be able to enforce the agreed regulations and carry out other sanctions locally on their own, is crucial to the long-term success of the co-management approach, as this issue lies at the heart of the problem. Both government and the committees need to re-examine this question and determine how these committees could be empowered to apply sanctions locally on their own. The BVC at Nalikolo beach expels offenders, especially if they are not residents. This shows that perhaps with time and the right support, committees could apply some of sanctions on their own. Evidence from case studies (Jentoft 1989) shows that the legitimacy of the fishermen's organisations in the co-management arrangement improves if they are also actively involved in enforcement as they are able to exert peer group pressure. Ostrom (1994) also points out that *quasi-voluntary compliance* is one of the important features of long enduring common property resource regimes. "Quasi-voluntary" because the non-compliant are subject to coercion if they are caught. In explaining the importance of commitment to regulations by the players in these community-governed resources, external enforcement is found to be impractical. External enforcers cannot be on site all the time nor would they be able to travel to remote villages at the drop of a hat. The appropriators of the resource create their own internal enforcement to: (i) deter those who are tempted to break the rules and thereby (ii) assure quasi-voluntary compliers that others should also obey. This serves to explain the importance of BVCs participating in enforcement of the agreed regulations. Without the involvement of BVCs in such crucial regulatory functions, the approach will merely be a consultative arrangement rather than real co-management.

5.7 Demand for financial inducements

Paying BVC members is against the self-help approach on which the strategy is supposed to be based. In any case, paying for BVC members' services is likely to create frictions and animosities between committee members and the rest of the community. Already there is a lot of haggling among committee members about who is going to attend whenever workshops are held for BVCs and for which subsistence allowance is paid to those who attend. As a result, most BVCs rotate representation at such gatherings to ensure that all members benefit financially and are kept happy. Some committees have even been known to instruct those who attend to bring the money back so that it can be shared among all the committee members. One main drawback with this system is that such committees do not necessarily send the members who can articulate the wishes and aspirations of their communities most effectively. The other danger is that being a committee member will start to be seen as a paid job rather than voluntary community work. The danger is that committee members will start to be seen more as government employees than as part of the community. Some fishermen have even used the issue of allowances as a justification for breaking the closed season when workshops have been held during such seasons. Their argument has been that as committee members were receiving money for their daily expenses while at the workshops, they also needed money for their own daily expenses, especially during such hard times.

The success and sustainability of the co-management approach will, to a large extent, depend on there being enough voluntary and self-help spirit within the committees and the communities as a whole. However, until fishermen and communities can see some tangible

benefits, they will not be fully committed to the programme. Increased effort should thus be devoted to explaining and trying to show some real, future benefits of the programme. Allied to this is the need to develop the voluntary and self-help spirit within the BVCs and communities as a whole. At the same time modalities must be worked out for progressively reducing the need to pay financial inducements to Beach Village Committee members to attend meetings or workshops, especially when these are being held in their areas. This will not be easy given the economic conditions in the area, and the precedent already set of paying members allowances when they attend workshops and meetings. But for the success and long-term sustainability of the co-management approach, the communities will have to start developing a stronger voluntary and self-help spirit than they have demonstrated so far.

5.8 Ownership of the Programme

While the feeling on the Department's side might be that the committees should be given time to mature, mechanisms ought be worked out now for increasing the committees' level of involvement in running the programme. This should be seen as a learning process and as preparation for communities to assume increased overall responsibility for their part in the co-management arrangement. But taking up ownership of the programme will remain a problem as long as all the funding for the operation of the programme continues to come from government, as government will have to continue being involved in order to ensure accountability for the funding. Another lesson from Zimbabwe's CAMPFIRE programme is that of fishermen's contribution to their wards (Nyikahadzoi, 1995). Fishermen pay an agreed membership contribution to their wards and they manage the fund on their own. Part of this money is used for paying subsistence allowances for their members to attend meetings concerning the project at Kariba township with the Department of National Parks. As a result, the fishers appreciate that it is their programme and also that they have a financial responsibility for its administration. The Department and the communities in the Malombe/Upper Shire programme need to look at and work out similar mechanisms for becoming financially independent.

5.9 General discussion

Looking at the attributes associated with successful community-based resource management schemes, the programme has problems in the areas of: defining and legislating for fishermen who are going to be allowed to use the resource; application of sanctions locally by the committees; conflict resolution arrangements; and lack of higher institutions to complement the work of the BVCs. There are two main threats to the successful introduction of the programme. The first is over-reliance on external help, especially donor aid finance which is of a limited duration and also over-reliance on the Department to carry out most of the work in the partnership. The lesser threats are external factors such as the economy, the area's economic links and possible adverse environmental factors affecting the resource.

In any fisheries management scheme the crucial question is: what measures are needed to get fishermen to voluntarily advance their collective interests at the expense of their private ones? In other words, what could motivate fishermen to adhere loyally to the regulations

(Jentoft 1989)? The participatory or co-management approach was supposed to ensure and/or improve the chances of fishermen adhering to regulations. The programme, with its various components, was supposed to create the best possible environment for ushering in the new strategy. It is clear though, that progress and success of the strategy will depend on more than just the initial proper planning and drawing up of the regulations to help recovery of the fishery and ensure sustainable future exploitation - important as these aspects are. The argument referred to earlier about the narrow definition of co-management by Hersoug and Rånes (forthcoming) applies here. While the real objective of introducing co-management is improved resource management, it will have better chances of succeeding if the programme includes other aspects of the industry, general economic renewal of the area and long-term institution-building.

The challenge now is to look into the weak areas of the programme and the threats to the successful introduction of the new strategy and to try and mitigate their adverse impacts using lessons learned so far from implementing the programme itself, and from other case studies elsewhere.

A third lesson from the CAMPFIRE programme, after nearly ten years of implementation, is that implementation of the approach is a demanding and complex process (ODA 1994). Patience and perseverance are essential. Every community-based management scheme has its own unique features based on local conditions, cultural factors and prevailing economic and social conditions. Most of the examples of enduring participatory or co-management or community-based fisheries management systems such as the Norwegian (Hersoug and Rånes 1996) and the Japanese (Ruddle 1994) have evolved over a long time, taking in new dimensions as changing external and internal conditions would require.

5.10 Use of the design principles from Ostrom (1994)

At the outset, the intention was to use the design principles for robust community-based resource management regimes from Ostrom (1994), outlined in the theoretical part as a benchmark for evaluating the performance of the programme. In the end, this posed problems. The PFMP is an attempt to establish alternative institutional arrangements for management of fisheries. It is therefore still building its own attributes. The design principles seem more suited for evaluating established and functioning regimes. As a result, it turned out to be largely inapplicable for the purpose. Perhaps the best way to use them is as goals for the programme to achieve in the long-term, but in such a case the time perspective is anybody's guess. Thus caution must be advised about using the design principles for formulation and evaluating newly formed systems. Most such regimes are unlikely to have most of the attributes, especially in their early stages. The individual principles might also cause problems. For example *clearly defined boundaries*. In practice there are many kinds of boundaries other than just physical boundaries - such as ecological, social, cultural just to mention a few. Which boundaries are applicable would thus vary from case to case. At the same time, the threats to CBRM regimes could provide a useful list of things to guard against.

Thus, when establishing new management regimes it is important to remember the observations made by Symes (1997), Sen and Raakjær Nielsen (1996) and Jentoft and McCay (1995) about lessons to be learned from comparative analysis of CBRM case studies. The authors point out that design principles depend on the context and conditions under which the

co-management arrangement has to work. Fisheries management systems seldom result from a grand design. They often evolve gradually through a process of *muddling through* often as an urgent response to a crisis in a specific fishery. Also important is the prevailing political culture and organisational structures of the fishing industry. Thus, how to design a successful system can never be laid out as a blueprint for success.

6. Recommendations

To improve the chances of success of the co-management strategy, government and the communities will have to address the programme's weak areas and tackle any threats in order to minimise their impact. Thus, recommendations could be made in the following areas:

- *Revise legislation:* Passing of the revised enabling legislation ought to be a priority. This will provide formal and legal backing for the programme, apart from facilitating enforcement of the revised regulations and implementing limited access.
- *Institutional capacity building:* The BVCs and local leadership structures need to be strengthened, their roles clearly defined and integrated so that they can perform the functions under the strategy in unison. Also important in this aspect is the need to build and create the abilities and capabilities of the BVCs so as to be able to apply sanctions locally. This should be done through training, capacity building and the passing of enabling legislation.
- *Intensify extension and improve communications:* There is still a lot of work to be done in the area of explaining the necessity, importance and justification of some of the important aspects of the strategy, for example the importance of limited access. Intensification of extension is important in order to obtain the support of the fishers not just by coercion, but through enlightenment about the reasoning behind the regulations and procedures. In this way it can be ensured that they will pass on the messages to future generations and so ensure sustainability of the strategy.
- *Direct collaboration:* The new *District Focus* development approach launched in Magochi advocates an integrated approach to development. Projects such as the IGA programmes referred to earlier, have to be passed by this forum before they can be implemented. The forum is not yet fully functional and this is delaying implementation of programmes. The Lake Malombe and Upper Shire Participatory Fisheries Management Programme should look into the possibilities of collaborating with the concerned departments directly, so as to try and influence improvement in delivery of complementary programmes in the area.
- *Nurturing of the self-help spirit:* To ensure success and sustainability of the approach, the self-help spirit of those serving on committees, other co-management institutions and in other capacities as individuals, must be nurtured. Without people willing to serve on such a basis, the co-management arrangement will not work.
- *Financial independence:* For sustainability of the strategy, the government and the communities need to work out how to make the approach financially independent. Without this, the new approach will certainly fail.

- *Sharing of experiences:* It could be useful to share experiences with other programmes such as CAMPFIRE. Visits such as the one to the Kariba programme by extension staff in September 1995 should be encouraged. It would prove very valuable if a group of influential fishermen also visited the programme. Such visits could provide lessons for the fishermen which they could translate into useful practice in the Malombe/Upper Shire programme.

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The Lake Malombe and Upper Shire River fisheries co-management programme: An assessment

Wiseman Chijere Chirwa

*Chancellor College
University of Malawi*

Abstract

This paper is an assessment of the Lake Malombe and Upper Shire River fisheries co-management programme. It is based on the findings of an in-depth documentation study made in the area between 1995 and 1996 (Chirwa, 1996a). The focus is on the operations of the programme's institutional and administrative structures; decision-making arrangements; and the behaviour and attitudes of the co-management partners. The paper argues that the initiative to institute the co-management arrangements did not come from the fishing communities in the area. Instead, it came from the Fisheries Department (FD), donor agencies and other external stakeholders. As a result, the philosophical bases of the programme have not taken roots. A culture of mistrust and suspicion pervades the relationships between the co-management partners; and there is no clear definition and division of obligations and responsibilities among them. Despite these problems, there is a great deal of willingness to co-operate as all the partners can perceive benefits accruing from the programme. The co-management strategy is also a significant departure from the previous "top-down" approaches in which the FD was responsible for setting the rules and regulations, and for administering and enforcing them (Ferguson and Denman, 1993; Donda and Mtika, 1995). The new strategy is seen as democratic and empowering, giving the fishing communities a greater say in the management of a resource on which they depend for their socio-economic well-being.

1. The study area

The Shire River and Lake Malombe are natural outlets of Lake Malawi. Situated south of that lake, Lake Malombe has a surface area of 390 square kilometres, a maximum length of 29 kilometres, a width of 17 kilometres and a mean depth of 4 metres. "It is highly productive and achieved a maximum yield of 15,500 tons in 1988" (Scholz, 1996:27). Fishing and fish-trading activities are believed to support some 400 gear owners; 2,700 fishermen, 2,300 crew, approximately 1,220 traders and an unspecified number of fish processors. The population of the area is estimated at about 69,000 fishing families (Mtika, 1996); residing in at least 45 villages: 33 of them along Lake Malombe and 12 along the Upper Shire River. The villages have no fewer than 82 fishing beaches: about 65 on Lake Malombe and 17 on the Upper Shire River (Bell and

Donda, 1993: 111-112).

Biological studies suggest that "compared to Lake Malawi, species diversity of Lake Malombe is poor"; with 40 species appearing in catch (Scholz, 1996:27). The cichlid species are the most common. There are about 20 benthic haplochromine species locally known as *kambuzi*. Of these, three: lethinops "pink head", *capadichromis viginates*, and *othopharynx* species, comprise 75 per cent of the total catch (FAO, 1993; Scholz, 1996). Commercially the most valuable species is the tilappine cichlidae (*oreochromis lidole*, *oreochromis squamipinnis*, *oreochromis karongae*, *oreochromis shiranus*, and *tilapia rendalli*), generically known locally as *chambo*. Others include those in the catfish family, *claris gariepinus*, locally known as *mlamba* and *Bagrru meridionallis*, known as *kampango*; and those of the cyprinidae family, *Engraulicypris sardella*, locally known as *usipa*. The tillapine cichlidae and the haplochromine cichlidae are commercially the most important.

2. Background to co-management

Until recently, the Malombe fishery was an open access fishery with no centralised control over it. The co-management strategies were launched in 1994 as a result of an ecological crisis. Biological studies indicate that by the early 1990s, the fisheries of Lake Malombe and the Upper Shire River, as well as those of certain parts of Lake Malawi, had collapsed. Though this was a general trend, the worst affected was the *chambo* fishery of Lake Malombe and the Upper Shire River (GOM/FAO/UNDP, 1993; Bell and Donda, 1993; Ferguson and Derman, 1993; FAO, 1995). In 1987, the Lake Malombe fishery produced 11,900 tons of fish - nearly 20 per cent of Malawi's total production. By 1990/91 the lake's total catch was only 6 per cent of what it was in the 1980-1985 period; dropping from 7,726 tons in 1981 to only 441 tons in 1991 (GOM/FAO/UNDP, 1993:75; Ferguson and Derman, 1993:10, Tweddle et al., 1994). Similarly, "after 1986 there was a steady decline" in the catches of *chambo* on the Upper Shire River, dropping "from an average of 500 tons a year (and in good years up to 1, 000 tons a year) to less than 100 tons in 1991" (FAO, 1995:19). The trends in catches and types of gear used on Lake Malombe are presented in the following table:

Table 1: Trends in catches and gear used on Lake Malombe

| Year | Chambo % of catch | Kambuz % of catch | Other spp. % of catch | Total catch in tons | # of craft | # of gill nets | # of chambo seines | # of nkacha and kambuzi seine nets |
|------|-------------------------|-------------------------|-----------------------------|---------------------------|---------------|-------------------|--------------------------|---|
| 1976 | 90 | 4 | 6 | 4900 | 311 | 450 | 25 | 30 |
| 1977 | 89 | 6 | 5 | 5500 | 309 | 450 | 25 | 30 |
| 1978 | 85 | 9 | 5 | 4900 | 225 | 449 | 22 | 32 |
| 1979 | 86 | 10 | 5 | 4900 | 262 | 386 | 25 | 45 |
| 1980 | 85 | 12 | 3 | 5400 | 299 | 322 | 25 | 59 |
| 1981 | 80 | 18 | 2 | 8900 | 359 | 259 | 27 | 72 |
| 1982 | 75 | 23 | 2 | 10400 | 373 | 231 | 24 | 96 |
| 1983 | 73 | 25 | 2 | 11100 | 386 | 203 | 20 | 121 |
| 1984 | 70 | 27 | 3 | 9500 | 422 | 186 | 20 | 145 |
| 1985 | 58 | 38 | 4 | 10400 | 550 | 169 | 15 | 202 |
| 1986 | 37 | 59 | 4 | 11100 | 643 | 137 | 18 | 224 |
| 1987 | 26 | 70 | 4 | 11900 | 619 | 128 | 15 | 229 |
| 1988 | 20 | 76 | 5 | 9800 | 594 | 119 | 11 | 234 |
| 1989 | 15 | 81 | 4 | 9700 | 642 | 113 | 15 | 245 |
| 1990 | 10 | 83 | 7 | 9100 | 566 | 110 | 6 | 242 |
| 1991 | 6 | 87 | 7 | 10300 | 620 | 101 | 2 | 303 |

Source: GOM/FAO/UNDP, 1993:53; Ferguson and Derman, 1993:12.

The decline of the *chambo* stocks is attributed to the increase in the use of narrow-meshed *nkacha* and *kambuzi* seine nets which catch juvenile *chambo* "rather than to an increase in the number of fishermen entrepreneurs or overfishing of the parent stock" (Ferguson and Derman, 1993:10; GOM/FAO/UNDP, 1993). These nets increased from 30 in 1976 to 59 in 1980; to 202 in 1985; 245 in 1989 and 303 in 1991. "*Kambuzi* seine nets are thought to cause significant habitat destruction as they are dragged through the areas used by *chambo* during breeding and brooding, destroying nests and underwater vegetation". *Nkacha* seines, though they work in shallow waters, "also catch many juvenile *chambo*" (*Ibid*). Ferguson and Derman (*Ibid*: 10-11) have observed that:

Although the *chambo* fishery of Lake Malombe has collapsed... total fish yield from the lake has not declined significantly. In 1992, a total of 10,400 tons of fish were landed while in 1991 10,300 tons were harvested. What has occurred then is a significant change in the species composition of the lake's fisheries. Small haplochromine cichlids locally known as *kambuzi* have increased in importance from about 18 per cent to 87 per cent of the total catch.

This, itself, could be a result of the decline of *chambo* which is commercially the most important species. It is also because *kambuzi*, which is cheaper than *chambo*, is affordable to many of Malawi's rural and urban poor. Evidence from interviews suggests that the market prices for *chambo* have rapidly increased over the last two decades, against falling real wages and declining cash returns from peasant production. As a result, many people on low incomes living in the urban and rural areas cannot afford *chambo* on a regular basis. They go for the cheaper *usipa*, *matemba* (another small haplochromine species), and *kambuzi*. The market changes and the changes in the lake's species composition have therefore had reciprocal effects on each other. Some studies have further argued that "the decline of *chambo* catches and the increase of *kambuzi* species represent an economic loss" for the fishermen and fish traders. The "beach prices for *kambuzi* comprise only 25 per cent of *chambo* prices" (Scholz, 1996: 28). In addition, "while the tonnage of fish caught in 1982 was similar to 1990, the value of the 1990 catch was only approximately 8.4 million *kwacha* compared to 38 million *kwacha* in 1982" (Ibid; Banda and Hara, 1994).

The above factors should be understood within the wider context of economic changes in the country. The poor performance of the country's agricultural economy over the last two decades (Kydd and Christiansen, 1981 and 1982; Lele, 1989; Gulhati, 1989; Hirschmann, 1990) has forced many people formerly employed in peasant agriculture into petty trading activities, especially fish trading. This has put pressure on the fishermen to increase their effort; which in turn puts pressure on the country's fisheries resources. There has also been an expansion of the urban and rural markets for fish as a result of the growing urban population and the opening up of capitalist agricultural enterprises (estates and plantations) in various parts of the country. Thus, despite the "economic loss" to the fishermen and fish traders, fishing and fish trading remain more lucrative enterprises than peasant agricultural production.

Habitat destruction by seine nets has been the most emphasised cause of the crisis in the Lake Malombe fishery (Banda and Hara, 1994). What have been less studied are the general ecological changes in the area and how they are affecting the fishery. The incidences of falling water levels and the drying up of the lake have been documented (McCracken, 1987; Chirwa 1992 and 1996, Bell and Donda, 1993), but their effects on the fisheries have not been systematically analysed. The areas surrounding the lake, especially on the western and northern sides, are heavily cultivated and the hills are increasingly becoming deforested, and soil erosion is on the increase. During the rainy season there is a considerable amount of run-off carrying soil and stone debris from the hills into the lake. The ecological balance of the lake will be adversely affected by these factors particularly when coupled with the increase in the population along its shores. It is in this wider context of economic and ecological changes that we need to understand the importance of properly managing the country's fisheries resources.

3. The co-management strategy

The co-management strategies started as a pilot study. They were not based on any previous local experience. Though literature pertaining to fisheries co-management elsewhere in the world provided vital intellectual bases and useful policy guidelines, there was no local case example from which to draw useful lessons. Thus, the strategies were new to both the Fisheries Department (FD) and the local fishing communities. Though there is mention of some indigenous knowledge system of resource management among the local communities, these seem to have

been confined to the land and the other physical resources abutting the lake and the river front. From the oral data collected, there is no clear evidence for tenurial rights to the aquatic resources. However, in a few areas, for example at the bar where the Shire River flows out of Lake Malawi, there is historical evidence of chiefly control over fishing activities at certain times of the year in specific ecological zones such as pools formed by the flooding of the river or the lake and in parts of the river/lake traditionally used by the families in the area for domestic purposes. This was also true for some parts of Lake Malombe. This traditional management control largely died out with the commercialisation of the fishing industry during the first two decades of this century (see McCracken, 1987; Chirwa, 1992 and 1996b).

A closer look at the oral information suggests that chiefly control was not overfishing and the fisheries resources as such. Instead, rather it was over the general social and economic activities of the people who were under a particular chief. According to Chief Chimwala, the power of the chief was over his people. He was their guardian, and they gave him gifts of food and other items in return for his guardianship. A portion of fish was always given to him as a token of appreciation (Interview, 27/4/97).

Through the exchange of gifts for security and stability, the chiefs were able to control their 'subjects' and their economic activities. However, they did not exercise powers of intervention in matters of fishing as such, the reason being the abundance of the fish resources, with no apparent immediate threat to their continuance.

The constitutional powers of the chiefs over the physical and environmental resources in their areas were also somewhat unclearly delineated. Traditionally, in both *Yao* and *Nyanja* family systems¹, it was the maternal uncle who had control over the social and economic activities of a matrilineage. Land allocation and the family's livelihood and security were his responsibilities. The chief was a remote authority, removed from the day-to-day subsistence and other socio-economic activities of the people in his area. As a result, he had very little power to intervene directly in the management of the physical and environmental resources utilised by people in the area under his jurisdiction. It was only with the advent of the colonial period that chiefs were given administrative and political powers to intervene in matters of soil, forestry, water and land conservation and management. They became agents of the colonial state, which tended to create political tensions between the chiefs and their subjects.

The implication of the above socio-historical factors is that there were no traditional institutions and knowledge systems which could provide solid foundations for the present fisheries co-management strategies. A considerable amount of consultation took place between the FD and the local communities before the programme was put in place. The objectives of the co-management strategies were explained to the fishing communities; and the operational principles were jointly worked out by the two sides. Since the FD did not have qualified personnel in matters of co-management, training workshops were conducted for its extension staff. Representatives of the fishing communities were also given formal training through a series of workshops. Public meetings were conducted in the area to raise awareness, solicit support for the programme and facilitate the formation of local fisher groups (Mtika and Donda, 1995; Scholz, Hara and Mtika, 1995).

In the absence of indigenous institutions for fisheries management, the fisher groups were vital structures if the programme was to work efficiently. From these, representatives were elected

¹ The *Yao* and *Nyanja* are the local inhabitants of the area. They are matrilineal societies. Descent and residential patterns follow the mother's side.

to constitute Beach Village Committees (BVC). At first, a total of 28 of these were formed, rising to 29 by the end of 1995. The BVC members were then given training "in group dynamics and leadership" (Mtika and Donda, 1995:5-6). These committees then became the highest decision-making bodies at village level. They act as the mouth-piece for the fishing communities, and as a channel of communication between the FD and the user groups. Their composition includes elected members from all the villages they represent and traditional leaders such as chiefs, village headmen and group village headmen. The traditional leaders are patrons of the committees, and they do not take executive decisions on their own. Each committee has a chairperson and his/her vice, secretary and his/her vice, a treasurer and his/her vice, and committee members who are representatives of their respective villages. Every BVC has a written constitution which outlines its rules and conduct. Meetings are called regularly, and those members who do not attend are replaced following constitutional procedures. Decisions are mostly by consensus, there is almost no voting on the issues concerned. It can be argued that the structure of the BVCs, the rules by which they operate, and their decision-making processes follow democratic principles. They are indeed a marked departure from the old style in which the FD exercised all the power.

In addition to the co-management rules and regulations, the BVCs make their own rules, specific to their areas. These mostly relate to conflict resolution procedures. Violators are called and counselled and, depending on the nature and degree of the offence, they may be referred to the FD. The latter may decide to take the issue to court or settle it out of court. Very few cases have reached the courts, which may be an indication of the degree of co-operation on the part of the fishermen; but may also be a reflection of the inefficiency of the system.

In spite of good co-operation between the BVCs and the FD, administrative problems do exist. The former are dependent on the latter for guidance, technical information and logistics. The BVCs do not have the financial and administrative capacity to carry out their part of the co-management arrangements on their own. They do not have funds of their own; and are not funded by the government or any other external organisation. The licensing fees are collected and used by government. There are also some tensions in their relationship with the FD as the BVCs believe that they are being used as a source of cheap labour for a 'government project' and that the tasks they perform amount to nothing more than public policing. The feeling is that the BVCs were intended to be the local policing agents of the FD without the government meeting the cost. Unlike the FD staff, the BVC members do not receive salaries or allowances. They work as volunteers on the understanding that the resource they are managing is their own. "If this is the case", they argue, why should they co-manage *their* resource with a salaried outsider group? They should be the decision-makers as to how it should be managed, and with whom. The key issue here is the custodianship of the lake and its resources. It is still not clear whose lake it is and who should be responsible for it. The feeling in the fishing communities in the area is that they are told that the lake and the fish in it are theirs, but the reality is that these belong to the state. The communities use the phrase *ndi za boma*, meaning "they are for", or "belong to" the government/state. If the argument is that this is the "people's lake", and the fish in it belong to the same "people", then the responsibilities and authority of the government and its departments need to be defined in such ways that they reflect this position. The country's laws and the fisheries rules and regulations should do the same.

The current situation on Lake Malombe and the Upper Shire suggests that the custodianship of the fisheries resources is the state's, which acts on behalf of the people. It is therefore the state's responsibility to manage these resources on behalf of its people. The philosophy behind the co-management strategies suggests that the resources belong to the user groups (the "people")

who should therefore play an active part in their management. But it is less clear as to whether the user groups should participate in the co-management strategies as agents of the state or as the "owners" of the resource. This inherent tension between the philosophical understanding and the practice on the ground needs to be sorted out by defining clearly whether the co-management arrangement is a co-operative or a consultative one. The authority and responsibilities of each co-managing partner need to be spelt out within the legal framework of the programme.

4. Operational arrangements

At present the programme operates as a combination of *consultative* and *cooperative* strategies. The former is where "mechanisms exist for government to consult with users but all decisions are taken by government", and the latter is "where the government and the users cooperate together as equal partners in decision-making" (IFM and ICLARM, 1996:3 and 6-7). Policy issues, the power to punish offenders, and all other legal matters are in the hands of government. The input from the user communities comes through in the process of establishing operational rules and regulations at the local level. At present, there are no fewer than seven stakeholders in the programme. Their interests and the roles they play can be summarised as follows:

Table 2: Partners and stakeholders in the Lake Malombe Fisheries Co-management Programme

| Organisation / Group | Tasks |
|---|--|
| Department of Fisheries - District Fisheries Office, Mangochi - Regional Headquarters, Zomba | <ul style="list-style-type: none"> - Co-ordination, monitoring and evaluation - Provision of extension, research, enforcement and administrative personnel - Licensing gear and fishermen - Decides and enforces fisheries regulations - Outlines and implements policy |
| Malawi-German Fisheries and Aquaculture Development Project, MAGFAD (GTZ) | <ul style="list-style-type: none"> - Co-ordination, monitoring and evaluation - Training of fisheries staff and Beach Village Committee members - Provision of personnel and funds |
| Malawi Broadcasting Corporation (MBC) | <ul style="list-style-type: none"> - Production of the radio programme "usodzi walero" (Fishing Today) |
| Commercial Bank of Malawi (CBM) | <ul style="list-style-type: none"> - Administering the Loan Fund |
| Fishing Community - 2700 fishermen - approx. 2300 crew - traditional leaders - religious leaders - 29 Beach Village Committees - approx. 1220 traders | <ul style="list-style-type: none"> - Decides on and adopts regulations - Policing the beaches - Enforcement of regulations - Passing on extension messages |
| UNDP | <ul style="list-style-type: none"> - Provides funds and IGA and extension personnel |
| IDA | <ul style="list-style-type: none"> - Funds enforcement and extension |

The donor agencies: MAGFAD (GTZ), UNDP and IDA and the facilitating/supporting institutions: the CBM and the MBC, can be regarded as external players in the programme. They are not directly involved in the day-to-day activities of the co-management strategies. The radio programme, aired twice a week, is meant to deliver propaganda and extension messages. What is interesting to note are the similarities in the FD's and the BVCs' tasks, which suggests that there are no clearly defined boundaries to their responsibilities, authority and power.

Currently the programme has five governing regulations:

- a minimum mesh size of 0.75 inch for *nkacha* and *kambuzi* seine nets;
- a minimum mesh size of 3 inches for *chambo* seine gill nets;
- a maximum head line length of 250 metres for *nkacha*, 500 metres for *kambuzi* and 1000 metres for *chambo* nets;
- observance of a recommended closed season between January and March for shore seine net fishing on Lake Malombe, and between November and December for all the other nets on both Lake Malombe and the Upper Shire River;
- limiting access to the fishery through registration and licensing of fishermen and their gear.

The gear specifications and the recommended closed seasons are as follows:

Table 3: Gear specifications for Lake Malombe (LM) and the Upper Shire River (USR)

| Fishing gear | Max. headline length | Minimum mesh size | Closed season |
|----------------------|----------------------|--------------------|--------------------|
| Shore seine net, LM | 100 m | No restriction | Jan. 1 to March 31 |
| Shore seine net, LM | 1500 m | 3 inches (76 mm) | Nov. 1 to Dec. 31 |
| Shore seine net, USR | 100 m | No restriction | Nov. 1 to Dec. 31 |
| Shore seine net, USR | 250 m | 3.5 inches (90 mm) | Nov. 1 to Dec. 31 |
| Gill net, LM | No restriction | 3 inches (76 mm) | |
| Gill net, USR | No restriction | 3.5 inches (90 mm) | |

The above regulations and gear specifications have now been incorporated in the proposed new Fisheries Act to be tabled in Parliament. What is particularly significant about them is that they were reached after consultations with the local user communities. This can be interpreted as an indication of the democratic nature of the programme, and as a reflection of the user communities' willingness to cooperate with the FD and to participate in the programme as a whole. It has also been argued that through the consultations, the user communities made input into the setting down of the regulations and the policy relating to fisheries co-management. The FD maintains that the operation of the closed season and the regulations on gear specifications

have been quite successful. More than 95 per cent of the fishermen are said to have respected the closed season in 1995; and by July the same year, 90 per cent of them changed their gear to the specified mesh and length sizes. The absence of widescale violations of the rules and regulations, especially on Lake Malombe, can also be taken as a good indication of the success of the co-management strategy. Also limited has been the number of immigrants into the fishery. In the past, many fishermen from other lakes, especially Chilwa and Chiuta, used to migrate to Lake Malombe. However, the limited migration could be a result of the collapse of the lake's fishery rather than the effectiveness of the control of access through the registration of fishermen and their gear. Some Lake Malombe fishermen have themselves migrated to Lake Malawi creating a vacuum that has not been filled.

Both official and oral evidence suggest that the catches on Lake Malombe have increased in both size and quantity. However, statistical data is still fragmented and incomplete. It is too early to draw definite conclusions on this. There is a need to gather more and comprehensive statistical information on catches before such conclusions can be drawn. Data also needs to be gathered on the sales and profit margins of the fishermen and fish traders so as to assess not just the biological but also the economic recovery of the area's fisheries industry. A stock assessment survey needs to be undertaken to provide a fuller picture of the biological recovery of the fishery.

5. Co-management problem areas

The above co-management arrangements are beset with a few problems. To begin with, there is no representative body above the BVCs. As a result, these institutions report to the FD, and are therefore under the direct control of the former. This makes them "junior" partners in the programme which contradicts the fundamental co-management principle of equality. Proposals have been put forward to form a Lake Malombe Fishermen's Association that would function as an umbrella organisation above the BVCs, however it is not clear to whom the Association would report. In its strictest sense co-operative management is where government and users work together as equal partners in decision-making. The current operational arrangements show an imbalance in power between the FD and the BVCs. This raises the serious question as to whether partners with different degrees of power can successfully co-manage a resource. The FD's position of patronage means that the local user communities are the recipients rather than the initiators of decisions. They themselves, are managed, together with their resources, by the Fisheries Department.

The second problem is that the BVCs, democratically constituted as they are, cannot be said to be legally sanctioned. At present there is no law from which they can derive their authority. Their powers are therefore limited and legally challengeable. Similarly, the powers of the chiefs and the village headmen, both within and outside the BVCs, are not clearly defined. By being members of the BVCs these local leaders cannot use their traditional and customary powers to influence the instituted co-management structures. They are ruled by the terms of the written constitutions of the BVCs in their areas rather than by the powers of their traditional offices. To the rest of the members of the user communities, this creates socio-political tensions between two parallel power and authority structures. On the one hand, there is the power and authority of the traditional leaders, and, on the other, that of the BVCs, albeit in a limited way. The traditional leaders are themselves rather unsure about which of these two lines they should follow.

The operation of the closed season and the total closure of the Upper Shire River to seine net fishing are also areas of contention between the user communities and the FD. The former are of the view that for Lake Malombe, the dates for the closed season are inappropriate. They suggest closing it between 1st November and 28th February, or between 1st October and 31st December, every year. The reason they give is that the fish they catch between these months are carrying eggs which indicates that this is the actual breeding period, and not the January to March period as currently believed. This observation requires further biological investigations. Given that wider ecological changes may have an effect on the breeding habits of the fish in the area, the local people's observation may be valid. The most contentious issue is the closure of the Upper Shire River to seine net fishing for two years now. The intention was to allow the *chambo* fishery to recover from its collapse. The view of the BVC members and other fishermen in the area is that the problem is not fishing on the river, but rather what is happening in the eastern arm of Lake Malawi. They argue that trawler operators in the eastern arm have been allowed to fish close to the river without any meaningful control over them. In addition, local artisanal fishermen in the eastern arm using seine nets and lights, locally known as *kauni*, have increased their efforts over the last two years. This has put pressure on the fisheries resources of the area. Since the fish that come into the Upper Shire River and Lake Malombe migrate through the eastern arm of Lake Malawi, there will be no recovery of the Upper Shire River *chambo* fishery unless the trawling and *kauni* activities are controlled. The fishing communities of the Upper Shire River are of the opinion that the FD is failing to control the trawler operators because the majority of them are wealthy, powerful businessmen with strong political connections. "They can even go to the extent of having their fishing licences renewed by word of mouth or just with a phone call" (confidential interview, Malunda, 13/7/96). The FD officials are aware of this problem, and some of them admit their failure to control the trawler operators. This dangerous situation gives the impression that the FD is too willing and more able to deal with the weaker parties in the fishing industry.

Proposals have been made to ban *kauni*, and some chiefs, on their own initiative, have done so in their areas, but the trawler operators remain untouched. Plans are under way to discuss the reopening of the Upper Shire River on an experimental basis, and to review all fishing regulations on it. Also proposed is the extension of the co-management strategies to the eastern arm so as to provide uniformity of regulations between this area and the Lake Malombe - Upper Shire River fisheries since they are parts of the same system. However, there will be a need to review the regulations governing trawling in the eastern arm. Given that the technological requirements of the trawlers are not the same as those of the artisanal fishermen, and given also the differences in the socio-economic backgrounds and economic interests between the two parties, and the political connections of the trawler operators, the introduction of co-management strategies in the eastern arm will require strong government intervention. It is also important to bear in mind that the majority of the trawler operators are not indigenous to the area. They are migrants from other parts of the country, or from within Mangochi district itself, but have now settled in the area because of their investment in fishing activities. They operate along capitalist lines and have little attachment to the local communities.

Failure to control the trawler operations has affected the efficacy of the co-management strategies on the Upper Shire River. BVC members report frequent violations of the closed season by some radical elements in the fishing communities. These elements argue that it does not make much sense to control their fishing activities when the people in the eastern arm, who are believed to harvest larger quantities of fish than the individual artisanal fishermen on the Upper Shire, remain uncontrolled.

The success of the violators in challenging the authority of the BVCs is likely to encourage others, including those who were willing to cooperate with the regulations, to do the same. The BVC members are caught up in five difficult situations:

- the violators are members of the local fishing communities and have blood relationships with the BVC members. It is difficult for the BVCs to turn against 'their own people' and be hard on them;
- the BVCs sympathise with the violators given the failure of the FD to deal with the trawler operators. Thus, they do not feel morally justified in disciplining the violators;
- the BVCs are afraid that any attempts to intervene with force may aggravate the situation; and elements of resistance to all fisheries regulations may follow - with the possibility of violence;
- the BVCs do not have the capacity to intervene with force. They can only rely on assistance from the FD. Unfortunately, any attempt by the FD to intervene with force would lead to the fishermen concluding that indeed the BVCs are agents of the FD;
- the BVCs do not have the legal powers to prosecute the violators, only the Fisheries Department can do so.

6. Credit facilities

An important aspect of the co-management programme on Lake Malombe and the Upper Shire River is the provision of credit facilities to the fishermen through a commercial bank scheme, with interest at current bank rates (Scholz et al, 1995:3; Mtika, 1996). This was one of the major recommendations of the consultancies that preceded the launching of the co-management strategies. Initially it was recommended that the FD should buy off the outlawed gear from the users or pay them compensation for the loss of their gear due to the introduction of the mesh control regulations. After consultations the recommendation was modified to the provision of credit to those who were replacing their gear using their own resources.

MAGFAD (GTZ) provided a guaranteed fund to the Commercial Bank of Malawi from which the gear owners could borrow. An amount of not less than K200,000 was provided for the purpose. Fishermen maintain that in 1995 the maximum amount each fishermen could get was K6,000, which was enough to buy approx. four to five nets at a price of between K1,000 to K1,500 per net. By 1996, the nets had gone up in price to between K1,300 to K1,500. At the same time, the maximum size of loan each fisherman could obtain had been reduced to only K2,000, the reason being that "many people could not pay off the initial loans because they did not make enough money" (interview with BVC members, Ukalanga, 18/4/96).

Records from the Fisheries Department confirm the difficulties of loan recovery. In 1995, the average recovery rate was 89.38 per cent which was quite impressive. The figure dropped to 46 per cent by mid-1996, which shows that there were some serious difficulties with repayments. The variations may be an indication of the differences in the degree(s) of productivity of the beaches. The more productive the beach area is, the greater the potential for its members to quickly raise enough money to repay their loans. The variations may also be an indication of the differences in the activity and strength of the BVCs themselves. Those which are more active

have a greater potential to influence their members to repay their loans.

The fishermen also complain that many of them have not been able to obtain loans, the reason being that they are required to raise an initial sum of K600 on their own in order to qualify for the loan. Both their BVCs and the FD should provide confirmation that the person is indeed creditworthy. The fishermen cannot raise loans from the bank on their own without guarantees from their BVCs and from the FD being forthcoming. Records of the FD indeed show that only a few people have received the loans. For example, in 1995, only 31 people benefited from the scheme, and the majority of them, about 65 per cent, were BVC members (Mtika, 1996:10); only 11, representing 35 per cent, were ordinary fishermen.

Table 4: Participation in bank loan schemes

| Area | Creditors | Creditors paid off | as % |
|-------------------|-----------|--------------------|--------------|
| Upper Shire River | 7 | 3 | 42.86 |
| Northwest Malombe | 14 | 12 | 85.71 |
| Eastern Malombe | 1 | 1 | 100.00 |
| Southwest Malombe | 9 | 4 | 44.44 |
| Total | 31 | 20 | 64.52 |

Many ordinary fishermen are rather unhappy with the BVC members being favoured in regard to credit provision. The result is that those who cannot raise loans, and those who cannot afford to buy nets with their own resources, are systematically being forced out of the fishing industry. In Southwest Malombe some have retained their outlawed narrow-meshed nets in defiance of the regulations. The danger is that as they become increasingly frustrated with the operations of the credit scheme, these people will probably revert to the use of their old gear and, in the process, violate the gear specification regulations.

Both the FD and MAGFAD, the funding agency, are also unhappy with the operations of the credit scheme. They complain of long delays in the repayment of the loans which makes it difficult to revolve the funds at a faster rate. Also argued is that many fishermen are rather unwilling to honour their debts. They take it as compensation for the gear they 'lost' due to the changes in the regulations - especially as promises were initially made that compensation for the enforced change would be forthcoming. The loans are also difficult to collect; the FD and MAGFAD are not debt collection agents, and to expect them to be efficient debt collectors would be expecting too much. The future of the scheme is also unclear and no one knows what will happen when MAGFAD pulls out. The belief is that the fishermen will have replaced their gear and thus be able to stand on their own but given the falling returns from fishing, this is unlikely to happen within a short period.

It is worth noting here that out of the K200,000 that MAGFAD had made available, the amount that has been disbursed to date is more than the initial capital. However, as this is a revolving fund, there should always be same amount of money to be distributed. This, of course, depends on the repayment of the loans which in turn depends on the returns the fishermen get

from their businesses and their willingness to repay. Given the difficulties the fishermen are currently facing, their potential to repay the loans quickly is very limited and debt recovery will therefore continue to be a slow and painful process.

7. Income generating activities (IGAs)

To alleviate the economic hardship of the implementation of the new fisheries regulations, especially during the closed season, it was decided to promote supplementary and alternative Income Generating Activities (IGAs) for the affected fishing communities (Mkumbwa, 1995). In this regard, gender issues were given special consideration, as in the matrilineal *Yao* and *Nyanja* societies men move from place to place looking for new wives or in search of an income. It is therefore the women and children who are more vulnerable to economic forces - especially if they are abandoned by their husbands, brothers and/or fathers.

Since there were no indigenous institutions to facilitate the formation of groups, these had to be formed and given training. The process was the same as that for establishing the BVCs. However, unlike the BVCs, the IGA groups were advised to institute membership fees which provided the initial capital for revolving funds. These supplemented the seed money from MAGFAD (GTZ). So far, the amounts given to the clubs are very small, not even enough to start a meaningful petty trade enterprise. In fact, the money was meant for training and not as start-up capital for businesses. The intention was that once the groups were trained, they would be handed over to lending institutions so that they would be able to raise loans on their own. The emphasis was placed on assisting women because it was believed that men would not be attracted to the idea of alternative sources of income, especially if they were already established in fishing and fish trading.

The membership in IGA groups is very low which reflects the experimental nature of the exercise and/or the general unwillingness of the local people to participate in the proposed IGA schemes. All the women's groups, except two, were formed in August 1995, and all the men's groups were formed in October of the same year. This reflects the degree of "top-down" intervention on the part of the planners. The exact dates when the groups were formed (many on the same dates) suggest the systematic way the exercise was carried out, and the administrative engineering that accompanied the intervention. With the emphasis being on assisting women, men tend to believe that, for them, nothing is to be gained in participating in these activities. Given the meagre amounts of money disbursed to the groups, both men and women tend to trivialise the whole idea of alternative sources of income and feel that there is lack of official commitment to the scheme.

The proposed IGAs have been grouped into four categories (Mkumbwa, 1996:6):

Table 5: Proposed Income Generating Activities

| Category | Activities |
|-----------------|--|
| Agro-based | Food and cash crop production Woodlot establishment Livestock production including guinea fowl Fish and bee-keeping |
| Industry-based | Palmcraft item production Bakery Woodcraft Beer brewing Pottery Brick tiles Stone quarrying Food processing |
| Trade-based | Grocery shops Secondhand clothing Crop production; maize, beans, rice, coconut, cassava Fish Firewood, bamboo, grass, linya ² |
| Service-based | Video showing Photography Selling foodstuffs Repairing cars, bicycles, watches, shoes, sewing machines, etc. |

An international consultant was hired to "critically analyse" the market size, profitability, environmental impact and sustainability of the above activities (Mkumbwa, 1996). The present study did not have access to the consultant's report, but made its own observations:

- The agro-based activities will require the availability of adequate land. The poor soils, the increase in the population of the area and the inadequate amounts of land will limit the profitability of these activities unless they are undertaken on an intensive, and thus expensive scale. They will also require massive external intervention.
- Poultry, fish farming and bee-keeping would be viable small enterprises. However, poultry requires fish meal among other types of feed. This will have implications for fishing activities. Livestock require adequate land for grazing, the Lake Malombe area has limited capacity for this activity. Fish farming will not attract many people because of the existence of a natural fishery to which they have almost unlimited access.

² Linya, from the Portuguese word *linhas*, is the nylon thread extracted from used tires. It is used for tying things together, construction of thatched roofs, rope and mending nets.

- Most of the activities in the "industry-based" category require start-up capital larger than the amounts currently being provided. Unless they are operated on a larger scale, these activities will not be very profitable. They also have environmental implications which need to be thoroughly assessed. The suggested craft activities are already dominant in the area. Their increase will be accompanied by environmental implications.
- Trade and service-based activities will mostly utilise the local market provided by fish traders and processors, tourists and the fishing communities themselves. All these depend on the water resources, including the fish. Fishing and fish trading bolster the other commercial activities in the area and are the activities which increase money circulation in the local economy. It therefore follows that all the other commercial activities depend on fishing and fish trading. Without these, the profitability and sustainability of the other commercial activities will be difficult to achieve.

To transform people who have been fishermen and fish traders for generations will not be an easy task. It will take a long time for them to acquire new skills and a new economic culture associated with the proposed IGAs. In the process, there will be much moving backward-and-forward.

8. Conclusions and recommendations

The greatest achievement of the Malombe co-management strategies has been that they have put in place management structures and regulations where they did not exist before. These can be adapted to the local social, economic and ecological conditions as situations demand. Despite the problems discussed above, there is a great deal of willingness on the part of the fishing communities to co-operate with the FD and the other partners in the co-management programme. Though some good progress has been made, it is rather too early to draw strong conclusions as to the effectiveness and the benefits of the programme. The administrative arrangements are still rather unsatisfactory. The BVCs are too dependent on the FD, which currently act as their patron and their relationship needs to be reviewed in light of the complaint that the latter are used as cheap labour by the former. There is need to enhance the administrative, technical and financial capacity of these institutions. Also needed are follow-up studies on the social and economic organisation of the fishing communities and on how they have adapted to the new institutions created for the co-management strategies. These would provide useful information on how deep-rooted the philosophy of co-management has become. A detailed stock assessment survey is needed so as to generate information on the biological recovery of the fishery. The proposed fisheries legislation and the formation of the Lake Malombe Fishermen's Association need to be speeded up. These will provide a solid legal framework and viable institutional structures for the co-management strategies. There is also a need to critically examine the cost-effectiveness of the whole programme. The FD's financial records need to be carefully analysed, to be done in line with the fishermen's and fish traders' economic performance over the period in which the co-management strategies have been in place. It is from this information that a detailed evaluation of the co-management programme's economic efficiency and its benefits can be arrived at. The future of donor funding for the programme needs to receive greater attention. Given the FD's financial problems arising from poor government funding, the programme will not be sustainable without continued donor funding.

The most successful aspect of the co-management strategies has been the gradual transformation of an open access fishery into a community-controlled fishery. This trend needs to be strengthened as it has several advantages. To begin with, it instils in the user community a spirit of stewardship. Second, it facilitates an equitable distribution of costs and benefits to the fishermen and the FD which is one of the major attributes of the co-management strategy. Third, and most important of all, it will facilitate long-term processes of planning, monitoring and enforcement of policies and regulations based on the active participation of the user communities. This way, co-management becomes a 'bottom-up' strategy.

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Patricia Hachongela

Jeremy Jackson

Isaac Malasha

*Centre for Applied Social Sciences (CASS)
University of Zimbabwe, Harare, Zimbabwe*

Sevaly Sen (ed.)

*Institute for Fisheries Management and Coastal Community Development (IFM)
The North Sea Centre, Denmark*

1. Introduction

1.1 A brief history of Lake Kariba

Lake Kariba is one of the largest man-made lakes in the world (see map page 97), shared between Zambia and Zimbabwe on the Zambezi River. Construction of the lake began in 1955 and the dam wall was sealed in 1958. The lake reached its maximum capacity in 1963. The main purpose of its construction was to provide hydro-electric power to the copper mines in Northern Rhodesia (now Zambia) and Southern Rhodesia (now Zimbabwe). The lake is approximately 300 kilometres long, 40 kilometres wide at its widest point and has a total surface area of 5,500 square km. At its deepest point, the lake is 120 metres deep, but average depth is around 29 metres. It has a carrying capacity of 190,000 million cubic metres. The major tributaries flowing into Lake Kariba are the Zambezi and Sanyati Rivers. The two make a great contribution to the maintenance of the lake's fertility; the former by its tremendous water supply and the latter by the rich quality of its floodwater. The formation of the lake led to the displacement of a large number of people who for generations had relied on farming the alluvial soils on the banks of the Zambezi River. At the time, it was believed that displaced peoples would be compensated for their lost land in the form of high incomes from the new fishery as speculations for a productive fishery were optimistic.

Following the closure of the dam in 1958 fishing activities started at different times on both the Northern and Southern shore-lines. On the former, fishing commenced soon after the dam wall was sealed while in Zimbabwe, later fishing did not start until 1963. Due to the eutrophic nature of the lake at the time, fish production was high and it appeared that early predictions of high catches would be fulfilled. However, by 1967, the situation began to change as catches began to decline, first on the Zambian shore and later, on the Zimbabwean shore. Around the

same time, a fresh-water sardine, *Limnothrissa miodon* (kapenta) was introduced from Lake Tanganyika. This pelagic resource has, over the past twenty years, grown into a major industry, for both countries.

The boundary between the two countries lies along the deepest channel of the river. There are no physical or visible marks to show where the boundary lies. The lake is divided into five different natural basins which are common to both countries except for basin five which is only on the Zimbabwean side of the lake. The four basins common to the two countries are divided by the international boundary. The five basins are:

- Basin 1: Devil's Gorge to Sebungwe Narrows.
- Basin 2: Sebungwe Narrows to Chete Gorge.
- Basin 3: Chete Gorge to Kota Narrows.
- Basin 4: Kota Narrows to a line running between Fothergill Island in Zimbabwe and Siavonga in Zambia.
- Basin 5: Sanyati Basin in the eastern part of the lake. This is the basin which is confined to the Zimbabwean side of the lake only.

The creation of Lake Kariba took place during the time of extensive state-based appropriations and enclosures of land by the Colonial Government of the then Federation of Rhodesia and Nyasaland (1953-63). As Lake Kariba developed, the settler state replaced the pre-existing riparian rights of the large Tonga communities with new rules of access. In the Zambezi Valley this legislation defined many forms of state lands including forestry reserves, national parks and wildlife estates. Thus, the state expropriated and took on centralised management of enormous chunks of resources.

Political independence for Zambia in 1964 and the Unilateral Declaration of Independence for Rhodesia in 1965 brought about an early divergence in the policies, programmes and management regimes regarding the respective inshore fisheries of Zambia and Zimbabwe lake shores. As a result, over the past 30-35 years, two discrete fisheries have separately evolved.

2. **Zambian fisheries**

Once Lake Kariba was created, the then federal administration on the northern lakeshore (the Zambian side) effected an ethnically-based system of exclusive rights in favour of the dominant resident and relocated Tonga communities of the northern inshore fishery. This policy was in effect between 1958-68. Zambia became independent in 1964, and in the following decade, the nationalists replaced the ethnically-based rights of the local community with a pan-national system of rights to all the nation's resources, including those of Lake Kariba. Moreover, the regulation of all fisheries in Zambia was centralised and came under the Department of Fisheries in the Ministry of Agriculture, Food and Fisheries. Government policy which stated that resources of the country are available to all Zambians (captured in the slogan "One Zambia, One Nation") opened up the assumed bounty of Lake Kariba to immigrant fishers from elsewhere in Zambia. This National Access regime 1968-74, evolved until it was disrupted by the Zimbabwean war of liberation 1974-80. By 1980, the war in Zimbabwe was also affecting the Zambian side of Lake Kariba and caused the complete withdrawal of the Zambian Department of Fisheries (DoF) from the lake. Commercial fishing ceased as well. As a consequence of this and the policy concerning

access for all Zambians to their country's resources, the inshore fishery became "open access" up until 1993.

2.1 Bio-technical and physical characteristics

Four species out of more than thirty fish species dominate catches in the inshore fishery, as shown in Table 1. Being riverine, most of the species are demersal except for tiger fish which is found in deeper waters where its major prey (*Limnothrissa miodon*) is found. Since 1990, there has been a small decline in the abundance of cichlids (breams) and an increase in tiger fish. Total catches in the fishery have fluctuated between 1,000 and 3,000 tons since commercial fishing started. Over the period 1990 - 1993, total catches varied between 2,237 tonnes in 1990 and 1,196 tonnes in 1993. The greatest influence on lake productivity, and hence catches, appears to be lake level. During drought years, catches go down considerably. Catch per boat/night (kg's) for cichlids has shown considerable fluctuation over the period 1986 - 1992 from 4 kgs/boat night to 1 kg/boat/night. Catch per boat/night of tiger fish has remained fairly steady at around 1 to 1.5 kgs/boat/night. However, in general data is considered to be fairly unreliable before 1992 and distorted from 1986 onwards when minimum mesh sizes were introduced resulting in catches using illegal gear going unrecorded.

Table 1: Composition of catches from the Zambian inshore fishery, 1993

| Species | Percentage of total catches |
|---|-----------------------------|
| Tiger Fish (<i>Hydrocynus vittatus</i>) | 23% |
| Red breasted tilapia (<i>Tilapia rendalli</i>) | 22% |
| Brown squeaker (<i>Synodontis zambezensis</i>) | 17% |
| Eastern bottlenose (<i>Mormyrus longirostris</i>) | 10% |
| Sharptooth catfish (<i>Clarius gariepinus</i>) | 9% |
| Other Cichlids | 10% |
| Others | 9% |

Source: ZZSFP, 1993

Fishing is carried out throughout the year. Individual fishers, however, stop fishing when there is a full moon. Until the recent changes in the management regime of the lake, the inshore fishery was open-access. Fishers migrated from one part of the fishery to another in search of higher catches. During the annual closures of other important fisheries in Zambia (e.g. Kafue

River and Lake Bangweulu), fishers from these fisheries migrated to Lake Kariba and returned once these other fisheries were reopened.

The fishery is artisanal, dominated by the use of non-motorised boats (Table 2). Less than 50 boats on the fishery are motorised and most of these boats are used for transporting dried fish to access roads. According to the frame survey in 1993, the number of boats have decreased from 2,013 to 1,300 in 1995. The reduction is attributed to some fishers not being happy with the new management changes and opting to leave the fishery. They have moved to other fisheries where there are no changes being implemented, such as the Kafue River.

Table 2: Types of vessels in the inshore fishery

| Vessel type | Total | % |
|---------------|-------------|------------|
| Dug-out canoe | 1148 | 89 |
| Fibre glass | 92 | 7 |
| Planked | 45 | 3 |
| Metal | 12 | 1 |
| Asbestos | 3 | - |
| TOTAL | 1300 | 100 |

Source: Frame Survey, Chitembure, 1995

Fishing is carried out inshore (up to 15 metres in depth) because most of the targeted species are found in shallow waters and most of the boats are not sufficiently seaworthy for deeper waters. The main gear used are mono-filament nylon nets ranging from 1.5 inches to 8 inches in mesh size although the minimum legal mesh size is 3 inches. Other gear used are hook and lines and baskets although compared to the number of net users they are insignificant. Baskets are normally used by women in flooded river estuaries. Different gear-users target the same species. Table 3 shows the distribution of gear, villages and fishers.

Table 3: Distribution of gear, villages and fishers by strata. 1995

| Strata ¹ | Villages | Fishers | Boats | Nets |
|---------------------|-----------|-------------|-------------|--------------|
| 1 | 15 | 385 | 357 | 4391 |
| 2 | 14 | 293 | 275 | 2878 |
| 3 | 20 | 422 | 424 | 4037 |
| 4 | 18 | 255 | 244 | 1832 |
| Total | 67 | 1355 | 1300 | 13138 |

Source: Frame Survey, Chitembure, 1995

¹ For definition of strata see description of administrative boundaries

When fish is processed it is either sun-dried or smoked using different types of kilns. Fresh fish is put in ice-boxes and transported to markets.

2.2 Boundaries

Apart from the international boundary and the physical boundaries described in Section 1.1, the Zambian side of Lake Kariba also has three other boundaries: administrative, legal and technical.

Administrative boundaries

The lake is divided into four strata and four zones. Zones and strata do not share the same boundaries. Each strata is supposed to have more or less the same number of fishers that can adequately be covered by DoF Fisheries Assistants (extension officers) in each stratum. The strata are used by DoF for data collection.

Zones are defined on the basis of the four local chieftainships on the lake-shore namely Chief Mwemba, Sinazongwe, Chipepo and Simamba. Each zone is under the chairmanship of a chief. The three district councils (Sinazongwe, Gwembe and Siavonga) along the lake shore are represented at the zonal level.

Legal boundaries

Previously, there were no formal fishing boundaries. The new regulations being implemented intend to create geographically defined fishing grounds for each village. The Department of Fisheries in consultation with fishers, chiefs and headmen will define the fishing grounds.

Technical boundaries

Whilst administrative boundaries may allow fishers to fish up to certain distances from the shoreline, their actual operations are limited to the littoral zone of the lake. This is because their boats do not have the technical capacity to fish in deep and rough waters and most of the fish species targeted by the artisanal fishers are naturally riverine and concentrated in the shallow parts of the lake. The deeper waters of the lake are a niche occupied by *Limnothrissa miodon* (kapenta) which is exploited by the large high capital industrial fishing companies.

2.3 Characteristics of the market

Fish is sold at domestic urban markets and there are no exports. About 80 percent of the catch is sold on the markets. It has been estimated that around 10% of the catch is retained for household consumption and spoilage accounts for the remaining 10% of the catch.

Approximately 65% of this fish is sold dried and 35% sold fresh. Due to a decline in per capita disposable income, per capita fish consumption declined from 19 kg in 1989 to about 11

kg, in 1992. This decline also saw consumers buying more dried fish because it is cheaper and can be stored longer than fresh fish. Although consumers prefer some species such as tilapia to other species such as barbel due to cultural and religious beliefs, there is no significant difference in price between species. However, fresh fish attains a higher unit price than dried or smoked fish. Fish prices are also influenced by the annual three-months closure of other fisheries in the country. This has the effect of increasing the price of fish, prompting fishers from these closed areas to come to Kariba and catch as much fish as possible.

It is estimated that there are around 800 people involved in fish trading of either dried or fresh fish. About 70% of the total number of traders deal in dried fish. This trade is dominated by women as it is a lower cost and lower risk (losses from spoilage) compared to the fresh fish trade. Fish is bought from fishers, processed and transported to the markets in other parts of Zambia. There are three major types of dried fish traders involved:

- (1) Women traders from urban areas. This group is dominated by single female household-heads who have the freedom to travel. They are the majority of dried fish traders. They usually buy fish and process it themselves. They can stay up to a month at the fishery depending on the availability of fish.
- (2) Spouses of fishers are also involved in fish trading as a way of obtaining higher incomes for their households by not using middle-men. Spouses normally have the time to travel to markets while the men continue fishing. They account for about a third of the number of dried fish traders.
- (3) Wholesale fish traders who do not usually travel to the lake but buy fish in bulk from other traders who come from the lake. They comprise about 10% of the total number of fish traders.

Fishers can also travel to markets to sell their fish. They normally do this when they want to purchase new gear and household effects.

Fresh fish traders comprise about 30% of the total number of traders. They buy fresh fish, put it on ice in insulated boxes and transport it to the markets by personal, public or hired vehicle. This trade is limited to fishing camps near access roads such as Siavonga, Chipepo and Sinazongwe. Due to the high costs required in the fresh fish trade, such as reliable transport and ice-boxes, the fresh fish trade is dominated by men who come from outside the area.

Fish is bought and sold by individuals who do not have large outlays of capital. Fish are sold by sight at the lakeshore and by sight or weight in urban markets. The trade is very competitive and is dominated by individuals and not companies. Apart from a fish levy payable to the council, there is no official control over individual fish traders such as the issuing of licenses. Some traders provide gear, clothing, salt and food items in exchange for fish.

2.4 Socio-economic characteristics

After the creation of Lake Kariba, the fishery was exclusively used by the Valley Tonga people who had been displaced from the banks of the Zambezi River by the rising water levels. Today, however, the inshore fishery is exploited by four main ethnic groups from all over Zambia, as shown in Table 4. In 1995, there are an estimated 1355 fishers in 67 villages.

Table 4: Ethnic groups in the fishery

| Ethnic group | % |
|------------------------|-----|
| Valley Tonga | 45% |
| Bemba | 32% |
| Lozi | 10% |
| Plateau Tonga | 3% |
| Others and Non-Zambian | 10% |

Source: ZSFP, 1995

With the exception of some of the Valley Tonga, all fishers are full time. The majority of the Valley Tonga are seasonal fishers, spending the months November - April carrying out agricultural activities and livestock-keeping.

Until 1994, the lake was open access with no restrictions on who could enter the fishery. This contributed to the high mobility of fishers from one part of the lake to another or from other fisheries in Zambia to Lake Kariba. There were a total of 278 temporal and permanent fishing villages along the entire shore-line. These villages have now been reduced to 67 permanent fishing villages (see section 3). According to frame surveys conducted in 1993 and 1995, the number of fishers has decreased from 2,283 in 1993 to 1,355 in 1995. This is probably because some fishers who were dissatisfied with the introduction of the new management arrangements have opted to leave the fishery.

The Valley Tonga own more livestock such as cattle, goats and sheep than other groups. For them livestock is seen as a store of wealth. They are also engaged in the agricultural production of cotton, sorghum, maize and millet. While the other crops are grown for subsistence, all cotton is sold for cash. Other ethnic groups tend to invest most of their money in urban areas in other parts of Zambia (e.g. Lusaka or in their homes of origin). These groups are occasionally involved in petty trade of second-hand clothes and food items. The Valley Tonga have the largest households with an average size of eight members (preliminary results of 1995 socio-economic survey). They also practice polygamy such that before the new management arrangements they used to migrate to other fishing camps usually taking one wife and leaving the other wife in the permanent home. Other ethnic groups are largely monogamous having smaller households with an average size of 5.6 members (preliminary results of 1995 socio-economic survey). These households tend to have simple household structures and migrated with their entire households. However, due to their investments in agriculture and livestock, the Valley Tonga tend to be less migratory than other ethnic groups.

The Valley Tonga people are strong believers in traditional ceremonies such as rain-making. The influence of education and churches and influx of other ethnic groups have tended to dilute some of these traditional beliefs.

Fishing is the major activity of common interest between the indigenous Valley Tonga and the non-indigenous people. Although the relations between the two are not openly confrontational, there are certain areas of conflict. The most serious conflicts have been over land. Some of the newly designated villages (see section 3) are established in permanent Valley Tonga

villages. The Valley Tonga in these villages do not see any economic benefits in sharing their land with the newcomers most of whom are non-indigenous to the area. They argue that these 'foreigners' are in the fishery to fish and should therefore not engage in other activities such as farming. In other instances, some of the Valley Tonga are being asked by the Government to leave their permanent villages to live in the newly designated fishing villages. The Tonga argue that since the majority of them are only part-time fishers, they do not see any reason why they should resettle in permanent fishing villages. This behaviour is resented by the non-indigenous people in the fishing villages who argue that the Tonga are also fishers and should abide by the new fishing regulations operational in the fishing villages.

There are no major differences in ownership of gear and boats between ethnic groups although a few Valley Tonga fishers own motorised boats which are normally used for transport purposes and not fishing. Local lending arrangements are sometimes made to assist those who do not own boats such that fishers borrow boats from other fishers for some form of payment. Fishing gear and boats are owned by individual households. Almost every fisher owns nets.

With regard to the fishing activities, fishers are relatively big risk takers and they themselves consider fishing to be a risky activity. The vessels they use are not very safe in rough weather and there is always a threat of being attacked by hippos and crocodiles. There appear to be no ethnic differences in terms of their attitude towards risk.

However, ethnicity does seem to be a factor in determining the willingness to undertake collective action. Collective action is more evident within a particular ethnic group and not across ethnic groups. For instance, the Tonga perceive other immigrant ethnic groups as being 'foreigners' and responsible for illegal fishing practices.

2.5 Knowledge about the fishery

Fishers seem to have a good knowledge about the fishery and tend to adjust their fishing patterns accordingly. They know the spawning patterns of each species and that most of the species are riverine. They are also aware that during the cold season, fish will migrate to the deeper parts of the lake, and respond to this by setting their nets lower.

Fishers know that most of the fish caught during the months from November to May are gravid (have eggs); they know about the dangerous parts of the lake and when to stop fishing if the wind speed starts to rise.

Biological information on the fishery is conducted by researchers employed by DoF. Fishers attend short-courses at a Fisheries Training Centre run by the DoF where they are taught modern fishing methods and the regulations in force. These courses are supplemented by those run by Non-Governmental Organisations and church groups. The DoF also employs Fisheries Assistants who are based in fishing villages where they conduct extension services as well as collect data on catches.

2.6 Other stakeholders

While the lake was primarily created to generate power, there is also a number of other stake-holders who have interests in the lake, lakeshore and interact with the inshore fishery:

- The Kapenta Fishers's Association. Members of the Association are operators from the mechanised offshore kapenta fishery. This sector uses highly mechanised fishing rigs for its operations. The sector became a prominent stakeholder only after 1980.
- The Zambezi River Authority. The Authority is responsible for the overall development of the lake-shore and water in the lake. Its main responsibility is to monitor activities that could have an effect on water levels such as the use of wood for fish-processing.
- The District Councils. There are three district councils (Siavonga, Gwembe and Sinazongwe) whose responsibilities include the setting-up of infrastructure such as harbours and markets and the provision of other social services such as health and education. Councils are also responsible for collection of fish levies from fish traders.
- Safari operators. Since 1990, tourism has been expanding along the lakeshore. This includes game viewing and sport-fishing.
- The Ministry of Agriculture, Food and Fisheries, represented by the Department of Fisheries. They have overall responsibility for fisheries development on the lake.
- There are also some fishers who, apart from fishing, are involved in cross-border illegal trading.

3. Decision-making arrangements

3.1 Department of Fisheries

The resources of Lake Kariba are owned by the people of Zambia. The government, through the Department of Fisheries in the Ministry of Agriculture, Food and Fisheries, has rights to make operational rules to manage the fishery. The current functions of the DoF are outlined in the Fisheries Act, Cap 314 of 1974. Among other things, the Act empowers the Department to control fishing, to register fishers and their boats and to prescribe special fishing areas and licenses. Fisheries policy concerning the management and development of all fisheries resources in Zambia is formulated by the DoF, with negligible consultation with fishers and stakeholders and strongly influenced by the fisheries development policies of donors participating in, or interested in, participating in the sector. The fisheries policy is currently being amended to promote community-based resource management. The idea arose because the DoF does not have sufficient resources to monitor and enforce fisheries regulations in Zambia and more generally in the idea that user participation will improve management. The policy was formulated by the DoF within the wider context of a World Bank sponsored Agricultural Sector Investment Programme which promotes decentralisation and aims to attract donor funding for the sector as a whole, including fisheries. Within the fisheries sub-sector of the programme, the objectives are to involve users in management as well as encouraging the private sector to take over some of the functions which were previously done or provided by DoF.

3.2 Lakeshore Development Plan

For Lake Kariba, a Lakeshore Development Plan has been formulated by the DoF, which includes the participation of stakeholders. The plan recognizes that the three Districts (Siavonga, Sinazongwe and Gwembe) are among the least developed in the country due to poor road and communication infrastructure and hostile climate which does not support a large selection of crops. The plan intends to focus on seven sectors which have the potential of generating employment and increasing household food security. The sectors are agriculture, livestock, fishing, small-sector industries, forestry, tourism and mining. However, the Plan recognizes that the fisheries sector is dominated by fishers from other areas of Zambia and that instead of promoting fishing for the indigenous population, agriculture should be encouraged as it offers the best employment alternative in the region compared to artisanal fishing. Adoption of the plan is scheduled to take place in phases. Initially, sector committees will be formed and these will be expected to produce concrete sector development plans by February 1997. After this has been done the ZZSFP will convene a meeting of the sector committees to outline issues for discussion at a workshop. This workshop will prepare draft plans of activities and must be held before the end of March 1997. Provisional participants are chiefs, fishers, the Provincial Planning Unit and other interested parties such as tour and Kapenta operators. The final phase is the adoption of the plan and its submission to the National Commission for Development Planning for sourcing of funds, presumably from donors, for implementation. This process is scheduled to be completed by July 1997. There is, however, pressure to complete and implement the Plan which means that there is little time to discuss with fishers and obtain agreement on the proposals from fisher households.

3.3 Legislation

According to the Fisheries Act of 1974, significant powers are given to the Minister of Agriculture and Director of Fisheries to manage the fishery. The Minister can make regulations to improve the implementation of the provisions of the Act through the use of Statutory Instruments. This includes regulations concerning effort limitation, technical regulations, processing, trade, monitoring and enforcement. Regulations are made for each fishery. For the Lake Kariba inshore fishery, entry limitation or licensing of fishers exists. Examples of technical regulations include mesh size regulations (nets to be used on the fishery should not be less than 3 inches), closed areas and limitations to the areas where nets in order to protect spawning areas (i.e. setting of nets has to be at least 50 metres from the shore). The use of explosives and chemicals is also prohibited to prevent indiscriminate killing of fish.

Ideas for changes in, or entirely new, regulations are drafted by the DoF and sent to the Ministry of Legal Affairs for legal drafting. Any changes in legislation are then circulated to Cabinet for approval and signature of the Minister. The new regulations are then published in the Government Gazette. Changes in regulations can be influenced by DoF fisheries assistants when they attend annual general staff meetings of DoF. Suggestions are put forward which are then discussed with the Permanent Secretary of Agriculture who consults the proposed changes with politicians from the areas which may be affected by any changes. Users and other stakeholders are usually not consulted. The process for changing or drafting new regulations can take a long time. It can take six months if closely supervised, but it is not unusual for a regulation to take two

years before it is amended. Any amendments to the Fisheries Act itself has to be approved by Parliament.

3.4 Proposed changes in decision-making arrangements

Currently, changes are taking place in the way Lake Kariba fisheries (inshore and kapenta) are managed. The main incentive for these changes has been the donor-funded Zambia/Zimbabwe SADC Fisheries Project. In early 1994, the project on the Zambian side contracted two consultants whose terms of reference included the identification of areas in which the current management was proving ineffective; where there were defects in the management system; where rules and regulations defined by the management were being ignored or infringed upon; where there was lack of understanding between the management and the fishers; and where further information or investigation was required.

During this work, the consultants interviewed 94 people of which 50 were from the fishing communities and the rest were chiefs, councillors, village headmen and other stake holders. The consultants prepared a report and made proposals for new management structures which were discussed at a workshop. They also drew up a list of persons to be invited bearing in mind the limitation of participants necessary for a successful participatory objective planning workshop.

At the workshop the artisanal sector had a 10.7 percent representation and the Zambia/Zimbabwe SADC Fisheries Project had a 21.4 percent representation. Other participants included district council officials, chiefs, NGO representatives and kapenta operators. One of the conclusions made by the consultants was that the inshore fishery should change from being open access to limited entry. The workshop also recommended that in order to curtail free entry into the fishery, the number of fishing villages should be reduced from more than 200 to 67. Fishers were therefore asked to move into the new designated villages by a certain date. In these new villages, fishers had to be registered. No fisher could be registered in two different villages.

The workshop also recommended the creation of new management structures which were aimed at facilitating the involvement of users in making some operational rules. The workshop also drew up a time frame in which to implement the workshops recommendations. The time frame runs from 1994 to 1999. Recommendations which emerged from the workshop were disseminated to the fishers by teams of people made up of chiefs and officials from the DoF. Currently, these recommendations are at different stages of implementation. Draft regulations have been prepared which lay down the roles of players in the new management structure and have been sent to Parliament for debate.

At the fishing village level, the workshop recommended that Fishing Village Management Committees should be established. According to the draft regulations, these committees, now called Integrated Village Management Committees (IVMC), would comprise an elected chairman from among the village fishers, three fishers elected by the fishers themselves, one village headman appointed by the chief of the area, one fisheries assistant representing the Department of Fisheries and one village fish scout, also appointed by the Department of Fisheries. As chiefs inherit the chieftainships from their kin and also appoint headmen along hereditary lines, these two positions will always be held by Valley Tongas. Although the Valley Tonga consider their chiefs and headmen to be legitimate it is not clear from the information currently available whether the non-Tongas view these leaders as legitimate. However, whenever non-Tonga are asked about their chiefs they refer to traditional rulers back in their home areas. The local Valley

Tonga chiefs also tend to side with local Valley Tongas in Tonga/non-Tonga conflicts. The rest of the elected posts on the committees are based on majority vote and can be held by anyone from the fishing communities.

The role of IVMCs is to recommend fishers for licenses, facilitate and assist in enforcement of fisheries regulations, ensure that fishers have valid licenses and register their vessels and gear. Apart from these functions, the power to make most operational rules remains with the DoF.

IVMCs report to the Zonal Fisheries Management Committees (ZFMCs) of which four have been established. These ZFMCs comprise of the chief of the area; one representative of the district council in which the zone is located and who is appointed by the district council; four representatives from the IVMCs (the regulations do not indicate the election or appointment criteria of these officials at the zonal level); two kapenta fishers appointed by the Kapenta Fishers Association; one representative of Non Governmental Organisations operating on the shore-line and; two businessmen with 'active and well established' businesses on the shore-line (the regulations do not specify how these will be appointed or elected to the ZFMCs).

The role of the ZFMCs is to monitor fishing practices, monitor implementation of fisheries regulations, source funds for loans to fishers, and monitor the operations of the IVMCs. They report to the Director of Fisheries who has control over each Zonal Committee relating to "methods to be adopted to ensure sustainable exploitation, conservation, preservation of aquatic resources and development of the fishing industry".

The Director of Fisheries is chair of the Lake Kariba Fisheries Board of Management. The Board has four secretariats responsible for revenue collection, regulations and policing, research and extension, and development promotion division. It is responsible for registration of fishers, licensing of fishers, boats and nets, collecting fish levy from fishers and traders and licensing fish traders and fish transporters and carrying out law enforcement activities. Proposed Board members are: the Director of Fisheries, three kapenta fishers from three zones, three representatives of District Councils, three resident chiefs, one representative from the NGO, two representatives from shoreline-based businesses and three inshore fishers or village headmen. All would be appointed. It is not clear who the Board would report to but presumably it would report to the Minister of Agriculture, Food and Fisheries.

Under the new regulations, the Minister of Agriculture will designate both permanent fishing villages and associated fishing grounds as well as buffer zones between fishing grounds. Although the regulations have not come into force, the new structures are already being implemented and the process initiated. The designation of fishing boundaries is being made by DoF in consultation with the IVMCs and chiefs.

In terms of representation, women seem to be better represented at the lowest levels in the new structures, i.e. at IVMC level rather than at higher levels which have more decision-making powers. For example, no women are members of the ZFMCs. Even at IVMC level they mostly occupy positions of committee secretary or treasurer. Although membership to some of the communities such as the IVMC is by election, in most cases, women are either not voted for or not confident enough to contest for various positions in the committees. Another contributing factor to limited representation of women is that rules for membership of the committees do not specify that there should be a certain proportion of men and women.

Due to the manner in which decisions on the new management regime were taken at the planning workshop and because fishers are poorly represented above the IVMC level, fishers are generally not satisfied with the way decisions are being made and implemented. For example, due to insufficient representation at the workshop, fishers feel that the new regulations and structures

are an imposition from central government. Government agents are also viewed as favouring other stake holders such as Kapenta fishers and safari operators. Fishers also mention that as soon as some of their fishing villages were re-designated, some fishing grounds were immediately re-allocated to other stake holders such as safari and kapenta operators which led to a feeling of betrayal among fishers.

4. Compliance, monitoring and enforcement

During the period when the fishery was entirely managed by DoF, Fisheries Assistants found themselves performing contradictory roles. They were responsible for collection of data, carrying out extension, and enforcement of regulations. They had powers to confiscate gear or hand over those breaking the regulations to the police. For these purposes, they were given boats, when resources allowed. Formal sanctions include confiscation of gear, and fines. Due to increase in inflation, the fines imposed on those caught have almost become symbolic because they do not correspond with the severity of the illegal action taken. Informal sanctions include expulsion from the fishing village and being treated as a social outcast by fellow fishers.

Monitoring and enforcement is now being transferred to the IVMCs and the ZFMCs. It is not yet clear what resources will be given to these committees but part of the levy to be collected from the issuing of licenses will provide funds for this exercise.

Compliance of regulations is dependent upon the fishers perception of their legitimacy. For the users, some of the regulations are still not viewed as justified, even after creation of new management structures. The breaking of such rules is considered legitimate. For instance, fishers know that fish spawn during certain periods of the year while the DoF keep certain areas closed all year round. The question of mesh sizes is also contentious; the regulations do not allow for the use of small mesh nets, although some species (e.g. Brown Squeakers) cannot be caught with larger mesh sizes.²

5. Incentives to cooperate and patterns of interaction

There are many levels at which users, stakeholders and governments interact amongst themselves and with each other. In this section, the interactions considered to be important for the establishment of a co-management regime are examined.

5.1 Fishers and Government (Local Councils and DoF)

The new management regime currently being implemented on Lake Kariba establishes some form of cooperation between government and users. However, incentives for cooperation are greater for government than users. The incentives for government to enter into some form of co-management agreement are as follows:

² Brown squeakers already account for 17 % of the catches. However, this is most likely due to the use of illegal mesh sizes.

- donor driven policy promoting co-management;
- high monitoring and enforcement costs in the fishery combined with limited resources;
- poor compliance with some regulations;
- poor living conditions of fishers.

The incentives for fishers to cooperate with government are the following:

- lack of representation in the decision-making process in the management of the fishery;
- perceived lack of legitimacy of some fisheries regulations;
- poor living conditions.

Before the introduction of the new management regulations, there was little cooperation between the two groups, and interaction was very limited beyond that of government carrying out monitoring and enforcement tasks. This was because DoF has had no active policy of consulting or discussing with fishers, and fishers themselves were unorganised and very geographically dispersed; sometimes living in temporary settlements. In addition, there has been no history of fishers representation in the decision-making processes. As described in the previous sections of this report, government has started to actively pursue a consultation process with fishers, although it can be argued that the main incentive for this has been donor policies and associated with this, funds.

Under the new management regime, government has set up decision-making arrangements which require fishers to hold meetings at the IVMC level, make recommendations which are passed on to the ZFMC and then to DoF. Under this new arrangement, government agents have so far interacted more with the 'leadership' of the fishing communities i.e. chiefs and at IVMC and ZFMC levels. Fishers themselves tend to be recipients of instructions with limited consultations on specific issues such as entry and fishing grounds.

5.2 Fishers, stakeholders and Government

Currently, the relationship between users and these other stakeholders (kapenta and safari operators) is confrontational, although there are clear incentives to cooperate for all parties:

- conflicts can be resolved;
- kapenta operators sometimes hire labour from the inshore fishery;
- some kapenta operators provide transport to fishers and their traders.

However, there are many more disincentives for cooperation. These are mainly related to the unequal relationship in terms of the economic and political power between fishers and the other stakeholders. Both the kapenta and the tourism industries on Lake Kariba generate considerable revenue. The inshore fishery, on the other hand, provides income and/or subsistence for a large number of people but does not contribute significantly to the national income of Zambia in the same way as the other two sectors. These differing power relations has made it difficult for fishers to negotiate with other stakeholders on an equal basis.

There is also a significant degree of mistrust between the fishers and kapenta operators as they know that some fishers collude with their employees to steal kapenta and company property.

These employees are often former fishers, from the same ethnic group as the fishers they are trading with. On the other hand, fishers accuse kapenta operators of being heavy-handed and carrying out unauthorised searches on their boats. Kapenta operators are also accused of dragging nets and fishing in areas meant for the inshore fishery.

Safari operators do not like fishers to fish in waters adjacent to their areas of operation because it is assumed that fishers will deplete fish stocks which they consider should be for sport fishing or they think fishers are poaching game under the pretext of fishing.

Government needs the revenues raised from the kapenta and tourism industries whilst these stakeholders need the support of government when conflicts with the inshore fishers arise and, in the case of the kapenta operators, to help prevent theft from their boats. Kapenta operators, through their organisation, the Kapenta Fishers Association, have provided help to government, usually in the form of providing resources such as boats, fuel and food to the ZFMCs and the police for use in enforcement and monitoring of the inshore fishery. DoF also allocates fishing grounds for their operations whilst they provide DoF catch and effort data. The important foreign exchange the tourism industry brings in also means that government has a strong incentive to cooperate with that sector. Thus the interactions between these stakeholders and government with regard to the management of the inshore fishery, are generally positive.

The government is in a pivotal position as a mediator in order to resolve conflicts between other stakeholders and fishers. Such resolution is in the interests of all parties, but given the relative strengths and weaknesses of the various stakeholders, it is unlikely that solutions will be favourable to the inshore fishery.

5.3 Fishers themselves

Although there is socio-culturally heterogeneity amongst fishers, they have had an incentive to cooperate together against other stakeholders (kapenta and safari operators) and government, especially with regard to the construction of temporary fishing camps, the use of illegal gear and fishing in closed fishing areas.

However, amongst the different ethnic groups of fishers themselves, there is limited cooperation or social interaction. For instance, there are few intermarriages between the Tonga and Non-Tonga. Under the new management regime, limiting access rights to the fishery might lead to further conflict between different ethnic groups.

6. Outcomes

This section examines outcomes of the management regime in terms of efficiency, equity and sustainability and predicts outcomes of the new co-management regime. Such predictions are based on existing incentives and patterns of interaction. Therefore, it is acknowledged that there may be unpredictable changes in decision-making arrangements which change incentives and patterns of interactions, thus affecting predicted outcomes.

6.1 Efficiency

From the DoF's point of view, the outcome of the previous management regime had low levels of compliance. The fishery was characterised by widespread use of illegal fishing methods, the catching of juvenile fish, interference with breeding areas and unlimited fishing effort. In addition, DoF did not have adequate resources for law enforcement such as patrol vessels and fuel and felt they had lost control of the fishery. From a fisher's perspective, compliance to many of the regulations was low as they did not consider them relevant or legitimate.

Other stakeholders felt that the artisanal sector was responsible for kapenta thefts, deforestation, lack of lakeshore tourism developments and loss of property from other users. This was attributed to lack of control on the movement of artisanal vessels at night, lack of enforcement agents and lack of a single body controlling 'development' on the fishery.

Under the new co-management regime, compliance is likely to improve for regulations which fishers are consulted on, such as fishing grounds and residency. However, compliance is not likely to improve concerning regulations on which they have not been consulted, such as minimum mesh size and closed areas. As the new system makes provision for monitoring and enforcement by users, it is therefore expected that only those regulations which are considered legitimate will be enforced.

Therefore it is debatable whether the new regime will improve the cost-effectiveness of all aspects of the management regime. Clearly the process of discussion with fishers at the IVMC and ZVMC levels will increase programme design costs as any participative process is more costly than a non-participative process. Enforcement and monitoring costs will be reduced only for those regulations considered legitimate by fishers, of which there are few.

6.2 Equity

The previous management regime, which was totally centralised, had no fisher representation, limited process clarity and heterogeneous expectations. The Valley Tonga felt non-indigenous ethnic groups, which had come from other areas in Zambia, were benefitting more from the fishery. Stakeholders were represented through political channels but there was no formal representation.

The new regime, through the IVMCs and ZFMCs, proposes to improve representation, process clarity and homogenise expectations of fishers and stakeholders at different levels. However, fisher participation is likely to be limited to rule making on access rights and fishing grounds - other rule-making will remain centralised. As a result, the relevance of such rules to the management problems may be limited, and compliance and enforceability may be poor.

There is likely to be an improvement in the flow of information especially from government to users because there will be clearly defined structures at the zonal and fishing village level. The management process is also likely to be clearer because everyone will know what is expected of them. Initially, however, fishers are likely to view the management process with suspicion as they have never been consulted before and are unfamiliar with such a process. Depending on the behaviour of all participants in the process, fishers are likely to have the same expectations as that of government if the management process is clear.

However, it is debatable whether such a process will bring about greater equity with regards to distributive effects. This is because the new institutional arrangements reassert the authority

of traditional leaders in the community. Valley Tonga are likely to use their permanent positions at the fishing village and zonal levels to give licenses to their kin and bar immigrants from the fishery. Other stakeholders, particularly kapenta and safari operators are likely to get a larger share of lakeshore, fishing grounds and coastal resources as they, because of their economic power and because they are better organised than the inshore fishers, will have a more powerful voice.

6.3 Sustainability

In terms of stewardship, under the previous management regime, fishers, especially immigrant fishers, had short time horizons. Valley Tonga had longer time horizons because they were indigenous to the region. With regard to the other aspect of sustainability, resilience, the previous regime was fairly resilient as regulations were changed to adjust to changing conditions - although in general the regulations were not considered legitimate and the legislative process took a long time.

Under the new regime, time horizons are likely to change among the Tonga as the fishing villages are their permanent homes. For non-indigenous fishers, the time horizons are likely to remain short term but may increase if they begin to identify themselves closely with the local structures and institutions.

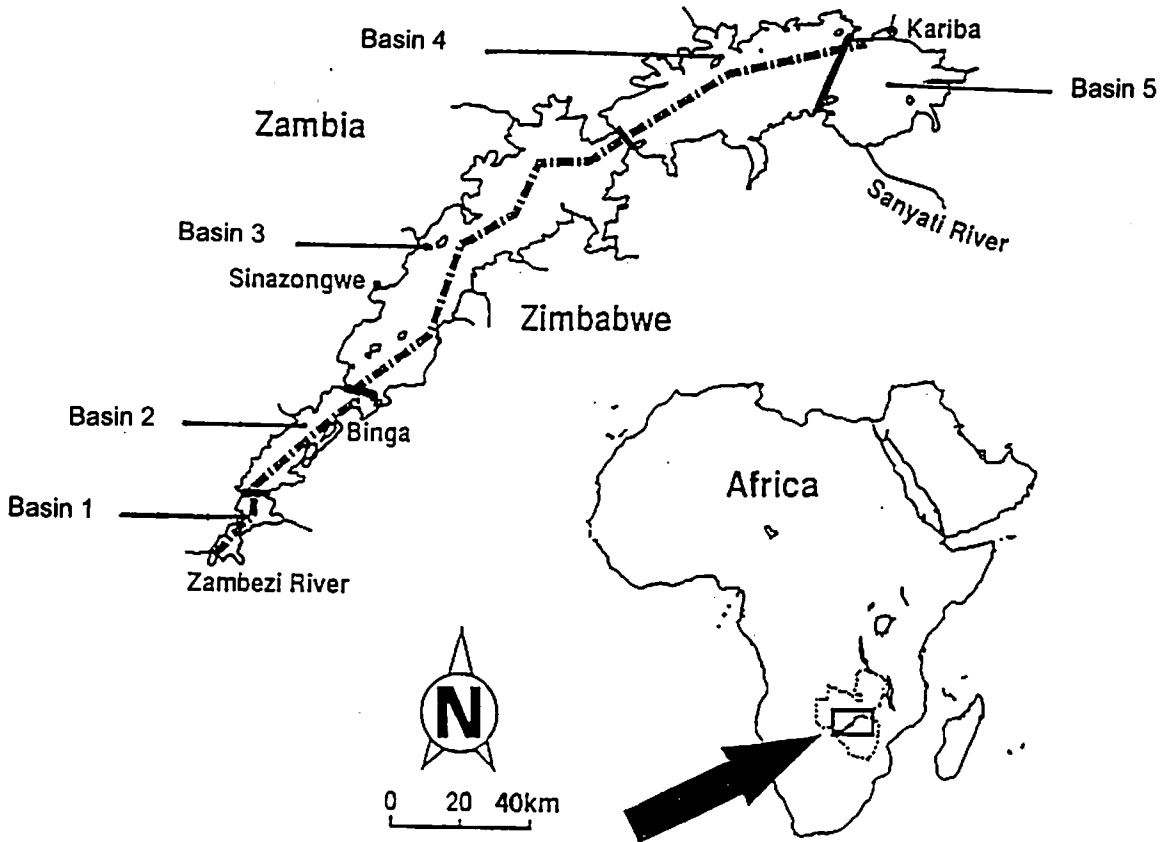
The structures created will enable changes in rule flexibility especially in areas related to entry and effort. The only drawback is that the legislative process is likely to still be long. The same structures at zonal and fishing village level are likely to be effective in mitigating any shocks that the system will endure. For instance, if kapenta operators decide to invest in the artisanal sector or if motorisation becomes widely used, these changes are likely to be discussed at the board, zonal and fishing village level before they are implemented thus allowing for absorption of any shocks.

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Map



Location Map of Lake Kariba

NB. Lake Kariba Recreational Park Zimbabwe occupies the area bounded by the southern shore line of the lake and the international boundary which runs through the Centre of the Lake.

Analysis of emerging co-management arrangements Zimbabwean inshore fisheries of Lake Kariba

Jeremy Jackson

Wellington Muriritirwa

Kefasi Nyikahadzoi

Centre for Applied Social Sciences (CASS)

University of Zimbabwe, Harare, Zimbabwe

Sevaly Sen (ed.)

Institute for Fisheries Management and Coastal Community Development (IFM)

The North Sea Centre, Denmark

1. Introduction

1.1 A brief history of Lake Kariba

Lake Kariba is one of the largest man-made lakes in the world (map 1 page 123), shared between Zambia and Zimbabwe on the Zambezi River. Construction of the lake began in 1955 and the dam wall was sealed in 1958. The lake reached its maximum capacity in 1963. The main purpose of its construction was to provide hydro-electric power to the copper mines in Northern Rhodesia (now Zambia) and Southern Rhodesia (now Zimbabwe). The lake is approximately 300 kilometres long, 40 kilometres wide at its widest point and has a total surface area of 5,500 square km. At its deepest point, the lake is 120 metres deep, but average depth is around 29 metres. It has a carrying capacity of 190,000 million cubic metres. The major tributaries flowing into Lake Kariba are the Zambezi and Sanyati Rivers. The two make a great contribution to the maintenance of the lake's fertility; the former by its tremendous water supply and the latter by the rich quality of its floodwater. The formation of the lake led to the displacement of a large number of people who for generations had relied on farming the alluvial soils on the banks of the Zambezi River. At the time, it was believed that displaced peoples would be compensated for their lost land in the form of high incomes from the new fishery as speculations for a productive fishery were optimistic.

Following the closure of the dam in 1958 fishing activities started at different times on both the Northern and Southern shore-lines. On the former, fishing commenced soon after the dam wall was sealed while in Zimbabwe, later fishing did not start until 1963. Due to the eutrophic nature of the lake at the time, fish production was high and it appeared that early predictions of high catches would be fulfilled. However, by 1967, the situation began to change as catches began to decline, first on the Zambian shore and later, on the Zimbabwean shore. Around the

same time, a fresh-water sardine, *Limnothrissa miodon* (kapenta) was introduced from Lake Tanganyika. This pelagic resource has, over the past twenty years, grown into a major industry, for both countries.

The boundary between the two countries lies along the deepest channel of the river. There are no physical or visible marks to show where the boundary lies. The lake is divided into five different natural basins which are common to both countries except for basin five which is only on the Zimbabwean side of the lake. The four basins common to the two countries are divided by the international boundary. The five basins are:

- Basin 1: Devil's Gorge to Sebungwe Narrows.
- Basin 2: Sebungwe Narrows to Chete Gorge.
- Basin 3: Chete Gorge to Kota Narrows.
- Basin 4: Kota Narrows to a line running between Fothergill Island in Zimbabwe and Siavonga in Zambia.
- Basin 5: Sanyati Basin in the eastern part of the lake. This is the basin which is confined to the Zimbabwean side of the lake only.

The creation of Lake Kariba took place during the time of extensive state-based appropriations and enclosures of land by the Colonial Government of the then Federation of Rhodesia and Nyasaland (1953-63). As Lake Kariba developed, the settler state replaced the pre-existing riparian rights of the largely Tonga communities with new rules of access. In the Zambezi Valley, this legislation defined many forms of state lands including forestry reserves, national parks and wildlife estates. Thus, the state expropriated and took on centralised management of enormous chunks of resources.

Political independence for Zambia in 1964 and the Unilateral Declaration of Independence for Rhodesia in 1965 brought about an early divergence in the policies, programmes and management regimes regarding the respective inshore fisheries of Zambia and Zimbabwe lake shores. As a result, over the past 30-35 years, two discrete fisheries, have separately evolved.

2. Zimbabwean fisheries

On the southern lake shore (the Zimbabwean side), the Rhodesian colonial government initially focussed on the resettlement of the Tonga communities displaced by the impoundment. It planned and provided for their access to the inshore fishery by sanctioning chieftaincy-based rights to fishing camps on Tribal Trust Lands adjoining the lake shore. African fishing concessions were designated and fishing began in 1963. The state also negotiated European fishing concessions in areas of the lake adjacent to national parks and other state or forest reserves. The aim of this was to establish a "commercial/industrial" sector which would also service the "artisanal" fishers, providing inputs and a marketing service for fresh fish. The designation of the Rhodesian side of the lake as a recreational park under the then Parks and Wildlife Act placed the lake under the direct control of the research, management and enforcement units of Department of National Parks. The Department managed this racially segregated regime of state regulated access to the resource for ten years up to 1974. The fishery was heavily disrupted by the war of independence 1974-1980. However, the post war recovery in Zimbabwe was rapid and effective in re-establishing the administration and services in the Zambezi valley and the lake shore. For

example, as part of a wider post-independence policy, the Lake Kariba Fisheries Research Institute (LKPRI) promoted, with other government departments, the establishment of cooperatives within fisher communities. It did this partially through the allocation of new fishing concessions to cooperatives. Since 1982, and in the context of a donor-funded SADC Zambia-Zimbabwe Fisheries Project, the state regulated access regime has increasingly come under pressure and has been criticised both internally and externally as failing to achieve its objectives.

2.1 Bio-technical and physical attributes

The Lake Kariba inshore fishery is dependent on the harvesting of ten fish species. However, three species made up 80% of the catch in 1993 as shown in Table 1. Tiger fish has become more abundant in recent years; since 1986 catches have increased from about 12% to 30%.

Table 1: Species composition in the inshore fishery, 1993

| Species | Percentage of total catches |
|--|-----------------------------|
| Kariba bream (<i>O.mortimeri</i>) | 41% |
| Tiger Fish (<i>Hydrocynus vittatus</i>) | 23% |
| Barbel (<i>Clarius gariepinus</i>) | 15% |
| Eastern bottlenose (<i>Mormyrus longirostris</i>) | 7% |
| Bream (<i>O.codringtoni</i>) | 3% |
| Bream (<i>Tilapia rendalli</i>) | 3% |
| Cornish jack (<i>Mormyrops anguilloides</i>) | 3% |
| Hunyani labeo (<i>Labeo altivelis</i>) | 2% |
| Others (incl. <i>S.macrocephalus</i> , <i>D.shenga</i>) | 3% |

Source: ZSFP, 1993

Species composition of catches changes further up the lake (and away from the dam wall) as the habitat becomes more riverine. Thus, in the upper reaches of the lake, the incidence of bream falls and a much higher proportion of cyprinids (*Labeo altivelis*) occurs.

Catches have now stabilised around 1,200 - 1,500 tons per year according to available records. Studies indicate that there is a significant positive correlation between changes in lake productivity and changes in lake level. Although official statistics show that total effort levels have declined since 1973 (except for 1984 and 1985 when twice the normal effort was recorded), this contradicts findings of several socio-economic surveys that show that the number of fishers

has been increasing since independence. This difference could be attributed to the fishers' under-reporting of the number of nets fishers actually use.

An assessment of the state of the inshore stocks found that the breams, *O.mortimeri* and *O.codringtoni* were underfished and that effort was close to optimum for tiger fish. In the case of *O.codringtoni*, the assessment noted that present legal mesh sizes are not exploiting the population. Although maximum sustainable yield (MSY) was ill defined, the assessment also found that all stocks were below MSY. However, certain areas might be subject to localised overfishing (e.g. the Eastern Basin especially around the Sanyati area), and some areas are maybe underexploited.

The riverine origin of most of inshore species in Lake Kariba (with the exception of tiger fish) means that fish are mostly found within the 15 - 20 meter depth of the shoreline as well as in rivers and river estuaries. Although species are not migratory, most species do make spawning runs and may therefore go upstream during the breeding season.

Fishing is carried out throughout the year although catches do fluctuate during the year, depending on temperature, rainfall, and moon phase. Fishers say catches are relatively high in January and February and poor during the cold winter months. During the rainy season, some fishers go to their farms in upland areas to assist their wives in agriculture, but in most cases their workers remain, to continue fishing.

The Lake Kariba inshore fishery is largely based on the harvesting of fish using gill nets. The most common types of nets used are monofilament nylon nets and multi filament cotton nets. The legally allowed minimum mesh size is four inches, although other, smaller mesh sizes are used. Gill netting is mostly carried out by licensed independent fishers and cooperative members for commercial purposes.

Hook and line fishing is also widely practiced by women and children and non-license holders for subsistence purposes, with a negligible percentage of the catch being sold. Beach seine and scoop nets (*chikokota*), though prohibited, have been occasionally observed as being used, but the prevalence of their usage is difficult to approximate.

There are four main types of non-motorised fishing vessels used within the inshore fishery as shown in Table 2. A few fishers own simple motorised boats although these are generally used for local transportation and not for fishing.

Table 2: Types of vessels in the inshore fishery

| Vessel type | Total | % |
|---------------|-------|------|
| Metal | 240 | 56% |
| Fibre glass | 88 | 21% |
| Dug-out canoe | 73 | 17% |
| Planked | 24 | 6% |
| TOTAL | 425 | 100% |

Source: ZZSFP, 1995

2.2 Boundaries

Apart from the international boundary with Zambia and the physical boundaries described in Section 1.1, the Zimbabwean side of Lake Kariba also has two other relevant boundaries: administrative and technical.

Administrative boundaries

Fishing areas are divided into seven fishing concessions (map 2 page 124). There are two types of gill net fisheries operating in these concessions. Firstly there are the local independent fishers operating concessions adjacent to District Council lands. The gill net fishers operating in these concessions are mostly those who were displaced by the creation of the lake. Historically, each displaced chief was allocated a fishing village which should be occupied by his subjects and used for fishing. Each village had, and still has, a headman appointed by the chief and who reports directly to him. There are currently 35 fishing camps.

There are also fishers operating from the European concessions adjacent to State lands (National Parks and Wildlife Estate). In the past, these fishers were directly employed by the concessionaires and later became sub-concessionaires. Some of these have since formed cooperatives but are still directly controlled by the concessionaires especially with regard to sales. Concessionaires still have control over certain fishing camps and grounds where they provide nets, boats, cooler boxes and ice blocks. Fishers are paid a fixed price per kilo of fish and independent buyers are not allowed into these concessions currently. There are four fishing camps in these areas.

In both types of concession areas, each fishing camp has its own fishing ground which is defined by landmarks such as river mouths, baobab trees, islands. Fishers are aware of each of these grounds, although in practice these boundaries are not strictly observed.

Technical boundaries

Whilst administrative boundaries may allow fishers to fish up to certain distances from the shoreline, their actual operations are limited to the littoral zone of the lake. This is because their boats or canoes do not have the technical capacity to fish in deep and rough waters and most of the fish species targeted by the artisanal fishers are naturally riverine and concentrated in the shallow parts of the lake. The deeper waters of the lake are a niche occupied by *Limnothrissa miodon* (kapenta) which is mainly exploited by the large high capital industrial fishing companies together with a few cooperatives formed by former independent gill net fishers.

2.3 Characteristics of the market

About 80% of the total inshore catch is sold, 10% used for home consumption and the remaining 10% accounted for by spoilage. Thus, the inshore fishery is largely exploited for commercial purposes. Fresh fish tends to be sold from areas which are easily accessible by boat or road. It is kept on ice in insulated boxes. The buyers, which are predominantly companies, supply the ice

and in some cases the cooler boxes to the fishing villages. In less accessible areas, where there are few fish buyers and where there are problems of getting ice for fish preservation, fishers and/or traders process fish. Fish is either salted and sundried or smoked.

There are two groups of buyers of the inshore fish. The first group consists of independent buyers of fresh fish of mixed species, who buy from independent fishers. This group processes the fish and transports it to rural and urban centres. Over 550 independent fish traders make a living from the inshore fishery. Traders in this group come from all over the country, and are allowed to trade provided they buy a license from the District Council. The majority are women, mostly fishers' wives. From the Mwenda estuary to Mlibizi, fish is exclusively sold to independent fish traders. Fish is sold individually in Binga and price depends on size, with larger sizes fetching higher prices. Fish traders spend several days drying and smoking fish in the fishing camps for sale elsewhere. Dried fish is sold in the Binga area, because tiger fish and cyprinids, the greatest proportion of catch, spoil more easily, and are hard to sell fresh. The dried fish trade accounts for more than half of the catch. Complaints have been raised over the poor quality of fish due poor processing techniques and potential deforestation due the use of firewood during fish smoking.

The second group of traders consist of large food companies which buy fresh fish (mainly bream), preserve the fish on ice and transport it to urban centres. Irvin & Johnson Kariba (I & J) is the largest single buyer of fresh fish, as well as the biggest concessionaire on the lake. The company buys fresh fish from all the fishing camps from Kariba to the Mwenda Estuary (except from the Gache Gache cooperative which markets its own fish). I & J collects fish and delivers ice at an interval of four to five days. The system of ice delivery and fish collection can be infrequent with occasional breakdowns and transport problems. The result is that fishers have to dry the fish, sometimes getting a lower price for their product. I & J sometimes provide nets and some foodstuffs to fishers on credit. Repayments are usually made with fish. I & J dominates the market for fresh fish and therefore determines the price of fish. Prices offered to fishers varies from area to area and according to species. Fish prices are highest in the Sanyati basin, but decrease towards Binga due to the high cost of transport. The price of fish also varies by species, with the value of white fish (bream) higher than that of catfish.

2.4 Socio-economic characteristics

There are an estimated 1,239 fishers in Zimbabwe according to the 1993 socio-economic frame survey. Table 3 shows the ethnic groups participating in the fishery based on the results of a socio-economic survey carried out in 1988. There has been a growth in the number of fishers by 5.8% from 1984 to 1993. This is because many people are joining the fishery either illegally, as workers for license holders or as licensed fishers.

Table 3: Ethnic groups participating in the fishery

| Fishing Concession | Tonga | Gova | Kore Kore | Other Zim | Non Zim |
|----------------------|-------|------|-----------|-----------|---------|
| Fishing Concession 1 | 24 | 0 | 14 | 3 | 4 |
| Fishing Concession 2 | 10 | 7 | 127 | 18 | 36 |
| Fishing Concession 3 | 24 | 0 | 0 | 0 | 0 |
| Fishing Concession 4 | 93 | 16 | 18 | 0 | 13 |
| Fishing Concession 5 | 218 | 2 | 6 | 5 | 14 |
| Fishing Concession 6 | 74 | 0 | 0 | 0 | 1 |
| Fishing Concession 7 | 136 | 0 | 0 | 0 | 0 |
| TOTAL | 579 | 25 | 165 | 26 | 68 |
| % | 67% | 3% | 19% | 3% | 8% |

Source: Socio Economic Survey, 1988

Along the western side of the lake in Zimbabwe, the Tonga keep livestock. The keeping of livestock is not allowed on the Eastern side (Sengwa and all other camps adjacent to National Parks), to prevent the spread of foot and mouth disease. For the same reason, no cattle or any form of agriculture are allowed in the fishing camps in the eastern basin. Consequently, most fishers from these camps own more than two homes. One home is located in inland areas where they carry out some farming and keep animals and the second home is located in the fishing village. They therefore consider the fishing village as workplace, with the money they earn from fishing invested in their other socio-economic activities.

A licensed fisher has the right to own fishing gear and is supposed to provide boats and nets to their fishing crews. There are a few fishers who do not own boats. Such fishers get access to boats through various local arrangements. They can use the boats owned by others on a monthly rental basis for a cash payment. The charges vary and are negotiable. Sometimes the use of a boat is paid for in kind, usually as a proportion of the catch. This is a very common sharing arrangement when a pair of fishers use one boat. The arrangement is mostly used by newcomers into the fishery before they acquire their own boats. Usually such arrangements are shortlived. In cases where the owner of the fishing boat does not go fishing, an arrangement is made that the owner receives the catch for a specific number of days in a week whilst the user receives the catch for the other days. Such an arrangement is based on trust. Some owners of fishing boats are women, because they inherited them from their husbands or fathers.

In general, most of the licensed fishers have their own nets because they are easy to make from local materials. Some buy them on credit from fish traders. In most cases, the traders are repaid with fish. Hooks and lines are owned by women and children who frequently use them for subsistence purposes.

Fishers could be considered to be risk takers as they operate in a very risky physical environment. The weather can be very windy resulting in very strong waves on the lake. These waves can force fishers to drift off course or capsize resulting in drowning. There are also crocodiles and hippos which can be very dangerous and which have been responsible for many

fatal accidents on the lake. On land, fishers have to face unfriendly, occasionally trigger happy armed game scouts, as well as elephants and buffalos. In most cases game scouts arrest violators of fishing regulations, sink boats and nets being used in prohibited areas and use live ammunition to scare away or to induce fishers to enable them to make arrests.

Fishers realize that the lake is the natural habitat of crocodiles and hippos. They also know from experience that game scouts are reluctant to come and scare away or shoot rogue hippos, elephants and buffaloes. At the same time the fishers realise that the lake is their source of livelihood. They therefore feel that they have no choice but to take risks to go fishing. When it comes to wind and waves on the lake, the Tonga and the Goba are greater risk takers than other ethnic groups because they tend to be better and more experienced swimmers. It is believed that they use witchcraft to fight against the water and the wind.

Fishers are mostly worried about the fate of their gear than actual arrest or payment of fines. As far as they are concerned the arrests are legitimate since they will have knowingly violated the law. Getting arrested is part and parcel of the game and is just one out of a multitude of risks that they face in the process of fishing. It is put in the same category as having one's nets being torn or dragged by crocodiles, being robbed or having a canoe destroyed by a hippopotamus. Due to the risk of having boats and canoes sunk by game scouts, some fishers now avoid investing in expensive boats because it is costly to replace. Instead fishers prefer to use home made poor quality canoes which they can always replace once sunk or confiscated by game scouts.

Fishers are not prepared to buy motorised boats even if they are sold cheaply because the revenues from the catches are unlikely to cover the operational costs such as fuel, and general engine maintenance.

Though most fishers prefer to work independently rather cooperatively, they are prepared to work together in preventing resource depletion and avoiding enforcement agents.

2.5 Knowledge of the fishery

Skilled fishers have good knowledge about the state of fish stocks, fish behaviour, species characteristics and habitat preferences. They know where and when fish are more concentrated. For example, fishers are able to accurately predict their catches according to the direction and strength of the wind. During the cold season, when fish migrate to deeper parts of the lake, fishers respond by using deeper nets and fish in deep waters even though it is not safe to do so using their small boats. Fishers know when and where a particular fish species breed. They know that their catches are mainly comprised of fish which are full of eggs when caught during the months of November to May.

With regard to scientific knowledge, scientific research and experimental fishing is carried out by the Lake Kariba Fisheries Research Institute and the University of Zimbabwe.

2.6 Other stakeholders

Lake Kariba is a recreational park under the Department of National Parks and Wildlife Management (DNPWLM). Besides gill net fishing, there are many other stakeholders. There is a wide range of organisations with vested interests in the lakeshore and lakeshore resources: kapenta operators, safari operators, anglers, Lake Navigation Control, the Zambezi River

Authority, the Forestry Commission, the Agricultural Development Authority, the Department of Agricultural and Technical Extension, the District Development Fund and an array of other statutory or para-statutory bodies operating within the fishing camps whose activities directly or indirectly affect the lives of fishing communities in general. In addition to that there are law enforcement agents such as the Zimbabwe Republic Police and the anti-poaching unit.

3. Decision-making arrangements

Lake Kariba is designated a Recreational Park under the 1975 Parks and Wildlife Act, with the exclusion of 3,466 hectares of water adjacent to Matusadona National Park. Thus it is Parks and Wildlife land and state land which rests with the President. According to the Act, the Minister of Natural Resources and the Environment, through the DNPWLM, is required to protect and preserve the park.

The Minister of Natural Resources and Environment has overall responsibility for developing policies for the control, management and maintenance of National Parks and Recreational Areas. The Minister formulates policy, assisted by the Parks and Wildlife Board. The Board is required to examine and report on policies which should be adopted. Members of the Board (not less than six and not more than twelve) are appointed by the Minister and hold office up to four years under terms and conditions set out by the Minister. The Chair and Vice Chair are appointed by the Minister. The Board has purely advisory functions and has no statutory authority of carry out regulatory functions. No fishers, or representatives of fishers have ever been members of the Board. Decisions by the Board are made by majority. In 1995, as a result of corruption allegation, the Board was suspended by the Minister and reappointed in early 1996. Twelve new Board members were appointed of which four were members of the suspended board.

Prior to 1991, policy decisions for each individual area were written, debated by the Parks and Wildlife Board, and submitted to the Minister of Environment for approval. They then assumed the status of ministerial directives for the interpretation of the Act. They could only be amended by the same process.

The Lake Kariba Fisheries Research Institute (LKFR I) has the ultimate responsibility for demarcating and allocating fishing concessions and fishing grounds and advising the two Rural District Councils (RDC) on these delimitations.

Fishing on Lake Kariba is managed through a number of rules, regulations and controls which govern the conduct of fishers and non-fishers who are resident in the fishing villages or who may visit the fishing villages for various reasons (such as fish traders). These rules and regulations were adopted by the state at the start of gill net fishing in 1963 as a way to control fishing mortality and distribute the fish resources among the fishers. Some of the rules and regulations operate or are enforced far outside the fishing camps.

The basis for operational rules for the inshore fishery are made by the LKFR I. LKFR I controls fishing effort by recommending the number of fishers for licenses and prohibiting any person from using nets in any part of the lake without a licence. The total number of licenses is decided on the basis of technical parameters. LKFR I can make adjustments in the number as circumstances change, either by issuing additional permits or withdrawing some. LKFR I determines how many fishers can operate within each fishing ground and how many nets each fisher within a designated fishing ground can set per time. In the past, preference for the issuance

of fishing licenses used to be given to people with historic and traditional claims, that is, those displaced by the creation of Lake Kariba. Today any person is eligible for a licence depending on the availability of the licence and the recommendation by the headman.

In 1992, the Department developed a single comprehensive policy document (Policy for Wildlife, Zimbabwe). The preamble of the policy states that the Government "intends to put into place mechanisms which will ensure equitable distribution of resources and opportunities to emergent entrepreneurship, without abrogating its fundamental obligation to society for conservation of Africa's biological heritage". The bulk of the general policy has greater relevance to terrestrial wildlife than fisheries. Devolution of management and use of wildlife will be allowed and encouraged by the Minister through the delegation of appropriate authorities. Conservation and management of aquatic resources is considered to be the responsibility of Government but the Minister can delegate appropriate authority for fisheries regulation on certain waterbodies. For artisanal fisheries the policy states that the CAMPFIRE principles will be applied wherever appropriate. The policy also states that the Conservation Committees of Rural District Councils will act as the first level of regulation and coordination on issues related to wild life in the rural districts of Zimbabwe in accordance with the Ministers delegation of Appropriate Authority.

Under the Parks and Wildlife Act 1975, the Minister controls fisheries management by notice in the Government Gazette. According to the Act, before publication, the Minister has to, by notice in the Gazette, invite persons to make representations and consider these. The Minister may also grant appropriate authority to any person for any waters. The DNPWLM has, however, given the responsibility for the distribution of fishing licenses to fishers fishing along communal lands to the district councils which fall under the Ministry of Local Government and Rural Development.

The Zimbabwean shoreline of Lake Kariba is currently administered by two District Councils (Nyaminyami and Binga), one Town Council (Kariba Town), the Forestry Commission and the DNPWLM. A series of laws provides various government departments with jurisdiction over the shoreline resources and institutional mandates to protect and manage those resources on a sustainable basis.

For fishing villages adjacent to communal areas under RDCs, access to the gill net fishery is administered by the Binga and Nyaminyami RDCs. These councils are responsible for issuing annual licenses to fishers after receiving technical recommendations from the LKFRI. Under this arrangement, the headman of a fishing village recommends the renewal of licenses and supports the applications of new entrants into the fishery. The District Council receives the application and then advises the DNPWLM to issue a license.

Under the previous colonial administration, only licensed fishers were allowed to fish in the lake. After independence in 1980, the LKFRI changed the regulations to allow each licensed fisher to employ two workers who can do the actual fishing on behalf of the licence holder. LKFRI also has the responsibility for advising on gear restrictions. The regulations state the total number of nets each fisher can use as well as setting minimum mesh-size (currently four inches). Furthermore, the use of explosives, chemicals, poisons or intoxicating substances, scoop-nets or jiggling is prohibited. Spear guns, basket traps (*zviduwo*) and rod and lines with more than three hooks each are also prohibited. Fish driving is prohibited within the lake and anyone who is seen beating the water whilst he/she is in the lake can be arrested.

It is the Management Section of the DNPWLM which is responsible for policing and enforcing fisheries regulations. They are supported by the Zimbabwe Republic Police as part of it's anti-poaching operations.

4. Leadership and representation

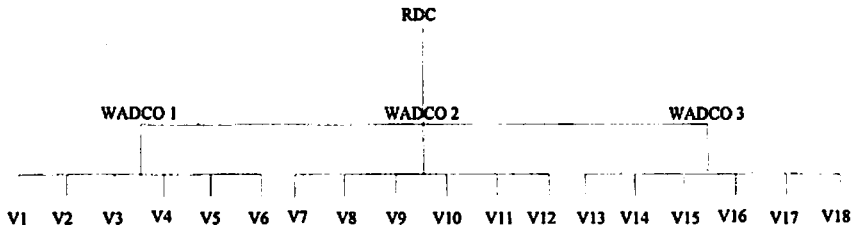
Within the Zimbabwean inshore fishery two forms of leadership structure exist. These are the traditional structure and the post independence government/political structure created as part of the decentralization programme. Prior to independence the traditional leadership structures were more influential in the fishing villages than they are today.

4.1 Traditional leadership structures

With the creation of the lake, each chief of whose people were displaced was allocated a fishing village by the colonial authorities along the lakeshore. This was supposed to be used only for fishing by his subjects. No permanent settlements were allowed and only licensed fishers and traders were allowed to reside in the fishing villages by the government. No cultivation of crops or the domestication of animals was permitted on the understanding that these were only temporary villages. Each village was under the leadership of a headman who was appointed by the chief. The headman was, and still is, a relative of the chief through lineage according to the traditional institution which operates throughout the country. The responsibilities of the headman included that of vetting aspiring fishers to make sure that they came from the communal area of the chief who would have been allocated the particular village, and to recommend them for fishing licenses. The headman was also supposed to enforce the exclusion of other fishers from their camp. This system therefore gave the headman some authority over, and responsibility for, fishery management. In addition, the headman had the traditional role of presiding over disputes within the fishing village.

After independence, the local government structures were transformed and the powers of traditional leadership, that is, the system of chiefs, headmen and kraal heads were greatly curtailed by the post-independence government. These structures were replaced with new arrangements. At the village level there is a Village Development Committee (VIDCO), made up of eight committee members elected by all village adults above the age of eighteen. The VIDCO is headed by a chairman who is elected by people within the village. All VIDCO chairmen automatically become members of the Ward Development Committee (WADCO) which is the next administrative level after the VIDCO. Six villages make up a ward. The WADCO is headed by an elected counsellor. The counsellor, elected by the people in the ward, represents the Ward at the District Council and is a member of the District Development Committee (DDC). This administrative hierarchy is illustrated in Figure 1. This local government structure is responsible for all developmental activities at various levels within the district.

All these local institutions are supposed to work for the good of the whole local community. Unfortunately, they are beset with a lot of internal conflicts attributed to their use as a way to achieve political centralisation. Unlike the traditional structures whereby the leadership which is ascriptive, all committee members and counsellors in the local government structures are elected by people whom they are meant to represent.



Note: V represents a VIDCO

Figure 1: Example of decision-making in local government structure

With the new post independence government's desire to see that local communities participate in, and benefit from natural resource management, the CAMPFIRE was formulated to ensure that local communities benefit from wildlife resources. As part of this programme, some wards along the shoreline formed Wildlife Committees as sub-committees within the VIDCOs and WADCOs.

The success of CAMPFIRE in terms of the management of terrestrial resources encouraged the DNPWLM to use the CAMPFIRE principles for the management of fishery resources. As part of the development of a management programme for the Lake Kariba inshore fishery, Fishers Associations were formed. The Lake Kariba Gill Net Fishers Association has the mandate of furthering the interest of fishers. Of interest here is the Fishers Association.

4.2 The Fishers Association

The Fishers Association is supposed to make representation to government, NGOs, and the donors. It is important to note that the Fishers Association is not a product of the fishers themselves. Many fishers viewed, and some still view, the Association with suspicion. The idea of a Fishers Association came about during a planning workshop held in Kariba in 1993 after the large fish buyers intimated that they had difficulties in communicating with fishers because there was no single body representing them. The Association also mandated to improve the marketing of fish, distribution of benefits, and ensure that the resource is used sustainably.

In order to make communication effective, the DNPWLM and fishers' representatives decided to group the fishing camps along the shoreline into Sub Area Units using proximity as a criterion. The idea is to have a reasonably short distance between the camps that make up a sub unit. In Nyami Nyami, there are four Sub Area Units (Table 4).

Table 4: Sub area units by existing fishing camps

| A | B | C | D |
|-------------------------|-----------|---------------|------------|
| Fothergill cooperative | Musamba | Chalala | Nyakatanda |
| Gache Gache Cooperative | Mudzimu | Musambakaruma | Chunga |
| Nyaodza Cooperative | Nematombo | Lyuando | Chatikira |
| | Nyamhunga | Sibilobilo | Makuyu |
| | Tsetse | | |
| | Dandawa | | |

In each Sub Area, a management committee is elected to handle issues such as accepting and banking the joining fees and subscriptions from members of the Associations on behalf of the Lake Kariba Gill Net Fishers Association.

The management committees for each sub area are part of the Fisheries Management Forum which meets twice a year. Members of the Fisheries Management Forum include the Nyami Nyami Rural District Council, and the Department of National Parks. Issues arising from sub area units are discussed at Lake Kariba Gill Fishers Association. A similar structure is expected to be established in Binga. Each Sub Area Unit is supposed to assist in management of the resource through monitoring and enforcement in their fishing areas as well as to assume other association responsibilities at a local level.

The Association has been viewed with suspicion by most fishers from its very inception. Some fishers question whether the intended co-management arrangements represent an altruistic gesture on the part of the responsible authorities or just another attempt to blackmail them as judged by their past experiences with government departments, especially DNPWLM. Some fishers regard the move as a ploy given that the authorities have failed to effectively manage the fishery. They think Government just wants to use them to do tasks which the government does not want to do. Equally, some fishers joined the Association as they thought that not doing so would probably lose them their licenses.

It has also taken people leading the Fishers' Association a lot of time and effort to disassociate the Fishers' Association from parallel but unpopular development programmes in the valley being implemented by other government agencies especially the Nyami Nyami District Council's resettlement programmes. Under these programmes there was some heavy handed bullying of fishers to relocate to growth points as part of district land use plans. Although the Association leadership claim that they managed to convince the people who had quit the association to rejoin, there is nothing to prove this, since few fishers who withdrew from the association have repaid their membership fees.

5. Regulations

Compliance with regulations that fishers consider complex, difficult to understand and perceived against their interest, is consequently poor. Among the regulations imposed on the fishery, fishers are vigilant against violators only when they violate those regulations that fishers think help sustain the fishery. Otherwise most of the regulations are being violated in a number of ways because fishers are unwilling to enforce the regulations that are not perceived as in their interest. These are described below.

5.1 Closed areas

Most of the fish species in Lake Kariba are riverine. Fishers have to fish within designated fishing boundaries. Every fisher knows the limits of his official fishing ground although they may neither agree with the boundaries nor respect them in practice. When caught, however, fishers either pretend that they have got lost or have been forced off course by the waves. It is therefore at the discretion of the DNPWLM to believe whatever the arrested fisher has to say when caught. Whilst no fisher admits to fishing in the river estuaries or in the grounds allocated to the cooperatives when confronted by the game scouts, they admit that they do fish there when approached in confidence. They argue that as fish do not spawn throughout the year they do not see the justification for closing rivers and river mouths throughout the year. Fishers would prefer the closure of the breeding areas during the peak spawning months, that is from November to May. Independent fishers also fish in grounds designated to the cooperatives.

There are a number of reasons given by fishers as to why they continue fishing in the grounds officially designated to the fishing cooperatives and in river mouths despite armed patrols. As far as independent fishers are concerned, the authorities are unfair when it comes to the demarcation of boundaries and the allocation of fishing grounds. For example, independent fishers in the Eastern Basin say their designated fishing grounds are congested compared to the fishing grounds allocated to Nyaodza, Gache Gache and Fothergill cooperatives. They view this as a clear example of administrative unfairness and arrogance from the authorities to address this issue. As long as that issue is not properly handled the independent fishers say that they will continue to violate the official boundaries.

Thus, as far as some fishers are concerned, they are fishing in their own fishing grounds which they used to share with the concessionaire before the grounds were allocated to the cooperatives. To them the grounds were taken from them illegitimately and without proper consultation.

The spatial question over boundaries has therefore become a source of conflict not only between the cooperatives as an institutional form and the independent fishers of the Eastern Basin but also between the independent fishers and the DNPWLM as the department which made that decision. The conflict has resulted in yet other conflicts between the independent fishers on the one hand and the cooperatives and law enforcement agents on the other.

5.2 Mesh size and net regulations

Some species found in abundance in Lake Kariba such as the some breams, Brown Squeakers,

Imberi and Silver Fish are so small at maturity that they escape the minimum prescribed mesh size of four inches. Fishers use less than four inch mesh size nets to catch such species. They do not see the rationale of using big mesh size nets where there are few large fish to exploit.

Fishers tend to use as many nets as they can buy or make. Besides increasing catch by setting more than the legal number of nets, fishers also keep more than five nets so that household income is not disrupted when one's nets are stolen or destroyed by hippos and crocodiles.

5.3 Trade in fish

The possession of fish automatically leads to the assumption of guilt if a person fails to explain how he or she got hold of the fish. Carrying of fish from the fishing camps to the adjacent communal areas or to any other place removed from the fishing camps, even by the licensed fishers, is prohibited. Fishers used to argue that they need to take fish to their families which stay in the adjacent communal areas for their own consumption but the DNPWLM has remained reluctant to relax that regulation. The argument used to justify the prohibition is that the carrying of fish to the villages is problematic in that it is difficult to approximate how much an individual can justifiably and reasonably carry to his or her communal area for domestic or household consumption. Mere suspicion can lead to a person's arrest. This measure is also meant to curtail illegal trade in fish.

5.4 Enforcement of rules and regulations, and sanctions

Policing and enforcement of the rules and regulations is carried out by the management wing of the DNPWLM, with the help of the Zimbabwe Republic Police. More recently, the RDCs have employed fish guards for areas under their jurisdiction. Some of their duties are to check mesh sizes, the total number of nets per licensed fisher, ensure that unlicensed fishers do not gain access to the resource, and that fishers and their workers fish within the defined concessions. The fish guards report to the RDCs or LKFRI.

The fishers are generally not happy with the way in which the police and the DNPWLM react to their reports of theft of fishing gear within the fishing camps. Theft is not taken as seriously by the law enforcement agents within the fishing communities as it is in other communities. Normally it is after a citizen's arrest has been effected, that the residents of the fishing camps telephone or radio DNPWLM so that they can come to collect the arrested person or persons.

Sometimes the fishers say they have to wait for long hours at the harbour for law enforcement agents to come and collect the arrested people or in some cases, they do not turn up at all. This might stem from a general mistrust of fishers by outsiders. Cases of theft can be treated with an attitude or an actual pronouncement that fishers steal from each other as part of their lives and therefore there is nothing to panic about when something of that nature occurs. The solution is therefore to leave them by themselves unless they violate rules, regulations and the "real law" such as laws pertaining to wildlife and poaching. In addition, enforcement experts believe that carrying out investigations in the fishing camps is a futile exercise because fishers are not cooperative and therefore tend to cover up information.

Fishers often report that scouts use heavy handed tactics (including shooting, beatings, hut-

burning, sinking canoes and confiscating nets and fish) whilst carrying out their investigations. As a result, the management section of DNPWLM is the most hated government department in the fishing villages. At the same time the fishers' resolve to continue practicing prohibited methods has rendered ineffective the enforcement capacity of the scouts.

When violators of fishing regulations are arrested they are supposed to be taken to court for trial. When convicted, the culprit can either be fined or imprisoned. In practice, however, violators tend to run away leaving behind them their fishing gear, usually nets and boats. In such circumstances the law enforcement agents have no choice but to confiscate the nets and boats or sink them. Less serious offences may lead to the expulsion by the community of the perpetrator of the offence from the fishing village.

Other stakeholders also assist in the enforcement of rules and regulations. For example the Anglers' Association, safari and kapenta operators provide some funding, manpower, boats and other means of transport to facilitate law enforcement. In the past they have apprehended fish and wildlife poachers and licensed fishers operating outside their designated fishing grounds, especially in the closed areas. Fishers also enforce regulations they view as legitimate, such as the prohibition of the use of beach seines.

6. The Lakeshore Development Plan

The changes in the management of the Lake Kariba artisanal fishery should be seen against the background of the Zambezi Valley Regional Planning process which began in 1990. The planning process was initiated by LKFRI. Instead of just dealing with the lake fisheries, which is its statutory mandate, the LKFRI felt that it would be more sensible to consider the broad planning issues of the whole lake area and its environs. The result of the initial study was a recommendation that new institutional arrangements should be introduced which should address the strategic issues of Lake Kariba and the surrounding areas.

The need for regional planning was a response to development pressures facing the Zambezi Valley as a whole and the resultant damage to the environment. There was also a realisation that there was some common denominator to most of the problems and therefore ad hoc and piecemeal projects and programmes not only foreclosed other development options but also had potential for conflict generation. The planning had therefore conflict avoidance and resolution as a key component issues. The overall strategy for development was aimed at preventing ad hoc actors from taking advantage of the less powerful groups of people.

The planners identified the major resources in the valley and the various sectors with special interests in the valley. It was observed that Lake Kariba supports a wide range of economic activities ranging from electricity generation, kapenta, other forms of livelihood fishing, leisure fishing, recreation, wildlife, boating and safari operations. In addition, it was realised that each activity did not inherently constitute a problem, but problems emanated from intensification of use. The other major conflicts identified were:

- wildlife versus agriculture over land and water;
- wildlife versus human settlement over land and water;
- human settlement versus environment over natural resources;
- industry versus wildlife over land, air and water.

An issue which was considered to be very important in the planning exercise was that of human population. The main issue raised was that the region is relatively underpopulated and therefore can be opened up for human settlement in order to ease overcrowding elsewhere. However, it was recognised that the extent to which the valley can accommodate additional people without negatively affecting it, had to be assessed. In addition, ideal areas for settlement, those which have to be restricted and the most effective mechanisms for controlling immigration, had to be identified. Cattle rearing has always been an area of conflict between the authorities and valley populations. Thus another aspect of the planning issue was whether cattle can be safely introduced into the valley.

After consultation with relevant government departments and representatives of various user groups, objections and representations will be discussed. It is expected that amendments will then be made and the Plan will be submitted for approval to the Minister of Local Government, Rural and Urban Development in July 1997.

However, there is some concern that the pressure to complete and implement the Plan means that there is little time to discuss with fishers and obtain agreement on the proposals from fisher households.

6.1 Proposals for a co-management regime

Whilst the modus operandi of the co-management regime were largely worked out and determined by the state on the basis of recommendations from consultants, the process has to be viewed in a positive way since fishers were informed and participated in some workshops and meetings in which some of the pertinent issues were discussed. Continued consultations and participation by fishers is likely to bring positive results by fostering mutual understanding, trust and the appreciation of each others fears.

Below are some of the basic principles underlying the proposed co-management arrangements adopted by the DNPWLM for the gill net fishery of Lake Kariba on the Zimbabwean side of the lake.

- (1) The demarcation of concession areas along the lakeshore and the zoning of Exclusive Fishing Zones (EFZ) within the concession areas by DNPWLM. The department will also specify the broad parameters of control and limits to the resource use within the concessions and the EFZ, for example the number of fishers per area.
- (2) DNPWLM will lease the concessions or devolve appropriate authority over the concession areas to the Rural District Councils.
- (3) Formation of committees for each EFZ or its sub units and the fishers to decide on the structure of the sub units and the respective committees.
- (4) Whilst the DNPWLM will continue to specify the broad rules and regulations for the fishery, each EFZ will be a self regulating unit or entity and will be run by the fishers on a day to day basis. Fishers will have to agree on membership, fishing effort, and the use of the resource.
- (5) Fishers will monitor and police the EFZ by way of their continual presence and the use of the EFZ.

- (6) All areas outside the designated concession areas to be closed for fishing and the DNPWLM will carry out anti-poaching operations and enforcement in these areas.
- (7) DNPWLM to remain the overall authority and therefore will be expected to maintain overall control.
- (8) RDCs will ensure that fishers comply with rules and regulations and the provision under which appropriate authority was given by the DNPWLM. Continued violations may lead to the withdrawal or cancellation of the lease issued to the zonal sub committees by council at the instigation of the DNPWLM. Failure of councils to act according to the recommendations of the DNPWLM may result in DNPWLM threatening to cancel the entire lease to the responsible RDC.

7. Incentives to cooperate and patterns of interaction

There are many levels at which users, stakeholders and governments interact amongst themselves and with each other. In this section, the interactions considered to be important for the establishment of a co-management regime are examined.

7.1 Fishers and DNPWLM

The DNPWLM has an incentive to cooperate with inshore fishers for the following reasons:

- government policies in wildlife management promoting co-management;
- donor driven policies;
- weak and unsuccessful monitoring and control systems;
- poor compliance with regulations;
- wildlife poaching;
- perceived need to limit access to the fishery.

The fishers have an incentive to cooperate with the DNPWLM for the following reasons:

- perceived lack of legitimacy of regulations;
- conflicts with the tourism industry;
- lack of representation in the decision-making process on fisheries management;
- wish to increase areas authorised for fishing.

Although there are clearly many incentives for each side to cooperate with each other, the interactions between the two groups has been one of conflict rather than cooperation. This can be partially attributed to fishers' suspicion of government based on their experiences in the past. Conflicts have predominantly been over the content and nature (i.e. relevance and legitimacy) of fisheries regulations as well as fishers' perception that other stakeholders, particularly the tourism industry, are favoured by the DNPWLM.

DNPWLM tends to treat the rules and regulations as fixed and considers the technical parameters on which they are based as beyond reproach and as the only plausible foundation for

sound fisheries management. The question of incorporating indigenous knowledge is therefore irrelevant to the managers. At the same time, the fishers do not believe in some of the technical information upon which regulations are formulated and therefore do not see any value in the regulations. Management of the fishery without listening to the knowledge of the fishers has acted as a disincentive for the cooperation of fishers with DNPWLM. For example, the DNPWLM fears that giving access to fishers to waters adjacent to some National Parks would aggravate wildlife poaching as the control of poachers would be very difficult. On the other hand, fishers consider the same areas as prime fishing areas and fish there illegally. Equally, the closure of breeding areas all year round does not make sense to fishers when they know that fish breed between November and April.

In addition, the one year licence system seems to make fishers insecure, thus working as a disincentive when it comes to observing rules and regulations.

7.2 Fishers themselves

Despite ethnic heterogeneity and employer/employee relationships among independent fishers, they generally cooperate among themselves against outsiders, especially law enforcement agents. For example, they forewarn each other about the presence of law enforcement agents in prohibited areas and do not report violators.

Apart from the incentive to cooperate with each other against a perceived common enemy, there are conflicts amongst fishers, between independent fishers and their employees and between independent fishers and members of cooperatives. These disincentives to cooperate are largely economically driven.

Each licensed fisher is legally allowed to employ two workers. However, workers feel that their incomes are too low for such a risky job, whilst employers think that their workers sell some fish before landing them. Such accusations are common in areas (e.g. Tsetse Island) where competition among fish traders is so high that they use motorised boats to buy from fishers whilst still on the lake. Employees are also acquiring and setting their own nets without the knowledge of the license holder which means that the license holder and his two workers ends up have three times the number of permitted nets per license. Workers also poach in prohibited areas in order to increase catch and therefore their share of income. However, if these workers are caught, it is always the license holder who is fined or prosecuted.

The conflict between independent fishers and cooperative members centres around access to fishing areas. Some independent fishers claim that they once fished in concessionaire areas together with the concessionaire before the height of the war of independence. They maintain that they have traditional and historical rights and claims in these concession areas. They also argue that, for security reasons, they were told to stop fishing in these fishing grounds by the Rhodesian government when the liberation war intensified in that area. They therefore expected the grounds to be handed back to them after the war, but were surprised when the grounds were given to the cooperatives. Cooperative members on the other hand, claim that independent fishers are not only poaching but also stealing their nets.

7.3 Fishers and the sport anglers/safari operators

There is considerable conflict between fishers and sport anglers and safari operators and there are strong disincentives for cooperation. Tourism in Lake Kariba, including sports fishing, is a thriving and significant foreign exchange earner for Zimbabwe. The inshore fishery contributes a relatively small amount to the Zimbabwean economy - although it does provide income and food to fishers and their families. Safari operators are predominantly white-owned companies and sport anglers are also white Zimbabweans. Because of the wide disparity in socio-economic attributes between the two groups as well as competition for fishing areas, there are few incentives for fishers and these stakeholders to cooperate. In addition, safari operators, because of the importance of the tourism industry to Zimbabwe, are more effective at lobbying government, compared to fishers who are not organised and have a weak political and economic voice.

Sport anglers complain that poaching, and illegal use of nets in closed areas, indiscriminately depletes the resource and tangles boat motors, and propellers. When this happens, they confiscate and/or destroy the gear. Fishers from the eastern basin allege that sport anglers are not only catching tiger fish from areas closed to inshore fishers (especially the Sanyati Gorge) for a very small license fee, but their boat propellers are also damaging their the fisher's nets.

With regard to safari operators, there is a general understanding with the local authorities that they should assist in the development of the area in which they operate. This is expected to be through the provision of facilities such as shops and lake transport as well as employing local people in their operations. In practice, however, fishers say that safari operators bring their own employees and prevent local communities from benefiting from their services and amenities. Fishers complain that some safari operators do not want to see them fishing along the shore close to their operations, even though they may be fishing within their legitimate fishing grounds. Thus, they claim that safari operators intimidate them and/or confiscate their nets.

The safari operators claim that fishers, besides disturbing wild animals from drinking water, also poach small animals. They say that they only confiscate fishing gear when the fishers have been caught in closed areas. Fishers now fear that with time, and as the number of operators increase in the area, they are going to lose their fishing grounds and suspect that local authorities will encourage this development because they are increasingly entering into joint ventures with private safari operators.

7.4 District councils, traditional authorities and fishers

As described previously, Rural District Councils under the Ministry of Local Government, Rural and Urban Planning control access to the fishery by issuing fishing licenses to independent fishers. They are also responsible for the planning, development and administration of the communal areas under their jurisdiction. This is a source of cooperation and conflict between the local authorities and the fishing communities.

Conflicts have arisen between the traditional leadership and the local authorities due to the decision by the RDCs that traditional authorities should not participate in this decision-making process. Previously, two of the traditional roles of the headmen in the fishing camp was to recommend people for fishing licenses and to settle disputes. Now the councils prefer to deal with

appointed presiding officers of VIDCOs and WADCOs thus eroding the authority of traditional leadership. As a result, the traditional authorities are actively encouraging people not to cooperate with the district councils on issues which they fear might erode their authority even further. The marginalization of these traditional institutions has generally resulted in a lack of strong, properly functioning local institutions which can liaise with government structures.

During the planning and implementation phases of development projects, the district councils also came into conflict with interests and aspirations of the local fishing communities. A good example of this lack of understanding is the planned or in some cases, actual relocation, of fishers from some fishing camps to centralised villages. This has been, and continues to be, a major source of serious conflict between the local authorities and the fishers. Fishers consider the relocations as unnecessary and disruptive as some fishing grounds are now very far away.

The RDCs are of the opinion that fishers are ignorant and argue that the rationale behind centralised villages is to provide essential and much needed infrastructure and services such as schools, drinking water, and clinics. They also argue that controlling settlement would make the controlling of access and enforcement of some fishing regulations much easier.

As a result, some fishers now maintain two homes, one in the centralised village for the family and a makeshift overnight shed used as a base for fishing in remote fishing grounds. Fearing that their makeshift shelters might be burnt or destroyed by the RDCs or by game scouts, as has been the case in the past, some fishers now sleep on the open during the day and fish at night. This has been a major cause of illness and death in the Sanyati Eastern Basin.

7.5 DNPWLM and local government

The DNPWLM has delegated the responsibility of issuing licenses to RDCs for those fishers operating in waters adjacent to council land i.e. independent fishers. Revenues raised from license fees (inshore and kapenta licenses) are meant to be used for district development projects.

The decision about the number of licenses to be issued is made by LKFRI based on estimates of the size of the stock. Neither fishers nor representatives of RDCs participate in this process. This lack of representation in the decision-making process concerning allocation of licenses has acted as a disincentive for cooperation between DNPWLM and the RDCs, as both have different objectives for managing the fishery. DNPWLM want to manage the fishery based on biologically optimum levels i.e. maximum sustainable yields. RDCs, for political and economic reasons, find it necessary to take into account social and economic factors in the allocation of licenses. As a result, councils tend to issue more licenses than the number recommended by LKFRI in order to keep a sizeable number of people employed. LKFRI researchers now complain that local authorities are not sufficiently concerned about the resources, but are more interested in creating employment and maximising revenue from license fees.

8. Outcomes

This section examines outcomes of the management regime in terms of efficiency, equity and sustainability and predicts outcomes of the new co-management regime. Such predictions are based on existing incentives and patterns of interaction. It is acknowledged that there may be unpredictable changes in decision-making arrangements which change incentives and patterns of interactions, thus affecting predicted outcomes.

8.1 Efficiency

From the government's point of view the fisheries management regime put in place by the colonial authorities and inherited by the post independence government is both costly in financial terms and ineffective in addressing management problems within the fishery. More recently, the country's economic structural adjustment programme has caused a reduction in government budgets which has forced DNPWLM to cut back on manpower and other requisite resources for monitoring, policing and enforcement of the fishery. The increases in non-compliance of regulations has been partially attributed to this. However, DNPWLM has also realised that the dearth of participation and poor representation by fisher communities in decision making processes has caused low levels of compliance. This realisation came about through experiences in wildlife management, namely CAMPFIRE.

From a fishers point of view, many of the regulations emanating from the centralised management regime were not considered relevant and therefore were not complied with. However, costs of non-compliance were high, as boats and nets were destroyed by law enforcement officials.

With regard to the new regime, enforcement costs on the part of the central government will definitely be reduced as localised monitoring and policing will become the fishers' responsibility and the statutory law enforcement agents will only have the responsibility outside concession areas only. However, with the exception of access rights and fishing areas, decision-making for the rest of the regulations will remain with the DNPWLM. It is likely that there will still be high levels of non-compliance with regulations which fishers do not consider relevant.

8.2 Equity

The previous management regime, which was totally centralised, had no fisher or RDC representation, limited process clarity and heterogenous expectations. Under the new co-management arrangements, the government expects that fishers will assume greater responsibility and comply with management regulations. However, the actual behaviour of the fishers will depend on the extent to which government is willing to incorporate them, and fishers are willing and able to participate in the decision making processes. If this occurs, then process clarity may be improved leading to more homogenous expectations. However, other stakeholders representation is also important in this process, otherwise there will continue to be a divergence of expectations between fishers and these other stakeholders.

During the planning phase for a co-management regime, fishers were generally not vocal in meetings because a tradition of victimization led them to be suspicious of outsiders. Some fishers are ambivalent and wary about the motives of DNPWLM suspecting that the state has some ulterior motives behind its moves towards giving management responsibilities over the fishery to the user communities. Others, especially those who are in leadership positions and who participated in the planning workshops and meeting, are more optimistic. The latter group could influence the group of doubtful fishers, especially if some tangible benefits emerge from the new institutional arrangements. Increased communication, consultation and dialogue during the first operational stages of the co-management system may improve the confidence of fishers and encourage them to participate and become more active in the planning, development and management of the fishery as well as other projects and programmes which affect their lives. The

development of the Fishers Associations may assist this process.

The new management system is likely to improve the flow of information from state to fishers but unlikely to improve the information flow from the fishers to the state because most managers consider fishers to be ignorant and not worth listening to. If managers do change their attitudes and listen to fishers rather than having them represented but not participating in the decision-making processes, a different outcome might be achieved. Such attitudinal changes are likely to make fishers' contributions reach the responsible government departments and therefore make their participation in decision making process more meaningful.

It is expected that there will be no change in the boundaries of fishing areas as the current boundary review clearly states that no new fishing grounds will be opened. In addition, no redistribution of licenses is expected. Therefore, it is expected that there will be no distributional changes as a result of the new co-management regime. Preference will continue to be given to displaced people.

8.3 Sustainability

The Tonga people who have permanent homes close to the lakeshore have long time horizons as they have limited prospects of emigration. This is different to other ethnic groups who have homes elsewhere where they can always go when the resource is depleted. Under the previous management regime, the non-Tonga fishers had little sense of stewardship of the resource as they were uncertain whether their licenses would be renewed and whether government would reduce their fishing grounds. Under the new arrangements, the establishment of exclusive fishing zones (EFZ) combined with the possible sanctions in case of abuse of rights within the EFZ is likely to heighten the responsible authorities (i.e. the RDCs) sense of responsibility and give them a greater degree of proprietorship. The provisions may also compel the resource users (i.e. the fishers) to comply with the regulations as violations would result in a permanent withdrawal of fishing rights from culprits, a penalty which no fisher is prepared to face given their dependence on the fishery for their livelihood.

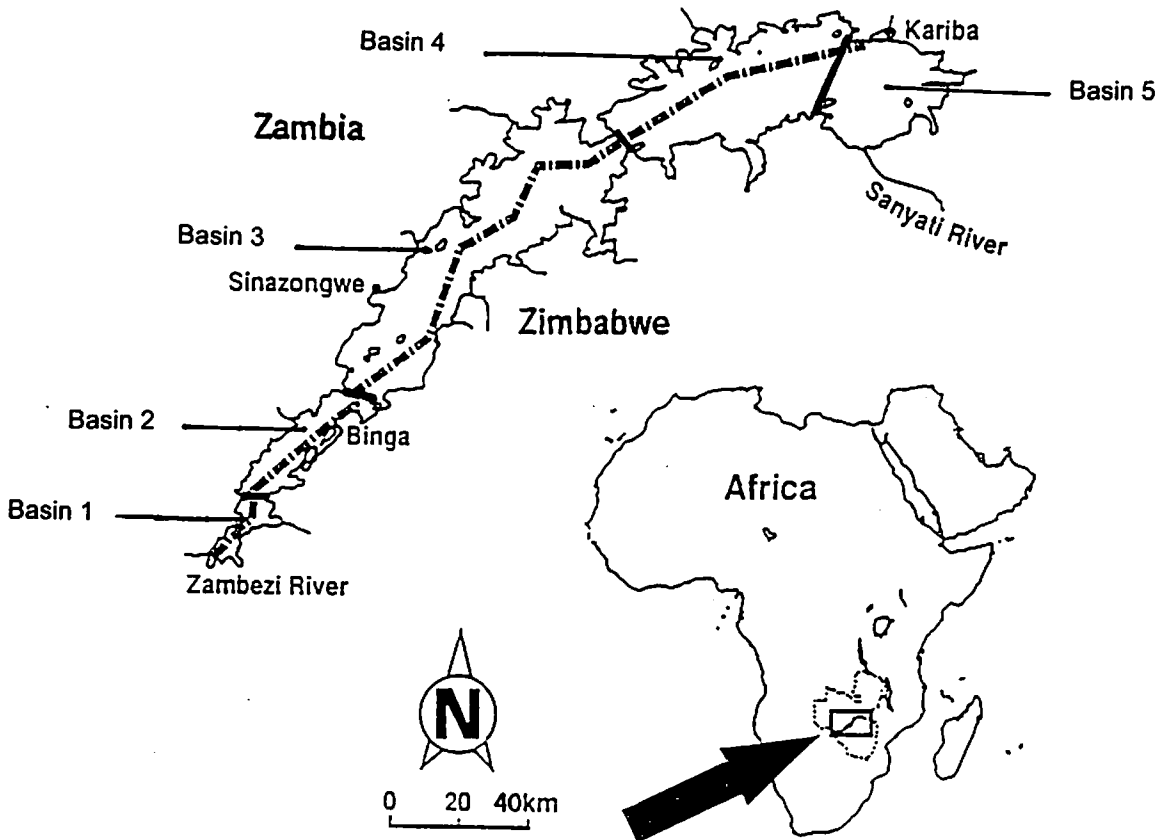
At the same time, it seems that there are considerable in built controls to ensure that corrective action is taken before things get out of hand. Involvement of both partners may lead to resilience in the system. This is provided that managers uphold the principles of participation and collective decision making at the local level.

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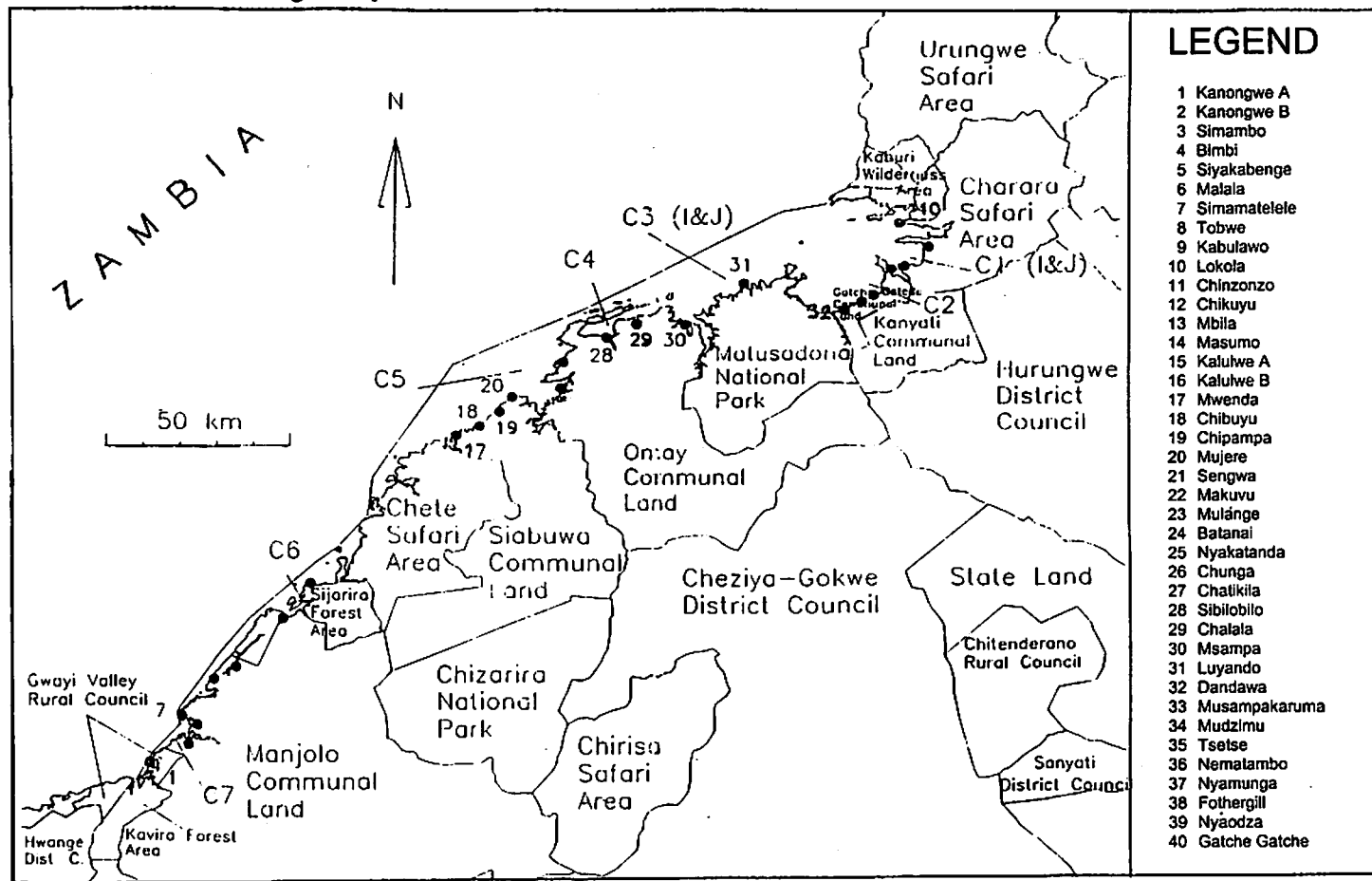
Map 1



Location Map of Lake Kariba

NB. Lake Kariba Recreational Park Zimbabwe occupies the area bounded by the southern shore line of the lake and the international boundary which runs through the Centre of the Lake.

Location of Fishing Camps - In-shore Gill-net Fishery Zimbabwe.



Map 2

From no management towards co-management?

A case study on artisanal fisheries
in Angoche district, Nampula Province, Mozambique

Simeão Lopes (ed.)

Ernesto Poiosse

James Wilson

IDPPE, Maputo

Jean Louis Kromer

Lino Manuel

Caetano Cululo

IDPPE, Angoche

M^a Ascensão R. Pinto

IIP

Abstract

This current work documents the results of an investigation into the socio-cultural and biological aspects of fisheries management in Angoche district, Nampula Province. The data analysed in the study is circumscribed to Kwirikwidge, a fishing centre belonging to the Morua village.

The team that undertook the fieldwork comprised of two members of staff from Instituto de Desenvolvimento de Pesca de Pequena Escala - Small-scale Fisheries Development Institute (IDPPE) headquarters in Maputo, one from Instituto de Investigação Pesqueiro - Institute of Fisheries Research (IIP) and three from the IDPPE delegation based in Angoche. The information was collected using two questionnaires, one on socio-cultural aspects, including decision-making arrangements, and the other on the physical and biological characteristics of the region. The market information was taken from a study by James Wilson¹.

The attributes studied are the ethnic homogeneity of the target group, its demographic characteristics, the fisheries economy, power structures, decision-making processes, people's lifestyles and livelihoods in the regions concerned, and their level of knowledge and awareness about the environment and resource conditions.

¹ "Marketing and distribution of fish in Nampula Province", 1995.

The biological element details the type of species found and their behaviour, existing or known technologies used to exploit these species, the level of exploitation, the condition of the habitat, existing frontiers and how these are defined, fishing practices in the region, and whether fishing is localised or dispersed.

With regard to the prime objective, a preliminary assessment of the data collected confirmed our hypothesis that there was evidence of overfishing in the beach seine fishery. This is particularly true of the areas around Kwirikwidze where the situation is worsening at an alarming rate because of the practice of attaching mosquito nets to the beach seines. This is essentially due to a scarcity of resources or because of the type of resource found and the demand for small species and juvenile fish.

Consequently, the high level of migration by 'outside' fishermen into areas considered potentially rich in fish resources results in conflicts between these 'immigrants' and the local fishermen. In addition, land held as a monopoly by the BORROR company and Companhia de Culturas de Angoche (C.C.A) which are both unwilling to lease land to the local population, has meant that the communities are obliged to turn to fisheries as an alternative source of income.

Traditional/local forms of resource management are still in place, even though they are less deep-rooted than in earlier times. In the past, these traditions were very strong and their diminishing importance is now much lamented by older fishermen. The younger fishermen tend not to believe in the efficiency of traditional management methods.

Serious problems exist with regard to surveillance and enforcement of the regulations, and because of the poor working conditions within the Administração Marítima – the Maritime Administration. There is a lack of interest among staff in carrying out their duties, and a waning of the power once held by traditional authorities that used to ensure that users complied with customary laws. A body of community managers was established in 1993 by the government through the Government Gazette, because of the limited management capacity of its members who were selected by fishermen, but the decree has been somewhat ineffective because of poor liaison among official sectoral structures.

Nevertheless, there are indications of strong concerns among the local authorities responsible for regulating fishing activities, and among the community, and some contacts have been made between the two groups which has resulted in several initiatives aimed at a rationalisation of resources.

Unfortunately, with the exception of information relating to the industrial fleet, no studies have ever been undertaken about stocks of pelagic resources in northern Mozambique or on coastal resources exploited by the artisanal fleet. Thus, some conclusions are still considered preliminary, and require confirmation. One pre-condition for promoting with some degree of success a sound co-management project is the availability of biological information on the resources. There is an urgent need, expressed by both fishermen and state institutions, for biological investigation and determination of the fisheries potential.

Meanwhile, even if the economic situation of the majority of fishermen is not particularly favourable, due to the lack of viable alternatives to fishing activities, some positive conditions exist in which to test a pilot project in one of the fishing centres.

1. Introduction

In Mozambique, because so few marine/biological investigations have been undertaken, very little is known about the potential of the marine resources accessible to artisanal fisheries. Furthermore, there is no monitoring and evaluation system in place for the fisheries in order to assess the size and condition of stocks and the impact of any fishing effort on them. After Mozambique became independent in 1975, control over fishing activities in the small-scale fishery became the responsibility of the *Administração Marítima*, the former *Capitanias* when Mozambique was a Portuguese colony. This organisation is still responsible for the enforcement of fishing regulations and has control over the artisanal fisheries sector.

During the 1980s the strategy for developing small-scale fisheries in Mozambique was based on the *Combinados Pesqueiros*, a para-statal organisation that supplied fishing inputs and services to artisanal fishermen and marketed their surplus production on their behalf. In 1987 Mozambique launched a structural adjustment programme (PRE), which initiated a new process aimed at creating more incentives and facilities to enhance the role of the private sector in the development of the national economy. As a result, the privatisation process for the *Combinados Pesqueiros* assets and their activities began.

The institutional set-up of the fisheries sector changed after the launch of the PRE, and led to the creation of IDPPE with the responsibility of promoting small-scale fisheries development in Mozambique. As a result of global political changes, a new structure for the fisheries administration was established in 1994. Those institutions of the Ministry of Agriculture and Fisheries (MAP) involved in fisheries management, and which give advice and make recommendations to the MAP are the following (see also the organogram in annex 1 page 150):

- *Direcção Nacional da Pesca* (DNP) - handles legal aspects, and mostly deals with industrial fisheries;
- IDPPE - *Instituto de Desenvolvimento de Pesca de Pequena Escala* - whose objectives are to improve knowledge of small-scale fisheries and to identify development programmes;
- IIP - *Instituto de Investigação Pesqueiro* - which undertakes biological research on the resource;
- the *Serviços Provinciais de Administração Pesqueira* (SPAP) - the state institution in charge of monitoring and control at the provincial level, and which functions in tandem with the *Administração Marítima*. SPAP is the only institution with actual representation in the field in all the coastal districts.

The Fisheries Master Plan approved by the Mozambican government in October 1994 sets the priorities and strategies for development to be pursued in subsequent years. With regard to the management of small-scale fisheries, the Master Plan lays emphasis on the involvement of fishermen in setting and enforcing the management regimes.

The implementation strategy for promoting co-management arrangements implies that a first step should be to research into the existing management regimes, focusing on the traditional systems in place. In this respect, baseline data as well as biological, socio-economic, technological and other relevant information needs to be collected.

From 1 January 1997 the *Regulamento de Pesca Marítima* came into force. This regulation saw the establishment of a fisheries management committee, *Comissão de Administração Pesqueira* (CAP) that includes fishermen's representatives from the artisanal as well as the semi-industrial and industrial sectors. This Committee is an advisory body that will meet four times a year to make recommendations on the management measures they feel are necessary in order to control the national fisheries.

The CAP plays an advisory role to the Minister of Agriculture and Fisheries with competence in conservation, fisheries management and regulation. More specifically CAP makes recommendations as to:

- The determining of fishing quotas;
- the determination and definition of closed periods for fishing;
- the maximum number of licences to be granted for the various fisheries;
- the defining of terms for the fishing licences;
- the defining of protected areas.

Although many issues still need to be addressed regarding the functioning of the CAP, and the legal and institutional aspects of co-management, the Committee provides a framework for further development of co-management arrangements in Mozambique.

2. The Angoche case study

Traditionally, in the Angoche district, in the Nampula region (see annex 2 page 151 and 152), the authority at local community level used to be held by traditional leaders, the *mwenes* (chiefs, also known as *régulos*) who governed with the assistance of the *naphucos* (head of a group of isolated houses facing four streets or transversal). During the colonial era, the Portuguese Government Administration tried to maintain this local structure, adapting it to its own political and economic interests. Their functions were primarily aimed at the collection of licence fees, taxes and dues from the fishing community.

After independence in 1975, the socio-political situation in Mozambique, and also the economic climate prevailing at the time, led to a reluctance on the part of the new government to assign or share the responsibility for resource utilisation and management with the local communities. In this period, all traditional forms or non-scientific methods with regard to regulating fishing activities were considered outdated, and consequently seen as obstacles to any development action, and were therefore passively discouraged.

With the introduction of structural adjustment programmes in 1987 and the creation of a multi-party system, the fisheries institutions have expressed their concerns with regard to the problems associated with overfishing. The Fisheries Master Plan of 1994 identifies "co-management" as a sustainable strategy to overcome these problems. IDPPE has been given the responsibility for undertaking studies aimed at identifying viable ways in which to implement co-management systems.

Preliminary studies² in this area show that fishing communities are increasingly concerned about overfishing and the degradation of resources, as fishing activities constitute

² Case studies of Chacon & Sande; Christiansen & Lopes; Angoche/Moma Project Area Assessment Report.

the basis for their income. However, due to the heterogeneity of the fishing communities, few initiatives have been taken up to date.

The Kwirikwidge area is considered to be over-exploited due to the increased population pressure exerted on the resources, to a great extent by a population who had to leave their villages during the war and who settled in Morua which they considered a place of relative security. The growing importance of markets and the demand for fish after 1992 (end of the war) combined with the system of "open access" to fisheries resources, has exacerbated the problem. This clustering of populations is even more logical as Kwirikwidge is close to the urban centre of Angoche.

2.1 Characteristics of the study area

This study is based on data collected during the period October 1995 to April 1996, from the fishing village of Kwirikwidge in the district of Angoche, which covers an area of approx. 3,600 km² and has a population of about 200,000. The district is located in the south-eastern part of Nampula Province, between latitudes 15° 58' and 16° 27' south and longitudes 39° 26' and 40° 08'. The coastline of Angoche is also bordered by several islands with fishing communities, one of which, Kelelene, was visited during the study, although no data from there was used in this analysis.

The area of Kwirikwidge is located at about 25 km away from Angoche City, and is part of the administrative locality of Morua that has a population of 2,246. Kwirikwidge's coastline is an open beach with some rocky formations to the north, sand banks, a small island (Baixo de St. Antonio) 5 miles NE of the coast, with a few square kilometres of coral formations. The tides are strong with a range of up to four metres during spring tides.

There are no indications of water pollution in the Angoche district, except human related organic matter near the main villages. Most of the boats are unmotorised and there are few maritime industrial activities. The level of industrialisation in the area is very low.

The annual mean temperature in Angoche City for the period 1992-1995, was 25.5°C with an average annual rainfall of 1,135 mm, falling mainly between December and March (Angoche Meteorological Station). The prevailing winds (locally known as *nkusi*) come from the south and when blowing strongly, limit fishing activity. The winds from the north, *kasikasi*, prevail during the rainy season, and are beneficial for fishing according to the fishermen interviewed.

The main economic activity in the Angoche district is agriculture, with cashew nuts as the main commercial crop but most plantations are old and productivity is low. There is also a significant production of peanuts and copra. Sisal culture and cattle rearing were important economic activities before independence (1975) but have now practically disappeared. The main subsistence crop is cassava.

The only industry in the Angoche district is cashew nut processing with two plants operating in Angoche City. The degraded state of the physical infrastructure, especially the poor condition of the roads, is a major constraint to the development of all economic activities. However, in the last year, the situation has improved.

2.2 Historical context

When part of the Portuguese colonial empire, Mozambique was considered a potential market for fish products from Angola and Portugal as well as from South Africa. Fisheries development was not regarded as a priority. As a matter of fact, due to this market interest, a regulation existed that prohibited trawling in Mozambican waters. This prohibition was lifted in the early 1960s and a national fishing fleet (mainly trawling for shrimp and handlining) developed. However, the exploitation of shrimp in the marine waters of Mozambique has so far mostly benefited foreign companies.

The artisanal fishery is a traditional activity that has existed throughout the coastal areas and inland waters. This activity plays an important role, producing mainly for family consumption with some surplus going for sale, thus providing cash income for fishermen's households.

In this era, the *Capitanias do Porto* were organisations given a mandate to control small-scale fishing activities within the fishing communities, in collaboration with the traditional authorities. They collected taxes and monitored compliance with the limited existing legislation. In the late 1960s, the *Missão de Estudos Bio-Oceanológicos e de Pescas de Moçambique* was created following the development of the fishing fleet once trawling had been permitted. Being a fisheries research institute, this organisation set in place the first formal marine fisheries management regimes in Mozambique.

After independence in 1975, there was a dramatic exodus from the country of people with knowledge and skills, mainly because of the development of a socialist-oriented economy that subsequently led to the banning of private property. As a result, the experience of those working in the sector and in existing local social structures were either lost or dismantled - both of which resulted in a void in the control of fishing activities. The situation was made worse by the lack of experience within the new institutions created by the government to promote the fisheries sector, and by the civil war which decimated the country during the following years.

In order to improve the situation, the new government tried to give due priority to fisheries development and initiated the creation of an institutional set-up for fisheries development, although emphasis was placed on production rather than on introducing management controls. A comprehensive survey of the fishing fleet and fish resources was undertaken. In addition, the ratification of a 200-mile EEZ took place.

During the civil war, fishing expeditions took place according to the political stability of the country at any given time. Since the war, which ended in 1992, fishing is carried out daily and the number of fishermen has increased. Local communities were introduced to a new economic system in which business transactions were effected for money, unlike in an earlier era when transactions were made in kind, and when agricultural goods were exchanged for fish products. A large number of peasants became fishermen, as fishing yields immediate (daily) profits, whereas with agriculture one would need to wait for a period of 3 - 4 months in order to obtain an income.

3. Contextual Variables

3.1 Bio-technical and physical characteristics

3.1.1 The fish resources

Very little is known about fish resources in Mozambican coastal areas, especially in the northern provinces, as historically the only stock assessment studies undertaken targeted off-shore species, mostly shrimp, which were being exploited by industrial and semi-industrial trawlers. No study has ever been conducted on coastal resources. In 1995 a pilot research programme was initiated through a collaboration between IDPPE and IIP in the Angoche district. This was part of an IFAD-financed (International Fund for Agricultural Development) project (Nampula Artisanal Fisheries Project), implemented by the IDPPE delegation stationed in Angoche with activities being carried out in both the Angoche and Moma districts. A fisheries statistics scheme is also in place and will be developed further over the next five years.

The fishery is multi-species, but mostly comprises small pelagics. According to preliminary beach seines' catch data received from Kwirikwidge for the seven-month period October 1995 to April 1996, the most abundant fish species caught is mackerel (*Decapterus* spp. and *Rastrelliger kanagurta*). Mackerel makes up 19% (by weight) of the catches, followed by thryssas (*Thryssa* spp.) 17.8%, sardines (at least 3 species) with 13.2% and anchovies (*Stolephorus* spp.) 9.2%. Six per cent of the production consisted of the fish larvae of diverse species.

There is as yet no available catch data for gill-net fishing. The commercially most important species, especially thryssas and anchovy, are migratory and seem to effect some annual south-north migrations during the rainy season but this is yet to be confirmed. Shrimp (mostly *Penaeus indicus* and *P. monodon*) is an important resource during the rainy season. Seasonality is observed in the capture of other commercially important species of the Sciaenidae (*Otolithes ruber*, *Johnius* spp.) and Carangidae (*Carangoides* spp.) families.

3.1.2 The fishery and the technologies applied

In the period between October 1995 and April 1996, the average monthly catches per fishing unit in the Kwirikwidge area were 1.3 tonnes, varying between 63 kg in October to 1,930 kg/unit in January. The average monthly catches measured on an annual basis would be smaller as fishing activity and productivity are lower between June and September.

Catches are apparently higher during the rainy season (December-April) when a migration of fishermen southwards is observed, from Angoche, Larde, Mualase, Matadane to several regions in Zambézia Province (Terepwane, Cwasiane) where productivity is higher. According to most fishermen these migrations have increased during the last few years due to a fall in available resources in the Angoche district.

In May, when the abundance of thryssas (*Thryssa* spp.) is higher in the Moma area, which lies to the south of Nampula Province, some fishermen from Kwirikwidge move to these fishing sites where they claim to earn better incomes than they would in Kwirikwidge.

The nets are set between one and three times a day, depending on the results obtained from the first haul. The majority of the fishermen in this survey perceive that catches per unit effort are decreasing, but unfortunately there is no data to confirm this.

During the period October 1995 - April 1996 the number of registered boats operating beach seines in the Kwirikwidge area was 33, of which 25 were operational during the survey. There was only one fisherman using a gill-net. In other areas of the Angoche district gill-nets and handlines represent a more significant element of fishing activity but beach seine is the predominant gear on the coasts of both the Angoche and Moma districts.

In the Kwirikwidge area, a beach seine is operated by an average of eight fishermen. Vessels are canoes of the 'Moma' type (a round bilged, planked open canoe), with a length varying between 5 and 8 metres, propelled by paddles and sails. They are used to set the beach seines and for travelling along the coast.

There is a high concentration and utilisation of beach seines along the coast of the Angoche and Moma districts (around 1,000 beach seines for 150 km of coast). Beach seines were introduced in the 1950s, using nets made from roots of a plant known as *nakatha* or *kapothi* (*Brachystegia utilis*) and using banana leaves locally known as *nahali*. The use of this gear replaced other methods previously in use, such as hook and line, which then almost entirely disappeared.

Fishing units in Kwirikwidge (April 1996)³

| | Beach seines | Gill-nets | Total |
|---------------------|--------------|-----------|-------|
| Number of boats | 33 | 1 | 34 |
| Number of fishermen | 261 | 3 | 264 |

Fishermen began intensifying their use of beach seine nets at the end of the 1970s with the establishment of the communal villages, particular since the war, which ended in 1992. The main aim of such migrations was to concentrate rural populations into particular areas in order to give them access to basic services.

The stretched mesh size for the wings varies between 24 and 48 mm. Mosquito nets or bags are used for the central parts of the nets and these catch a high percentage of larvae and juvenile fish. It appears that the use of mosquito nets began a few years ago and was first limited to the Angoche district. Their use seems to have spread rapidly along much of the coast. When asked why they use mosquito nets, fishermen usually say that they do so because of the non-availability of real fishing nets. After further discussions, and according to preliminary data obtained from an experiment where one fisherman who was provided with a one-inch mesh size net, the real reason seems to be that the catches, when using this mesh size, are very low, at least for a part of the year. The use of mosquito nets guarantees some minimal catches, of at least a few kilos of fish larvae, for subsistence purposes. The long-term impact of such practices is certainly worrying.

³ According to an IDPPE census taken in 1994, beach seines are predominant in the Angoche and Moma districts and constitute 71% of the all fishing gear types used, followed by surface gill-netting 16%, bottom gill-netting 2% and handline fishing, 11%.

In Kwirikwidge the average length of a beach seine, not including the hauling ropes, is 155 m. The beach seines operate within a few hundreds metres of the coastline, the limit being determined by the length of the hauling cables, a maximum of 400 metres in Kwirikwidge.

One of the objectives of the IDPPE/IFAD project is to support a diversification of fishing technique in order to alleviate the pressure on near coastal resources and juveniles, and to explore pelagic and demersal species further offshore. The intensification of fishing effort is mainly due to lack of job alternatives (some sisal, cashew and rice processing plants in the area have closed after independence) and the activity of many plantations has not as yet been recommenced.

Fishermen claim that there is more resource potential near the coastline than in the open sea. The tendency to fish in the coastal waters is further strengthened by the availability of beach seine nets which dominate the gear supply market, a market controlled by middlemen⁴. This contributes to the 'clustering' of fishermen using beach seine nets, a pattern which is even more evident on the beaches. The majority of fishermen prefer to invest in beach seines, even though they are expensive, because of the diversity in species able to be caught, and the lower economic and physical risk involved compared with other fishing gear types.

3.1.3 Boundaries and habitat

In Kwirikwidge, physical boundaries are defined on the basis of natural phenomena found in the area (rocks, coral reefs). Access to the various fishing areas is free. During the colonial period the fishing grounds were reserved for those fishermen living along the coast. With permission from the chief, fishermen from other regions could also fish in these waters. However, the chief is no longer in a position to regulate these fishing activities as this authority has been handed over to the Maritime Administration.

The distribution of fishing grounds as well as access to fishing resources is open and thus, does not depend on a fisherman's social or economic status, or his political affiliations. Access to fishing grounds is in fact permitted to anyone with a fishing licence issued by the Maritime Administration.

3.2 Market attributes and indicators

All quantitative data is taken from the Wilson study (1995). The fieldwork for the study was carried out in September 1995.

3.2.1 Degree of commercialisation

The fishery in the Moma and Angoche districts is essentially commercial and although it supplies local subsistence needs, it also produces significant excesses that are then processed and distributed for sale inland.

⁴ It appears that the fishermen themselves encourage it.

The principal market is the provincial capital, Nampula City, which serves both urban consumers and also as a resale and redistribution centre. From here fish products from the Moma and Angoche districts are taken as far as Lichinga (Niassa Province) and Gurué (Zambezia Province), but the distribution of fish products is highly dependent on the type of processing and the size of the individual fish. Only a very small quantity of fish products processed in the area is exported, and this is confined to prawns that are then sent to South Africa by a small Mozambican/South African company based in Angoche City. The consumption of fresh fish is confined to littoral districts, there being no extensive cold storage and distribution network. The distribution of smoked fish and dried fish is likewise limited, and confined to the immediate hinterland as far as Nametil and Chalaua. Salted and dried fish has a much wider distribution, especially in the case of small-sized fish, for which there is a marked consumer preference.

3.2.2 Market structure

The demand for fish at 'beach level' is best described as variable. There is a noticeable difference in demand and in the prevalence of traders depending upon the road conditions between a particular fishing centre and the urban centres of Angoche, Moma or Nampula Provinces.

At certain times of the year, in particular at the start of the rains, when production can be at its height, some centres are cut off by floods or poor road conditions and fishermen may wait weeks for a buyer to appear, or traders may wait equally long for transport. In the fishing centres nearest to Angoche (Sangage, Kwirikwidge) this is not the case and traders are reported never to be lacking. On the contrary, several traders spoke of the difficulty of securing a regular supply of fish from these areas.

The supply of fish at beach level is likewise variable, depending principally upon the season and the weather. In the dry season there seems to be a surfeit of traders, especially near Angoche City, and a relative dearth of fish products. In the early part of the wet season the situation can be the reverse and large catches become difficult to sell especially in those fishing areas far from the urban centres of Angoche or Moma.

It is important to recognise that the fishermen have distinctly different priorities in the two seasons. In the dry season they are interested in maximising the benefit from the little that is caught and will enter into credit/supply agreements with traders (see section 4.4); in the wet season the priority is to be able to sell fish in quantity.

3.2.3 Market orientation

The interior markets supplied by the Moma and Angoche districts are characterised by a very broad consumer base whose individual purchasing power is extremely low. This has a direct influence on the demand and distribution of fish in the Provinces as consumers prefer to purchase *small* fish in *small* mounds, each mound costing between 1 - 2 Cts (USD 0.09 - 0.18).

In this way an individual purchase can be easily divided up between family members or used for more than one meal. Consumers seldom purchase several kilograms of dried fish but

seem to prefer to buy regularly at low expenditure levels in spite of the fact that purchase of a small mound is approximately 50 - 120% more expensive than purchases made in kilograms.

This preference for small fish without doubt encourages the use of beach seines in the Moma-Angoche districts as traders are always willing to buy this type of product, and because fishermen actually find it easier to market the juveniles of larger species than the adults. This undoubtedly constitutes a serious constraint to the development of a more sustainable fishery.

In the interior of the Province and over towards Lake Niassa salt is in short supply and salted and dried fish from the Moma-Angoche districts, which is one of the few sources of salt, is consequently in high demand.

3.2.4 Product value

In general, prices in the Moma district are significantly lower than those in the Angoche district, reflecting both lower local purchasing power and poorer communications with the markets of Moma's hinterland.

It is of interest to note that in many cases the price increment between fresh and dried fish is very small and even negative when weight reduction is taken into account. Salted and dried anchovy however shows a clear value increment between its fresh and dried state, reflecting consumer preference in the inland markets.

At the time of the study no higher value products were being landed by the artisanal fishery (inappropriate season), hence no price data for prawns and lobster is presented.

3.3 Socio-economic characteristics

3.3.1 Stratification

The population of the region is broadly made up of one ethnic group, the *makuwa*, with Islam as the predominant religion. The socio-economic structure is made up of four distinct social classes: the traditional political chiefs, religious leaders, net- and boat-owners, and workers of these nets and boats.

Socio-cultural authority is held by the chief's council (the *mwene* and his subordinates); religious authority is held by the *Ches* and *Imamos* who are also part of the chief's council, and economic power lies in the hands of net- and boat-owners. At the bottom of the scale we find a group of seamen and simple villagers who usually work for the big property owners as well.

This social structure also reflects differences in wealth and material possessions (good housing, bicycles, motorbikes, furniture etc.), social opportunities (education, health and the possibility of marrying more than one wife), ownership of fishing gear as well participation in debates and decision-making at community level on issues concerning the community.

3.3.2 Importance of fishing to the livelihood and motivation of users

In spite of not having quantitative data, it is still a fact that today fishing activity is the single most important source of income for the subsistence of several families in Morua village, which is located in the area of Kwirikwidge. Changes in the socio-economic and political situation have led to an increased number of people becoming involved in artisanal fisheries activities, particularly within the region of our study. This is due to a lack of alternative employment and the deepening impoverishment of the population, which has been aggravated by the long civil war that lasted almost 20 years.

The basic needs of the population (food, shelter, clothes, means of production etc.) not only within the region, but also in neighbouring regions, has rapidly altered social and economic conditions. These changes are an outcome of the concentration of great masses of people bordering less extensive but rich fishing grounds, using beach seine nets, and in particular mosquito nets.

Prior to the end of the war, many transactions in the coastal zone were carried out on an exchange basis, usually agricultural goods for fish products. Since the end of the war monetarised systems have developed and exchanges in kind (bartering) have become less common.

The growing importance of the market and the increasing demand for fish and fish products in the country, combined with the system of open access to the fisheries resources, lack of employment alternatives and poor living conditions, has contributed to a growing number of people entering fisheries.

3.3.3 Attitudes towards risk, innovation and collective action

In general, elderly fishermen argue that the unique and best method of obtaining good results from fishing activities is the observance of traditional rules and norms rather than the use of new technologies and techniques. In their opinion it is not worth the risk to try other approaches, the traditional one alone will suffice.

The younger fishermen acknowledge that belief in God is both desirable and necessary, but they also feel the need to try new techniques and to become involved in other activities such as agriculture, and sale of alcohol, in order to reduce the risks involved with fishing activities.

In any event, it is a matter of concern that the prosperous, successful fishermen practise beach seine fishery and are therefore unwilling to experiment with other techniques or technologies. Even if an artisanal fisheries project helped promote their activities and supply the fishermen with other types of fishing gear, they argue further that *"a beach seine is more profitable than any other gear used in the region"*.

In the absence of both an effective competent authority, and the breaking down of the old fisheries management system that involved traditional authorities, this line of thinking does not bode well for achieving effective resource management through the limiting and diversification of fishing effort. However, the percentage of conservative fishermen is small in relation to the total number of fishermen. The existing habits, customs and beliefs observed in the study area should not be regarded as obstacles to experimentation by the fishing communities and/or the adoption of new technologies.

The main obstacle is related to the types of resources in existence. It would be difficult to recover any investment made in more sophisticated fishing technology or the acquisition of motors to explore other fishing grounds further away, in the light of the current small demand for high value products, the low purchasing power of the local population and the logistical difficulties aggravating the risks for export.

3.3.4 Level of information and knowledge of the fishery and its management

Several interesting habits and customs were observed in the study area, which appear to influence and contribute to the utilisation and conservation of fish resources, based on traditional social and cultural values which have been transmitted from one generation to the next. "Traditional" religious institutions, myths and magic used to play an important part in resources management. Until recently, the council of chiefs organised and held annually thanksgiving ceremonies to ask for blessings from their gods in which all fishermen participated, known as *Tahilili or Mukotho*⁵, *Hijabo or Satakha*⁶ and *Ehako*⁷. During the ceremony food made from millet, maize and water is presented and offered whilst pleas are made for good fishing.

There are strongly diverging views between the young and elderly fishermen with regard to the efficacy of the ceremonies. The elderly argue that these traditional ceremonies, particularly *Tahilili or Mukutho*, are extremely important to the success of fishing activity. Young fishermen tend to distance themselves from these customs, claiming they are a waste of time; they feel that it is not only God who determines catches, but also personal will, initiative and experimentation with new models for fishing. Furthermore, the majority of the young fishermen are Sunni Moslems, who advocate that followers of the faith should not believe or observe the rituals of *Mukutho*, which is based on witchcraft, but should only have faith in Allah, since it was He who placed the fish in the sea.

It was our perception that the artisanal fishermen of this region have no scientific knowledge about fishing. However, there are some aspects of fishing activity that could be considered to be based upon a form of local scientific knowledge. For example, the months are divided in three periods, the first and the last being the most profitable for fishing. This corresponds to high tides, the time when the seines are the most efficient.

This, and other knowledge, such as the determination of the fishing grounds, which can vary significantly depending on the phase of the lunar cycle, wind direction and temperature, are the result of practical experience and observations of the resource behaviour over the generations.

⁵ *Tahilili or Mukotho*, a ceremony that is meant to protect a denoted area from bad spirits and from those who violate the customs regulating the use of the environment and its resources. In accordance with local ethics, this ceremony is conducted by chiefs and *Imamos*.

⁶ *Hijabo or Satakha*, a ritual for the treatment of nets and boats, held any time someone suspects a bad omen and/or when catches are low, using a traditional antidote called *Mahuko*. The ritual is conducted by *Imamos* or traditional doctors.

⁷ *Ehako*, a prophecy ritual, generally conducted by *Mwalimo* and/or traditional doctors, usually held at the beginning of the fishing season. On the basis of the prophecies, fishermen are told where, when and how to fish. It is during this ritual that a decision is made about when to begin the construction of a boat, and when and how to launch it into the water.

Information about the fisheries and the political/economic situation in the country in general, reaches the fishermen of Kwirikwidge and surrounding areas via radio and informal contacts, or through individuals who have been in the big cities like Nampula, Beira and Maputo. There are also local fishermen who, in the process of looking for fishing materials, visit various places in the country like Maputo, Quelimane, Mocimboa da Praia (Cabo-Delgado) where they learn about other experiences related to fishing activity.

The Maritime Administration department of Angoche district (in spite of all its limitations regarding human resources, funding and materials as mentioned earlier), the IDPPE Angoche-based delegation and the private enterprises linked to the fishing activity in the district, also constitute important vehicles for the distribution of information about fishing activity throughout the country.

3.4 Decision-making arrangements

3.4.1 Traditional leadership and power structures and types of rules

Traditionally, in Angoche district, local or community authorities (the *mwene*, *regulo* or chief) used to govern at community level, with the assistance of the *naphucos*, who acted as heads of groups of households. After independence this structure was abolished for political reasons. However, the current economic and social dynamic brings with it a need to re-establish this social organisation, and those families holding the traditional right to authority are resuming their community functions, including their involvement in the control of fishing activities.

During the colonial period, one particular fisheries co-management arrangement was carried out at regional level by both the local community and the old *Capitania do Porto*. In this way fishery activity was controlled, with traditional authorities playing an integrated role in the process. On the other hand, community leaders were obliged to report all decisions taken regarding community management in order for them to be sanctioned.

Thus, according to the data available from our research, the following community rules were observed at Kwirikwidge (until 1975):

- Prohibition to fish in the afternoons;
- forbidding the use of fishing gear not approved by the *Capitania do Porto*;
- prohibition to fish at the site by non-resident fishermen without the consent of local traditional authorities;
- forbidding migration to other fishing grounds without the permission of the local traditional leaders and the knowledge of the authorities of the *Capitania do Porto*.

With the exception of laws relating to acceptable gear types, these practices in almost their entirety were abandoned after independence. This was for two main reasons: one because to some extent the availability of other sources of protein (meat and other consumables) had declined and second, because of the Government's new policies of "*New State = New Man, so free man of traditional pre-conception*" and its eagerness to guarantee food for the people. In effect, the Government practically closed its eyes to the abandonment of traditional management measures by communities.

Since 1989, due to the increasing number of people involved in fishing activities thereby increasing pressure on the resources with a subsequent decrease in the by-catch, traditional authorities have been trying to introduce the prohibition of fishing activity in the afternoons. However, the Maritime Administration intervened, claiming that according to fisheries law all licensed fishermen had the right to fish at any time and in any place they wished. In April 1996, as a result of the traditional authorities' concern, a ban on fishing in the afternoons was re-introduced by the chief and the fishermen's representative. It was decided, with the knowledge of the *Administração Marítima*, that corrective measures should be taken by the community against anyone who violated this rule.

3.4.2 *The decision-making process and representation*

Before independence in 1975, responsibility for fisheries management was vested in two institutions (formal and informal). Responsibilities and authority were well defined. The *Capitania*, a formal institution, through the *capitão-mar* and *patrão-mor, cabos do mar* (enforcers in the field), each one of the latter assisted by four to five fishermen, were responsible for the control of fisheries activities along the coastline from Angoche to Moma. This structure had the necessary support of the council of the chief of the community, who was usually requested to intervene in instances of disobedience by a fisherman, or to mobilise fishermen into some action or to conduct traditional religious ceremonies.

This situation changed after independence, especially during the period between 1975 and 1994, due to new systems of governance introduced by FRELIMO which tried to suppress the role of traditional local authorities and the way of life in which they were the principal managers. Furthermore, the role of the *Capitania* changed and responsibility for surveillance activities were transferred to Fisheries Administration that, in the case of the study area, has never had a local representation.

At present it is the responsibility of the fishermen's representative, and in this case in co-ordination with the Maritime Administration, to register those fishermen operating in a particular area, and to ensure the fulfilment of the norms established by law. This may require mediation and the settling of any conflict that arises in his area of influence. He is also responsible for communicating to the Maritime Administration all problems and initiatives, including fishermen's suggestions. The involvement of the traditional authority is in fact non-existent in the fisheries management of this region.

The participants in this "embryonic co-management" system are elderly fishermen, especially those boat- and net-owners with high social status, and government representatives who are also members of the community. In practice, the council of the chief and the wealthy boat- and net-owners are the main decision-makers. Any decisions they make are complied with by the skippers and seamen (i.e. those with less economic power).

Community level representatives will eventually approach the chiefs and *Imamos* and together they will try to find solutions to fishery-related problems. Some initiatives are already being taken, as for example the re-introduction of some community management mechanisms that had broken down some time ago because of the social, economic and political conditions being experienced by the communities at that time.

"...because of the fishermen who have come from elsewhere, we have abandoned (around 1993⁸) our system of discontinuing fishing for a few days every month. As they did not abide by this regulation, we felt deceived, and so we also opted for fishing continuously".⁹

However, the fishermen's representative argued that the practice of disallowing fishing for a few weeks a year had been abandoned since 1980 as many people had learnt to preserve fish using salt.¹⁰ This was in response to the increasing opportunities that were opening up, such as the demand for fish proteins and the growing market in the interior for preserved products.

3.4.3 Relevance of rules

In the decision-making process for fishing activity, above all users and stakeholders take into account economic and social aspects, particularly those affecting the families of the fishermen. The lack of alternative sources of income in the Kwirikwidge area allows little leeway for the implementation of restrictions on fishing practices.

With regard to the legitimacy of official rules, there is a very low level of acceptance among user groups, particularly for rules such as limitations on net mesh sizes. These rules are considered totally unrealistic and their implementation would imply such low catches that it would make the activity economically unviable. The very few local rules still in practice, such as the closing of fishing during the afternoon for part of the year, seems to be widely agreed upon, as the catches during these periods would be very low anyway.

Currently, those rules implemented at community level have to be sanctioned by the local department of the Maritime Administration, including the punishment of law-breakers. We believe the situation will improve with the creation of the Commission of Fisheries Administration (*Comissão de Administração Pesqueira - CAP*) as one of its responsibilities is to attempt to establish rules and norms which respect the wishes of the user groups concerned, and take into consideration the particular characteristics of each region.

This presupposes that powers should be given to the fishing community so that in accordance with their knowledge about the biology of the resources, and cultural factors as well, they are able to make decisions aimed at a more rational and efficient management of fishery resources. A first step towards this has already been taken with the participation of the Angoche fishermen's representative in the first session of CAP held in Maputo, and the first informal meetings of fishermen's representatives from the main fishing centres of the Angoche district with representatives of the administration (IDPPE and Maritime Administration). The main objective of these meetings, organised on the initiative of the IDPPE/IFAD project team, was to start a dialogue which would constitute a first step towards the implementation of more formal co-management structures, such as fisheries advisory committees.

⁸ Perhaps because of the effects of the civil war that only ended a year ago, many people had entered this area in the hope improving their socio-economic situation as rapidly as possible and at any cost.

⁹ Quote from a fisherman from *Mukorodge*.

¹⁰ Either learnt from the fish processing factory based at Moma or an outcome of the By-Catch project.

Enforcement of all legislation related to fisheries remains under the authority of the Maritime Administration (MA). However, because of the poor working conditions within the Maritime Administration, effective enforcement and fisheries management has proved difficult.

4. Incentives for co-operation and the pattern of interaction

The interaction between the users of the resource i.e. artisanal and semi-industrial fishermen, and the Government, is considered to be important for the establishment of a successful co-management regime.

4.1 Fishermen and the Government

Due to the critical socio-economic conditions faced by most fishermen, caused by the scarcity of resources, they are becoming more aware and are trying to re-introduce some management practices. However, they claim to be having difficulty achieving this. Given the circumstances of fishing communities, such as a lack of alternative sources of income and employment opportunities, it is difficult to implement regulatory measures which would mean a reduction in fishing effort (day fishing or licensed fishing units) or the CPUE (Catch per Unit Effort) such as mesh size regulation.

The Government is also gradually becoming aware of the problems encountered in the enforcement of fisheries regulations. On 13 January 1993, through a Ministerial decree issued by the then Ministry of Finance and Fisheries Secretariat, a body of local fishermen's representatives, elected by the fishermen themselves, was formed in every fishing centre, each known in Mukorodge as concentration leader¹¹.

The incentives for the Government to enter into some form of co-management arrangement are as follows:

- Currently, the management of the fishery is limited to the partial registration of canoes and the occasional payment of "*Guias de Pesca*" (permits to fish in an area other than the one where the fisherman is registered); the regulation of fishing gear characteristics (minimum mesh sizes in particular) remains purely theoretical;
- the high costs of monitoring and regulating the fishery, combined with extremely limited human and financial resources, has led to an almost total absence of monitoring;
- aid donor policies that support the concept of co-management and its integration into fisheries management, as stated in the Fisheries Master Development Plan of 1994.

The incentives for fisherfolk to co-operate with the Government are the following:

- A lack of representation within the fisheries decision-making process;

¹¹ Normally a proprietor of nets and boat.

- perceived lack of legitimacy of some fisheries regulations, such as minimum mesh size (one and a half inches) for beach seines;
- poor living conditions and the lack of viable employment alternatives outside fisheries activities.

4.2 Fishermen and the Maritime Administration

The role of the Maritime Administration, the government institution in charge of implementing fishing regulations within artisanal fisheries is, in practice, limited to registering fishing canoes and the issuing of *Guias de Pesca* (permits to fish in an area other than the site where the fisherman is registered). These *Guias* are regarded as a tax and not a management tool, and are delivered without consulting the local traditional authorities. As a consequence, in the more productive areas a fishery may be overcrowded, resulting in conflicts among fishermen.

When asked about the possibility of introducing effective management mechanisms into their areas, fishermen usually replied as summarised in the following:

1. "The Maritime Administration should delegate to the community the task of regulating 'outsiders' that come to fish in our areas, as we know how many fishermen we can accept. This way, the outsiders are also obliged to respect our customary rules."
2. "It is possible to reach a consensus about a closed season, especially between January and April (rainy season) as long as the State hands back power to the traditional chiefs... and the young should learn to respect traditional community rules."
3. "A formal management system is not necessary as only God should decide when we ought to stop fishing in order for the species to recover, and this happens when He creates bad storms at sea, for a required period, when we are unable to go fishing."

The Maritime Administration still has a rather rigid, police-type approach to fisheries management issues. Their function is to implement the law, whether the fishermen agree with it or not. This attitude is slowly changing and the discussion process initiated within the framework of the IFAD project is beginning to lead towards a more participatory/consultative approach.

4.3 The fishermen themselves

Two types of conflict are common in the area:

- a) Those among artisanal fishermen, characterised by the crossing of beach seines due to a concentration of nets in resource-rich areas.
- b) Those between artisanal fishermen and semi-industrial trawlers, when trawlers operate very close to the coast, thereby destroying beach seines.

4.3.1 *Conflicts among artisanal fishermen*

The high concentrations of fishermen in confined areas can result in serious conflicts among them, due to the crossing of nets in places considered potentially rich in fish. One morning during our study in Kwirikwidge, 16 beach seines were observed operating on a 100-metre stretch of beach.

Recently, a quarrel between the local fishermen of Kwirikwidge and the 'outsiders' resulted in the death of one fisherman and the destruction of all the shelters belonging to the immigrants. The resident fishermen allege that migrant fishermen are to blame for the scarcity of resources in the area since they are the ones who introduced the use of the mosquito net into the beach seine fishery.

However, based on the above, there seems to be a common feeling of private community ownership among the local fishermen of Kwirikwidge, a belief not supported by the current legislation which is based on open access to the fishing grounds. This belief in ownership manifests itself as a deep-felt hostility towards immigrant fishermen.

The granting of *Guias de Pesca* by the Marine Administration without consulting the fishermen of the host fishing centre is perceived as an arbitrary decision which undermines the local (traditional) authority and the Administration's ability to implement any regulation. If fishermen were involved in determining the number of *Guias de Pesca* to be distributed in their area, this would constitute a first step towards controlling access to fishing grounds and would help reduce conflicts.

4.3.2 *Conflicts between artisanal fishermen and semi-industrial trawlers*

Conflicts between artisanal and semi-industrial fishermen rarely occur in Kwirikwidge as the topography of the fishing grounds makes it hazardous for trawlers to operate within them. However such conflicts are very common along most of the coast of the Angoche and Moma districts, including around Kelelene Island which supports the highest concentration of artisanal fishermen.

Conflicts are caused by the operation of semi-industrial and even industrial shrimp trawlers a few hundred metres from the shore, resulting in beach seine destruction and a probable negative impact on fish stocks and nursery areas. Fishermen are allowed to claim for reimbursement of the destroyed gear but the process is complicated, time consuming and slow, and basically depends on the good will of the fishing company in reimbursing what they believe to be fair compensation for the loss.

There are cases when fishermen feel that they have been inadequately compensated, and take their case to higher authorities such as the National Fisheries Directorate and the Ministry of Fisheries and Agriculture. The IDPPE delegation in Angoche helps the fishermen to channel documents to the competent authorities, and also puts pressure on the authority to reach a fair decision with regard to resolution of the problem.

The relationship between artisanal and semi-industrial fishermen is complex, and the artisanal fishermen's opinion of semi-industrial trawlers depends on whether or not the former

are involved in by-catch collection¹². To collect by-catch, fishermen go to the trawlers using their traditional canoes. At first (around ten years ago) this was considered a complementary activity for artisanal fishermen, but in many cases has since become a full-time occupation.

The interests of such fishermen are obviously not the same as those of beach seine operators. Their main point of divergence is that for beach seine fishermen, the trawlers should operate as far as possible from the beach seine fishing area, whereas for by-catch collectors the closer to the shore that trawlers operate, the easier and less risky the by-catch collection. The situation is made still more complex by the fact that an individual fisher might be involved in both activities.

Apparently such conflicts exist almost along the entire coast of the Angoche and Moma districts, but mostly in places with high concentrations of shrimp and where the geographical conditions allow the operation of trawlers. The trawlers belong to two major companies *Krustamoz* and *Emopesca*, based respectively in Quelimane and Beira. They often operate as close as a few hundred metres from the coast, and in doing so invade the beach seine fishing grounds.

The trawler crews argue that artisanal fishermen are actually responsible for the conflicts. Often nets are set without any signalling and with dimensions exceeding those permitted. The industrial fishermen emphasise that artisanal fishermen are ignorant of the fishing regulations and that the Maritime Administration does not have the means to properly implement these regulations.

4.4 Fishermen and traders. Social aspects of production and marketing

In general, the marketing of fish is carried out on a monetary basis, but social linkages between traders and fishermen do exist, established by mutual interest. Typically these include:

- Supply of fishing materials by the trader in exchange for an obligation on the part of the fisherman to supply the trader with fish;
- cash loans from traders to fishermen in return for similar obligations.

These types of agreements were found only in the area near to Angoche where competition for fish amongst traders is high and the agreements secure forward and backward linkages in the production/commercialisation chain.

¹² By-catch collection: fishermen go to the trawlers using their traditional canoes, and collect the fish which is thrown into the sea by crew members of the shrimp trawlers, after being separated from the by-catch product. This by-catch is often the major source of income for artisanal fishermen, and provides proteins for the poorest people.

5. Outcomes

5.1 Sustainability

Most fishermen are aware that the use of mosquito nets in beach seine bags, and the intensification of fishing effort in an area (a result of increasing numbers of people and nets in a particular area) exerts mounting pressure on the resource and significantly contributes to the diminishment of marine stocks. As fishermen have no control over access to their fishing grounds, the present regime tends to encourage the destruction of the resource and non-compliance with any regulation.

The granting of *Guias de Pesca* carried out as part of a collaboration between the Maritime Administration and fishermen's representatives, would be a significant first step towards controlled access to fishing sites. The total number of fishing units allowed to operate in a specific site would be agreed upon between the fishermen's representatives from the main fishing centres, and the Maritime Administration who would then take this figure as the maximum number of *Guias* to be distributed for the area. Such a system might face some resistance from fishermen in areas where fishing has become less productive, possibly due to overfishing, but seems a necessary first step to start to build up some feeling of co-ownership and joint responsibility, and to develop the fishermen's sense of responsibility.

The process of establishing a Consultative Committee in the Angoche district, with representatives from both the fishing communities and from the various government agencies involved in small-scale fisheries management (Maritime Administration, IIP and IDPPE), has begun. We hope that this Committee will constitute another important step towards the implementation of a co-management arrangement. Until now, informal meetings have been held and, from 1 July 1996, the national legislation has recognised and promotes such entities.

The "New Maritime Fishing Law" foresees the constitution of a Fishing Administration Committee (CAP), operating at the central level, with meetings being attended by representatives of various sea-resource user groups, including the artisanal fishermen of Angoche. It is within local committees like that of Angoche that community problems are discussed, and are then taken to the CAP for their appraisal and action by the Minister of Agriculture and Fisheries.

5.2 Equity

Socio-political change (since 1975) and the devastating civil war profoundly affected the position of fishermen and their relation with the environment on which they depend for work and survival.¹³ These outcomes led to the breakdown of the traditional authority system, its norms and values, and led to the impoverishment of the fishing communities. This was not only because the war has only recently ended (1992) but also due to the abolishment of customary "laws" related to fishing activities. In fact, soon after independence, the new Government abolished all customary forms and rules that were considered to have their roots in obscurity and ignorance. The Government shifted the whole responsibility for the

¹³ Overwhelming global problems and the extreme poverty of the community in question contribute quite significantly to this situation.

management and control of fisheries to the *Administração Pesqueira* (Fisheries Administration).

Since 1993, the government is seeking to re-integrate the resource user groups into the management of these same sources. It is within this process that the individual known as a fishermen's representative, referred to earlier, has come into existence. However, under the current very basic "management" regime, the government does not grant any official rights to the fishermen's representatives. They are generally viewed as the most efficient way to collect taxes and register canoes. Co-management measures as those described above would start to improve their equity in terms of representation and process clarity.

The new national marine fisheries regulation, to be implemented on 1 January 1997 does increase the degree of representation by artisanal fishermen through the participation of their representatives in meetings of the Fisheries Administration Committee (CAP). However, allowing semi-industrial and industrial trawlers to operate as close as one mile from the coast, down from 6 miles under the former regime, does not appear to defend the interests of small-scale fishermen.

5.3 Efficiency

From the Government's point of view the current artisanal fisheries management regime inherited from the colonial authorities remains mostly theoretical as there are neither the human nor the financial resources to implement it.

From the fishermen's point of view, the regulations emanating from the centralised management regime are either unknown (particularly by those who are not really fishermen, but people looking for some way to earn money) or not complied with. The regulations are considered either irrelevant or unrealistic when taking into consideration the present local situation. The best example of this attitude is the use of mosquito net for the beach seine bags.

An evolution of the management regime towards one of co-management should increase the efficiency of fisheries management. In any event, there is a need for a profound change in the attitude of local government authorities who mostly see their role as tax collectors and would apparently prefer to adopt a rather rigid approach regarding the implementation of official regulation, if they had the means to do so.

Considering the present economic situation of the country and the overall weakness of the Maritime Administration, it appears clear that the only way to efficiently manage artisanal fisheries will have to be via some form of co-management arrangement and the involvement of fishermen in the implementation of fishing regulations.

6. Discussion

The communities studied show awareness of the problems and the necessity of introducing management strategies for fisheries activities. However, due to limited institutional support and economical problems in the region, the translation of these ideas into tangible actions is far from view.

In a meeting conducted by the chief of the Kwirikwidge area, a ban on fishing in the afternoons was re-introduced and should have been initiated in April 1996. This idea was

initiated at the level of the chief's council of Morua but was not presented for discussion in an assembly of fishermen, who were merely informed and agreed in principle. Nor did the chief inform the *Capitania* about this initiative. The fishermen often do not comply with this measure, probably because they were not consulted before the decision was taken.

This awareness within the communities is expressed by the following: (a) fishermen's own initiative to partially reduce the fishing effort; (b) their assertion that fish resources are born and mature during the rainy season; (c) their complaint about the lack of support and collaboration or solutions, to a certain extent, forthcoming from the Maritime Administration; (d) their assertion that they would be able to adopt some measures regarding fisheries management if the government were willing to recognise their authority; (e) the utilisation of the mosquito net is very much disputed.

According to the actual situation at Kwirikwidge, one can summarise the positive and negative factors affecting the implementation of a co-management arrangement in the Angoche district as follows:

Positive

- National Mozambican fisheries policy supports the establishment of co-management schemes;
- existence of a donor-financed fisheries programme (IFAD) which could support the implementation of co-management schemes;
- nucleus of a co-management system inherent in fishermen's representatives already working for the Maritime Administration;
- existence of the *Guias de Pesca* system which could be used as a tool for controlling the access within each area;
- relative ethnic homogeneity of the area.

Negative

- Fishing activities take place on open beaches, so geographical boundaries are unclear within the fishery;
- high density of fishermen and existing conflicts among them;
- divergent interests between artisanal fishermen and semi-industrial trawlers;
- localised overfishing problems due to the widespread use of destructive fishing gear with limited possibilities of either changing its characteristics or diversifying fishing techniques.

7. How to progress fisheries co-management in Kwirikwidge

A co-management system for artisanal fisheries should be seen as an initiative to increase knowledge and awareness among fishermen about the condition of marine resources, and as a means of reducing government intervention and costs in the management process.

Within this perspective, the IDPPE delegation should promote the formation of a steering committee comprising of representatives from the Maritime Administration, Fisheries Administration, National Directorate of Tourism, and representatives of fishing communities, in order to jointly determine permanent and efficient forms of intervention, whenever the situation requires it.

The Maritime Administration should implement the permit system (*Guias*) in a positive manner, to regulate and restrict outsiders, in co-ordination with fishermen's representatives drawn from the localities frequented by immigrant fishermen. This institution could function as more than just a distributor of permits. For instance, it could promote and increase awareness among fishermen of the need to conserve the natural resources, which are the basis of their survival.

There is a need to increase awareness among the community at large of the needs of the future generations. It is imperative that decision-makers and managers of this economic activity in the province, especially in the Angoche district, become more attentive to the problems, anxieties and wishes of the fishing communities. We believe that this is a key to attaining the desired improvements in catches and economic revenues, not only for the benefit of local communities but for the entire country, on the basis of a rational utilisation of resources.

Thus, dialogue and systematic communication between those institutions responsible for fisheries activities, and between the organs and communities directly involved in fisheries, must constitute an integrated effort (with the active involvement of both the IDPPE delegation in Angoche and the local department of the Maritime Administration). This effort should be directed at improving the mechanisms for resource utilisation.

The integrated (IFAD) development project for the Angoche and Moma districts should proceed with the implementation of all elements of the project, particularly with regard to the tax-exempted importation of fishing gear and equipment. In fact this project is important for co-management strategies for fisheries throughout the region. Under present circumstances, dialogue, communication and the sharing of responsibilities, especially the latter, should constitute an appropriate method for the management of fisheries resources, as this would make fishermen more responsible for all aspects of their environment, on which they depend so entirely.

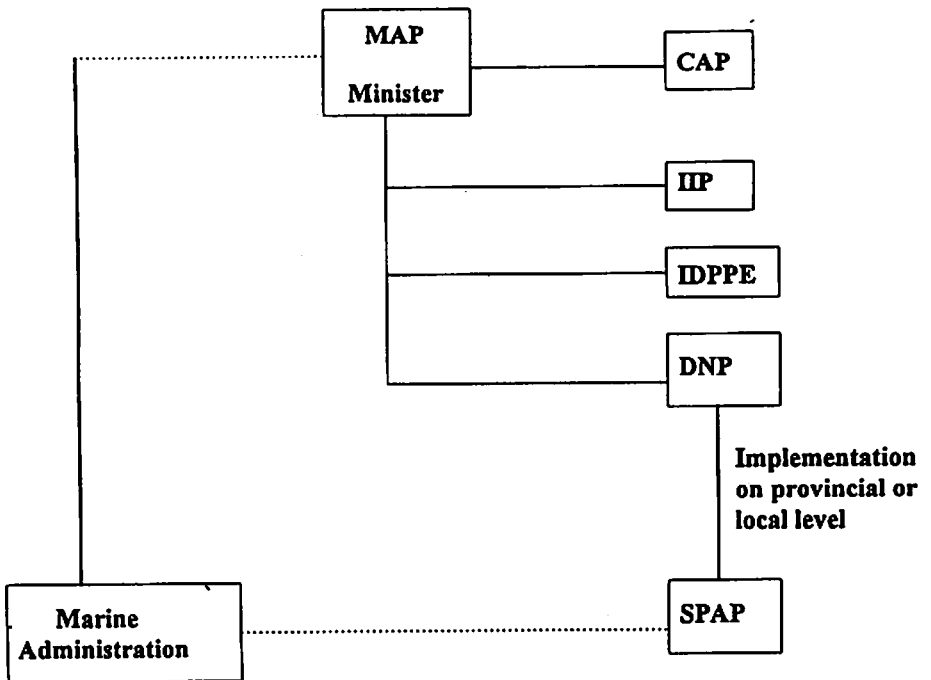
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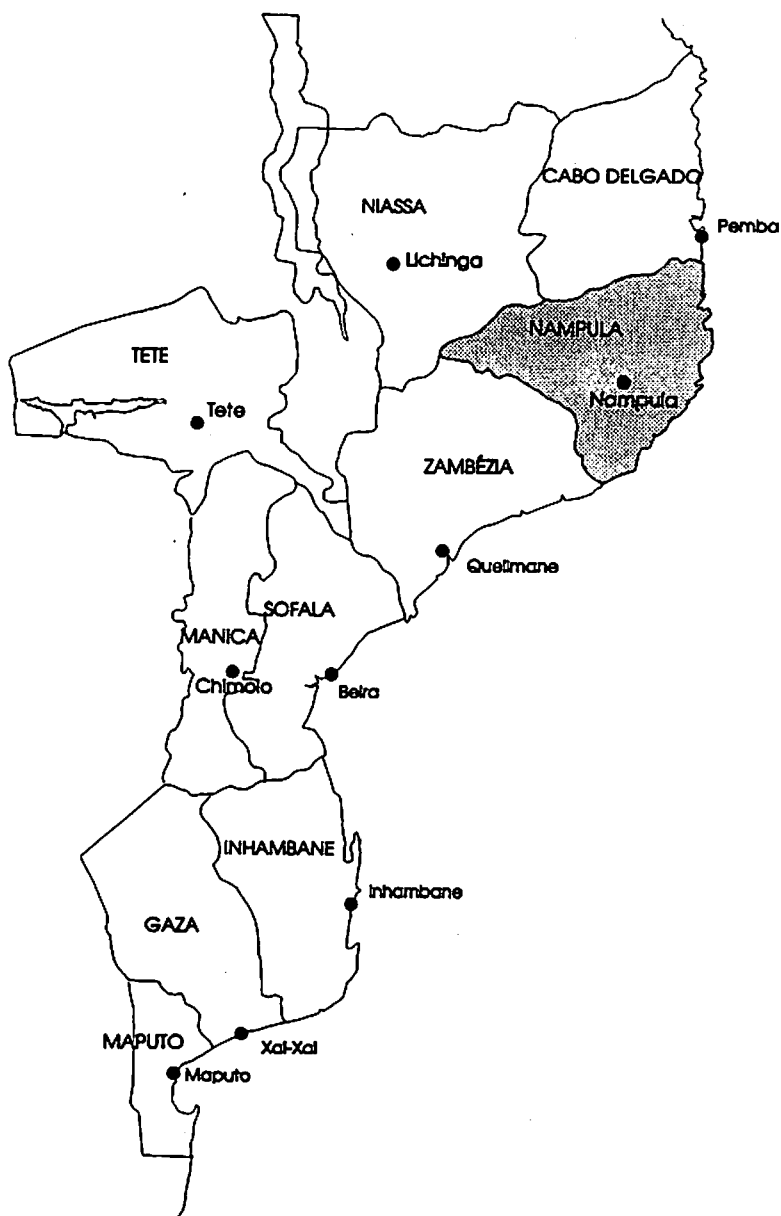
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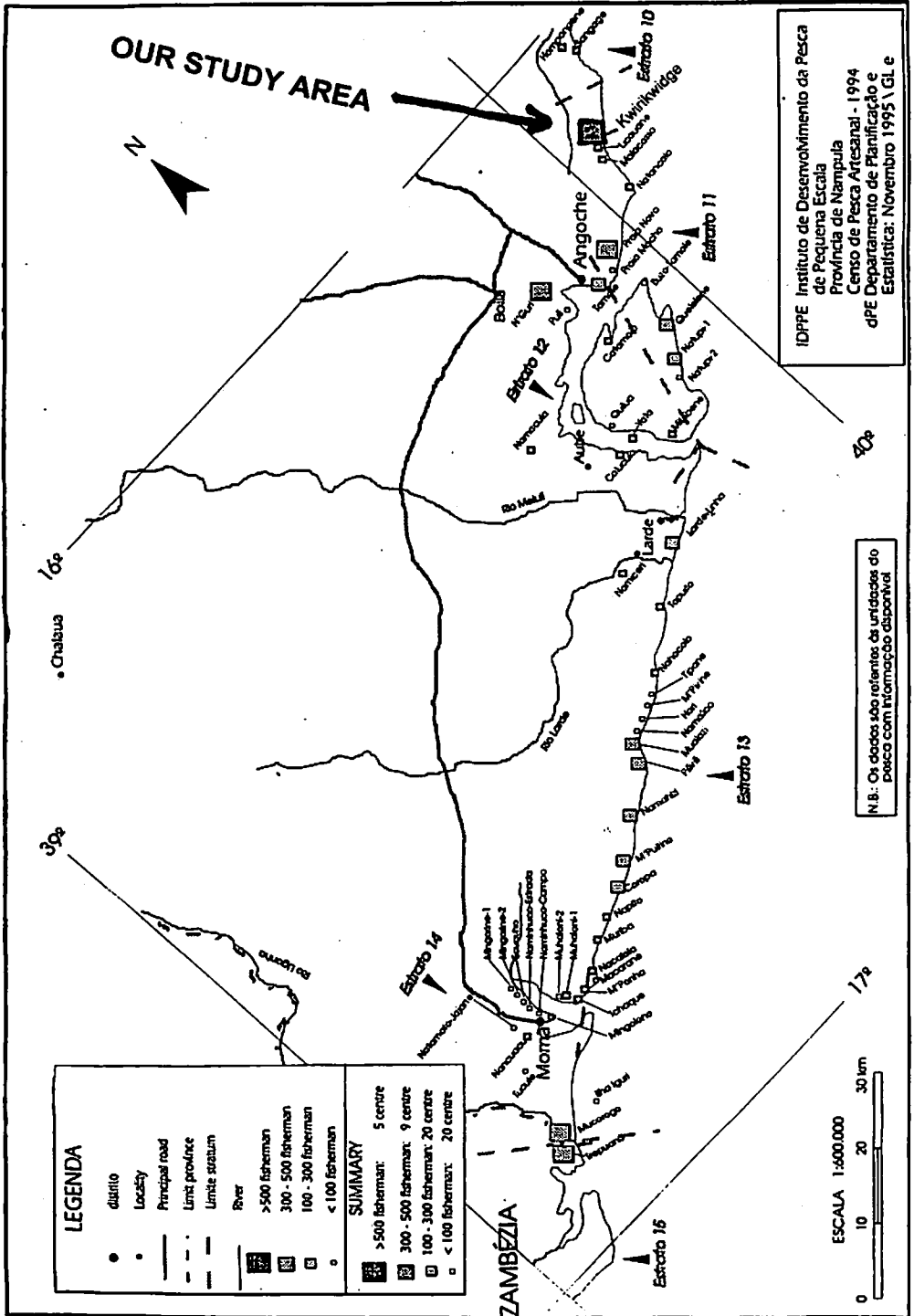
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INSTITUTIONAL DIAGRAM OF DECISION-MAKING FOR FISHERIES SECTOR



MAP OF REPUBLIC OF MOZAMBIQUE





Creation of a new fisheries policy in South Africa: The development process and achievements

Richard Martin

*Regional Manager, Coastal Management Policy Programme
Namaqualand and West Coast Region, South Africa*

Jesper Raakjær Nielsen

*Institute for Fisheries Management and Coastal Community Development (IFM)
The North Sea Centre, Denmark*

1. Introduction

South Africa has a coastline over 3,000 km long and an Exclusive Economic Zone (EEZ) of 200 nautical miles, constituting an area which contains a huge variety of fish species. The wholesale value of the fishing industry is worth R1.7 billion which represents 0.5% of South Africa's GNP and 1.5% of the GRP of the Western Cape province.

The fishing industry, which employs 27,000 people¹, is mainly based in the Western Cape, and close to 90% of all South African landings are made in Cape harbours. The industry is extremely complex, and there is a great diversity in catching techniques, processing, marketing, capital investment, equipment and infrastructure. However, the industrialised hake sector dominates the industry.

Recreational fishing is very popular in South Africa (approx. 500,000 sports fishermen) and although it is difficult to quantify its value, it contributes substantially to the South African economy. The non-consumptive uses of living marine resources e.g. whale viewing, seal and seabird watching and recreational diving are also of great economic importance, and there is a large potential for developing eco-tourism based on the country's living marine resources.

The historical development of the fishing industry needs to be reviewed in the light of the country's political history where, previously, access to the resource had been removed from the traditional fishing communities and concentrated in the hands of a few large companies.

The fundamental problems which afflict South African fisheries today relate to the period of political transition from apartheid towards the creation of a new South Africa under the governance of the African National Congress (ANC). The ANC government came into power in 1994 with a Reconstruction and Development Programme (RDP), an integrated, coherent socio-economic policy framework, as their election platform. The ANC's election promise committed the democratic government of South Africa to the "upliftment of impoverished coastal

¹ This figure excludes the informal sector and non-consumptive tourism.

communities through improved access to marine resources" (ANC, 1994), which created enormous expectations among the marginalised fishing communities.

In fisheries as in many other sectors of the economy, the predominant issue is access and ownership. The challenge facing the ANC government is to formulate a fisheries policy which addresses the issue of the redistribution of access rights to primarily black traditional/ordinary fishermen. In this way a more equitable system of allocating rights and quotas could be achieved in accordance with the aims of the RDP, while still maintaining an internationally competitive industry, which as the market stands, favours the large-scale, established, white-owned companies.

The process of formulating a new fisheries policy has proved to be a very difficult task, with no apparent, easy solutions to hand. In order to create a policy acceptable to all parties involved in the industry, the Minister in office in 1994, Dawie de Villiers, initiated the fisheries policy formulation process by establishing the Fisheries Policy Development Committee (FPDC). The objective of this paper is to document the history of this process and to evaluate its achievements in detail.

2. A portrait of the South African fishing industry

2.1 The structure of South Africa's fishing industry

The deep-sea trawl hake fishery dominates South African fisheries, and in terms of value it accounts for approx. 45% of all landings. It is a labour intensive industry and employs approximately 8,600 people of which 2,850 are sea-going. This fishery is controlled by a small number of large companies, where the two largest companies, *Irvin & Johnson* and the *Sea Harvest Corporation*, hold 75% of the quotas. These companies control not only harvesting rights, but are vertically integrated companies thereby controlling the entire value chain from harvesting to marketing and sales.

The second largest sector is the pelagic purse seine fishery (anchovy and pilchard) which is also controlled almost exclusively by large companies. The three largest companies *Marine Products*, *Oceana* and *Saldanha Bay* hold more than 50% of the quotas. This sector employs about 700 fishermen, 1,300 permanent workers and 1,500 seasonal workers. Private boat owners have been excluded from this fishery since 1974, when a system of individual quotas was implemented by the South African Sea Fisheries Advisory Committee (SFAC). In terms of value, the pelagic fishery contributes 25% to the total value of South African fisheries. Most of the landings are processed into fish oil and fish meal, but a percentage of the pilchard catch is canned for human consumption.

The rock lobster fishery is the third most important fishery, and accounts for approx. 12% of the total value of all landings. The lobsters are mainly caught with traps (80%), but in shallow waters hoopnets are used. The rock lobster industry employs about 4,800 people in peak season.

The linefishery, which also makes up approx. 12% of the total value is a multi-species fishery and consists of several sectors whose motivation differs, ranging from full-time commercial operators to semi-commercial, artisanal and recreational fishers.

The linefishery comprises of the following fisheries: a) the tuna fishery: employing 2,600 fishermen using large boats which make landings of blast frozen tuna for exported unprocessed, as there is no tuna canning industry in South Africa, b) the squid-jigging fishery: with a fleet of

approx. 300 mostly small vessels. The sector employs some 3,800 people at sea, and almost 1,000 ashore and is today a critical primary economic engine for industry along the south coast. Turnover varies between 40-90 million ZAR a year, and c) the traditional linefishery: comprising of many smaller individually-owned boats, the fishery is spread along the west and south coast, and provides employment for over 19,000 fishers and recreation to several hundred thousand people. In 1984 the South African Linefish Management Association (SAMLA) was formed.

The inshore trawl fishery is a multi-species fishery, but mainly directed at hake, Agulhas sole and horse mackerel. This sector employs 320 sea-going and 790 land-based personnel. An individual quota system introduced in 1982 has reduced the number of quota holders from 23 to 11 by 1995. The quota holders are represented by the South East Coast Inshore Fishing Association (SECIFA), an industrial body which negotiates on behalf of its members on all aspects of the fishery.

The abalone fishery is controlled by three companies, *Sea Plant Products (Marine Products)*, *Tuna Marine (Oceana)* and *Walker Bay Cannery (Irvin & Johnson)* which together hold 82% of the TAC quotas. The abalone is caught by 55 registered divers, who by law are compelled to deliver their catches to registered companies. These companies have the sole right to process and export abalone. The legal industry employs about 300 people but poaching activity is widespread in this sector and large volumes of abalone are illegally harvested. In addition, an extensive recreational fishery is also carried out.

2.2 Landings and production

The following table summarises the types of commercial catches, landings and values of the fishing industry for 1994².

| Total | Nominal Catch (tons) | Landed value (R'000) | Processed value (R'000) |
|---|-------------------------|-------------------------|----------------------------|
| Demersal: | | | |
| Deep-sea & inshore trawl, longline | 188,842 | 294,815 | 716,554 |
| Pelagic: | | | |
| Canned fish, fish meal, fish oil, bait | 315,545 | 70,737 | 289,475 |
| Rock lobster: | | | |
| West & South coast | 3,190 | 104,207 | 168,347 |
| Crustacea, molluscs: | | | |
| Abalone, mussels, oysters, prawns, red bait | 3,895 | | 74,239 |
| Line: | | | |
| Snoek, tuna, squid, handline fishing, small net | 24,617 | 102,810 | 166,876 |
| Total | 537,227 | | 1,634,452 |

² South African Fishing Industry, 1996 - 24th edition

2.3 Marketing

Compared with other fishing nations, South Africans are not big 'fish eaters'. With fish products being perishable items, sales depend on an expensive infrastructure over which the larger companies for all intents and purposes have a monopoly. This means that fishermen are obliged to sell most of their catch to these large companies. Snoek is an exception, with its substantial informal market particularly in Cape Town. The law requires that 20% of all catches are sold on the local market.

The powerful trawling industry supplies the majority of fresh and frozen seafood consumed by South Africans, either directly through shops and supermarkets or indirectly through catering and hospitality operations. This sector has developed an extensive international market, with the accent on high value-added products and is a large foreign exchange earner with exports amounting to R300 million. Rock lobster and abalone are also important export commodities.

The vertical integration of the South African fishing industry has limited market access for new entrants and has become a critical factor in the quota reallocation process. The majority of small processors have no direct access to regular supplies of fish, as at present most fish is sold to and supplied by the big companies.

The thriving informal sector sells crayfish and abalone via alternative channels to the domestic market, but is also beginning to expand its range of activities to include foreign markets, especially Southeast Asia and Japan.

2.4 Socio-economic characteristics

The power relationships within the industry are reflective of the political history of South Africa. Ownership is concentrated in the hands of whites, and fishermen are primarily black or coloured. It is important here to recognise the historical distinction made by the apartheid government between the coloured and black communities. Although these racial distinctions are not popularly acknowledged, the reality of this is evident when visiting a coastal village where the majority of fishermen are coloured and speak Afrikaans.

Apartheid legislation distorted the fair distribution of access rights to natural resources, denying the majority of South Africans (black and coloured) the use of land, water, mineral and marine resources. Of the total allowable catch of 512,437 mt for 1994, only 0.75% were allocated to blacks. Of the 2,700 registered commercial fishing boats in South Africa just 7% are owned by blacks, and of the 4,000 fishing licences issued approx. only 6% were issued to blacks³.

Apartheid was a system that favoured the growth of the large, white-owned monopolies, and curtailed and in some instances prohibited the growth of small businesses, particularly those which were black-owned. The curtailment of property ownership rights of blacks made it impossible for them to acquire collateral as a basis for loan financing, thus excluding blacks from the process of capital and asset accrual.

In addition, the majority of small businesses, particularly small processors, do not have direct access to the marine resources, or their quotas are too small to establish financially viable operations. Furthermore, the vertical integration of the fishing industry, which is dominated by

³ The Small Business Sector in the Fishing Industry, Strategies for the Integration and Promotion of the Small Business Sector in the Fishing Industry, 1995.

a handful of major companies, has meant that access to markets is a crucial factor in the business growth of previously disadvantaged companies.

To overcome these disadvantages while still maintaining stability within the industry, in May 1992 the concept of a Fishermen's Community Trust (FCT) was launched by the ANC's Minister of Environmental Affairs & Tourism (MEA&T) in order to improve the socio-economic conditions prevailing in the fishing communities by allocating quotas to the communities which could be utilised or sold as they desired.

3. The South African fisheries management framework

South African fisheries are regulated by the Sea Fishery Act of 1988. This Act gives the Minister of Environmental Affairs and Tourism (MEA&T) the mandate to formulate all aspects of the policy for the conservation and utilisation of South Africa's living marine resources.

The three institutions in South African fisheries management which have a significant impact on the structure and functioning of the industry are:

The Sea Fisheries Advisory Council (SFAC), an advisory body appointed directly by the Minister to advise on:

- the determination of the annual TACs;
- the rules and regulations to be applied in the management and preservation of the marine resources⁴.

The Quota Board (QB) established in 1990 under the apartheid regime. QB members are appointed by the Minister. The Act clearly specifies that no person having any direct or indirect interest in the fishing industry can be appointed to the QB⁵. The functions of the QB are to:

- recommend to the Minister for his approval guidelines for the allocation of quotas and fishing rights;
- allocate quotas in accordance with the approved guidelines;
- grant fishing rights in accordance with section 25 of the Act and the approved guidelines⁶.

The Sea Fisheries Research Institute (SFRI) which conducts research to support the decision-makers on the optimal utilisation of South Africa's living marine resources and the conservation of the country's marine eco-system.

4. Organisation and structure of the policy decision-making process

4.1 Introduction

As mentioned earlier, the fisheries policy process was initiated by the MEA&T at a

⁴ Sea Fishery Act 1988

⁵ *ibid.*

⁶ *ibid.*

public/stakeholder/user group meeting convened on 27 October 1994. A time line for the policy process is given in Annex 1. The meeting was convened in response to the plight of the fishing communities and the demand for a fairer distribution of access rights to the marine resources. Addressing these demands, the Minister established the Fisheries Policy Development Committee (FPDC) in order to formulate a new fisheries policy for South Africa. Mr Mandla Gxanyana, General Secretary of the Food and Allied Workers Union⁷ was appointed as chairperson of FPDC.

The first planning meeting was convened in December 1994 at which the structure and function of the policy writing committee was discussed. At this meeting the following proposals were considered⁸:

- The Minister proposed the forming of a committee of 15 people: 5 labour representatives, 5 government and 5 business representatives. He indicated that the writing of policy should be completed by April 1995;
- the large industrial conglomerates proposed that a five-person committee should write the policy and present it to all concerned parties;
- regional representatives proposed a 21-person committee comprising 5 representatives from each of the four coastal regions and one inland representative.

The first meeting of the FPDC was held in March 1995.

4.2 Objectives

The main objective of the FPDC (FPDC, 1996) was to develop a new fisheries policy with the participation of all sectors of the fishing industry. The process for the policy development had to be transparent and democratic, and it was especially important to include the views of the disadvantaged fishing communities, as they were one of the main groups targeted for assistance.

The vision⁹ of the new policy was based on the belief that:

- The marine resources are a national asset and part of the heritage of the people of South Africa, present and future, and should be managed and developed for the benefit of the country as a whole, especially those communities whose livelihood depends on these resources;
- the management and control of these resources will be vested in the State and will reflect and uphold the principles outlined in the Reconstruction and Development Programme;
- the allocation of the resources will be made on an equitable basis, with a view to ensuring the long-term sustainability of the resources and their healthy condition for present and future generations;
- the State shall manage and develop these resources in accordance with the international conventions and/or treaties to which South Africa is a party or signatory, and thus is bound to comply with in international law.

⁷The most influential union within the RSA's food industry, and closely allied to ANC.

⁸FPDC Minutes, 13 December 1995

⁹ibid.

4.3 Organisation

The Fisheries Policy Development Committee became responsible for setting up the necessary structures to carry out the policy development process. An FPDC office was established to take care of the practicalities, and became responsible for liaison between the various sectors and for convening meetings/workshops to facilitate the policy process. The FPDC office was also responsible for undertaking capacity-building programmes in the Southern, Northern and Eastern Cape and on the west coast in order to enable communities to participate in the process.¹⁰

In particular, the FPDC office had an important role to play with regard to representing those different sectors which up until that time did not have the required organisational capabilities to participate in the policy process. 'Labour' is organised into separate unions, each representing different categories of workers within the fishing industry. The FPDC office thus played a crucial role in bringing together the different unions, and convening workshops for the small business sector and environmental sector, and for the regional forums which represented different stakeholders in the regions. When the policy process began only one Fishing Forum, the Cape Fishing Forum was in existence. As part of the policy process several regional forums were set up.

According to the mandate of the FPDC it should, in performing its task, establish a working committee (FPDWC) to be assisted by Technical Committees. The task and responsibilities of the FPDWC was to collate and discuss inputs from community forums, sectors/stakeholders, government and the technical committees, and to prepare presentations and recommendations to the FPDC, the Ministry of Environmental Affairs and Tourism and the *ad hoc* Cabinet Committee and to ensure that the working documents reflect all scenarios and that there was consensus on the decision-making for the policy process.¹¹

In the event that no consensus can be reached, the Chairperson of the FPDC should consult with all the stakeholders concerned in order to achieve consensus. If still no consensus can be reached regarding the contentious issue(s), they should be referred to an independent arbitrator and the aggrieved party would still have the right to pursue their claim outside the FPDC forum. As a prerequisite for their participation in the policy formulation process, the industrial sector insisted that if no consensus could be reached, the Minister should appoint a Commission of Enquiry to investigate the issue(s), a stipulation which was accepted and endorsed by the Minister¹².

The overwhelming issue of concern to the policy process was that of access rights to South Africa's marine resources, and the FPDWC agreed that the access rights issue should be investigated by an independent multi-disciplinary team of experts, representing legal, sociological, economic, environmental, management and scientific expertise. The Technical Committee on Access Rights (TCAR) had to address the following issues:

- Resource management strategies;
- breadth of access rights;
- economic impact of any changes;
- methods of resource utilisation;

¹⁰ FPDWC Minutes, 10-11 August 1995

¹¹ FPDC Plenary Minutes, 6 March 1995

¹² FPDWC Minutes, 28-29 April 1995

- legal framework;
- recreation and tourism;
- subsistence and artisanal fisheries.

It was the task of the TCAR to produce a review of policy options and to outline the advantages and disadvantages of each option¹³. It was clearly stressed that the TCAR should only look at options and not make recommendations.

However, during the course of the policy writing process, no acceptable way was found of providing immediate interim relief to informal fisherfolk with regard to the redistribution of quota allocations. The problem had surfaced early in 1996 when approx. 2000 members of the informal sector decided to take matters into their own hands and defied the restrictions on crayfish and abalone fishing.

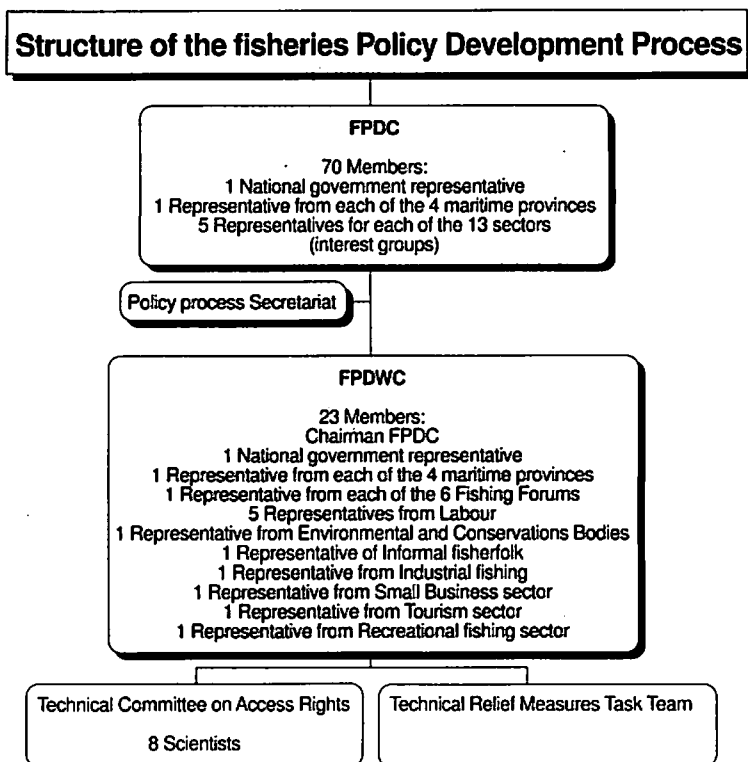
The situation was eventually defused when the Working Committee set up an Interim Relief Measures Task Team (IRMTT), which only served to highlight the pressing need for this issue to be resolved. The IRMTT (IRMTT, 1996) recommended that all subsistence fishers be registered as a matter of urgency. The report identified four levels of informal fishers, with the most needy being the coastal communities. It also noted that many fishers masquerading as subsistence fishers, were in fact employed or were suffering because of poor employer support. The Task Team recommended that these fishers should not be accommodated in the broadening of any access rights.

The White Paper¹⁴ and the subsequent legislation should be based on the policy document and the final recommendations of the FPDC. The process of drafting the policy document was scheduled to take six months by the Minister, but the demand from the constituencies for an open, democratic and participatory process combined with the need to become organised before being able to participate and the fact that insufficient resources were committed to this element delayed the process. The completion date was deferred on two occasions, and this created a public perception that the process was being deliberately slowed by the government. The expectation was that the process would be completed by November 1995, and that a new policy would be in place for the implementation process to take off. The delays in the process have contributed towards a feeling of frustration among the fishing communities which has led to the violation of access rights as mentioned earlier.

¹³ FPDWC Minutes, 10-11 August 1995

¹⁴The first step in the normal procedure of South African political decision-making is the formulation of a Green Paper, which in practical terms is a discussion document that highlights those issues to be eventually formulated into official policy. The Green Paper will lead to a White Paper, which is the official policy document of the government. The White Paper is submitted to Parliament and logically leads to legislation and action. At an early stage it was decided to skip the Green Paper stage as the FPDC document should constitute the main input in the formulation of the White Paper.

4.4 Representation and participation



The FPDC comprised 70 members represented by one government representative for each of the four maritime provinces plus one for the national government, and five representatives for each of the 13 sectors (interest groups). All sectors (interest groups) had one representative on the Fishing Policy Development Working Committee (FPDWC) which had a total of 23 members in all (see diagram above). The first plenary of the FPDC was held in March 1995. The whole process was basically in the hands of FPDWC which did not have a proper mandate, and the date of the meeting conflicted with the agreement that the FPDC should convene every 3 months to discuss progress made on the policy document by the Working Committee. The FPDC was not involved again before May 1996 when the 6th FPDWC draft policy document was presented.

The industrial sector and labour are the best organised sectors, and are therefore in the best position to influence the process. The informal sector expanded its network during the policy process. The tourism sector was mainly represented by the KwaZulu-Natal hospitality industry. National government was represented by the Deputy Director of the Department of Sea Fisheries; provincial governments by members of the provincial legislature or by officials from nature conservation departments. The environmental sector was represented by both conservationists and environmentalists. The small- and medium-sized enterprises (SMME) and Fishing Forums were poorly organised even though, as part of the policy process, the FPDC office had assisted them in organising themselves by setting up regional forums to enable stakeholders operating at a

regional level to participate in the process.

The regional Fishing Forums were run totally by volunteers, and the consequence was that those who had the time and transport, attended Forum meetings. The issues of representation and proper mandates became a crucial issue. These will be discussed further in section 6.1. Towards the end of the process, regional consultative meetings were convened to allow constituencies and regional forums to comment on the 6th draft policy document.

4.5 The FPDWC process and pre-policy restructuring

During the policy formulation process the fishing industry continued to operate as usual with certain issues needing to be addressed by the FPDWC along the way e.g. the institution of an interim Quota Board (QB). The Minister requested the FPDWC to consider if the present Board should continue or if a new board should be appointed. The FPDWC decided that the interim Board should continue, and that it should adhere to the following guidelines:¹⁵

- The Quota Board must be sensitive to the principles behind the RDP;
- they must adhere to the old guidelines;
- the quota allocation process must be transparent.

It was decided that actions taken by the QB should not compromise the outcome of the fisheries policy process¹⁶, and no restructuring of the industry should take place before a new fisheries policy was decided upon. Thus, no new entrant should be allocated a quota, and present quota holders would continue to keep their privileges until a new policy was in place, a decision which became problematic as the process took much longer than expected.

Furthermore, the integration of the legislation in place in the former Homelands of Transkei and Ciskei, with that of the Republic of South Africa (RSA), and the subsequent nomination and appointment of members to the Sea Fish Advisory Committee (SFAC) were examples of the key issues requiring attention in the course of the policy process.

The Homelands had different legislation for marine resource exploitation which, after the democratic elections in April 1994, had to be brought into line with the legislation of the RSA. The Department of Sea Fisheries established a working committee to draft the legislation for the integration process and their report was presented to the FPDWC for endorsement. The Minister presented a list of names to the FPDWC on which the nomination of members to the SFAC was to be based. This initiated a debate within the FPDWC. Two views¹⁷ were presented, on the request of the Minister and the Department, when the FPDWC was asked to comment on these issues which could be said to lie outside the policy process. A minority was of the opinion that the task of the FPDWC was to draft a policy document and not to become involved in restructuring as this could undermine the outcome of the policy process. The majority, however, was of the opinion that the FPDWC needed to participate in the ongoing discussions and expressed no fear that their participation would compromise the outcome of the policy process.

¹⁵ FPDWC Plenary Minutes, 6 March 1995

¹⁶ FPDWC Minutes, 5-7 September 1995

¹⁷ FPDWC Minutes, 9-10 June 1995

4.6 Funding

An initial sum of money was made available from the Department of Sea Fisheries to run the policy process. However, this funding was insufficient to cover the whole process and at one stage the policy process was threatened because of a lack of funds.

There was a strong suspicion amongst the disadvantaged groups that the process was being undermined by the Ministry (MEA&T). In the event, the FPDWC had to draw on funds from other sources¹⁸ and the Ministry of Trade and Industry made a grant available to complete the policy process.

With regard to policy formulation processes in South Africa, it is customary that members of working committees participate on a voluntary basis, and that only transport costs are reimbursed. However, members of the FPDWC were rewarded for their participation as they were paid an attendance allowance of R450 per day^{19,20}.

5. Critical issues

5.1 Access rights

The main objective of the policy formulation process was to find a mechanism by which South Africa's marine resources could be more equitably allocated to previously disadvantaged people. Given that the sustainability of the fishery is an accepted non-negotiable principle, access cannot be granted by simply increasing the TACs. The problem therefore, is how to grant access to the previously excluded fishers without endangering the established fishing industry, as the prevailing quota holders are important employers on the coast.

The FPDWC agreed that the policy formulation process in principle was driven by the desire for wider access to marine resources and therefore on 7 September 1995 decided to appoint a Technical Committee on Access Rights (TCAR) to investigate the issue. By doing so, the FPDWC effectively disempowered itself and its constituencies and became dependent on the findings of "outside experts".

The Technical Committee (TCAR,1995) identified areas which needed different management approaches. The analysis showed that there is a whole spectrum of different types of fisheries, from offshore resources which require high technology for harvesting and are largely exploited by a few large industrial enterprises (e.g. deep sea hake trawling, pelagic purse seining and tuna longlining), to inshore resources which require low or no technology for harvesting and are exploited by many small businesses or individuals.

Most fisheries are already fully exploited, and opportunities for new entrants are therefore limited. Due to the difficulties involved in the redistribution of quotas, the TCAR proposed that new entrants to the fishery should be given access to new or under-utilised resources. This solution alone will not satisfy the demand for more equitable access from the disadvantaged people, and solutions to the problems associated with the redistribution of access rights have also to be found in fully exploited fisheries.

¹⁸ Weekend Argus, 4-5 November 1995

¹⁹ R118,000 was budgeted for attendance allowances

²⁰ The industrial sector representative donated his attendance allowance to the FPDC office

The TCAR proposed a two-phased approach for restructuring access to the fisheries. The first phase should be of 5-10 years' duration and will aim to gradually reduce the number of current quota holders by compensating them for the loss of quotas. These quotas should then be allocated to new entrants, who should be supported further by development organisations in setting up new businesses.

The industrial fisheries offer the least scope for quota reallocation, whereas line fishing and inshore fishing in general, and abalone, kelp and squid fishing provide the best opportunities for new entrants. The second phase of the restructuring process should allow market forces to determine the access to the fisheries.

The TCAR recommended that all fishers be registered, that recreational fishers should not be permitted to sell their catches, and that subsistence harvesters should be allowed larger bag limits. Finally, poachers (illegal fishers) should be granted an amnesty in order to re-integrate them into the 'legal' fishing industry. The conditions for the amnesty had to be considered carefully to avoid people taking unfair advantage of them.

The TCAR further proposed that the policy document should be subject to a scientific screening procedure by the South African Network of Coastal and Oceanic Research (SANCOR); the FPDWC agreed, and SANCOR's comments were generally accepted and incorporated into the draft policy document.

The question of access rights was treated as a scientific issue, although fundamentally it is a socio-economic issue and one which lies at the core of the transformation process in South Africa in general, and in the fishing industry in particular. In our opinion it was a grave mistake that this important issue was not addressed by the FPDWC as there is no scientific solution to the access rights question; it is fundamentally a matter of politics and economic justice.

5.2 Interest groupings and alliances

The representative members of the FPDWC can be divided into different groups/alliances:

a) large industrial business and labour, b) the Western Cape Fishing Forum and recreational fisheries, and c) a broad alliance including the informal sector, environmental organisations and the Eastern Cape Province.

During the policy process, industrial business and labour organisations were concerned about maintaining a competitive and long-term viable fishing industry. They wanted to ensure that the reallocation of access rights should not disrupt the performance of the large-scale industry which depended on landings from current quota holders. Therefore by 1994, several of the larger fishing companies had introduced various schemes, which included the allocation of shares to workers (*Sea Harvest Corporation* and *Irvin & Johnson*), the sale of shares to black investors (*Oceana*) and joint ventures with small-scale operators (*Premier Fishing*), thereby initiating the reallocation process towards a more equitable distribution of the revenue generated by the South African fishing sector. In this way, the industrial sector took the first step towards building up an alliance with labour organisations and unions, thus ensuring that labour had a vested interest in maintaining the present quota allocation as it was able to convince labour organisations that any cut in quotas would result in job losses.

On one occasion labour representatives walked out of the FPDWC, supported by the industrial sector over their non-acceptance of a level of representation which equates their sector with non-stakeholder sectors, such as the environmental sector (see section 6.1). This further

cemented the alliance between what can be termed the 'bosses and workers', a relationship which until recently had often been antagonistic. Furthermore, labour had a dispute with the SMME (small- and medium-sized enterprises) sector stating that they would not be able to generate the same number of employment opportunities as the industrial sector.

A broad alliance between the informal sector, environmental sector and regional Fishing Forums was formed with regard to the regionalisation of access rights. They argued for the devolution of management authority to local areas and of access rights to local communities and fisherfolk.

The Quota Board (QB) and the Sea Fishery Advisory Committee (SFAC) formed another alliance. Although the two bodies were not directly involved in the policy process they exerted significant influence through their decisions regarding the policy process. The two bodies were obviously biased towards the industrial sector and wanted to maintain the *status quo*. To a minor extent the scientific community (marine biologists) became a part of this alliance, as they participated very actively in the formulation process as members of the Technical Committee (Hersoug, 1996) and so indirectly supported the old structures.

5.3 Negotiating power

Because of its professional structure and present dominance over other fisheries sectors in South Africa, the industrial sector held an influential position on the FPDWC. As mentioned earlier, industry further 'locked in' labour into supporting big industry through other measures (eg. shares for workers) and by warning them that any cut in quotas would result in job losses. Also, organised labour, in addition to its sheer size and make-up as nearly all labour is black, had close links with the ANC and therefore, generally speaking, was influential in the restructuring process in South Africa. Therefore, the mutual interests of these two sectors in maintaining the *status quo* on this particular issue created a very powerful alliance which completely controlled the policy process, as together they had a *de facto* right of veto.

The powerful influence of organised labour and the industrial sector should also be seen in the light of the fact that the other interest groups only became organised as part of the process and therefore were in effect one step behind the others. In general, other interest groups were represented by volunteers, and it was uncertain whether these persons had the support of their constituencies which, to some degree, undermined their negotiating power.

The Forums especially, were represented only by those individuals who could afford to participate in the FPDWC, individuals who were often only representing themselves and their own interests. Therefore fisherfolk were almost completely left out of the process in terms of organised input. However, some of their "representatives" still managed to influence the process to a considerable extent.

The informal sector did wield some power but to a large extent this was due to activities carried out outside the FPDWC, including heavy lobbying in the media which succeeded in giving this sector some 'say' in the policy process.

6. Analysis of the Process

The Fisheries Policy Development process had four main aims:

- To include previously excluded people/groups in the policy-making process;
- to ensure participation of all parties in the policy-making process;
- the drafting of a Fisheries Policy which would adequately cover the needs of all South Africans;
- to fulfil the requirements for a sustainable marine and coastal environment.

6.1 Representation and participation

The main problem with regard to institutional structures was that those people who previously had been deprived in the past, were not properly organised and therefore could not participate to maximum effect. The FPDWC (Working Committee) acknowledged that it would cost both time and money to identify the true spokespersons for these constituencies.²¹ A comprehensive process of capacity-building, education and the formation of representative forums were needed to involve the disadvantaged communities.

The problem lay in the fact that people from different backgrounds, who had had no previous knowledge or experience of policy formulation or fisheries management in general, had been brought together with other more 'educated' sectors to draft a policy document. The majority of the FPDWC members were only concerned about putting forward the views of their constituencies without understanding the basis of a policy development process.

The ability of the constituencies to organise themselves was also a contentious issue and there were communication problems between representatives and their constituencies²² and in communications with people on the ground.²³ No mechanism existed to ensure that FPDWC members were reporting back to their constituencies. Some representative members made a real effort to involve their sectors, while others just attended meetings with no proper mandate. The quality of representation for some sectors was very weak, especially in the regional forums, where members did not adequately represent the views of their constituencies or express the diverse concerns of a particular group to the FPDWC. This was partly because the regional forum representative was expected to represent the multi-stakeholder views of 'his' forum as a whole, whilst the representative him/herself was from a particular sector.

The SMME sector and regional Fishing Forums requested financial assistance to help bring their constituencies together for report-backs and to obtain new mandates. As funding for this was insufficient, this affected the ability of the FPDWC representatives to obtain mandates from their constituencies. Therefore, the needs of the disadvantaged people/groups could not be properly addressed by the Policy process alone due to constraints on funding, time and personnel; efforts could have been more successful if adequate funding had been allocated to this part of the process. However, the setting up of Fishing Forums along the coast was an important contribution towards the involvement of coastal communities in the policy process and towards the development of a structure that will be important in the future.

The spending of finances on the process was not geared towards the participation of sectors

²¹ FPDWC Minutes, 6 September 1995

²² FPDWC Minutes, 2 May 1996.

²³ FPDWC Minutes, 9-10 June 1995.

and regional forums, but on issues such as attendance allowances and the running of the FPDC office. On numerous occasions sectors and regional forums requested financial assistance to cover their operational costs. The KwaZulu-Natal Forum argued²⁴ that it was essential that funds be made available to ensure the fulfilment of the FPDC's mandate, which was to create a policy representative of people at grassroots level. However, no attention was given to financing those sectors and forums which represent grassroots participation, the very communities the policy was intended to help.

The payment of attendance fees to all FPDWC members can also be viewed as problematic as it meant that input/participation had been turned into a commodity for sale, thus making it disposable. Their contribution would no longer be voluntary, in contrast to the system whereby only out of pocket expenses are reimbursed.

The issue of representation, or the lack of it, on the FPDWC was a major recurring theme throughout the process. A lesson for policy formulation processes was that the issue of representation and accountability must be sorted out at the beginning of the process. The lack of clarity on representativity and mandates delayed the work of the FPDWC.

To stimulate the policy process, a policy analyst from the Development Bank of Southern Africa organised a workshop on policy formulation processes to guide FPDWC members in their work. With hindsight, a full-time policy analyst should have been assigned to the process as facilitator, as none of the full-time staff in the FPDC office had policy formulation expertise. At several stages during the policy process there was no progress due to lack of leadership or lack of understanding of the process. This naturally hindered the policy writing process.

With regard to the very powerful, well organised sectors, one must remember that the unions, which represent labour in general, mostly represent processing workers and those organised into unions. In so far as labour represented organised labour, one can also question their mandate with regard to representing unorganised labour and fishermen. It is very easy to organise workers in factories, but much more difficult to organise fishermen as they are not concentrated in one factory, but scattered all over.

At one stage labour representatives walked out of a FPDWC meeting, as they would not accept a level of representation which equates their sector with non-stakeholder sectors, such as the environmental sector²⁵. Labour's view on representation was based on union democracy, where the number of registered members determines their representation. The question is whether this type of democracy is consistent with participatory processes which aims to include all interested and affected parties.

The FPDC appears to have been fairly successful in including almost all stakeholders in the policy making process. One area which could have been improved was the direct representation of women and boat owners as they were almost absent from the process.

The inclusion of a broad spectrum of stakeholders, such as the tourism and environmental sectors, was laudable and represented ground-breaking steps towards the creation of a truly representative and holistic policy.

The Fisheries Policy process did provide a stimuli for the emergence of organisations to advocate the interests of the various stakeholders. However, the completion of the Policy process and the absence of an implementation strategy by the FPDC has contributed towards the gradual fizzling out of these organisations.

²⁴ FPDWC Minutes, 19-20 October 1995.

²⁵ FPDWC Minutes, 5-7 September 1995.

6.2 Will the Fisheries Policy process lead to changes in the South African fishing industry?

The implementation of the ideas and the achieving of the aspirations contained in the policy document submitted to the Minister is the single most important factor in the restructuring of the industry and its successful management. For the implementation to be successful an open and transparent process must be followed. Structures and co-operative relationships that have been built up through the policy process will need to be built upon. The role of the FPDC has come to an end on 4 June 1996 as the final draft was submitted to the Minister, and the FPDC will therefore not have any authority during the implementation phase. The implementation of the policy is now the responsibility of the Department of Sea Fisheries.

This means that the fishing industry will still be governed by the laws contained in the Sea Fishery Act of 1988 until the White Paper²⁶ is passed by the National Assembly. The policy writing process was an open and participatory process, but its actual implementation is confined to the Department of Sea Fisheries.

In the White Paper phase, the public (stakeholders) will be invited to comment. The problem with this phase is that the organised sections of the industry, large-scale industrial enterprises and labour organisations will be able to make focused submissions and exert a powerful influence on the terms of the final policy and new legislation. It is therefore to be feared that the not so well organised sectors will be left out of the process, incurring the risk that the disadvantaged people will be no better off than before.

As Hersoug (1996b) puts it: *"Summing up, the FPDC document does not present a new fisheries policy for South Africa. The document is very cautious when it deals with redistribution and is rather conservative regarding institutional structures. As in the political arena, this is, at most, a "negotiated revolution". The most important difference is that, if implemented, the strategy will ensure greater transparency towards the general public."*

All stakeholders are to become active players in resource management, and the document states that marine resources will be nationally controlled, but that the management of inshore resources, with their low mobility capability and limited access rights, will be the joint responsibility of national and provincial government.

With regard to the reallocation of access rights, no real redistribution is recommended; to a large extent, it remains a matter for the Quota Board, an issue we will take up in the discussion.

The Department of Sea Fisheries will continue to be responsible for fisheries administration, research and development, and law enforcement. A development unit will be responsible for promoting, in particular, small-scale enterprises and mariculture.

The Sea Fisheries Research Institute (SFRI) will be responsible for carrying out multi-disciplinary research and making management recommendations. A Consultative Advisory Forum (CAF) will be appointed by the Minister to advise him/her on resource management, research, funding allocation and departmental structures.

Although the fisheries formulation process did not lead to any major adjustments in quota allocations or structures, it managed to bring people from different sectors together to discuss the problems facing the South African fishing industry, and a major achievement of the policy

²⁶ The White Paper was formulated by the Department of Sea Fisheries with assistance from a Norwegian consultant and was released in June 1997.

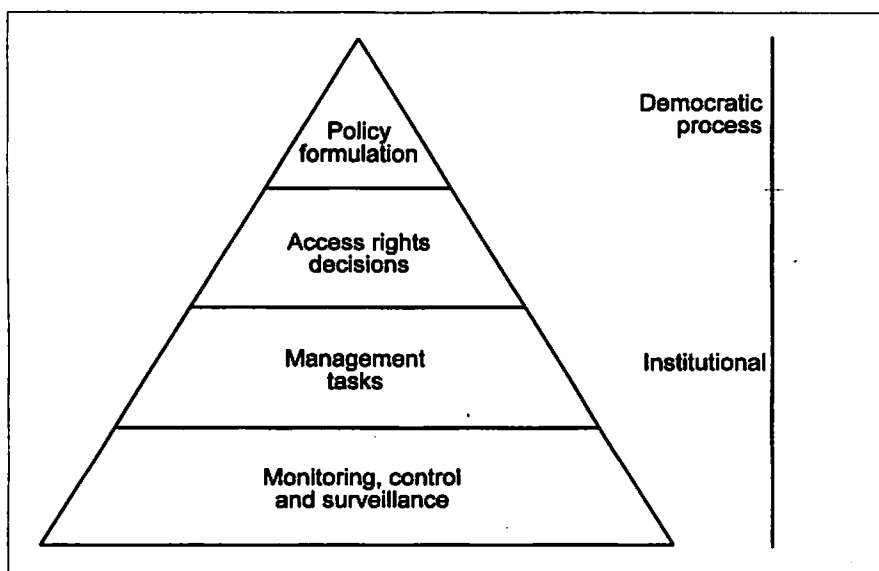
process was the establishment of Fishing Forums along the coast. In our opinion this represents an important step towards improving the legitimacy of the fisheries regulation. However, we foresee many obstacles and challenges ahead before disadvantaged fishermen can be considered equal partners in the process.

We therefore conclude that the policy process has been successful, and realistically, one should not expect a major revolution at the first attempt. What is important is that the process has begun, the first important step towards establishing a new fisheries policy for South Africa. Again, North's observation (1990) seems applicable, that institutional change often occurs as a marginal adjustment of old structures rather than radical innovations or a total reorganisation. Seen from this perspective the changes have begun to take hold, but many battles still remain before South Africa can be said to truly have a new fisheries policy.

7. Discussion

In this section we will look beyond the policy formulation process and discuss its implementation, in particular the structure and organisation of the management institutions. International experiences indicate that the current crisis in fisheries management has been caused by inappropriate institutional arrangements (Symes, 1996). It can be argued that the crisis has been caused, to some degree, by a lack of legitimacy within the existing management regimes (Jentoft, 1989). Legitimacy can be improved by transferring more responsibility to user-groups in order to reduce the transaction costs for monitoring and enforcement of rules.

At present, fisheries management in South Africa is mainly 'top-down' driven, and we propose a system which would take a more 'bottom-up' approach, as illustrated in the figure below.



Policy formulation is an ongoing democratic process which, over time, should redefine and steer the policy objectives. The fisheries policy determines the management framework, and in a democratic society user-groups should not, as with other South Africans, be accorded any privileges at the policy level. User-groups can, however, as other South Africans, participate in the political process and try to put persuasive arguments in front of the Minister.

In a South African context the main question remains the reallocation of access rights. We foresee two options for an institutional structure through which access rights may be allocated.

We advocate the creation of an Independent Access Rights Board (IARB), similar to the present Quota Board, operating independently from the Department of Sea Fisheries and the Ministry of Environmental Affairs and Tourism. Payne and Cochrane (1995) indicate that the next step in broadening representation in fisheries management decision-making will be the formation of an Independent Quota Board or as we phrase it, an IARB. The IARB should, based on the formulation of clear criteria for the allocation of rights approved by Parliament, operate without political interference or intervention. Criteria for allocation should be made public, and the appointment of board members should be open and subject to public scrutiny.

A tribunal appointed by the President should recommend individuals, to be appointed by the Minister, as IARB members. The IARB should have its own administration, monitoring and investigating arm. The proposed IARB should also take over responsibilities and powers for the allocation of licences and quotas, and the function and administration of the Board should be financed from quota levies. A judge from the Supreme Court could act as an independent Appeal Board.

A similar approach has been proposed in Canada (Mikalsen, 1997), where a *Fisheries Board* comprising of individuals who possess a knowledge and experience of the industry but have no direct financial interest in it.

Another option would be to make the Minister responsible for the allocation of access rights. The reason for the creation of an IARB is that such a board would be less vulnerable to political pressure, lobbying and nepotism. However, Scandinavian countries (Raakjær Nielsen et. al, 1997) have for these same reasons made the Minister responsible for all fisheries management decisions as in the final analysis, it was believed that the allocation of valuable resources belonging to the society should be a political decision (Hersoug, 1996a).

At the two topmost levels in the management triangle, exclusive user rights do not seem to be appropriate. At the management level, however, we argue that it is important to involve the users.

We suggest that management working groups (MWGs) for each of the fisheries described in section 2 are established in order to include the users in the management process. It is our opinion that the more specific the task, the greater the user group participation should be.

The management mandate for each of the MWGs depends on the type of fishery, the capacity of the user groups and the dynamics of the fishing communities concerned. The MWGs should be comprised of fishermen, processors and scientists, and for inshore fisheries this participation should be supplemented by recreational fishermen, environmentalists and representatives from the fishing communities.

We foresee some scope for user involvement in monitoring, control and enforcement (MCE) and for collaboration in scientific research. MWGs will need to develop and instil a sense of responsibility among fishermen, and MCE guidelines should be discussed at the MWGs. Strategies for control and enforcement should be developed as part of the management plan for MWGs.

Our main point in this discussion is to highlight the importance of establishing some form of co-management arrangement for South African fisheries. We have given some examples as to how this may be put in place, but find it premature at this stage in the process to make specific recommendations on the appropriate institutional structures.

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Fisheries Policy Development Process

TIME LINE

August 1994 - June 1996

| | |
|---------------------|---|
| August 1994 | Minister de Villiers of the Department of Environmental Affairs and Tourism (DEA&T) initiates policy process. |
| 27 October 94 | Public meeting organised by Minister at Good Hope Centre, Cape Town. |
| November 94 | Preparatory phase. Appointment of Mandla Gxanyana as Chairperson of the Fisheries Policy Development Committee (FPDC). |
| 13 December 94 | First Planning Meeting, Monte Carlo: Discussion on structure and function of the FPDC. |
| February-April 1995 | Regional and sectoral workshops held to elect Fisheries Policy Development Working Committee (FPDWC) representatives. |
| 13 February 95 | Labour Sector meeting, Belville Inn, Cape Town. It is agreed that more than one Labour representative should be elected to the FPDC. |
| 28 February 95 | Informal Fishing Sector meeting, Greenpoint, Cape Town. |
| 6 March 95 | <p>First Plenary Meeting of the FPDC held, Belville Inn, Cape Town on the procedures, rules and composition of the FPDC including:</p> <ul style="list-style-type: none"> • Function and composition of the FPDWC (Working Committee); • Determination of Process; • Definition of guidelines for the responsibilities/activities of the Interim Quota Board. <p>(All those involved in the process were asked to sign a declaration to work in the interest of all South Africans and to refrain from satisfying individual interests).</p> |
| 20/21 March 95 | Workshop attended by representatives of small and medium-sized enterprises. |
| 8 April 95 | First meeting of Environmental Sector. |
| 11 April 95 | Northern Cape Fishing Forum workshop. |
| 28/29 April 95 | <p>First meeting of FPDWC opened by Minister de Villiers. The following items were covered:</p> <ul style="list-style-type: none"> • Report of the Chairperson on administration matters; • Discussion on nomination of trustees to Finance Trust; • Appointment of independent auditors; • Division of Eastern Province into two regional forums: Eastern Cape and the Wild Coast; • Agreement in principle that an attendance allowance would be paid to all Working Committee members. |
| April/May 95 | <p>Discussion with Minister and DEA&T on the guidelines by which the Interim Quota Board (IQB) should operate;</p> <p>Sea Fisheries Advisory Committee (SFAC) meeting.</p> |

- May 95 Completion of initial longlining experiment by Sea Fisheries Research Institute (SFRI).
- 19 May 95 Meeting between FPDWC representatives and the Coastal Zone Management Team.
- 9/10 June 95 Second meeting of Working Committee held and first draft of Broad Policy Framework Document completed. Also covered/discussed:
- Integrated Policy Submissions;
 - Creation of a Fishermen's Community Trust;
 - Trust Deed Document.
- Development Bank of Southern Africa (DBSA) Policy Department held a workshop on Policy Formulation processes (a capacity-building exercise for Working Committee representatives)
- Labour Sector requests more representation on FPDWC;
 - Discussion on integrating legislation belonging to Transkei and Ciskei fisheries into RSA legislation;
 - Formal agreement to pay attendance allowance of R450 per day to FPDWC members;
 - Discussion on restructuring of the Sea Fisheries Department and the Interim Quota Board;
 - Proposal to prepare and distribute a pamphlet on the first draft of the Broad Policy Framework Document in English, Afrikaans, Xhosa and Zulu;
 - Finalisation of Sector definitions.
- 22 June 95 Meeting of Lamberts Bay fisherfolk.
- 3/4 July 95 Working Committee workshop to discuss first draft of Broad Policy Framework Document.
- 2 August 95 Letter from Minister of Trade and Industry offering/confirming additional financial support to the DEA&T in order for the FPDC to continue.
- 10/11 August 95 Third Working Committee Meeting held.
Integrated policy submissions tabled.
- First draft of Background Document submitted;
 - Status of some Working Committee representatives not yet clarified;
 - Discussion on financial needs of sector representatives to enable communication with constituencies (small and medium-sized enterprises);
 - Discussion on revision of Integrated Policy Document;
 - Need expressed for the creation of a Technical Team on Access Rights (TT to investigate and advise on the whole issue of access rights);
 - Need expressed for an extension of October 95 deadline for the completion of the FPDC process.
- 15-20 August 95 Financial Audit of FPDC by independent and government auditors.
- 19 August 95 Consultation between FPDC office and SA Association of Fishing Community Trusts.
- 23 August 95 CVs of potential TTAR members obtained and suitable candidates shortlisted.
- 29 August 95 Meeting between Minister and DEA&T on official/government representation on the Sea Fisheries Advisory Committee (SFAC).
- 4 September 95 Former Transkei and Ciskei legislation integration document finalised.

- 5-7 September 95 Fourth Working Committee Meeting held.
 Discussion on size of Labour Sector representation on FPDWC.
- Labour withdraw from WC pending decision as to the size of their representation;
 - Industrial Sector withdraw from WC in support of Labour's demands;
 - Discussion of Integrated Policy Document;
 - TTAR brief finalised;
 - Composition of TTAR finalised;
 - Amendments made to first draft of Background Document;
 - NORAD funding proposal submitted/finalised/drawn up;
 - Finance: Independent and Government audit completed. DBSA pledge R150,000.00 for the work of the TTAR.
- 11 September 95 Finance meeting held.
 Meeting between Chairman of FPDC and Labour Sector to discuss the size of their representation on the FPDWC.
- 15 September 95 Deadline for submission of mandates for sector representation on FPDC.
- 20 September 95 Fifth Working Committee Meeting held.
 Labour representatives back on board.
- Discussion on the creation of a task team to address Labour issues;
 - Discussion on third draft policy document;
 - West Coast Fishing Forum request separate representation from other Cape provinces;
 - Regional fishing fora are requested to ensure that they are representative of both the coastal communities and the different stakeholders in the regions;
 - FPDC office given responsibility for the translation of the third draft policy document into Afrikaans, Xhosa and Zulu.
- 19/20 October 95 Sixth Working Committee Meeting held, opened by Director-General of DEA&T.
- Five Labour representatives attend Working Committee Meeting;
 - Scientific review of third draft policy document suggested;
 - Discussion of access rights issues which the TTAR report needs to address;
 - New integrated legislation for Ciskei/Transkei passed to replace old homelands legislation;
 - Maritime Industry Training Board presentation on training programmes for all sectors involved in the SA fishing industry;
 - West Coast Fishing Forum granted separate representation on the FPDWC;
 - Labour Task Team work delayed due to lack of funding;
 - FPDWC requested to provide Minister for DEA&T with recommendations on the activities of/funding for Fishing Community Trusts. FPDWC to make a press statement on Community quotas to the effect that a quota system alone will not provide a solution for the upliftment of impoverished communities;
 - FPDWC request the Minister to initiate discussions between the FPDWC and the old Quota Board on the reallocation of quotas;
 - Finance Committee disband due to its redundancy;
 - Regional fora experience financial problems. KwaZulu Natal fishing forum with its large informal/subsistence component unable to meet due to lack of funds;
 - Tabling of Programme of Action leading to the submission of the draft policy to the Minister for DEA&T in April 1996.
- 3/4 November 95 Seventh Working Committee Meeting held.
 Scientific comment by South African Network for Coastal & Oceanic Research (SANCOR) on the draft policy document.
- FPDWC office streamlined due to lack of funds;
 - Appointment of Policy Drafting Committee.

- 17-19 November 95 Provincial workshops held to discuss fourth draft policy document.
- 8/9 December 95 Eighth Working Committee Meeting held.
TTAR present their report 'Review of Access Rights Options for SA' (comments recorded in order to be considered in the redrafting of the report).
- 23-25 January 1996 Access Rights workshop held in Stellenbosch.
Informal Sector stage placard demonstration in protest of restrictions imposed on crayfish and abalone fishing.
- February 96 Meeting between Acting Chief Director of DEA&T and delegations from Japan and Taiwan to discuss continuation of their longline tuna permits.
- 15 February 96 Meeting between Minister for DEA&T, FPDWC and Informal Sector representative to discuss demands of informal fishers regarding access rights.
- 15/16 February 96 Ninth Working Committee Meeting held.
Fourteen days allowed for representatives on the Working Committee who acquired quotas whilst serving on the Committee to resubmit mandates from their constituencies.
- Further discussions on Access Rights Report on various issues including: redistribution, length of allocation, selling of recreational catch and informal sector catch quotas.
- 14/15 March 96 Tenth Working Committee Meeting held.
Fifth draft of policy document presented.
- Discussion on regionalisation of access rights;
 - Informal Sector proposal for a CREAD system of access;
 - Decision taken that FPDWC must meet Parliamentary Select Committee to brief them on policy progress.
- 19 March 96 Meeting of FPDWC with Parliamentary Select Committee on Environmental Affairs and Tourism to keep them abreast of policy progress.
- April 96 Provincial workshops held to discuss sixth draft of the FPDWC policy document.
- 2/3 May 96 Eleventh Working Committee Meeting held.
Small businesses allowed to have four representatives attend the meeting, one from each coastal province.
- Interim Relief Measures Task Team (IRMTT) table draft report on interim relief for marginalised fishers as defined in the report. The harvest of this sector must be quantified and fishers within it must be registered;
 - An amnesty from prosecution proposed in order to quantify the illegal catch.
- 16-18 May 96 Twelfth Working Committee Meeting held.
Final discussions on sixth draft in order to prepare seventh draft for Plenary Meeting.
- 24/25 May 96 FPDC Second Plenary Meeting held.
Informal Sector dissatisfied with policy on grounds that it does not reflect concerns of disadvantaged fishing communities.
- Western Cape Fishing Forum voice concern that the policy does not refer to long-term goals, specifically the restocking of resources;
 - Informal Sector opposed to the new quota system and will submit their CREAD proposal to the Minister for DEA&T;
- Time constraints prevent a clause by clause discussion of the issues contained in the policy document during the Second Plenary Session.*

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4 June 96

Conference to launch policy to the general public and an international audience.

6 June 96

Final (seventh) draft policy submitted by the FPDWC to Minister for DEA&T, Minister de Villiers.

An analysis of emerging co-management arrangements for the Olifants River harder fishery, South Africa

Merle Sowman (Editor)
University of Cape Town

Judy Beaumont
Department of Environmental Affairs and Tourism

Michael Bergh
Ocean and Land Resource Assessment Consultants

Genevieve Maharaj
University of the Western Cape

Ken Salo
Peninsula Technikon

1. Introduction

This case study reports on an artisanal estuarine fishery at the Olifants River on the west coast of South Africa. The information is presented in a particular format to comply with the research framework developed for analysis of all case studies participating in the research project.

On method

Information on the contextual variables including biological, physical, technical, socio-economic and market attributes was obtained using a variety of methods. General information on the estuary and the biological characteristics of the harder resource (the southern mullet, *Liza richardsonii*) was obtained from the literature while specific information on the levels of stock exploitation in the Olifants River estuary was obtained from experimental work undertaken during 1995 and 1996 and data obtained from a community-based catch monitoring system established in 1995 (see section 2.3). Demographic and socio-economic information was obtained from a questionnaire survey conducted amongst all fisher households in September 1996. Information on particular topics such as the history of the

people and the fishery, marketing attributes as well as the perceptions of the fishing community regarding various issues, was gathered through informal discussion groups held in the community during 1996.

Information on decision-making arrangements has been gathered from discussions and workshops with the fishers, other stakeholders and conservation officials as well as from a review of the policy and legal documentation relevant to the management of the harder resource. An understanding of the patterns of interaction between resource users and the government, as well as progress in the implementation of a co-management system, has been obtained in the course of facilitating the process of developing a government-community co-management system for the Olifants River harder fishery.

2. Context

2.1 Geographical context

The Olifants River, named in 1660 following the sighting of a herd of 200 - 300 elephants on the river banks, is the second largest river system in South Africa, exceeded in size only by the Orange River (see Fig.1). The River rises in the Agter Witzenberg mountains, flows northwards for approximately 200 km before turning west and entering the sea on the west coast, some 370 km north of Cape Town. Much of the catchment area lies within the winter rainfall area which has a Mediterranean climate. The estuary, however, lies in an area of low rainfall, with an average of 250 mm per annum.

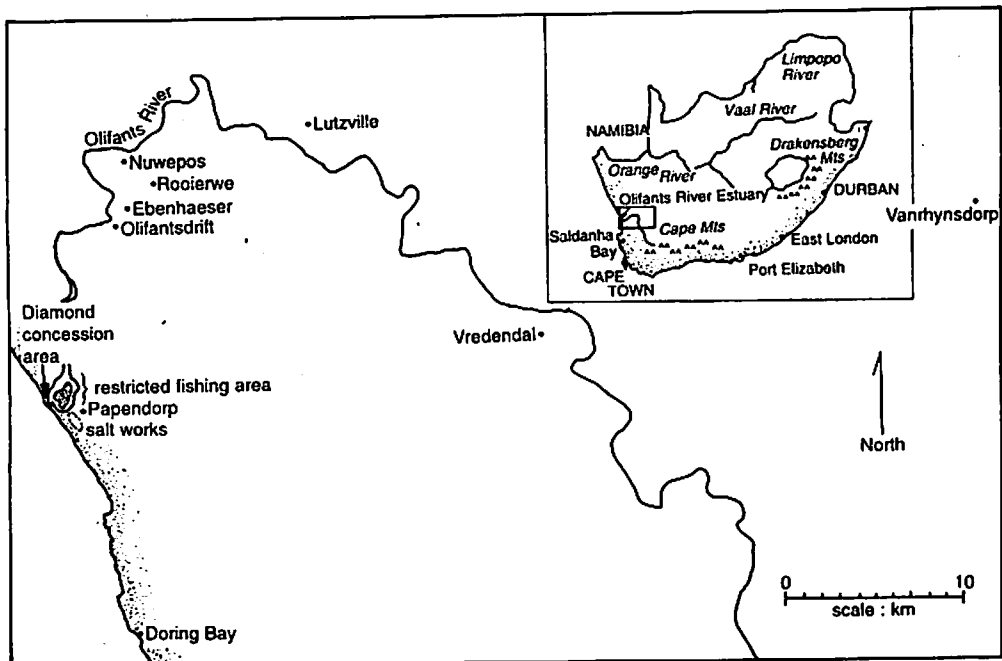


Figure 1: Location of the Olifants River Harder Fishery

The village of Ebenhaeser is fairly isolated from the main transport and tourist routes. Access is via a 10 km gravel road. The nearest towns are Lutzville and Vredendal (approximately 20 km and 40 km respectively east of the estuary) which are located in the heart of an intensively irrigated farming area (mostly vines and citrus). In contrast to this high capital farming area, Ebenhaeser, located 15 km upstream from the estuary, is a rural village that has battled against drought and poverty since 1925. It consists of 5 districts (Olifantsdrift, Nuwepos, Rooi-erwe, Nuwestasie and Papendorp located closer to the River mouth). The majority of these settlements are located on low lying land, where the River is affected by

tidal exchange. Over the years, much of the land has become salinised and unusable for farming purposes.

2.2 Historical context

In 1832, Captain Andries Louis, leader of the Khoikhoi, asked the Cape government for permission for his people to live at Doornkraal, now known as Lutzville. In the same year, he invited the Rhenish Mission Society to establish a mission in the area. The actual right to the land was settled in 1837, when the Governor of the Cape ruled that Doornkraal belonged to the Rhenish Mission Society (Surplus People Project (SPP), 1995). The name given to the new settlement at Doornkraal was Ebenaeser.

The realities of the Ebenaeser community today are rooted in the history of a land exchange which took place in 1925. The Ebenaeser Exchange of Land Act, No 14 of 1925, resulted in the exchange of 11,000 morgen (9,460 ha) of fertile land with access to fresh water from the Olifants River, for land located on the lower reaches of the River, where the water is saline. Only a small portion of this land had access to water for irrigation. The rationale for the transaction originated at the turn of the century when the full agricultural potential of the land at the site of old Ebenaeser was recognised. This land was surveyed for the development of an irrigation scheme, and designated for white farmers, who, in the view of the Governor General, would exploit the potential of the area far more productively than the coloured Ebenaeser community (SPP, 1995). In addition, it was argued that the residents of Ebenaeser would not be able to assist in the payment of a two hundred and fifty thousand pound loan that was taken in order to fund the construction of an irrigation canal. Ironically, the Olifants River Irrigation Works Act, No 10 of 1943, relieved the Olifants River Irrigation Board from the responsibility of repaying this loan.

Today, the Ebenaeser community is preparing a land claim, in terms of the Restitution of Land Rights Act, No 22 of 1994, to claim just compensation for the removal of their land in 1925.

2.3 Case study context

Most of the information on the Olifants River harder fishery presented in this document draws from experience and data collected as part of a separate and ongoing research project into the fishery that aims to:

- determine the social and economic importance of the fishery;
- develop a community-based catch monitoring system to make it possible to obtain reliable monthly values for the total tonnage of fish caught and the variability of catches, and to enable the community to participate in resource management;
- ascertain whether harder catches in the estuary are limited by an over-capacity of fishing effort, or by other factors;
- build the capacity of the local fishing organisation, to enable the fishing community to play a greater role in the management of the resource; and

- develop a community-supported management system consisting of:
 - a harvesting strategy, on which there is agreement among the fishers on the total number of fishing permits that should be allocated, and the allowable mesh size for fishing nets;
 - an agreed system for allocating access rights;
 - a partnership arrangement, in which the fishing community and the conservation authority take joint responsibility for resource management decisions.

The project started in 1993 as a collaborative effort between researchers from different research and educational institutions (Environmental Advisory Unit, 1993). The initial incentive for the research was claims from fishers that their catch rates and total catches were declining, leading to considerable hardship in the community. The community was strongly of the opinion that this was because, relatively recently, diamond recovery vessels had begun to anchor in and near the River mouth. As a result, they asked the researchers to focus on the influence of this factor in the decline of harder catches.

A fisheries biologist consultant was contracted to undertake an initial assessment of the situation. This preliminary study pointed out that there were a number of factors which could have affected fish catches, including for example, the harder fishery itself. The consultant felt that the most likely explanation for the reduction in catch rates was the granting of additional net permits in 1991. Unfortunately historical catch statistics (annual catches, catch rates, size of harders landed) were for all practical purposes non-existent, so all statements regarding trends in the fishery were based on impressions verbally gleaned from the community. As a result it was not possible to make any reliable quantitative statement about the status of the resource, or to assess whether the catch levels at the time were resulting in biological or economic over-exploitation.

Regardless of these preliminary findings, fishers were of the opinion that the main reason for reduced catches was the presence and activities of the diamond recovery vessels. This conviction was fuelled by their general dissatisfaction with the manner in which mining companies operated in the area, and the fact that there was no consideration of the impacts and implications of mining activities on the fishing community's resource base and lifestyle, nor any attempt to consult with them. As an example, fishing was prohibited in the region of the river mouth where the mining company had obtained permission to anchor its vessels.

At a workshop in 1994, with all relevant stakeholders including the mining company, Ebenaeser community representatives and relevant government departments present, it emerged that whilst the activities of the diamond boats and overfishing may be contributing to reduced fish catches which would require further investigation, other factors, namely the obstruction of a canal in the River mouth and the legal minimum gillnet mesh size could also be affecting fish catches, and should therefore be addressed. The current project was thus designed to address many of the issues raised, including:

- (i) the lack of biophysical data on the fishery and socio-economic information on the fishing community;
- (ii) the lack of consultation and *ad hoc* decision-making; and
- (iii) the need for an alternative approach to the management of the fishery.

The effect of different gillnet mesh sizes on catch rate and the size of harders caught was a focal issue of this research project.

3. The Olifants River harder fishery: Biological, physical and technical attributes and indicators

3.1 Biological characteristics of the fishery

Catches in the Olifants River gillnet fishery are dominated by southern mullet, *Liza richardsonii*. These so-called 'harders', are endemic to South Africa and occur in coastal waters from Namibia to KwaZulu-Natal (Fig. 1). The species is the subject of a number of estuarine fisheries along the South African coastline, and a dispersed marine fishery using trek nets operated from the shore at various localities. Of the estuarine fisheries, that of the Berg River about 200 km south of the mouth of the Olifants River, is far larger in terms of annual landings than the harder fishery of the Olifants River. Total landings in the Olifants River estuary probably comprise less than 1% of the annual landings of harders in South Africa (based on a rough estimate of landings from the number of fishers, and information in Lamberth et al, 1997).

Adult southern mullet (hereafter referred to as 'harders') breed in the sea, probably close inshore. A large number of juveniles of this species enter the Olifants River estuary (and other estuaries along the South African coastline), utilising the sheltered, protected environment as nursery grounds. Juveniles of *Liza richardsonii* are, however, not dependent on estuarine nursery areas, although they do benefit substantially from the favourable conditions provided there. Since the species is migratory, stock assessments are difficult and costly.

Fishers in the Olifants River estuary have reported a marked decrease in the number of species landed in recent years compared with the past. Whereas in the past catches included considerable numbers of White steenbras (*Lithognathus lithognathus*), Freshwater snoek (*Barbus serra*) and Cape silverside (*Atherina breviceps*), these species are now virtually absent from gillnet catches in the estuary. However, Elf (*Pomatomus saltatrix*) are still landed in fairly large numbers.

3.2 Technical characteristics of the fishery

There are 65 licensed fishing households. Although licences are issued to individuals, no more than one licence can be issued per household. The majority of licence holders own a small wooden rowing boat, a set of oars and a 35 m gillnet. The minimum legal mesh size is 51 mm, and this is presently the most commonly used size - larger mesh sizes are also in use, and there is a certain amount of illegal use of 48 mm gillnets. Of the 65 licence holders, 10 are restricted to a net of 10 m in length (instead of the length of 35 m for other licence holders). In theory, these people have an alternative source of income and are therefore fishing for home use and not with the intention of selling the fish. In addition to the 65 licensed fishing households, it is estimated that there are a further 30 unlicensed fishers. Most do not own a boat or net, and are dependent on the use of equipment that belongs to licensed fishers.

Fishing takes place during the summer season (usually October to April) when the River is not flooded. A long rainy season (such as that experienced in 1996) has a serious economic impact on households that are dependent on fishing since the additional input of freshwater into the estuary results in fewer harders. There is a preference for fishing at night when, from experience, catch rates are higher, possibly because the net cannot be detected by the fish in the dark. Fishers can spend as long as four days out on the River, camping on the banks. Catches may vary from 10 to a 1000 fish (for an excellent catch). The fish are either eaten fresh or salted. For commercial purposes the salted dried fish ('bokoms') are sold in bunches to farmers in the area.

3.3 Status of the habitat

There are no recent studies that have been undertaken to monitor the biological and physical conditions of the estuary. However, a report compiled in 1984 by the Council for Scientific and Industrial Research (CSIR) concluded that the Olifants estuary is in an almost pristine state and that human activity has had little impact on it. There is no industry and the general level of development is minimal in the lower reaches of the River. Consequently the estuary is unpolluted by industrial effluents. However, considerable quantities of agricultural chemicals leach into the River from adjacent, upstream agricultural lands bordering the river and from agricultural activity in the catchment area. There is also a small amount of sewage seepage from the Ebenaeser and Papendorp communities, but the effects are minimal. However, the presence of the diamond recovery vessels in the vicinity of the River mouth is also a potential source of pollution and requires monitoring. Activities upstream and in the catchment area probably have a greater effect on the estuary than those in its immediate vicinity. The overall effect of damming the Olifants (Clanwilliam & Bulshoek Dams in the upper reaches of the River) and overgrazing parts of the catchment area, has been to increase the amount of sediment reaching the estuary and to decrease the water flow available to scour it. However, the strong tidal flow reduces the tendency for the estuary to silt up. The vegetation is dense in and along the banks of the estuary and the fauna is relatively abundant.

3.4 Level of stock exploitation

Ebenaeser fishers reported declines in the catch rate of harders in 1991 and 1992. Unfortunately it has not been possible to put this experience in the fishery into a quantitative historical perspective, since there are no reliable records on the numbers and sizes of fish landed in the Olifants River. However, we do have records of catches along the South African coast and in the Berg River, the site of the largest estuarine harder fishery. Although harder fishing has long been a popular activity of both amateur and professional fishers in the Western Cape, the fishery has not been regarded as one of serious commercial importance and as a result fisheries management authorities and scientists paid very little attention to it. However, after 1967, when professional beach-seine operators in St. Helena Bay (situated along the west coast) complained about a decline in their catch rate, the importance of the resource was highlighted and the need for information on and the conservation of the mullet resource was realised. In subsequent years, a number of control measures were introduced

including the compulsory licensing of nets, restrictions on the use of certain nets, the introduction of new boundaries, restrictions on the number of permits issued and the compulsory submission of monthly catch return cards.

Recent research into the harder fishery in the Olifants River estuary is restricted to the research project carried out by the authors of this report. The scientific aspects of this study have been (a) the initiation in November 1994, of a catch monitoring system to collect catch statistics (catch, effort, harder sizes), and (b) a field experiment ("mesh size experiment") to determine the relationship between fish size, catch rate and gillnet mesh size. For the catch monitoring system, fishers are required to complete catch monitoring cards after each fishing trip. Initially, fishers were required to record the number of harders caught to obtain values for the total catch tonnage caught each month with the prevailing mesh size; the sizes of a sample of fish caught to estimate the population structure; as well as details such as duration of the net in the water to monitor effort; fishing location along the River and an indication of other species of fish caught. Now the fishers no longer record the sizes of fish because it was felt that the cards were too detailed and took too much time to complete, but the other details are still required. However information on population structure is obtained from the "mesh size experiment" which is repeated periodically. This field work is conducted over a period of five days and repeated approximately every two months during the fishing season (summer). In the "mesh size experiment", catch rates and the size structure of catches from gillnets, with four different mesh sizes, are compared.

Results of the catch monitoring data are given in Fig. 2. The catch monitoring system was implemented in November 1994, and although initially successful, probably due to assistance from paid 'walskippers' (literally shore skippers) who were responsible for collecting completed catch cards in their district, the system broke down after April 1995, mainly because of the time required to complete the forms. The monitoring system was, however, re-implemented towards the end of 1996 (the beginning of the fishing season) with simplified catch return forms. Statistical analysis of the data shown in Fig. 2 does not reveal evidence of any overall increase or decrease in the catch rate.

Results of the "mesh size experiments" are given in Fig. 3. Five experimental sessions were conducted, during March 1995, September 1995, December 1995, February 1996 and April 1996. These results show clearly that the catch rate declines markedly with increasing mesh size. For example, an increase in mesh size from 51 mm to 54 mm, only 3 mm, results in a more than 40% reduction in catch rate. The difference between a 51 mm and a 54 mm mesh size is subtle and is not immediately obvious from an inspection of a gillnet with the naked eye.

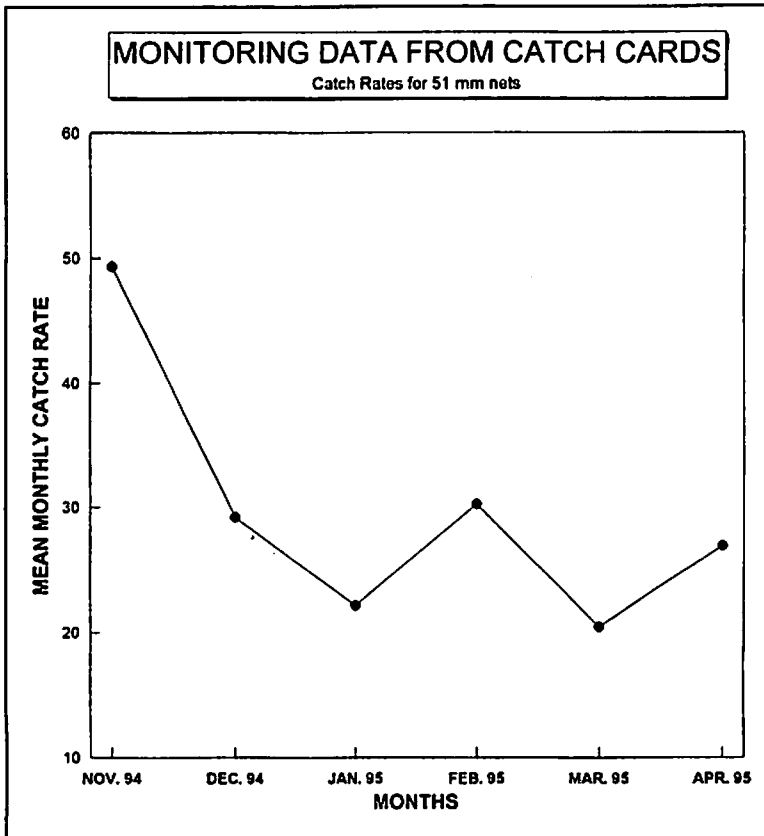


Figure 2: Catch rates from catch monitoring

EXPERIMENTAL RESULTS CATCH RATES & MEAN SIZE

● Mean Catch Rate (no. of fish per hour)
◆ Mean Fish Size (mm)

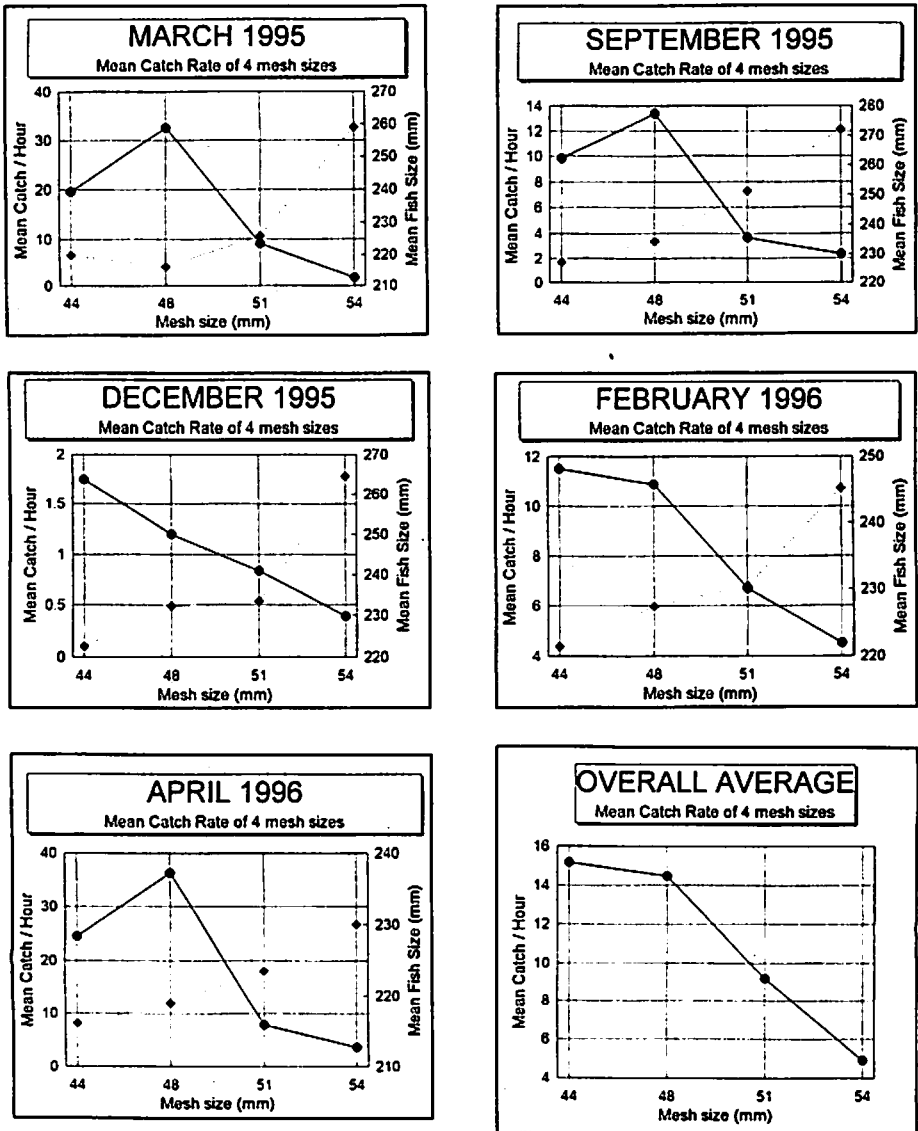


Figure 3: Experiment results: Catch rates and mean size

With the benefit of hindsight, and in view of the sensitivity of catch rate to subtle changes in gill-net mesh size, a historical review of management regulations was carried out. This revealed that in 1990, Cape Nature Conservation instituted an increase in the mesh size from 51 mm (2 inches) to 54 mm (2.125 inches) (i.e. by $\frac{1}{8}$ of an inch, or 3 mm). The research team is now of the view that this increase in mesh size may well have been the key reason for the decline in the estuarine catch rates experienced by the fisher community in 1990, 1991 and 1992. There may be a host of reasons for why the community never recognised the detrimental role of the increase in the mesh size to their fishery. These include:

1. The fact that the change in mesh size referred to above is very slight and is not noticeable to the naked eye;
2. The hyper-sensitivity of the community to other perturbations in the estuary such as the highly visible and politically unacceptable anchoring of diamond boats near to the River mouth;
3. The highly visible presence of seals in the estuary and anger directed at these seals because they both consume fish trapped by the gillnets and damage the nets;
4. The blockage of the Hartebees Canal, a region of the River mouth which was perceived to have been an important entrance route for harders into the canal.

In 1993, following workshops held between the fisher community of Ebenaeser, the CNC, the research project team and other interested parties, it was decided that the mesh size be reduced to 51 mm (2 inches) again. This reduction in mesh size has improved catches. Ongoing monitoring is essential in order to be able to determine whether this improvement is sustainable.

4. The people of Ebenaeser: Socio-economic attributes and indicators

4.1 Socio-economic attributes and indicators

Ebenaeser is an Afrikaans-speaking rural coloured community of approximately 500 households. The community consists of descendants of the families that were evicted from their land in 1925, as well as additional people that have, over the years, settled on the land and been accepted as part of the community. The legacy of apartheid has left an indelible mark on the community, which, in the 1925 eviction, not only lost access to a rich natural resource base, but also, in the intervening years, received no government development assistance. In contrast to the highly subsidised and well serviced commercial farming area higher up the Olifants River, on the site of old Ebenaeser, present day Ebenaeser has minimal infrastructure. Electrification of all houses in the community has only recently been completed, and infrastructure for delivering piped water to homes is currently being installed.

Social infrastructure includes a primary school, a post office, a local government office, a library and two small general dealers. There is no bank, petrol station or medical facilities, and residents of Ebenaeser have to travel to Lutzville or Vredendal for these services. The route to the nearest towns is not serviced by public transport and private taxis are expensive.

There are several local organisations including: a Farmers Association; a Fishing Committee; a Land Committee; a Women's Action Group; youth organisations; numerous church groups and the two major political organisations (the National Party and the African National Congress). The Dutch Reformed Church has a large membership (more than 1500 out of a total population of 2500).

4.2 Dependence on the fishery

While there is ethnic and religious homogeneity amongst the people of Ebenaeser, there is marked economic heterogeneity in the 5 different districts that form part of Ebenaeser. This is largely due to the limited availability of irrigable land, used by, or inherited from the original 150 registered owners, who were allocated land at the time of the land exchange. In certain districts, including Nuwepos and Rooierwe (see Fig.1), the majority of people have access to two hectares of irrigated land and a number of hectares of communal grazing land, enabling them to earn a living from crop and stock farming. While two hectares is by no means sufficient to make a living, it does provide limited food security. In contrast, people living at Olifantsdrift and Papendorp have no land, and depend entirely on fishing, state pensions and employment in surrounding towns and on farms. Opportunities for permanent employment in the area are few, and are limited to teaching posts in Ebenaeser, and with nearby mining companies such as Namaquasands and Transhex.

Of the 64 fishing households interviewed in the socio-economic survey, approximately 50% have access to land for cultivation and stock farming. Some of the households that do not have access to land (20%) receive a state pension or disability grant. Approximately 30% of respondents indicated that they are entirely dependent on fishing and seasonal work. Total incomes are generally low, and there is a noticeable seasonal variation. Almost 30% of households earn less than R600 during the summer months, while 60% earn less than R600 per month in winter. Sixty per cent of the households interviewed estimated that they receive between one quarter and one half of their total summer income from fishing. The remaining 40% obtain more than three-quarters of their income from fishing. In winter, there is no fish available - other than stocks of dried fish left over from the summer season.

4.3 Attitudes towards risk and collective action

It is difficult to gauge fishers attitudes towards risk, since most fishers are engaged in fishing not by choice but through circumstance. The risks associated with fishing such as unreliable catches, uncertain markets, rough conditions at the mouth of the estuary (one of the best fishing sites) and damage to nets by seals, are not really seen as risks by fishers, but as circumstances beyond their control.

As part of the socio-economic survey, respondents were invited to answer a number of open-ended questions on their views regarding the future management of the harder resource. Responses to two questions provide an indication of fishers attitudes towards collective action. The first question sought to ascertain whether the fishing community believed that they could manage the resource on their own. The second question inquired whether the

fishing community was prepared to collaborate with the nature conservation agency in a joint management arrangement.

There is divided opinion as to whether the community could take sole responsibility for resource management. Although more people answered in the affirmative, there were a number of qualifications to this response. For example, there were concerns that the present level of disagreement and conflict amongst fishers would jeopardise an attempt at local collective action in managing the resource independent of government. There was also concern that the various local committees would not work together. However, some felt there would need to be external support to assist with training to ensure the long term sustainability of the resource as well as financial assistance to develop the fishery. Those that answered in the negative to question 1 gave the following reasons:

- there will always be disagreements and fights among fishers;
- it will result in greater numbers of people fishing illegally;
- there will be chaos and corruption in the community because everyone will do as they please;
- the fishers are dishonest and undisciplined;
- there is insufficient knowledge in the community as to how to manage the resource.

In response to the question on a joint management arrangement, there was an overwhelmingly positive response. However, it is interesting to note that one of the reasons given for such a partnership arrangement is that the presence of the Cape Nature Conservation (CNC) would ensure that "order and discipline is maintained", that "the fishermen will do as they please if the CNC is not present" and that "without the CNC the community will abuse the resource". These responses indicate a lack of trust between the different groups, inhibiting the fishing community's ability to work together.

4.4 Knowledge of the fishery and its management

Fishers have specialised local knowledge regarding where and when to fish in relation to environmental conditions (e.g. tides, floods, weather patterns). Their interpretation of catch rates is, however, influenced by perceptions and socio-political factors rather than a genuine understanding of environmental interactions affecting the resource.

General scientific information on the harder resource is well documented in the literature (de Villiers 1987, Sauer and Erasmus 1996, Lamberth et al in prep). However, until recently, management decisions affecting the Olifants River fishery have not been based on any scientific investigations. The scientific component of the larger research project seeks to provide the information through (i) experimental work and (ii) development and implementation of the community-based catch monitoring system. Whilst the specialised local knowledge of the fishers on aspects of the fishery is crucial to the development of an appropriate and acceptable management strategy, the need for quantitative data to determine the optimal utilisation of the resource is recognised.

It is anticipated that involvement of the fishers in the research project: through participation in the catch monitoring system and experimental work; and via participation in

workshops where results of the monitoring and experimental work are presented and discussed, will, over time, enhance the fishers knowledge on the more scientific aspects of fisheries management.

5. Marketing attributes and indicators

The fish are either eaten fresh or salted, or are sold at R35 per 100 fish, to farmers in the area. More than 50% of the households interviewed eat fish either once or twice a day during the summer season, indicating that a large proportion of the catch is consumed by the household rather than sold.

Catches are erratic and unpredictable, making it difficult to set up organised and collaborative marketing arrangements. When there are good catches, fishers contact farmers in the area to assess whether there is a demand for the fish, which is purchased as a food source for farm labourers. A vehicle then has to be hired to transport the fish from Ebenaeser, either to Lutzville or Vredendal. On any one day, there may be up to five sellers and an equal number of buyers. While an abundance of fish saturates the market easily, there is usually not sufficient fish for a formal marketing arrangement, such as transporting fish to a market in Cape Town, or organising for fish to be sold to a local factory. While fishers are eager to improve opportunities for marketing the fish, commercialisation of the resource is likely to reduce local consumption of fish with resultant health implications.

There is currently a project under way to investigate alternative means of marketing the harders. Food technology students from the Peninsula Technikon are undertaking research and experimenting with the production of a nutritious fish sausage, which could be marketed in the surrounding area and further afield. This project is still in its infancy and several issues such as the availability of a reliable source of fish, a potential market for the fish sausage and the acceptability of the product among local communities, still needs to be investigated.

6. Decision-making arrangements and indicators

6.1 Policy and legislative framework

Currently, the management of marine and estuarine resources is being undertaken at national and provincial government level in terms of the Sea Fishery Act, No 12 of 1988, and a variety of provincial ordinances. However, in terms of the interim (1993) and new South African Constitution Act, No 108 of 1996, marine resources, which include estuaries, lagoons and tidal rivers, shall be managed at National level by the Minister of Environmental Affairs and Tourism. A White Paper providing policy direction for the management of these resources is currently being drafted and discussions are under way to explore the roles and responsibilities of the provincial environmental and conservation departments as well as local government. Although a draft National Fisheries Policy document, which forms the basis for the White Paper, advocates the active participation of stakeholders and local communities in the management of marine resources (section 1.8), there is not much evidence that local community involvement in marine resource management is being seriously explored except in very specific cases (Fisheries Policy Development Committee 1996). The Olifants River

harder fishery is one such case. With regard to the future management of estuarine resources the emphasis is on streamlining the various pieces of legislation governing estuarine resource management and putting in place appropriate administrative arrangements for their management within extremely limited financial and human resources.

In the meantime, while policy and legislation are being drafted and existing institutions are being restructured, the day-to-day management of estuarine resources is still being undertaken at the provincial level by departments responsible for nature and environmental conservation in the coastal provinces. In the Western Cape Province proclamations are issued in terms of the Nature Conservation Ordinance No 19 of 1974. While the Ordinance does not make formal provision for local level involvement in resource management, in certain areas the responsible agency, Cape Nature Conservation (CNC) has facilitated the establishment of fora, comprising representatives of resource users and relevant authorities. These fora have no legal status but provide the conservation department with an opportunity to consult with users on management decisions. Currently, management of the Olifants River estuary is guided by a proclamation issued in terms of the Nature Conservation Ordinance, No 19 of 1974. Administration and enforcement of these regulations is undertaken by officials stationed at a district office of the Department, approximately 50 kilometres from the estuary.

6.2 Power structures of user groups and responsibilities

6.2.1 The Department of Cape Nature Conservation (CNC)

The provincial Department of Cape Nature Conservation is currently responsible for managing the harder fishery, although a management system involving the fisher community in all aspects of management is being developed (see Section 8). Management is effected through controls on 1) fishing effort, 2) restrictions on mesh size and net length, and 3) closed areas. At present, 65 licences for the use of gillnets with a mesh size of 51 mm, and a length of 30 m or 10 m are allocated annually. Decisions regarding the total number of licences to be issued are taken by the CNC while the identification of potential licence holders is undertaken by the Fishing Committee. Permit allocation is based upon criteria developed by the fisher committee and include factors such as economic need, alternative sources of income, illegal fishing activities in the previous year and so on.

The CNC is also responsible for enforcing regulations relevant to the broader management of the estuary. In particular, the enforcement of regulations restricting boating and fishing activities in a demarcated area in the vicinity of the River mouth, is vigorously pursued. The rationale for this regulation is the creation of a fish sanctuary in an area of the estuary which contains high concentrations of fish.

The CNC have ultimate decision-making power over all matters pertaining to management of the harder resource. The district officials make recommendations to the provincial head office on any proposed changes to the rules before informing the Fishing Committee. Up until fairly recently, the style of management has been largely 'top down' and technocratic with minimal involvement of the fisher community. Furthermore, decisions regarding management of the resource have been based upon limited scientific information and a lack of any consideration of socio-economic factors which may impact upon the estuary or community. Decisions have been based upon district officials' judgement of the health of

the resource and attempts to keep rules and regulations consistent with similar fisheries in nearby estuaries.

6.2.2 The Fishing Committee

A Fishing Committee, comprising licensed and non-licensed fishers as well as other members of the community has been in existence for approximately 10 years. This committee is elected at a public meeting by the broader Ebenaeser and Papendorp communities for a period of three years. All five fishing districts are represented on this committee. The committee then elects a chairperson, secretary and treasurer. Except for the secretary, all members of the committee are male. Their chief function has been to determine criteria for the allocation of licences and to assist the CNC in identifying who qualifies for licences in any particular year. Other functions include provision of a channel of communication between the CNC and the fishers, addressing the concerns of the fishers, and representing the interests of the fishers in other fora.

In general, the fishing sector in Ebenaeser, including the Fishing Committee have traditionally been accorded a very low status in the community. Prior to the first democratic local government elections in 1996, the committee operated as a puppet of the Management Board, a local level institution established during the Apartheid era to deal with local government issues. It had no legitimacy within the community, and any changes to the management of the fishery, which would give the fishers greater power in decision-making were actively resisted by the chairperson of the committee.

In 1995, a new Fishing Committee was elected. The relationship between the new democratic local government structures in the community and other civic structures and sector committees (e.g. health, fishing, youth and land) are still being worked out. To foster these linkages a member of the local council attends Fishing Committee meetings and is supposed to represent the fishers interests at council meetings. These local government structures are extremely new and the relationship between the Fishing Committee and this structure is still to be determined.

6.2.3 Characteristics and legitimacy of the leadership

Since being in office the Fishing Committee has made noticeable progress in building its organisational capacity. Achievements include: (i) the formulation of goals and objectives; (ii) the drafting of a constitution for the organisation; (iii) submission of a project proposal for funding; (iv) the drafting of guidelines for the allocation of fishing permits; and (v) the development of a co-management arrangement with the CNC. While these are significant contributions towards the development of the organisation, the achievements are not immediately visible to the fishing community, and the committee does not have the full support of the fishers. This emerged during the socio-economic survey conducted in 1996. In response to a question on the effectiveness of the Fishing Committee in representing the community's concerns, less than 50% of respondents answered in the affirmative, and even many who actually voiced support for the Fishing Committee indicated concern about a lack

of feedback to the broader fishing community. Those that answered in the negative, provided the following responses:

- the Committee is not neutral;
- it is a matter of who you know on the Committee;
- the Committee does not report back to the community;
- the Committee removes licences without explanation; and
- the Committee allows friends and family to get away with illegal fishing, but reports others.

The Committee is currently addressing these problems by ensuring regular feedback at community meetings, and tackling issues that have high visibility, such as the conflict regarding the use of the estuary by diamond recovery boats. The balance between spending time and resources on: (i) internal and invisible organisational capacity building (essential to the process of establishing a partnership) and (ii) practical and visible projects that are perceived to be contributing to the development of the fishery, is delicate, and one that the committee is struggling with. One way of increasing the visibility of the organisational development process, is to raise its political profile by inviting key government officials to constitute and sanction the partnership agreement once the negotiations relevant to the co-management system have been finalised.

6.3 The decision-making process for operational and collective choice rules

There are three operational rules relevant to this fishery: (i) the legal mesh size and net length; (ii) the total number of permits allocated and (iii) the restricted fishing area in the River mouth. It has been noted earlier in the report that decisions on the operational rules have until recently been *ad hoc*, with minimal scientific rationale and no explanation given to the resource users. By way of example, it has not been possible to obtain an explanation from the CNC for the reason behind the decision in 1990 to change the legal mesh size to 54 mm. The legal mesh size used in the harder fishery in the Berg River estuary, some 200 km south of the Olifants River estuary, is 48 mm. In 1993, following complaints by the Olifants River fishers about the declining fish catches, the decision to reduce the mesh size to 51 mm was agreed and passed. This decision was based on scientific advice from an independent consultant. Additional justification for the reduction in mesh size was that the legal minimum mesh size in the Berg River estuary is 48 mm, and there seemed no valid reason why the mesh size in the Olifants River estuary should be that much larger.

Decisions on changes to the number of permits allocated have been made in response to an increased demand for permits. In 1990, the CNC more than doubled the available permits, from 24 to 65, in an attempt to legalise the large numbers of illegal fishers. This decision was not based on any scientific information but on the conservation officers' opinion of the biological sustainability of the resource.

A third example of an operational decision that has not been scientifically or rationally motivated, is the boundary of the restricted fishing zone. General regulations restricting the use of nets in all tidal waters are set out in Proclamation 357 of 1972, issued in terms of the

Nature Conservation Ordinance. Details on the boundaries of the restricted fishing area in the Olifants River mouth are provided in Part 3 of this Proclamation. In the Olifants River, there is a section between the sea and a beacon located 1 km upstream, in which no person shall use 1) a trek-net of more than 100 m in length, or 2) any boat or craft for the purpose of speedboating, aquaplaning, waterskiing or for any purpose other than the transportation, at a speed of not more than 10 km per hour, of animals, goods or persons by the shortest route from one point to another.

The location of the beacon is contentious as it keeps fishers out of the richest fishing grounds, yet diamond recovery vessels are permitted to anchor in this area. From discussions with the fishers, it would appear that historically, the beacon was of practical use as it separated fishers using trek-nets from those using gillnets. However, the use of trek-nets has since been banned and the reason for the positioning of the beacon is no longer valid.

Collective choice rules are those rules that specify: (i) who may participate in changing the operational rules, and (ii) what level of agreement is required to make those changes. Until recently, the fishing community has virtually had no voice in determining or changing the rules governing the management of the fishery. A system of co-management which gives the fishers certain decision-making powers and management responsibilities is currently being negotiated between the Fishing Committee and the CNC (see Section 7).

6.4 Level of representation in decision-making processes

This section lists the stakeholders in the Olifants River harder fishery, and describes their involvement in the present and future decision-making processes relevant to its management. Stakeholders include:

1. Fishers (all are male): Represented on the Fishing Committee through district representatives;
2. Women of fishing households: Often involved in the process of marketing and preserving the fish but are presently not represented on the Fishing Committee. Future representation of women in fisheries management has not been discussed;
3. Youth: There are a number of young fishers, the majority of whom do not have licences. Their representation has also not been addressed;
4. The local authority: A local government representative has been nominated to the Committee. The relationship between the two organisations is however, tenuous, and will need to be strengthened in future;
5. Owners of land adjacent to the Olifants River: Certain landowners have recently made applications for fishing permits; this has so far been ignored by both the CNC and the Fishing Committee;
6. Transhex, the diamond mining company: Has legal rights to mine in the vicinity of the River mouth and offshore, and to undertake activities which support their diamond mining operation such as the construction of infrastructure on land adjacent to the estuary. The legality of anchoring diamond recovery vessels in the vicinity of the River mouth is currently being challenged. They are not represented within the

structures in the new co-management system, but will be invited to participate in an estuarine management forum once it is established.

6.5 Current rules and regulations and their relevance

Although certain rules are regulated in terms of legislation such as restricted fishing areas and the use of boats in these areas, others, however, such as restrictions on mesh size, net length, total number of licences allocated, are determined by the CNC on an annual basis. Information regarding changes to the rules and regulations are communicated to the fishers via the Fishing Committee or by the officials when they attend general fisher community meetings or when they meet fishers while patrolling the River. While certain fishers adhere to the regulations and acknowledge the importance of restrictions on, for example, fishing in the River mouth area, others have ignored these and use a variety of mesh sizes and net lengths, and fish in the restricted area. For many, complying with any changes to the rules has huge financial implications which make it prohibitive to abide by them. For example, the cost of purchasing a new net is approximately R600 which approximates the entire monthly household income for many fisher families.

In response to a question in the socio-economic survey as to whether the fishers should be allowed to catch fish in the restricted fishing area (stretching 1 km from the mouth of the River upstream), the majority were opposed to this proposal. Most felt that the restricted fishing area provided a sanctuary for fish and that fishing in this area would result in resource depletion. In addition, the restricted area enabled fish to migrate upstream, thus providing a source of fish for fishers upstream. However, certain fishers felt that fishing should be allowed in this area since the diamond boats utilise this area and angling and using a throw net, both activities undertaken by recreationists, is permitted in the restricted area. This indicates that the legitimacy of the regulations are being undermined through inconsistent application by the CNC. Legitimacy is also being undermined by the youth, who are less law-abiding than the older fishers, and are also more physically able to escape an arrest.

The fishers have expressed dissatisfaction with the current system of management. A key concern has been the lack of consultation with the fishers regarding all decisions affecting the harder resource and the estuary. In particular, the allocation of permits for 10 diamond recovery vessels to anchor in the River mouth area - a restricted fishing area - has caused considerable dissatisfaction amongst the fishers. Other issues of concern include the *ad hoc* changes to the rules governing permitted fishing gear, the fact that decisions are based on limited scientific information, a lack of clarity regarding the rules and sanctions governing the fishery, unclear criteria for access to the fishery and the inconsistent manner in which fines are imposed and illegal fishers prosecuted. The broader fishing community have also expressed dissatisfaction with the Fishing Committee's involvement in the management of the resource.

6.6 Enforcement of rules

The enforcement of rules and regulations is currently carried out by two officials from the district office at Van Rhynsdorp. They patrol the estuary by boat and arrest fishers undertaking any illegal activities. In some cases fish and fishing equipment are confiscated.

Fishers are then taken to the local magistrates court for trial. If convicted the offender can either be fined or imprisoned.

Over the past two years 13 people have been charged with undertaking illegal activities. Fines ranged from R100 (or 50 days in prison) to R1200 or (8 months in prison). A key source of tension between fishers and the regulatory authority has been the inconsistent way in which fines have been imposed.

7. Developing a co-management system for the harder fishery

In the early 1990s, the fisher community became increasingly dissatisfied with management and decision-making arrangements for the fishery. In particular, the presence of diamond recovery vessels in the River mouth and their concern about reduced catches and increasing economic hardship, prompted them to seek assistance from the Environmental Advisory Unit, a non-governmental organisation based at the University of Cape Town. After a preliminary investigation into the possible causes for the decline in fish catches, the current research project was developed in consultation with the fishing community (refer Section 3.3).

A key objective of the research project was to facilitate the development of a community-supported management system, where the fishers, in partnership with the conservation authority, jointly manage the resource. Having obtained the support of the broader community to embark on this process, a series of workshops with the Fishing Committee and the CNC have been held. These workshops have been facilitated by the research team members. Once agreement was reached by both parties that co-management of the resource was desirable from both the fishers' and the conservation department's perspective, discussions have focused on the management functions and decision-making powers of the partner organisations. Table 1 lists the management activities and identifies which institution will take responsibility for particular activities and which issues require joint consultations on decision-making.

Table 1: Division of management responsibilities

| Management Functions | Single management | | Joint management |
|---|-------------------|-----|------------------|
| | Fishing Committee | CNC | |
| (I) Issuing of licences | | | * |
| 1. No. of licences | * | | |
| 2. Maximum number to be issued | | | * |
| 3. Develop guidelines/criteria | * | | |
| 4. Comment on guidelines | | * | |
| 5. Management of licence fees | | | * |
| (II) Regulations | | | * |
| 1. Mesh size | | | * |
| 2. Net length | | | * |
| 3. Restricted area | | | * |
| (III) Law enforcement | | | * |
| 1. Report offenders | * | | |
| 2. Determine fines | | * | |
| 3. Apply/pay fines | | * | |
| (IV) Other aspects | | | * |
| 1. Decisions regarding seals | | | * |
| 2. Decisions regarding diamond boats | | | * |
| (V) Gathering and analysis of scientific information | | | * |
| 1. At a national level | | * | |
| 2. At a local level | * | | |
| (VI) Development of the resource | | | * |

While the process of identifying the management functions and decision-making powers of the partner institutions has been completed, a series of discussions is currently under way to assess the implications of taking on these responsibilities and identifying potential problems or constraints that may arise in executing these functions. In particular, the limited capacity (both human and financial) of the Fishing Committee and the limited staff and resources of the CNC to support the Committee in their tasks, is being examined. Further, mechanisms and rules for decision-making as well as mechanisms for conflict resolution within this co-management regime are currently being discussed. The ongoing role of the project team and the NGO sector in providing scientific information and assisting with building the capacity of the Fishing Committee is also being discussed. These discussions are being undertaken in the light of the legislative and administrative changes occurring at the present time.

8. Incentives to co-operate and patterns of interaction

Up until fairly recently (1995) there has been virtually no co-operation between the fisher community and other stakeholders or government authorities. In fact, under the apartheid regime, the fishers were an extremely marginalised group and not consulted on any decisions affecting the estuary and surrounding area. For example, a decision by the CNC to allow 10 diamond recovery boats to anchor at the mouth of the estuary, in the restricted area (see Fig 1) was taken without consulting the fishers. Whilst there is no conclusive evidence to prove that the presence of these vessels is having a negative impact on fish catches, from the fishers' observations fish catches have declined since the permits were issued. Furthermore, the government's decision to allow the diamond boats to anchor in a 'restricted area' (a sanctuary for fish) is contradictory. This has been a source of tension between the fishers and the CNC.

The relationship between the fishers and other stakeholders, which includes the mining company, has been mistrustful and at times confrontational. The key source of tension between fishers and these stakeholders is that activities and decisions affecting the estuary, which in turn affect their livelihood, are taken unilaterally without any consultation. Until the recent democratic elections, the fishers have felt powerless to challenge the actions and decisions of government and the historically more powerful industry-related organisations.

However, since the election of the Government of National Unity there has been greater effort on the part of government, and their appointed consultants, to involve the Ebenaeser community in initiatives and decisions affecting their environment. For example, in 1996 planning consultants were appointed by the West Coast Regional Services Council, to prepare a development plan and management guidelines for the Olifants River estuary and environs. The fishers were identified as an important user group and were thus represented on a Steering Committee which guided the planning process.

The proposed co-management system recognises the fisher community as an equal partner in the management of the harder resource. The partnership agreement provides incentives for both partners to co-operate and honour agreements. It is the authors' view that there are clear incentives for both parties to adhere to the partnership agreement. These are:

- to reduce the workload and management responsibilities of the CNC who are presently under-resourced and understaffed;
- to build trust between users and the regulatory authority;
- to encourage fishers to take greater responsibility for the long term sustainability of the resource;
- to increase the credibility of the CNC among the new government structures and the progressive movements;
- to comply with the principles and spirit of the new constitution and with several policy documents which advocate community participation in decision-making;
- to provide opportunities for fishers to influence decisions which previously affected them; and
- to provide a forum for both organisations and other stakeholders to raise questions and concerns relevant to the fishery and the general management of the estuary.

9. Outcomes

This section of the report is concerned with evaluating the outcomes of the co-management regime in terms of efficiency, equity and sustainability. However, since the details of the co-management system are still being negotiated between the fishers and the Department of Cape Nature Conservation and have not yet been formally implemented, this evaluation is somewhat premature. Therefore, our evaluation is based on our understanding and predictions of the likely outcomes of the proposed partnership agreement and assumes that both parties will honour their commitment to it. This evaluation also recognises that several obstacles still stand in the way of the smooth implementation of the partnership agreement, including:

- the current restructuring of the CNC and the possibility that in the future the CNC may not be the authority responsible for managing estuarine resources;
- the difficulties facing the CNC in coming to terms with their changing role from 'enforcer of rules' to 'partner in management';
- the limited capacity of the Fishing Committee; and
- the absence of immediate tangible benefits which may reduce effort and commitment to the co-management system, especially in times of hardship (e.g. poor catches due to high rainfall in the catchment) or conflict (e.g. inability to reach consensus on an issue).

9.1 Efficiency

Currently, the CNC is responsible for all aspects of estuarine management. As mentioned earlier, decisions regarding harvesting strategies and rules of access have been determined by the provincial office based in Cape Town. Previously there has been little consultation with the fishing community on any aspect of management (see section 7.6). Day-to-day management has been the responsibility of two district conservation officials. Given the limited resources of the district CNC offices, attention has focused on law enforcement rather than undertaking scientific investigations to determine the status of the resource, or understanding the difficulties experienced by fishers and responding to their concerns. Consequently, the outcome of the previous management regime in terms of efficiency criteria has been high costs (both financial and time) associated with patrolling the River and apprehending offenders as well as the administration of licences and fees. Furthermore, compliance with rules and regulations has been relatively low amongst fishers.

From the fishers' perspective, compliance with the regulations has been low because fishers were of the opinion that the resource could sustain many more fishers, and that the circumstances of certain members of the community were so desperate that they had no option but to fish illegally. The introduction of changes to permitted fishing gear (e.g. mesh size and net length) also posed a severe financial burden on fishers and many continued to fish with existing illegal gear. Furthermore, they felt that certain restrictions were introduced several years ago, such as defining of the boundaries of the restricted area at the River mouth, and were no longer valid and required revision. In general terms, the fishers have not been supportive of the regulations governing the fishery and compliance has been low.

The new co-management regime requires that the fishers and the CNC take joint responsibility for the management of the resource. Table 1 indicates which functions are the sole responsibility of the fishers and the CNC respectively, as well as which require joint management and decision-making. This system of management will require much greater interaction and co-operation between the conservation authority and the fishing community. It is anticipated that initially, a lot of time will be spent in meetings and workshops clarifying roles and responsibilities and working out the logistics of joint management arrangements. Further, it is anticipated that on certain issues, for example the re-issuing of licences to the diamond boats, it will not be easy to reach consensus and mediation may be required. Thus it is anticipated that for the first years of implementation additional time will need to be spent by both parties in managing the resource.

However, the Fishing Committee's role in overseeing the monitoring process, assisting with the administration of licences, determining criteria for access to the fishery and reporting fishers who operate illegally, should reduce the management input from the CNC and enable them to focus on issues other than law enforcement. The involvement of the fishers in management including the determination of appropriate fines for various offences and the total number of licences to be issued each year (which in the future will be based on an analysis of data collected by the community) should lead to greater support of management decisions and therefore a greater degree of compliance.

9.2 Equity

Up until fairly recently, the management regime has not been representative of the fishing community. Procedures and processes governing decision-making and day-to-day management have been unclear; decisions have been *ad hoc* (e.g. the decision to increase access to the fishery has, in the past, not been based on scientific information) and inconsistent (e.g. fines imposed for the same offence differ widely). Furthermore, the legislative and administrative framework governing the fishery and its management, have created unequal power relations between fishers and government. These factors have reinforced the marginalised position of this user group, and fostered feelings of powerlessness and inadequacy to such an extent that certain fishers, when presented with the opportunity to participate in management decisions, felt that they were incapable of taking on this responsibility (see section 4.3).

Furthermore, the fishing community of Ebenaeser is not a member of any of the unions in existence along the Cape West coast. Although most of these unions are concerned with representing members grievances regarding access and labour issues with respect to marine industrialised fisheries, membership of the union provides information on debates and initiatives taking place at national and provincial level as well as an opportunity to participate in the national fisheries policy process. The Ebenaeser fisher community were unaware of the fact that a national fisheries policy was being developed until informed by members of the project team.

Although the Fishing Committee has been in existence since 1986, it has not been regarded by many as representative of the fishing community. Their role in representing the concerns and interests of the fishers in discussions and negotiations with the CNC has, until recently, been extremely limited.

A fundamental principle of the new co-management system at the Olifants River is that of equity. The partnership agreement, which sets out the principles and procedures for decision-making, and clearly identifies the management functions of the partner institutions seeks to give equal power to both users and the government department and equitable access to the resource within sustainable limits. Since the partnership agreement clarifies roles and responsibilities of fishers and the CNC, as well as the process for decision-making and conflict resolution, it is anticipated that its implementation will result in (1) improved communication between partner organisations and other stakeholders, (2) processes guiding management will be clearer, and 3) expectations amongst fishers and the CNC will be similar in terms of the objectives and procedures underpinning the co-management system. Under this new regime, it is anticipated that distributional effects will be improved because of a more representative Fishing Committee and management guidelines will be clearer, particularly with respect to the criteria governing access to the fishery.

However, in the authors' view the greatest challenge in the creation of a more equitable relationship between fishers and the CNC is changing the attitudes and behaviour patterns of both groups. Fishers will need to take a more responsible, pro-active and sometimes challenging approach. On the other hand, the CNC will no longer be able to take unilateral decisions but will need to consult and negotiate with the fishers on all matters relevant to the management of the fishery.

9.3 Sustainability

To address the issue of sustainability, it seems important to first draw a distinction between sustainability and the concept of optimal resource utilisation. Managing a fishery on a sustainable basis is not a complicated task and can be achieved by simply setting extremely conservative catch and/or effort levels which pose no threat to long term sustainable utilisation. Clearly, the challenge is to utilise the resource in an economically optimal manner, and on a sustainable basis as well. This is where one begins to encounter difficulties, because there are obvious biological and economic risks involved. In the trade-off between biological and economic risk, which is typical of all fisheries, one significant characteristic of the Olifants River harder fishery must be recognised: that the impact of the Olifants River harder fishery on the entire South African stock of *Liza richardsonii* is less than a few per cent in terms of total landings. It therefore seems unlikely that the fishery would threaten the long term biological viability of the stock. Put another way, it seems unlikely that any actions by users of the Olifants River harder fishery would have an irreversible impact on the resource which would put the rights of future generations at risk.

Concerns about the biological viability of the entire stock of harder off South Africa should be addressed at a higher level, at which the total annual landings along the South African coastline can be estimated and limits on this amount can be regulated and enforced.

For the Olifants River harder fishery the primary concern is its long-term economic viability and optimisation. This translates into the following issues:

1. Whether catches by one fisher have an effect on the catch that will be achieved by another fisher shortly thereafter - if so, then this would imply that there is a simple,

immediate and straightforward trade-off between catch rate per fisher and the total number of licence holders;

2. Whether there are longer-term processes which mean that there is a less obvious and direct trade-off between catch rate per fisher and the total number of licence-holders. Such processes are mainly the rate at which the estuarine stock is replenished by influxes of harders from the sea.

In view of these points, the value of co-management is (a) to facilitate technical work to quantify the extent of the trade-offs postulated above, and (b) to facilitate the allocation of access to the resource implied by the need to balance the number of users with the benefit per user and the total net benefit to the community. In view of the lack of previous technical work on the fishery, the involvement and obvious interest of the community has and can only continue to promote the technical work that is required. As regards the allocation problem, the community is obviously heavily dependent on the government for enforcing rights of allocation. However, co-management will lead to a greater level of acceptance of the level of allocation eventually determined, by virtue of the community involvement in the process leading up to the final allocation decision. This may have spin-offs such as heavier sanctions imposed by the community against illegal fishers, because of the greater credibility and wider acceptance of the system and the scale of allocation.

In terms of stewardship, the fishers do have an inter-generational perspective and frequently refer to the need for management controls in order to ensure fish for the "nageslag", or future generations. Furthermore, the majority of fishers support the concept of a restricted area at the mouth of the River as well as a minimum mesh size and net length. However, their support for these controls is driven more by economic and equity considerations than by concerns about the long-term biological sustainability of the resource. In their view, since the Olifants River is an open system, they do not believe that increased fishing effort will affect the sustainability of the resource. However, the notion of setting limits in order to maximise the economic sustainability of the resource is not fully understood nor supported by the fishing community. The scientific component of the broader research project seeks to provide the necessary information to guide management decisions and promote the utilisation of the resource in an economically optimal manner. By involving the fishers in all aspects of the research process, it is anticipated that the benefits of restricting access to the fishery and imposing certain controls will become apparent and, over time, will be supported.

10. Conclusions

In conclusion, in terms of the three evaluation criteria, it seems likely that the involvement of the user community in decision-making and in the day-to-day management activities will ultimately lead to a management system that is more efficient, equitable and sustainable. However, it is likely that during the initial period of implementing the co-management system, logistical difficulties will occur and attitudinal problems will have to be overcome. Further, since the benefits of the co-management system will not be immediately apparent to both partners, it is anticipated that there will be pressure to revert to the old style of management especially in times of hardship and conflict. Ideally, the government department

responsible for fisheries management in South Africa, namely the Department of Sea Fisheries, should establish a unit within the Department which provides scientific, financial and human resource development support to these emerging co-management systems. In the absence of such a support unit within the Sea Fisheries Research Institute at the present time, it is proposed that ongoing support for the initiative be provided by the research team and other non-governmental organisations currently involved in the project until such time as the partner organisations have sufficient capacity and confidence to manage the resource jointly.

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Opportunities for co-management: The application of a research framework to a case study from South Africa

T. Hutton

*Fisheries Centre, University of British Columbia
Vancouver, British Columbia, Canada, V6T 1Z4*

S. J. Lamberth

*Marine Biology Research Institute, Department of Zoology
University of Cape Town, Rondebosch 7701, Cape Town, South Africa*

1. Introduction

The aim of this paper is to apply the co-management research framework, including an analysis of outcomes, to the linefishing community in Arniston (Figure 1). In undertaking the analysis, the aim is also to evaluate the opportunities for and constraints to the establishment of co-management arrangements in South African fisheries.

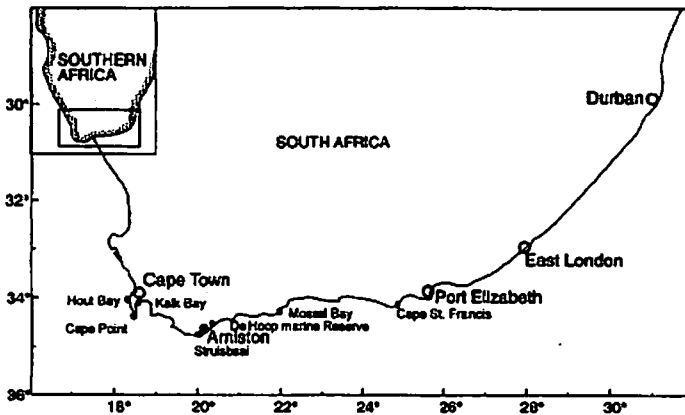


Figure 1: The location of Arniston on the southeast Cape coast of South Africa

2. The management of marine resources in South Africa

In global terms, South Africa's fishing industry is medium-sized with landings of between half a million and one million tons of fish annually during the period 1975 - 1991 (SFRI 1993). It has a complex array of fisheries encompassing the commercial, recreational and subsistence sectors. Within the commercial sector catches are dominated by the demersal and the pelagic fisheries. These two groups accounted for 88 - 95% of the reported annual catch for the period 1975 - 1991. Wholesale earnings from all fisheries reached an all time high of R1318 million in 1991 (SFRI 1993). Table 1 reflects the importance of each fishery in terms of landed catch and wholesale value.

Table 1: The catches and economic value of South Africa's commercial fisheries in 1994 (from Stuttaford (1996) and Cochrane and Payne [in press]). SA Rand 3.57 = USD 1 (exchange rate as on 31.12.94)

| Sector | Nominal Catch (t) | Wholesale Value - processed USD millions |
|------------------------------|-------------------|---|
| Demersal and Mid-water trawl | 188 842 | 201 |
| Pelagic | 315 545 | 81 |
| Rock lobster | 3 190 | 47 |
| Linefisheries: | | |
| Tuna | 4 069 | 6 |
| Squid-jigging | 6 442 | 19 |
| Handline fishery | 12 878 | 21 |
| Abalone | 613 | 15 |

In the past few decades the central government has played an increasingly influential role in assuming responsibility for the management of marine resources within the Exclusive Economic Zone (EEZ). The Ministry of Environmental Affairs and Tourism (MEA&T) administers this policy through the Sea Fishery Act (1988). In recent years the country has undergone major political changes and the Act is soon to be revised. At the national level a new constitution exists and various regional and local government bodies are in the process of being restructured. Policy is being formulated to address the inequitable practices of the previous (apartheid) government.

With regard to fisheries management, the practices of the previous government were based on the recommendations of the Diemont Commission which states that the management of the fishing industry and the fisheries should be the responsibility of central government (Diemont *et al.* 1986). Legislation pertaining to marine resource ownership is based on South African Common Law in that wild animals are *res nullius*, belonging to no-one until they are caught, at which point they become the property of whoever has caught them (Field and Glazewski 1992). Superimposed upon this legislation are the Statutory Laws, the Acts and the stipulated regulations within these Acts. Since 1948, a series of Fisheries Acts have imposed a limited entry system (Stander 1995). A broad range of statutory controls and restrictions on

fishing have been imposed under these Acts, including fishing permits, licensing requirements and quota allocations.

The Sea Fishery Act of 1988 empowers the Minister within the Department of Environmental Affairs and Tourism (DEA&T) to determine policy with regard to the conservation and the use of South African living marine resources¹. To achieve this, the Act of 1988 grants extensive discretionary powers to the Minister, who is then responsible for appointing a Sea Fisheries Advisory Committee (SFAC) and the Quota Board.

The Minister also is also responsible for setting quotas, and for granting and terminating exploitation rights, and the setting of the Total Allowable Catch (TAC) for the quota controlled species. Nine members are appointed to the SFAC by the Minister. They are chosen on the basis of their expertise and ability to contribute towards the functions of the Committee which advises the Minister on any matter prescribed in the current Sea Fishery Act. The constitution, membership and the establishment of sub-committees of the SFAC are prescribed in detail in Sections 7 to 12 of the Sea Fishery Act of 1988. The allocation of quotas is undertaken by an independent body, the Quota Board, whose mandate is to ensure stability in the industry (Stander 1995).

It is common in many industrialised nations for users to participate in management to the degree that representatives from the various fishing sectors are active members on government decision-making bodies. This has occurred in South Africa, however, user participation is mainly taking place in the form of advisory channels of communication, thus the sharing of management responsibility is not a common feature of operational management procedures.

Government bodies such as the SFAC include members who indirectly represent the sectors in terms of their expertise, but not as formal representatives. In some circumstances resource specific industry-government committees have been set up to exchange information with regard to the impact of any new regulations. Bross (1986) highlights the benefits of such arrangements for the industry. They are valuable for sector decision-making and ideal interfaces for policy, commerce and science (Bross 1986).

The decision-making arrangements and roles of the various responsible parties is reflected in Figure 2. The Sea Fisheries Research Institute (SFRI) has established resource working groups which include staff of the Institute as well as scientists from independent bodies such as universities. The working groups determine the scientific basis for proposed management measures. Recommendations from all these sources are sent to the Sea Fisheries Advisory Committee (SFAC), which provides to the Minister final advice on resource management (Figure 2).

¹ Sea Fishery Act No. 12. 1988. *Government Gazette* Vol. 273 No. 11201.

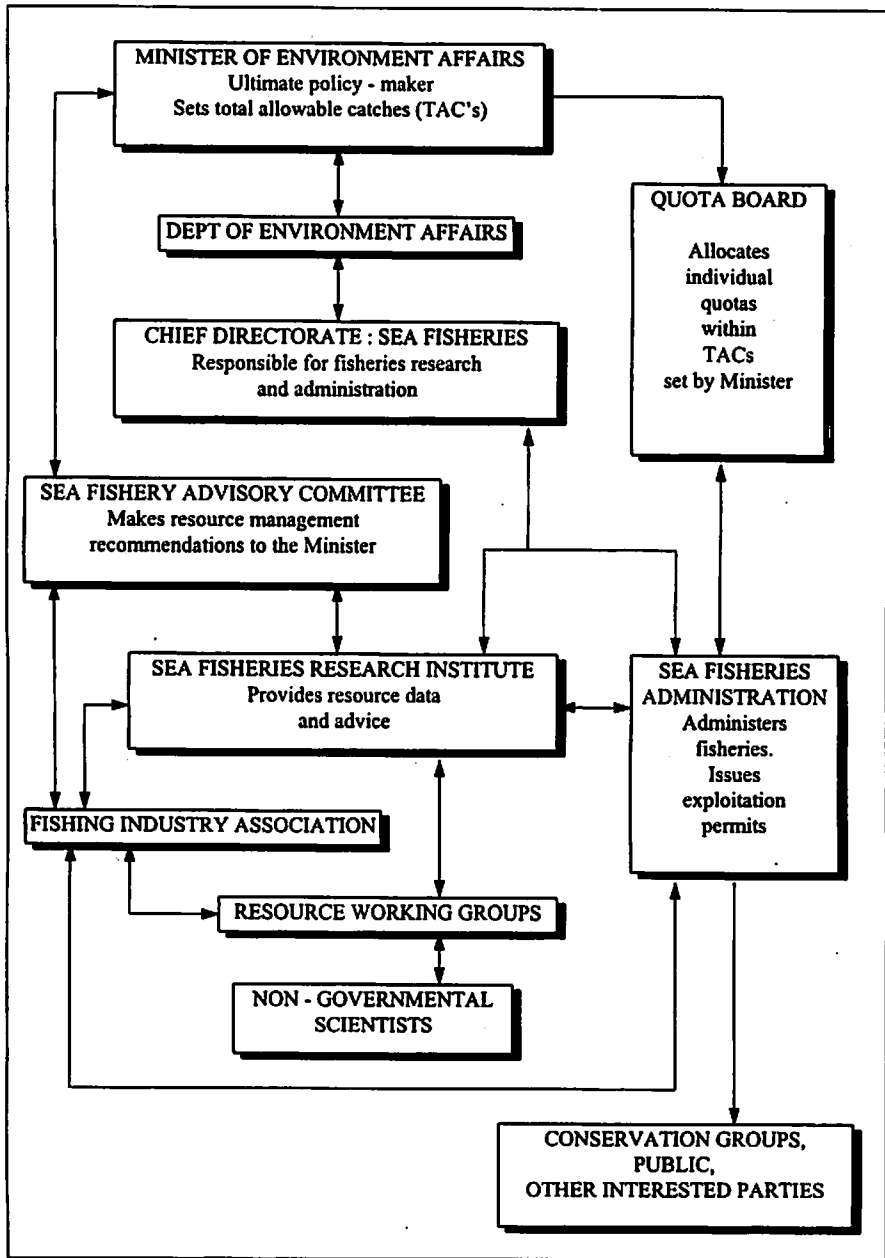


Figure 2: Organogram of structures created under the Sea Fishery Act of 1988 to manage the marine resources of South Africa (from SFRI, 1994)

Under the Sea Fishery Act, the Minister may recognise any industrial body or interest group operating in different sectors of the fishing industry. As such, these groups then have the power to advise and make recommendations either to the SFAC or to the Minister. Table 2 lists the interest groups and industrial bodies which are officially recognised under the Act. This recognition has resulted in organisations such as the South East Coast Inshore Fishing Association (SECIFA) playing an active role in the management of the inshore trawl fishery, which targets hake and sole. This is also the case for the South African Marine Linefish Management Association (SAMLMA) which plays active role in the management of the linefishery.

Table 2: A list of the interest groups and industrial bodies officially recognised under the Sea Fishery Act of 1988, as of 23rd October 1992 (Government Gazette No. 4967).

| Interest Group or Industrial Body | Principal Fishery |
|---|-----------------------------|
| | |
| Interests Groups | |
| South African Marine Linefish Management Association | linefish |
| False Bay Trek Fishermen's Association | trek-net fishing |
| Mariculture Association of Southern Africa | mariculture |
| | |
| Industrial Bodies | |
| South African Deepsea Trawling Industry Association | hake demersal trawl fishery |
| Abalone Sea Management Committee | abalone |
| South African Seaweed Concessionaires Association | seaweed |
| South East Coast Inshore Fishing Association | South coast inshore trawl |
| South African Frozen Rock Lobster Packers (Pty) Ltd. | West coast rock lobster |
| South African Squid Management Industrial Association | squid |

2.1 The linefishery

The modern linefishery in South Africa is a multi-user and multi-species sector that dates back to the 1600s. The national linefishery is so diverse that Cochrane and Payne (in press) state that it could be classified as a number of discrete fisheries. These would include the inshore handline fishery with its open boats, the larger component of offshore vessels which remain at sea for several days, the tuna fishery and the squid fishery. In 1994 these were, collectively, the third most economically valuable fishery in South Africa, as valuable as the rock lobster fishery (Cochrane and Payne, in press, see Table 1). The linefishery provides

employment for approximately 131,560 people and contributes about R2.2 billion to the Gross Geographic Product (GGP²) of South Africa's coastal provinces (Honer *et al.* in press.).

The fishing vessels range in size from open row boats of 3 - 5 m long to large decked freezer boats 20 m in length (Pulfrich and Griffiths 1988). There is a considerable diversity of vessel types. The largest are most often wooden with single screw inboard diesel engines which are moored in one of the harbours. Among the smaller vessels are the 'ski-boats' which are normally constructed from fibreglass, propelled by twin outboard petrol engines, and launched from trailers. There are at least 412,000 recreational shore anglers, 7,000 recreational spearfishers, 24,000 recreational boat anglers, 25,000 commercial boat fishers and 7,000 gill-net and beach-seine net fishers active in the fishery for linefish (van der Elst and Atkin 1991, Lamberth *et al.* in press., Honer *et al.* in press, Mann *et al.* in press).

2.1.1 Target species and the status of the stocks

Despite the long catch history for certain target species, biological research aimed at the management of these stocks only really began in the late 1970s (Buxton 1995). Of the 95 species identified as being important to the fishery, 39 are still listed in need of research (van der Elst and Atkin 1991). The main species reported caught by the linefishery by mass, are snoek *Thyrstites atun*, kob *Argyrosomus* spp., silverfish (carpenter) *Argyrozona argyrozona*, yellowtail *Seriola lalandi*, hottentot *Pachymetopon blochii* and geelbek *Atractoscion aequidens*.

The Technical Relief Measures Task Team (TRMTT) reported on the status of the major stocks according to the broad categories into which they fall and this information is presented below (TRMTT 1996). The following four broad groups of linefish stocks are targeted:

- A. Tuna species, such as albacore *Thunnus alalunga*, make up over 90% of the reported commercial catch (Table 1). Stock assessments indicate that albacore is over-exploited. In fact the stock has fallen to less than 20% of the pre-exploited level (TRMTT 1996). Recommendations have been made for a 30% reduction in effort on this species and therefore plans are in train to reduce participation in this fishery (TRMTT 1996). Other tuna species only contribute a small percentage to the catch in this fishery, although they all provide significant economic returns (Table 1).
- B. Cape snoek: The abundance of this species fluctuates over periods of years and correspondingly there are fluctuations in the reported annual catches. In years of high abundance there may be scope for increased catches, however any increases in effort will have to be made in the knowledge that there will have to be cut-backs in effort in years of low abundance (TRMTT 1996).
- C. Migratory shoaling species, such as geelbek and yellowtail. Recent research has shown that geelbek are over-exploited, and fishing effort on this species should be reduced to allow the stock to recover to biologically sustainable levels (Griffiths 1997). Current effort for the species exceeds the maximum F_{MSY} level (Griffiths 1997). Although abundance fluctuates, yellowtail appear to be exploited at maximum sustainable yield.

² For the provinces: Kwazulu-Natal, Eastern Cape and Western Cape (see Honer *et al.* in press).

Past purse-seine catches and recent illegal catches roughly doubled the total catch and resulted in a decline in the abundance of this species (TRMTT 1996). Recent studies (Penney *et al.* in prep.) show that the west coast shoals of yellowtail do not constitute a separate stock to those fish which migrate up the east coast and thus do not provide significant scope for an increase in catches.

- D. Reef fish species, such as seventy-four *Polysteganus praeorbitalis*, red roman *Chrysoblephus laticeps*, red steenbras *Petrus rupestris*, red stumpnose *Chrysoblephus gibbiceps*, dageraad *Chrysoblephus cristiceps*, silverfish and slinger *Chrysoblephus puniceus*. Many of these species have been over-exploited, resulting in declines in total catches, catch rates and mean sizes of fish caught. Seventy-four and dageraad, which were once targeted by the commercial sector, are now at very low levels (TRMTT 1996). Slinger, which is the main commercial species in Kwazulu-Natal is also over-exploited (TRMTT 1996). Since 1985 various strategies have been applied to substantially limit catches of these species in order to foster stock recovery.

2.1.2 Linefishing sectors and regulations

In 1984 the National Marine Linefish Committee was appointed by the Deputy Minister of Environmental Affairs in order to review the management of the linefishery. The Committee considered the factors determining the status of linefishers, the transferability of permits and licences, and the regulations relevant to the conservation of linefish stocks such as size and bag limits (Stander 1995).

The Minister accepted a proposed new system of classification of commercial (A) and semi-commercial (B) permits and enacted regulations such that no new linefish boats could be registered and licensed after November 1984 (Stander 1995). Regulations were formulated which made provision for categories of "unrestricted", "restricted", "protected" and "critical" species with bag and size limits for species within each category. Different regulations were made applicable to the recreational, semi-commercial and commercial sectors (Stander 1995).

With the publication of the new Sea Fisheries Regulations in October 1992, provision was made for a new series of fish categories reflecting their conservation status, namely critical (4 species), restricted (13 species), exploitable (20 species), recreational (24 species) and bait lists (16 species). These were based on recommendations put forward by the South African Marine Linefish Management Association (SAMLMA).

Bag limits vary from zero for some species, to no limit for others, with differences between the bag limits for the commercial, semi-commercial and recreational sectors. Closed seasons have been established for four species. Size limits and mass restrictions for certain species have also been revised on recommendations received from SAMLMA (Department of Environmental Affairs and Tourism 1996).

As mentioned earlier, the number of linefish permits available was frozen in late 1984. The aim of a gradual reduction in the number of permits has not always occurred as planned. In fact, the number of 'A' permits rose by 3.1% from 512 in the 1991/92 permit year to 528 in the 1992/93 permit year (SFRI 1994). This was due to a number of factors including the change to the licence classification for vessels with tuna permits, and the requirement for squid boats to have valid linefish permits.

In the early 1990s a substantial increase in the number of linefish vessels in Kwazulu-Natal was observed. The concern over reef stocks in Kwazulu-Natal prompted the introduction of a moratorium on the transfer of 'A' and 'B' permits from the Cape to Kwazulu-Natal with the inception of the 1992/93 year. In a further effort to halt the increase in 'A' permits, the transfer of 'A' permits, except between *bona fide* commercial fishermen with the approval of the Chief Director of Sea Fisheries, was prohibited from November 1992 onwards (SFRI 1995).

The grouping together and splitting of 'A' permits has occurred since the Sea Fishery Act of 1988 came into effect, which allowed for the transfer and sale of permits not necessarily tied to a particular vessel. Vessel numbers therefore fluctuate, although the total number of (local) crew on linefish vessels has remained constant. Limiting the total crew size is now the main way effort is controlled within the linefishery. However, the transfer of crew permits to larger vessels has resulted in an increase in overall effort and a change in its distribution, since larger vessels remain at sea longer and travel further to previously under-exploited reefs.

Larger vessels are also equipped with blast freezers which allows them to land higher quality fish which can be marketed internationally. A total of 3097 'A' and 'B' permits were in circulation in 1995. However, these numbers are not a true reflection of total fishing effort. The TRMTT (1996) states that more than 16% of these have defaulted on their permit conditions by not submitting any catch statistics, whereas 54% of the balance reported a zero catch for that year. In summary, apart from limiting crew size and thus effort, bag and size limits and closed seasons are the basic tools used to regulate the fishery in addition to management control measures such as the establishing of marine reserves.

A national programme to evaluate participation in, and management of, the South African marine linefishery was initiated in 1994 (Lamberth and Bennett 1994). The programme was divided into four regional projects, encompassing the four coastal provinces: Northern Cape, Western Cape, Eastern Cape and KwaZulu/Natal. The main objective was to determine fishers' perceptions of management regulations within each of the sectors. This was undertaken to ascertain to what extent their activities are being controlled by the current legislation (Lamberth and Bennett 1994). Individual fishers were interviewed, shore and harbour patrols conducted, and catch and effort data were collected (Lamberth *et al.* 1996). Some of the results of these studies are reported within the review of the case study.

2.2 National management associations

The South African Marine Linefish Management Association (SAMLMA) was formally constituted in 1980. The regulations governing the line fishery are based partly on recommendations made by SAMLMA. The constitution of SAMLMA defines its role as a co-ordination body for all organisations interested in the promotion, protection and sustained use of the marine linefish resource. There are four categories of membership: scientific institutions, regional conservation and management agencies, the commercial linefishery, and the sport and recreational linefishery (Brunt 1993). Members from the commercial linefishery sector are drawn from members of the South African Linefish Management Industrial Association (SALMIA). Membership to SAMLMA is by invitation only. The number of

members in each category is limited to a maximum of eight, which must be representative of these sectors.

The Association may appoint or invite observers (or advisers) to attend meetings in order to facilitate discussions and improve representation. However, the only means by which individual fishers from the different sectors can have an input into the government decision-making process is by indirect involvement through sector representatives at SAMLMA. User participation, although indirect, is thus dependent on the role that SAMLMA plays in the management of the linefishery. A summary of the major recommendations emanating from this Association are provided in Table 3. Recommendations made at SAMLMA meetings are sent to the Sea Fisheries Advisory Committee (SFAC). Based on these recommendations the SFAC are then mandated to provide final advice regarding policy-making to the Minister.

Table 3: A summary of recommendations/resolutions emanating from SAMLMA between November 1991 and March 1995 (SAMLMA Secretariat)

| Date of SAMLMA meeting | Recommendations / Resolutions |
|------------------------|---|
| 27 November 1991 | <ul style="list-style-type: none"> • Minimum size length of white stumpnose to be reduced to 25 cm |
| 8 May 1992 | <ul style="list-style-type: none"> • Agreement on the linefish species lists and implementation of linefish regulations • Restriction on the sale of fish without a permit • Moratorium to freeze the issuing of 'A' and 'B' permits • Splitting of 'A' and 'B' permits provided there is no increase in number of crew |
| 22 October 1992 | <ul style="list-style-type: none"> • Bag limit of five per day per person for red steenbras to be implemented • General bag limit of five shad (elf) per person per day to be implemented in Natal • White stumpnose to be transferred to Exploited List • West coast steenbras to be transferred to Restricted List |
| 25 March 1993 | <ul style="list-style-type: none"> • Bag limit of five per person per day for red steenbras for 'A' permit holders and bag limit of two per person per day for red steenbras for 'B' permit holders and recreational fisher to be implemented • Minimum size limit of white steenbras be increased to 60 cm |
| 28 October 1993 | <ul style="list-style-type: none"> • Submission of document to SFRI on bait requirements of linefish sector • Potato and brindle bass to be placed on the Critical List with a bag limit of zero • Amendment of regulation 48(2) on the sale of fish by recreational anglers |
| 24 March 1994 | <ul style="list-style-type: none"> • Task Group appointed to handle the amalgamation and incorporation of different regional regulations |
| 20 October 1994 | <ul style="list-style-type: none"> • Mortality of white steenbras by anglers and trek-net fishers to be reduced by 70% • Reduction of size limit of squaretail kob to 350mm to be reviewed • Extension of a further year on the moratorium on the transfer of 'A' and 'B' permits from one province to another |
| 8 March 1995 | <ul style="list-style-type: none"> • Bag limit of two per person per day for poenskop to be retained • Closed season for poenskop (1 September to 30 November) to be discarded • Bag limit of two per person per day for red steenbras to be implemented • Closed season for red steenbras (1 September to 30 November) to be discarded • SFRI Linefish Working Group to pursue the implementation of rod licences |

3. The new fisheries management policy for South Africa

Following the first democratic elections in April 1994 it was deemed appropriate for a new fisheries policy to be developed in an effort to mirror these changes. A Fisheries Policy Development Committee (FPDC) was set up by the Minister of Environmental Affairs and Tourism in April 1995. The Committee consisted of representatives from industry, the commercial fishing sector, the regional fishing forums, the provincial governments, labour organisations, the environmental lobby and the recreational sector. Regional fishing forums, which aim to represent fisheries interest groups at "grassroots" level, are based on the Fishing Forum originally set up in the Western Cape.

The draft FDPC policy document addresses such matters as institutional structures, policy objectives, principles and fisheries research, and labour. The document also included sections which made reference to user participation in management. This is in line with the objectives of the new government with regard to fisheries which include lowering unemployment, promoting sustainable use, earning foreign exchange, bettering economic efficiency, achieving more equity in the distribution of benefits, and increasing user participation in management (African National Congress 1994). Specific clauses in the draft FDPC policy document imply that management authority could, under certain circumstances, be delegated to the regional and local level. A clause headed "User Participation" details guidelines for participation at all levels. Other clauses makes reference to user participation in management plans and the potential role of the regional and local fishing forums which could become instrumental in providing users with greater access to decision-making processes. The current policy document is being modified and a White Paper is at present being formulated for release in mid-1997.

In addition to the input provided by the sector associations alluded to above, a diverse range of other cases of active participation by users in both management and research are already in evidence. Examples include the tag and release programmes under the direction of the Oceanographic Research Institute (van der Elst and Bullen 1993), the False Bay beach-seine fishery (Lamberth 1994), stock identification of the yellowtail resource (Penney *et al.* in prep.), and the contribution of data to the National Marine Linefish System (NMLS) provided by fishers (Penney 1993).

4. The Arniston fishing community

Arniston is racially segregated geographically, which is typical of the towns and cities in South Africa. In the last few decades there has been an increase in the number of 'holiday homes' owned mostly by 'Whites', only a few of which are occupied the whole year round. These are separated geographically from the fishers' cottages. These permanent residences belong to the what is known as the 'Coloured' population who make up the majority of the fishers who use the harbour.

These fishermen and their families are descendants from indigenous people, slaves and settlers of mixed ethnic origin whose mother tongue, in most cases, is Afrikaans. The use of racial categories in this case study reflects the South African reality (Adam 1972) and the choice of names is made in accordance with the dominant preference of the respective group and is not intended to prejudice the analysis. South African Coloured population distinguish

themselves from 'Blacks' (e.g. indigenous Zulu and Xhosa people), in contrast to the Anglo-American use of the word (Adam 1972).

The 'Coloured' population live in a residential area adjacent to the harbour and 'holiday homes', and are referred to as "the Arniston fishing community". Thornton and Mamphela (1988) argue that local populations are not necessarily 'communities' of homogenous or co-operating people. They state that 'community' is often used as a political term in South Africa, indicating the political leaning of a particular group, or a distinct audience for political rhetoric, and does not mean that a 'community' in the social sense of the word actually exists. There may in fact be no willingness to cooperate and no sense of belonging (Thornton and Mamphela 1988). However, in this particular case "the Arniston fishing community" as such does exist, as not only can they be defined geographically, but they are also 'homogenous' in terms of ethnicity and their united call for political action.

Although this case study focuses on this specific fishing community, reference is also made to other fishers and stakeholders in Arniston as the incentive for their current political action and co-operation is an attempt to redress the inequities experienced under previous government policies.

4.1 Bio-technical and physical characteristics

In terms of mass, the main species in the reported annual catch landed at Arniston are yellowtail, geelbek and kob. The total catch in kilograms per month for the ten boats which fished for more than 100 days was computed for 1993 (NMLS, 1993). It is clear from this data that the catches for the species are seasonal and are targeted during different months of the year depending on availability and oceanographic conditions. In 1993, most of the yellowtail were caught in February, geelbek in March and kob mainly in May. During the months when these species are not targeted, most of the catches are made up of redfish, sharks and other species such as carpenter (silver fish).

Approximately 200 t is recorded as having been landed annually since 1990 at Arniston harbour, with an average of nine boats launching each day, fishing for approximately 184 days per year (NMLS, 1993). On average 75 boats are registered within the Arniston area which report an annual catch in the region of 300-500 t (NMLS, 1993).

The bulk of the catch is made up of migratory species but a significant proportion consists of residential reef fish. The over-exploitation of the local reef species is due to the long-term effects of local fishing effort (namely from Arniston and Struisbaai). These 'residential' species could be managed locally despite being caught by fishers from elsewhere. This is also true for other species which are harvested locally from the shoreline, for example oysters and octopus, with the latter being used as an important source of bait.

The migratory species (yellowtail and geelbek) are exploited throughout their geographic distribution by all the sectors (commercial, semi-commercial and recreational) operating in different regions, and thus effort control and management of these species has to be undertaken at a national level. Thus constraints exist that do not allow for any form of locally-based management for these species.

Overfishing on a national scale is causing a decline in the major stocks. For example, in 1994 the national kob catch declined by 28%, while the total catch of carpenter declined by 10-20% (SFRI, 1995). Catches of redfish continued to decline, by 25-30%, as a result of

decreasing abundance and because effort was being concentrated on snoek (SFRI, 1995). Corresponding decreases in catch per unit effort were recorded with the National Marine Linefish System (NMLS) by the Linefish Section of the SFRI (SFRI 1995).

4.1.1 Vessel types

The Arniston "fishing community" mainly makes use of small wooden deck boats with single screw inboard diesel motors, referred to as "chukkies", moored on a slipway. Although the total number of vessels operating consistently out of the harbour varies according to whether vessels are in for repairs or if some are being temporarily moored at Struisbaai harbour, there are on average about 15 vessels which are active at the harbour at any one time. For each year during the period 1990-1993, only 10 of these vessels reported fishing for more than 100 days. These 10 vessels have an average age of 19.4 years and an average length of 7.16 m. Eight of them have a crew size of 8 and the other two have a crew size of 6 (National Boat Licence System 1994).

4.1.2 Physical, administrative and legal boundaries

The fishers at Arniston make day trips in their "chukkies" which have a range of 12-15 nautical miles. The harbour at Arniston does not have a breakwater which many other harbours in South Africa do possess. Typically, harbours have a breakwater and a jetty with fishing vessels either having dockside moorings or shallow water moorings within the breakwater. At Arniston the vessels are launched into the surf with the aid of a tractor. At the end of a day's fishing, the vessels are dragged up the slipway with a motorised winch. Thus, the technical limitations to fishing vessel size and power, and the launching facilities at Arniston place an upper limit on the number of days per year that vessels can be launched. Fishing vessels cannot be launched on certain days during the winter months when storms produce large swells. Strong winds in the summer from the south-east also reduce the number of fishing days.

An inherent boundary also exists in that there is no further physical space in which to moor additional fishing vessels on the slipway at Arniston. Local fishing effort is thus limited, because of a lack of space and the absence of a breakwater. Information from informal interviews conducted in Arniston point to a reluctance on the part of the local fishers within the community to accept an upgrade to the harbour, in the form of a breakwater, as this could result in an influx of outsiders and an increase in local fishing effort, putting further pressures on both local fishermen and resources. Although a breakwater would allow an estimated 20 - 40% increase in effort for the local fishing vessels (the "chukkies"), the ski-boat effort which accounts for 17% of the total, could increase to about 40% as occurred in the case in Struisbaai (Lamberth and Pulfrich 1997). They estimate that this would increase overall fishing effort operating out of Arniston harbour by about 100%. However, these estimates depend upon the annual occupancy rate of the 286 holiday homes and the corresponding influx of ski-boat operators. The predicted increases in local fishing effort is a long standing

concern for the local community having first been reported in a survey on "*The Fishing Industry*", completed by the Board of Trade and Industries in 1934 (Fahey et al. 1934)³.

Generally speaking, fishing is not a seasonal activity even though the targeting of certain species and the corresponding catch varies seasonally. Crew size is also seasonal, with a mean size of nine in summer and six during the winter months, indicating that some of the crew find alternative employment elsewhere during the winter or remain unemployed. On the other hand the number of boats landing each day is generally higher in winter which may be because some of these boats are being moored at Struisbaai during the summer months.

Twelve "chukkies" have moorings at Struisbaai harbour, however, only seven or eight make use of this facility on a regular basis during the summer months depending on the availability of yellowtail. Struisbaai harbour is located approx. 12 nautical miles south-west of Arniston. It is typical of many harbours in South Africa as it has a breakwater, thus increasing the range of the Arniston vessels by allowing them to make use of these moorings during the yellowtail "runs" when this species shoals on the fishing banks located to the south-south-west of Struisbaai. The fishing vessels are moored overnight at Struisbaai and the crew have to make the 20-minute trip to Struisbaai harbour by motor vehicle via a 38 km long access road.

Within the national linefishery there are larger deck boats which carry ice and have onboard freezers, whereas size limitations do not allow ice to be carried aboard "chukkies". Therefore the "chukkies" are also limited in range as they have to return to place their catch in freezers or on ice before it deteriorates. The fish are landed fresh and either placed on ice and transported immediately or stored in freezer facilities at Arniston. Based on the gear and the type of fishing vessels used this sector can be classified as 'artisanal', although this term is not used as a formal categorisation as are the terms "commercial", "semi-commercial" and "recreational" by the government management agencies.

Fishing vessels moored at Arniston are licensed within the Bredasdorp District registration area, which includes Struisbaai harbour. In 1993, 68 commercial ('A') permits were issued in this area out of a national total of 528 and 104 semi-commercial ('B') permits out of a national total of 2,663. However, this does not provide a clear indication of the distribution of fishing effort as there is considerable movement of fishers and vessels between regions. All permit holders are required by law, that is the Sea Fishery Act of 1988, to submit catch returns and to obey the regulations of this Act.

The management of the linefishery is the responsibility of the DEA&T. Within the DEA&T, the SFRI is the primary research body which is responsible for the assessment of fish stocks. A Linefish Section within the SFRI is responsible for undertaking biological research and the compilation of statistics relating to effort and catch data which is then entered into the NMLS. The NMLS is a data base administered by the Linefish Section since 1985. Research institutes such as the Marine Biology Research Institute (University of Cape Town), the Oceanographic Research Institute (Durban) and the Department of Ichthyology at the University of Rhodes (Grahamstown) are also involved in stock assessment and life-history studies on linefish species.

Control and enforcement is undertaken nationally by Fishery Control Officers within the Marine Control Section of the Chief Directorate: Sea Fisheries (CD:SF). The issue of local

³ "The spokesmen for the Coloured Fishermen's Union said they were satisfied with conditions as they were and although they experienced difficulties, there was nothing about which to complain. If Government provided a breakwater, bigger boats would be sheltered in the bay and the "livelihood of 400 poor Coloured fisherfolk would be threatened" (Fahey et al. 1934:22).

enforcement is dealt with in more detail in a following section dealing specifically with compliance and monitoring.

4.1.3 De Hoop Marine Reserve

De Hoop marine reserve was declared a "no take" marine reserve in 1986⁴. The reserve is located 7 km to the north-east of Arniston and encompasses a stretch of coast 50 km long and extends out to sea for three nautical miles. It is one of 44 coastal and marine conservation sites located along the South African coastline. Fishing permits have not been issued to certain sectors or communities, including Arniston fishers who often fish illegally within the De Hoop marine reserve as the boundaries of the reserve include their traditional fishing grounds. At the time of the reserves proclamation, the late John Wiley, then Minister of Environmental Affairs, supported their cause. Arniston fishers claim that a letter of support from Mr Wiley allows them ongoing fishing access.

Recent negotiations between *Denel*, the armaments manufacturer which tests missiles over the reserve area, and the Arniston Fishers' Forum as to the status of Arniston's fishing access rights were inconclusive. However, the management of *Denel* expressed interest in working with the Arniston fishing community by repairing the tractor which is used to launch the fishing vessels into the water. With the tractor inoperative the boats can only be launched manually.

4.2 Characteristics of the market

The fishing vessels moored in Arniston are registered within the commercial sector. The fish are landed and depending on the species, are weighed and sold individually or in 'bunches'. Although a fish or two is kept back by individual crew on any particular day (termed "fry"), 50% of the value of a fisher's catch goes directly to the owner of the boat to cover costs. The balance is recorded and the crew are paid at the end of the week. If the skipper is not the owner of the boat, one-third of his catch is sold to cover the boat's running expenses. Depending upon the ownership of the fishing vessel, the buyers vary, from being the actual owners who reimburse the crew, to middlemen and buyers from the major fishing companies. Those vessels owned by local companies hand over their catches to the respective company employees who are responsible for transporting the fish. The ownership of vessels is discussed in the next section (4.3).

In Arniston the majority of the catch, over 98%, is sold to three major buyers. The largest, *Grey's Marine* owns the local factory. The company has its headquarters in Cape Town where it employs 68 people and has recently opened a second factory in Hout Bay worth R1.5 million. All the fish purchased in Arniston are either sold locally, within the province or countrywide, depending on demand, although plans are being made to export certain species.

Nationally, the major fishing companies, such as Irvin & Johnson (I & J) dominate the market as they have established markets and an extensive network of contacts. These large companies have facilities for storage, processing and marketing. The various fish species are

⁴ The Environment Conservation Act of 1982 prohibits the disturbance, harvesting or killing of any marine organisms within the reserve.

marketed countrywide and are transported by road or rail, although some of the higher value species are exported. Quality export fish are obtained mostly from large freezer boats, none of which are based in Arniston. Relative to other fish products on the local market some linefish species are of quite high value.

If catches are small, the price may be up to ten times higher than when the fish are abundant and large catches are made. For example, yellowtail can fetch a price of R2 per kg. when catches are large, vs. R20 per kg. when catches are low. The value of fish in Arniston is relatively low compared with landing sites closer to the major centres as the larger companies tend to pay less for the fish, the further they have to transport it. Large catches in other areas also affect the local price in Arniston. For example, large catches in Kalk Bay, near Cape Town, will drive down the price in Arniston and vice versa. However, the landed price in Kalk Bay is seldom as low as in Arniston as transport costs are lower.

Fish are sometimes auctioned when catches for a particular species are low, with the seller dictating the price, unlike the times when catches are high. In some instances a buyer will make a previous arrangement to buy the day's entire catch or strike a deal to earn seller loyalty. For example, squid may be bought from fishers at inflated prices during the lean season and sold back to them for bait at lower prices when yellowtail are abundant to ensure the transfer of these more valuable fish to the buyer. The geographic position of Arniston and the fishers' relative isolation from the main markets makes them vulnerable to exploitation by buyers.

Women have a limited role within the Arniston fishing community relative to the national linefishery, as local processing, traditionally a female occupation, is not undertaken on a regular basis or on any significant scale. However when very large catches of, for example, yellowtail are landed, up to 15 women can be employed on a part-time basis to process the fish. The locally-based fish processing company won the 1996 SBDC/Ernst & Young, Socially Responsible Entrepreneur of the Year award for its policy of empowering the community's women and for training them in factory and office skills. At bigger ports, such as Mossel Bay, where larger freezer boats land their catch, women are employed within the factories and are involved in the processing and packing of fish.

In Arniston the *per capita* consumption of fish is estimated to be 7 kg. per year, whereas the *per capita* consumption of households where fishers reside is estimated to be closer to 20 kg. per year. This results from an informal arrangement whereby each crew member retains a "fry" or two each day, some of which is either sold directly on to tourists or to the local restaurant, or is traded for meat from the surrounding farms. On certain days when catches are very low, i.e. when only "fry" are landed, the entire value of the catch may go to the crew. In these instances they are excluded from paying the 50% share of the boat's running costs and the owner of the boat receives nothing.

4.3 Socio-economic characteristics

Socio-economic boundaries and differences exist between the different racial groups resident in Arniston. The town is small, with a total population of 792 (males: 413, females: 379). Ethnically this can be divided as follows: 169 Whites (males: 93, females: 76) and 623 Coloured (males: 320, females: 303) (Central Statistics Service, Republic of South Africa. Thus, in percentage terms 86% of the total population of Arniston is Coloured. As mentioned,

the entire so-called "fishing community" is drawn from this group. There are no Black residents.

Statistics showing the differences in the ethnic origin of fishers in the linefishery have been collected for the area between Cape Point and Arniston. For boat skippers, 57% were White, 42% Coloured and 1% Black, whereas the crews were 33% White, 66% Coloured and 1% Black (Lamberth 1997). Indeed, the southwestern Cape linefishery is dominated by Coloureds which reflects the demography of this area.

Schutte's (1993) socio-economic assessment of thirteen Coloured fishing communities on the west and south coasts included Arniston. He found that the average monthly income in the Arniston fishing community of R831 was considerably lower than the average monthly income of R1203 earned by all the Coloured communities surveyed (Schutte 1993). Even this average is less than half of the mean monthly income of R2800 for all households, that is all population groups in South Africa. However, in order to obtain an indication of the differences in the distribution of wealth between population groups, the Arniston fishing community's average monthly income of R831 would need to be compared with that of Arniston residents living in the more affluent White residential area, data which was not available on completion of this study.

It is not possible to obtain the classification of vessel ownership in Arniston according to ethnic group, from the Boat Licensing System of the DEA&T. However, out of 15 of the "chukkies" registered in Arniston, three are operated and owned by two companies, while the balance are registered as privately owned. Three "chukkies" are also owned by one person who is not a resident of Arniston. Only five of the privately owned "chukkies" are registered with owners who reside in Arniston and these people do not necessarily live in the Arniston fishing community. Since the exact numbers are not known, one can only estimate from the above information that the ownership of most of the fishing vessels in Arniston is not in the hands of the actual fishers within the Coloured community.

During informal interviews fishers complained of having no other source of income. Alternative employment in Arniston is limited by the town's size and the only industry apart from fishing is tourism. The percentage unemployed was estimated to be 6% when Schutte (1993) completed his assessment in 1992. Nationally, the mean annual income of commercial skippers working in the linefishery is R54,600 p.a. while crew members earn an average of R7,500 per annum (Honer *et al.* in press). However, crew members in the southwestern Cape, from Cape Point to Arniston, earn on average R13,804 per year (Lamberth 1997). This averages to earnings of R1150 per month per individual fisher, which is more than the community's average total household income of R831 per month as calculated by Schutte (1993). This indicates that relative to other professions fishing is a lucrative activity within the Arniston Coloured community and that the families of the 192 fishers are probably among the most affluent. Fishers of the southwestern Cape, which includes Arniston, earn a slightly higher income than the average national income of fishers within the linefishery, but in comparison with other commercial fishers they are low income earners.

4.4 Local knowledge, compliance, monitoring and enforcement

Local knowledge of the linefishery needs to be quantified in terms of the productivity of stocks, the relative participation of all sectors, market conditions and current decision-making

arrangements at the local, regional and national level. One of the most important issues which needs to be addressed is the differing degrees of knowledge regarding such aspects as biology, conservation and an understanding of the fishery as a whole. For example, fishers may know the biological reasons why a particular size limit has been introduced, but still land a juvenile fish because it benefits their short-term economic interests. This reflects a lack of understanding of the consequences of individuals' actions on the entire fishery.

Preliminary findings from informal interviews conducted in Arniston suggest that fishers do not fully understand the reasons for size restrictions and bag limits. Fishers also admitted not knowing how productive the resources are. Fishers have acquired a local knowledge in terms of knowing which fish will bite and where depending on the season and local oceanographic conditions, but do not necessarily know the scientific explanation for this. A good example of this is the fishers' insistence that temporally and spatially separated different sized shoals of geelbek are separate species, even though genetic morphometric studies have shown that this is not the case (Griffiths and Hecht 1995).

With regard to fishers' attitudes towards management regulations, fifty boat skippers were interviewed in the Arniston-Struisbaai region and asked which regulations they supported as effective ways of managing or conserving fish stocks. Support for minimum fish sizes was 36%; 67% for bag limits; 35% for closed seasons and 65% for marine reserves. However, they wanted a waiver on all the restrictions that applied to species they targeted, but stressed that these restrictions should still apply to the other sectors. Their knowledge of size limits was high, 86% answered correctly as to size limits as all the fishing vessels have onboard rulers, whereas their knowledge of current bag limits (52%) and closed seasons (44%) may be considered low. In addition, many admitted to knowingly disobeying regulations, i.e. 43% keeping undersize fish, 47% exceeding bag limits, especially those for red steenbras, 46% fishing during closed seasons, especially for elf *Pomatomus saltatrix* and 100% fishing illegally within the De Hoop marine reserve.

The overriding impression is that local fishers (>50%) do not obey regulations because they choose to ignore them as they are not perceived as legitimate. There were several complaints about the current regulations within Arniston's fishing community which, apart from informal interviews, was also evident in Schutte's (1993) social survey. There is discontent with regulations regarding size restrictions for particular species, bag limits, closed seasons and restrictions on fishing in marine reserves, especially within De Hoop marine reserve.

Locally, government regulations are enforced by fishing control officers and the Harbour Master's office of the Inspectorate which is located adjacent to the slipway. Three government staff are responsible for monitoring activities within the harbour as well as enforcing regulations along the coastline adjacent to Arniston. Fines are levied for violations on linefish regulations which are clearly posted. For example, landing an undersize fish carries a penalty of R50. However, the local enforcement of these laws is somewhat problematic as the local marine inspectors are resident in the community. There is evidence that minor infringements of the law, such as the landing of one or two undersize fish, is often overlooked. This occurs when catches are very low and the fish are intended for personal consumption. The Harbour Master, who also is a fishing control officer, has on occasion acted as an unofficial ombudsman which has served to improve relations between the inspectors and the fishers.

With regard to compliance, one of the most contentious issues concerning the local fishing community is De Hoop marine reserve. Fishers in the community still enter the area to fish, and as mentioned earlier, since this is an illegal practice it has become a controversial issue. The enforcement of the boundaries of De Hoop reserve is problematic although an arrangement is in place for the local airforce base to have an aircraft on standby. The objective is to photograph any boats fishing illegally when missiles are being tested as this is the only way prosecutions can be made. While it appears that local fishers indirectly control local effort by opposing further developments of the harbour, there is no evidence available as to how informal management rules are enforced and what sanctions are used.

4.5 Local decision-making arrangements

Decision-making at the local level in terms of resource management is limited, as under the Sea Fishery Act of 1988 management of marine resources in South Africa is the responsibility of central government. Even the new draft Fisheries Policy document re-affirms this although as mentioned, it makes reference to the potential of increasing user participation in management and the possibility of delegating management to the local level in certain circumstances. Greater participation of local users in management is dependent on a local organisation representing their interests, as any co-management agreement would have to be fostered between a particular local organisation and the government. The formation of one such organisation, the Fishers' Forum, its influence and current role in local decision-making is discussed below.

A key element in recent developments in Arniston has been the influence of the activities of the local Fishermen's Community Trust. The Trust had a major influence on the community by facilitating the evolution of a locally-based organisation concerned with local fisheries management issues, the Fishers' Forum. The agenda at community meetings held to discuss the distribution of Community Trust money also focused on issues relating to the management of the fishery. The Chairperson of the Trust thus became the formal representative of the community with regard to local management issues and concerns.

Fishermen's Community Trusts were established in 1992 with the prime objective of facilitating development within the coastal fishing communities. In order to fund these Trusts, a certain share of the revenues earned from the total allowable catch of the hake fishery was allocated to thirty-three Community Trusts. As part of the agreement, the quotas were sold to the established fishing companies in the industry and the funds distributed to the Trusts. Aspects such as identification of the beneficiaries in the communities led to conflict (SFRI 1995). Heated debates as to the merits of the Trusts followed, culminating in a Supreme Court decision in 1995 to bring about an end to the system. In spite of this decision, the presence of a Trust in Arniston provided the opportunity for further development of a local organisation concerned with fisheries management. In early 1996, a local Fishers' Forum was set up to fill the partial void that had been created by the loss of the Trust. The aim of the Forum is to act as a local organisation representing the fishers in the Arniston "fishing community". Whereas the main role of the Community Trust had been to administer funds, the Fishers' Forum is concerned with fisheries management issues.

The formation of the local Forum in early 1996 was also facilitated by developments in the Fisheries Policy Development process during the same period. The objective of the Forum

was to increase the bargaining power of the local community in the Policy Development process, as issues such as access rights were being discussed. The members of the Fishers' Forum are drawn from Arniston's Coloured fishing community. This is partly historical as the Fishermen's Community Trust system was only set up in the Coloured community. It is also based on their common interest as a previously disadvantaged ethnic group. In 1996 one hundred and ninety two fishers from the Coloured community were identified and registered by the Fishers' Forum as being active in the local fishery. The incentive for them to co-operate is in order to try and force the new government to redress the inequities of the past. Annual meetings are held to democratically elect a committee of five members and a chairperson. The future formal role of the local Fishers' Forum is uncertain as it has only recently been established, and the implementation strategies of the new Fisheries Policy have not yet been formulated. However, it has the potential to play a critical role in facilitating local user participation in the management of marine resources.

4.6 Issues raised by the Fishers' Forum

A number of key issues have been highlighted by the local Fishers' Forum over the last few months, information which has been compiled from committee meetings. The key issues relate to access and linefish regulations. Representatives from the community have requested a permit to fish for squid in order to increase income during the period when the geelbek and yellowtail catches are low. They feel it is unfair that fishers from Port Elizabeth fish for squid in their area. Fishers also want to obtain permits to catch abalone and oysters which would be marketed, thus creating employment in the community. The controversial issue with regard to linefish permits was raised by category 'A' permit holders. They want the government to clarify the status of 'B' permit (semi-commercial) holders. Fishers consider it unfair that 'B' permit holders can compete with them for fish. They argue that the livelihood of Arniston fishers is dependent solely on fish and there are no other sources of income, whereas many fishers holding 'B' permits do have other employment during the year.

Another contentious issue is the 60 cm size limit on geelbek. Requests have frequently been made for a reduction in the size limit to 55 cm as undersize fish are being discarded with loss of income. They claim there are two types or stocks of geelbek; the "boesman" type which arrives earlier in the season and is rounder and shorter, and the longer, thinner type which comes later in the season. Fishers want to fish for the "boesman" type with a limit of 55 cm, their thinking being that "boesman" will never reach 60 cm in size.

These problems, as identified by the community, need to be evaluated in terms of the current status of the stocks and the local fishers' degree of participation vs. the other sectors and commercial fishers. Catches of squid in their area are small compared to the fishing grounds off Cape St. Francis and it is unlikely that increased catches will have any significant impact on annual income. Abalone and oysters are not caught from linefish boats, but from the shore and these two species are not abundant in the area. Requests for greater access to these resources are made in reference to De Hoop marine reserve. This is a "no take" reserve at the limits of their geographic range.

The issue of the status of 'A' and 'B' permits is currently under review by the DEA&T. The initial idea was to allow new entrants into the fishery by issuing them with 'B' permits, which would not necessarily increase effort on heavily or over-exploited species. The 'B'

permit allows fishers to catch and sell species not considered vulnerable to over-exploitation. However, this system suffered abuse at its initiation as many recreational fishers managed to obtain 'B' permits at the expense of *bona fide* commercial fishers. Many of the Arniston and Struisbaai fishers equate 'B' permits solely with ski-boat operators, when in reality 'A' and 'B' permits have been issued to both ski-boats and "chukkies". The perceived unfairness and competition with 'B' permit holders is due to the fact that ski-boats have longer ranges and are also faster than "chukkies". They are thus able to reach port and market their fish before the "chukkies" can.

As far as the size limit for geelbek is concerned, the species is estimated to be over-exploited (Griffiths 1997). Shoal size structure is very specific and the discard mortality of undersize fish could be reduced if fishers did not target these shoals. A reduction in the size limit for the duration of their fishing season would undermine the intended purpose of the management measure, which is the long term sustainability of the resource. The fishers' perceptions that there are two species of geelbek stems from the temporal separation of size specific shoals, that is different cohorts shoal separately, whereas Griffiths and Hecht's (1995) research has shown that they are indeed one species and one stock.

5. Incentives to co-operate and patterns of interaction

5.1 Fishers and Government (The Fishers' Forum ["Vissers Forum"] and the Department of Environmental Affairs & Tourism)

A new management regime is soon to be introduced by the government. Based on the draft Fisheries Policy document, some form of co-operative management arrangement between government and user groups seems inevitable. The incentives for government to enter into co-management arrangements with fishers are twofold. Firstly, the policy promotes user participation in management and secondly, it is assumed that the problems related to the legitimacy of regulations, and which result in high monitoring and enforcement costs, could be substantially reduced.

The incentives for fishers to co-operate with the new government vary depending on the characteristics of the particular user group. Indeed, before the formulation of a new policy, there had only been limited interaction between the government and user groups, as in the case of Arniston's fishing community. The interaction has been limited to the government's role in creating regulations, monitoring and enforcement. This was because the DEA&T has not had a policy of consulting directly with fishers at this level. Only recently has the government started to actively pursue a consultation process with fishers in order to develop the new fisheries management policy, and even then only representatives were involved.

The objectives of the new government are to increase user participation in management and allow greater access to fishing opportunities for those who have been disadvantaged in the past. The aim is to set up democratic structures within the fisheries management decision-making bodies (ANC 1994). Nevertheless, one could describe the attitudes of fishers to these changes as mixed. They are aware that real political change has occurred and a new fishing policy will be implemented. However, they are frustrated with the fact that many of the proposed changes have not occurred rapidly enough. Fishers from previously disadvantaged communities claim that a redistribution of access rights is urgently needed. This is one of the

main issues raised by the committee of the Fishers' Forum and this argument was presented to the Chairman of the FPDC when he visited Arniston in 1996. The "fishing community" were therefore provided with the opportunity to have an input into the policy development process of the new government. Their potential input in the future is less certain as the actual implementation of the new policy has not yet begun.

In June 1997 a task group was set up to formulate funding proposals for a national research and development programme on coastal and fisheries co-management. Since this project is in its infancy, the responsible parties are not mentioned here, however, a representative from the Arniston Fishers' Forum is one of the community representatives. There are also representatives from government departments and research organisations. The initial stages have been supported by NGOs specialising in coastal development, and the government-funded Fisheries Research Department (FRD).

5.2 Fishers, stakeholders and government

Fishers within the linefishery can be placed in three broad categories: commercial, semi-commercial and recreational fishers. These three groups and the major differences in their interests can be clearly identified in a community such as Arniston's. However, when identifying stakeholders, these broad categories do not provide a complete view of the diversity of sectors and interests groups within the linefishery. For example, the recreational category can be divided into rock and surf anglers, boat anglers, gamefish and deepsea anglers, as well as spearfishers. These groups can be further divided into those who are members of a representative association and those who are not. There are also recreational fishers who sell their catch illegally. Even legal recreational fishing now provides substantial economic benefits to the local economy of coastal provinces and the number of anglers is expected to increase at an exponential rate in the next few decades (Taylor 1993).

Competition exists between the different sectors in the linefishery for the same stocks, and many disincentives for co-operation exist between user groups. This is related to various factors such as unequal relationships in economic wealth between fishers in different user groups and the alternative interests they have for exploiting resources. An illustration of the large diversity of stakeholders can be observed in Table 4. Thus, the responsible management body of the multi-species linefishery, has not only to ensure against the over-exploitation of stocks, but also has to find common ground with regard to other objectives within a myriad of diverse interests in the different jurisdictions along the South African coastline.

Table 4: A list of stakeholders in the linefishery, by sector or group represented. The list is not conclusive, but reflects the diversity of interests, and is compiled from the list of attendees of the Second South African Marine Linefish Symposium in 1992, and the list of Associations officially registered with SAMLMA.

| Sector or group represented | Interest groups, associations and organisations | Official member of SAMLMA |
|---|--|---------------------------|
| Commercial | "St. Helena Baai Net and Lyne Vissers Vereniging" | yes |
| | Agulhas 'A' Licensed Commercial Boat Owners Association | yes |
| | Kalk Bay Commercial Line Fishermen's Association | yes |
| | Kowie Commercial Fishermen's Association | yes |
| | South African Linefish Management Industrial Association | - |
| Recreational | Natal Anglers and Casters Union | - |
| | Natal Coastal Anglers Union | - |
| | Natal Deep Sea Angling Union | - |
| | South African Anglers Union | yes |
| | South African Deep Sea Angling Association | yes |
| | South African Rock and Surf Angling Association | yes |
| | South African Underwater Union | yes |
| Western Province Deep Sea Angling Association | - | |
| Management agencies | Cape Provincial Administration (CPA) | yes |
| | Natal Parks Board (NPB) | yes |
| | Chief Directorate: Sea Fisheries (CD:SF) | yes |
| | Sea Fisheries Research Institute (SFRI) | yes |
| Universities and research organisations† | Fisheries Research Department (FRD) | yes |
| | Oceanographic Research Institute (ORI) | yes |
| | Department of Ichthyology, Rhodes University | - |
| | SA Network of Coastal & Oceanic Research (SANCOR) | yes |
| | Marine Biology Research Institute, Univ. of Cape Town | - |

† If not official members, most of these participate in the deliberations

Source: Beckley and van der Elst (1993) and SAMLMA's constitution

The inclusion of the above stakeholders in management is based on the assumption that the legitimacy of the associated regulations will increase. Thus researchers such as Jentoft and McCay (1995) state that it is not so much if and why, but in what way will these user groups be more involved. Following this thinking the next logical step is to include individual fishers or their representatives as active participants in government fisheries decision-making bodies. Alternatively, fishers can participate indirectly in the formulation of regulations by having their representatives, as members, attend meetings such as those held by SAMLMA. Many of

the stakeholder/interest groups are official members of SAMLMA (Table 4) and in this way already participate in the formulation of regulations which are then forwarded to the government as recommendations.

Irrespective of the scale of involvement, management systems which involve co-management can only be established by formalising the arrangements which define the hierarchical organisational structure and responsibilities of all parties involved in the process (Lane and Stephenson 1995). In a fishery as complex as the linefishery, the participation of user groups is limited largely by the characteristics of the system in that there are many players.

For Arniston, the most important recommendation that can be made is that the local Fishers' Forum should act as the mouthpiece for airing any problems experienced by the community. This should be achieved by formally incorporating this local forum into the regional forum as an integral part of the new fisheries management system when it is eventually implemented. Formal agreements between local forums, regional forums and higher government structures should also be instituted. However, the role of the regional forums is now uncertain as considerable time has passed during the process of preparing the White Paper and consequently they appear to have lost their momentum.

Alternatively, representatives from Arniston and other fishing communities could potentially be formally integrated into national management associations such as SAMLMA. However, this would require changes to SAMLMA's constitution, especially if representatives from every community are going to apply for membership. Although the interaction between the Arniston fishers and SAMLMA has been limited, the commercial sector representatives (e.g. SAMLIA) speak on behalf of fishers who reside in communities such as Arniston. However, SAMLMA has recently indicated that there is a lack of representation from the commercial sector and a decision was made to include representatives of local fishing forums when future meetings are held in their regions. The Kalk Bay Commercial Line Fishermen's Association has been actively involved in SAMLMA for the last few years. For example, a size limit of 25 cm, instead of 30 cm, was accepted for white stumpnose after extensive input from this user group. There is no reason why other communities such as Arniston cannot be involved in a similar manner, a participation which depends in part on the presence of a local representative organisation.

The growing interest in a decentralised management approach has resulted in the need to question whether these local organisations and new institutions can adequately manage the fishery. The linefish resources are common pool resources in that they possess the characteristics of inexclusivity and subtractibility. The linefish catch is shared by users ranging from small rural fishing communities to large commercial operators in coastal urban substructures, both of which include recreational fishers. A central authority may be the only organisation able to represent these diverse interests at a national level. This does not exclude extensive user participation, but one should not lose sight of the fact that the extensive scale of these common pool resources and the large number of players, places a limit on the possible institutional arrangements for greater user involvement.

5.3 The “fishing community”

User participation may result in positive outcomes through which the legitimacy of regulations is improved, whereas exclusion may result in negative actions such as the abrogation of regulations. Recent studies have identified the existence of a variety of customs practised by fishers to manage the resource (Ruddle 1988). In fishing communities social sanctions exist to enforce informal rules. Thus there are opportunities for local initiatives such as involving fishers in monitoring and data collection. There may also be pressure from those involved in shore activities to restrict catches of small fish, as well as attempts to limit landings to maintain the long-term profitability of their business.

What is even more important is the integration of local and scientific knowledge. Fishing is an occupation undertaken by a distinct community, a community in fact defined by the nature of its occupation. The knowledge base of fishers differs significantly from that of the “scientific community”. It may therefore be quite difficult to convince fishers of the existence of certain problems. It is common for fishers to place the locus of the problem outside their area of responsibility especially when there are other sectors who can be blamed.

Environmental changes also affect the productivity of the resource which makes stock assessment difficult. The scientific uncertainty associated with these assessments makes it even more difficult for biologists and managers to convince fishers that they have used the best possible techniques for estimating the productivity of the resources. Within this framework, linefish regulations such as size limits and permits, are referred to as operational rules (Raakjaer Nielsen *et al.* 1996). One challenge unique to South Africa is to convince fishers that many of the operational rules protecting linefish stocks are legitimate, despite the fact that they were set down under a previous (non-democratic) government where the constitutional rules were inequitable for the majority of the population and collective rules were made by a minority.

Apart from these difficulties there is the serious issue of representation within local political forums. Firstly, in line with the country’s new political climate, the Fishers’ Forum which represents only one population group, needs to be integrated into the greater Arniston “fishing community”. Secondly, problems related to issue of representation are impeding the formal recognition of local organisations. With the political uncertainty at higher levels of government, i.e. future directions in policy, there is always the potential that leaders are not necessarily acting in the interests of the community and are using their local political forums as a means of personal empowerment.

6. Outcomes

6.1 Efficiency

Under any new co-management system, compliance with regulations is likely to improve when fishers are consulted. If the system makes provision for local monitoring and enforcement, it is likely that those regulations considered legitimate will be enforced at a lower cost. However, as a general rule, the more participants involved in decision-making, the more the process is potentially delayed. This could have major consequences for efficiency

especially in the case of the linefishery which is complex with its many sectors and diverse interests.

Efficient management would require that shared resources such as those in the linefishery, be regulated through a single authority. This authority should be able to follow an overall plan to control the activities of all user groups and sectors. This authority would also have to possess an adequate regulatory capacity. Considering the opposing interests of the different user groups and sectors in the linefishery, the commercial, semi-commercial and recreational, it is critical that a senior authority retain final decision-making power in order to make decisions despite competing interests. The existing central government regulatory agencies and the structures which it has in place, the Chief Directorate: Sea Fisheries, SFRI and the resource working groups, provide such an authority. The arrangements to widen participation and include users in the decision-making process, that is the formal recognition of SAMLMA, provide the hierarchy of institutions suggested by Ostrom (1990) as critical for the management of common pool resources.

6.2 Equity

A more dynamic partnership between government, SAMLMA and local organisations such as the Fishers' Forum, could be fostered in South Africa to improve the equity of access rights for disadvantaged communities. This could be done by taking advantage of the capabilities of interest groups, complemented by the fisheries administration and scientists, to provide enabling legislation and technical assistance. This would also require the enhancement of skills in both groups. An educational thrust by the government, including increasing awareness of the management process, would also be beneficial.

One of the most important factors determining the success of any co-management arrangement is representation at the local level. The onus is on the users to establish truly representative bodies responsible for local decision-making. This is a lot to expect from communities who have previously been denied these opportunities and where in the past participation was limited because of the previous government's inequitable policies. However, in Arniston the local Fishers' Forum has attempted to begin changing the process. In the long-term, however, the overall constraint to locally-based management of the linefishery is the shared nature of the marine resources. If they are to be accommodated, local organisations which represent fishers will need to become part of a nested hierarchy of institutions responsible for management. Thus, their potential level of participation is not limited by a lack of capacity or inequitable practices, assuming the situation improves, but rather by the extensive scale of the common pool resources which they target.

As an initial task, mechanisms should be installed in order to increase participation in consultation on the managing of shared resources. The most critical issue which is plaguing the success of this process is what Jentoft (1989) refers to as "distributional effects". In South Africa, the central debate has not been about how to manage the resource, and what structures or institutions are needed, but who should be granted a quota, permit or licence. When discussions are initiated on issues such as the size limit for a particular species, the subject usually switches to access rights. There is an urgent need to resolve the issue of allocation and the resulting conflicts through negotiation, as these are issues which require political and not technical solutions. A widely accepted system of determining access rights is essential to the

sustainable management of marine resources in South Africa. Only if this is accomplished can there be a potential for the future delegation of some proportion of management responsibility to user groups.

6.3 Sustainability

The long-term sustainability of linefish stocks requires immediate cutbacks in effort for most species. It also requires a holistic management strategy which takes into account the diverse and competing interests of the various sectors and one which includes them in the decision-making process. In the short-term, setting management goals based on objective biological reference points using the framework of operational management plans, is critical for biological sustainability (Griffiths 1997). However, once these have been established the sustainable management of the linefish resources will depend on the creation of equitable and efficient institutional arrangements for management.

7. Conclusion

One of the major problems facing fisheries management in South Africa, especially in the linefishery, is that current regulations are often disobeyed. Within the co-management research framework these regulations are referred to as operational rules. The major issue then in South Africa is to convince fishers that the operational rules are legitimate despite the fact that they were created under the previous apartheid government where the constitutional rules were inequitable for the majority of the population. The situation is exacerbated by the fact that the collective rules (Raakjaer Nielsen *et al.* 1996) are currently undergoing modification by the policy development process.

In South Africa some elements of user participation are present in the form of advisory channels of communication and user participation in national associations such as SAMLMA. This is not, however, the true sharing of management responsibilities as understood by co-management. Transferring management responsibility to user groups, or communities, requires that they have a suitable management capacity which, to be successful, will require future investment in resources. Initially there will be a need to invest in information sharing networks and education of users as to the status of the stocks. A major task will be to create mechanisms to increase participation in consultation regarding the regulations. This would require a change in management philosophy, towards investing in human resources and capacity building, especially in communities disadvantaged by the legacies of the previous government. However, in the short-term any move towards user participation is going to be more apparent than real. This is largely due to the complex nature of the linefishery, the large number of competing sectors and the current controversy over access rights in the short-term to fishing opportunities.

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Current state and perspectives of marine fisheries resources co-management in West Africa

Benoit Horemans

Alhaji Jallow

*Programme for Integrated Development of Artisanal Fisheries in West Africa
Cotonou, Benin*

1. Introduction

Until recently, the fisheries sector in West Africa was characterised by abundant or seemingly adequate fishery resources with moderate human population pressure. The situation is now changing very rapidly and one could soon expect to face the triple constraints of reduced or depleting fish stocks, a degrading environment and increasing population pressure.

This scenario calls for a continuation of the integrated and participatory approach promoted by the Programme for Integrated Development of Artisanal Fisheries in West Africa¹ (IDAF) which remains relevant to the development of artisanal fisheries in the region. The strategy places emphasis on the elements and mechanisms that favour sustainable fisheries: responsible fishing, fishing communities empowerment, strengthening of human and institutional capacities, and the monitoring and consolidation of achievements.

During the 8th IDAF Liaison Officers Meeting held in Point Noire, Congo, in November 1994, several countries expressed concern about the need to restrict fishing pressure on their limited resources, a particularly difficult problem in artisanal fisheries. It was then accepted that the participation of local users in resources management could be one way of attaining this goal.

¹ The IDAF Programme, a DANIDA-funded and FAO-executed project, aims to ensure 20 coastal West African countries a sustainable development and management of their artisanal fisheries for maximum social and economic benefit of their fishing communities in terms of employment, health and earnings. This is done through an integrated and participatory approach in which emphasis is laid on equity, gender issues, the transfer of technology for development, environmental protection, as well as the strengthening of human and institutional capacities.

The immediate objectives are:

1. To identify, assess and disseminate strategies and mechanisms for sustainable management and development of the artisanal fisheries in fishing communities;
2. to improve the competence of national Fisheries Departments' staff in development and management planning of artisanal fisheries;
3. to enhance regional technical competence in the fisheries disciplines, particularly in fishing and fish technology;
4. to improve the exchange of information and experience related to artisanal fisheries within the region;
5. to promote regional and sub-regional collaboration for the development and management of artisanal fisheries.

Within this context, the IDAF programme organised, in conjunction with its 9th Liaison Officers Meeting, a regional Workshop on "Participatory and Traditional Management Practices in Artisanal Fisheries of West Africa" in Conakry, Guinea (13 - 15 November 1995). At this workshop reports of case studies in mainly inland and lagoon fisheries in seven countries of the region, and a conceptual framework for further research, were presented and discussed. The workshop recommended that IDAF collaborate with the International Centre for Living Aquatic Resources Management (ICLARM) in the Philippines and the Institute for Fisheries Management (IFM) in Denmark to organise a regional training workshop on the concepts of participative fisheries management (co-management), to assist partners in the region to catalogue experiences of participatory approaches and traditional fishery management practices, and to evaluate the impact of ongoing experiences in the Tchouvi fishing community in Benin and Aby Lagoon in Cote d'Ivoire.

This paper provides an analysis of existing and potential co-management arrangements in marine fisheries. After a brief description of the sector, it reviews the existing management approaches, both conventional and traditional, and presents a preliminary assessment. Section 4 describes some co-management arrangements in inland fisheries in the region and examines why the same approach is difficult to set up in marine fisheries. In section 5 the most recent participatory approaches used in West African fisheries, which could serve as a basis for marine resources co-management, are reviewed. Finally, the last section discusses the constraints and perspectives in marine fisheries co-management in West Africa.

2. Characteristics of marine fisheries resources

With about 10,000 km of coast and an Exclusive Economic Zone (EEZ) of 3.6 million km², the 20 countries covered by the Programme for Integrated Development of Artisanal Fisheries (IDAF) in West Africa, i.e. from Mauritania to Angola, represent 30% of the whole African continent.

2.1 Fisheries potential

Data related to the exploitable potential or Maximum Sustainable Yield (MSY) needs to be updated. The estimates currently available amount to 3.2 million tons (t) a year for the whole region. This MSY includes pelagic and demersal resources in a proportion of 73% and 24% respectively. The remaining 3% is for shellfish and cephalopods. This MSY displays a great disparity in geographical distribution. The zone from Mauritania to Sierra Leone has 60% and Angolan waters 11%. As a result only 920,000 t (29% of the total MSY) are shared among the other 12 countries of the region. Countries with the most significant potential are Mauritania (635,000 t), Senegal (383,000 t), Angola (365,000 t), Ghana (291,000 t), Guinea Bissau (245,000 t) and Gabon (176,000 t).

2.2 Level of exploitation

Catches by the fleets of the region's countries reached 1,250,000 t in 1994. They are divided as

follows: 962,500 t (77%) for the artisanal fleet and 287,500 t (23%) for the industrial fleet. Catches by the fleets of coastal countries have been growing steadily and doubled between 1970 and 1994. Today the catches registered by the IDAF countries are higher than those of the non-coastal countries (1,000,000 t). Ghana and Senegal combined represent 54% of marine artisanal fishery landings in the region.

The major part of the catches consists of small pelagics (58%): principally sardines, sardinellas, bonga and anchovies. Demersal species represent 20% of the catches, tuna 11%, cephalopods 8% and shellfish 2%.

The low-value small pelagics, which in the past have supported intense fishing effort from both artisanal and industrial fleets, are now moderately exploited after the departure of most of the ex-USSR fleets, whose catches were 85% small pelagics. Catches by these vessels reduced in the region from 1,688,000 t in 1990 to 394,000 t in 1994 (a 77% decrease). This situation may, however, be temporary as some modern European companies, which continue to benefit from subsidies, have started fishing for small pelagics within the framework of the fishing agreement between the EU and some coastal countries.

On the other hand, the high-value demersal fisheries are heavily exploited or even over-exploited. Fully exploited or over-exploited resources in the region are octopus and demersal fish in the shelf area of Mauritania; coastal demersal resources in Senegal, the Gambia, Guinea and countries of the Gulf of Guinea; lobster in Cape Verde and Mauritania; and shrimp in Mauritania and the Gulf of Guinea. Therefore, a real risk of overexploitation of demersal stocks is foreseeable if some management measures and conservation of resources are not rapidly implemented.

2.3 Means of production

In 1995, there were 557,000 full-time marine artisanal fishermen. In addition to these professionals, there are many part-time fishermen who were also engaged in agriculture and other onshore activities.

Migration within countries and into foreign countries is an essential characteristic of the marine fisheries of the region. For example, in Gabon, Togolese, Beninese and Nigerians (the largest group) represent about 90% of the marine fishermen. In Togo, migrant fishermen represent 65%, and in Benin 55%, mainly Ghanaians. In Cameroon, they represent 80%, mostly Nigerians. In the Gambia, 73% of the fishermen are foreigners, mostly Senegalese. These migrant fishermen are also present in Guinea Bissau where 25% of the fishermen are foreigners. In Congo, there is a community of 500 Popo fishermen from Benin who settled there in the early 1960s. They represent one-third of the country's marine fishermen. On the other hand, migrant fishermen are generally not present in insular countries (Cape Verde, Sao Tome and Principe, Equatorial Guinea) and in countries where strong migrating tradition exists: Senegal, Ghana and Nigeria.

There are about 135,000 artisanal fishing boats operating within this region. These are canoes traditionally built from huge tree trunks. A proportion are dugout canoes sometimes improved with planks on the sides, such as the Senegalese planked canoes that use purse seine gear, measure between 14 - 20 metres in length, and have a loading capacity of 20 tons. Many countries of the region still use either dugout canoes (Equatorial Guinea, Sao Tome and Principe, Congo) or planked canoes (Guinea, Sierra Leone) of more modest dimensions adapted to less intensive fishing. The Ghanaian-type canoes used in many countries are always dugout canoes

that can measure up to 14 metres in length. They use heavy and sophisticated fishing gear such as purse seines or large mesh nets.

The average rate of motorisation is growing steadily and is estimated at 30%. However, the disparities are important: Mauritania 90%, Senegal 67%, Sierra Leone 16%, Ghana 49%, Nigeria 21%. Outboard engine horsepower is essentially 8, 15, and 25. The majority use petrol. Fishing gear is similar throughout the region: gillnets, handlines, longlines, purse seines, beach seines or even cast nets used on small dugout canoes.

2.4 Fish consumption

In 1993 the annual consumption of fish products in the region was estimated at 9.8 kg per capita. This consumption has decreased compared to that of the early 1980s when it reached 15 kg. This is due to the population growth (average of 3%/year) and a fall in imports caused by the economic crisis. In 1993 the trade balance of fish products showed a deficit of 600,000 t.

Fish trade on the domestic market is largely conducted by women. The number of persons working in artisanal fish processing and marketing in the region is estimated at 1.8 million.

3. Marine fisheries management

Knowledge of the stocks is variable and generally fisheries activities and the effect of environmental fluctuations on the abundance of stocks are not well understood. Data collection in many countries is inadequate and the pace of updating the assessments of the state of exploitation of principal stocks is slow. Moreover, fisheries in the region are very diverse and each would require a particular management approach. For example, the management of the octopus fishery in Mauritania would be different from that of the anchovy fishery in Ghana, or the sardinella fishery in Senegal, or the rich demersal fishery in Angola, from the bonga fishery in Sierra Leone. Even within the artisanal fisheries in the countries concerned there is diversity in species targeted and gear used (passive and active); fishermen's activities can also vary according to their base, status and origin.

3.1 Current management approaches

In almost all countries in the region, marine fisheries resources are classified as state property, but in practice access is often left unregulated with the resource held in open access, although rules and regulations do exist.

In this context, the main approaches and measures in force in the region are: direct regulation of the exploitation rate, indirect control of fishing effort, regulation of catches through quota regimes and the seasonal closure of fisheries.

Regulation of exploitation rate

The region's countries have established an approach to the direct regulation of fishing effort

through a licensing system for industrial vessels. It is foreseen in the laws of several countries (such as Senegal, the Gambia, Mauritania and Guinea) that the acceptable volume of licences granted is determined by the condition of a particular fishery, within the framework of a fisheries management plan. However, in practice, only Guinea has actually prepared such a plan in the last three years. In some countries, the system is extended to artisanal fisheries in the form of permits, however, the fees collected are only of symbolic importance in artisanal fisheries.

Indirect control of fishing effort

The delineation of reserved fishing zones (zoning) is one of the most common measures used in the region. Narrow reserves of 2-4 nautical miles are recorded for the exclusive use of artisanal fishermen in Cameroon, Nigeria, Benin, Gabon and Togo, and wider ones of 5-8 nautical miles in Congo, Sierra Leone, Guinea, the Gambia and Senegal. These zones, which appear to vary according to the size of the continental shelf area, protect the coastal area, including the spawning grounds, and are intended to separate the activities of artisanal fisheries operators from industrial ones.

The regulation of the mesh size of artisanal and industrial fishing gear is also commonly found in legislation. Many countries have also adopted a policy of minimum commercial sizes for certain species, particularly with regard to cephalopods, crustaceans, oysters, sardinella, horse mackerel, mackerel and tuna.

The use of explosives and toxic substances is prohibited by all countries.

It is not common to prohibit any fishing technique in artisanal fisheries. An exception has, however, been observed in the banning of beach seine in the Gambia.

Quota regulation and the seasonal closure of fisheries

The approach to fisheries management through a quota system is applied in the foreign coastal pelagic fisheries of Mauritania, Senegal and Guinea-Bissau. However, various mechanisms have replaced this system because of the difficulties of maintaining control over allowed quotas or in order to maximise revenues derived from such arrangements.

The approach of management through the introduction of closed fishing seasons (biological rest) was recently adopted for the demersal fisheries in Mauritania. This is mainly intended to protect the cephalopod fishery. Seasonal fishing bans have been recorded for oysters in Guinea, lobsters in Cape Verde and marine turtles in Guinea-Bissau.

Traditional measures

Social and religious reasons have been used to deter fishermen from fishing on certain days. These days are usually chosen according to the dominant religion within a particular settlement. For example, in Goderich (a major coastal sardinella landing site with a dominant Christian population near Sierra Leone's capital, Freetown), Sunday is a no fishing day; while Friday is the no fishing day observed in Yeliboya, Konakridee and Mahera (northern coastal Bonga landing sites with a dominant Moslem population). In these areas violators of by-laws are punished with

compulsory down-time or are denied landing rights by the chiefs. However, the effectiveness of these measures are beginning to lessen in the more urban settlement of Goderich, where social control is weaker.

3.2 Towards integrated coastal management

In countries where artisanal fisheries have been effectively developed, interactions between the fisheries take many forms (biological, technological, spatial and socio-economic). These interactions often give rise to conflicting interests because of:

- problems of access to a resource that is under increasing fishing pressure;
- absence or poor implementation of management measures concerning the allocation of resources, areas and seasons for operating fleets and/or gear.

Management of marine coastal areas is further complicated by the conflict of interest between the various users. These conflicts arise between users competing for the tourism industry, oil exploration, urban expansion and industrial development. Another concern is the rapid degradation of the marine environment, in particular by erosion and pollution. This situation justifies the new approach of Integrated Coastal Fisheries Management (ICFM), which is an essential component of the broader Integrated Coastal Zone Management (ICZM) approach.

3.3 Assessment

Despite the efforts deployed in the preparation and adoption of these approaches and measures, they remain mostly unenforced or at best badly enforced. The reasons for this are related to the characteristic of the individual fisheries.

There is an absence of planned management, especially regarding issues related to the regulation of fishing effort. Certain measures for the management shared stocks have been taken unilaterally without any consultation, which has resulted in the failure of enforcement. These measures, among other, have registered the least success regarding effective application, and consensus remains that the major challenge in marine fisheries management is still the regulation or limitation of fishing effort.

In artisanal fisheries the control of mesh sizes is practically non-existent. First, because of the enormous means required, and second because of the socio-cultural complexity of this environment. In addition, most fishermen make their own nets.

The dominant principle of open access for artisanal fisheries resources, aided by subsidised fishing equipment and fuel, soft loans, and other incentive policies implemented by many countries of the region, have resulted in a very rapid increase in fishing effort.

In some countries, the artisanal fisheries sector benefits from a policy of fiscal advantages. These measures generally consist of a total or partial duty waiver, and are in force in Senegal, Côte d'Ivoire, Mauritania, Gabon, the Gambia and Ghana. They usually apply to fuel for outboard engines, and to imported engines and fishing nets.

However, the use of these fiscal instruments is often questioned by international financing bodies within the framework of Structural Adjustment Programmes (SAP). Their removal

automatically provokes a rise in investment and operation costs, difficult to pass on integrally to consumers. After Nigeria in 1993, it was in the Gambia, Togo and Ghana that fuel subsidies ended in 1994. However, they resumed in the latter part of 1996.

In many countries, no subsidy or tax exemption policy is applied. This is the case for Angola, Benin, Cape Verde, Congo, Guinea, Guinea Bissau, Equatorial Guinea, Sao Tome and Principe, and Zaïre.

Because of the characteristics of the fisheries resources, in particular the migratory pattern of several species and the fact that many stocks are shared between various countries, regional collaboration has been promoted for the last 30 years (see Box 1), however, this collaboration still needs to be reinforced.

Very few of the countries in the region have fisheries management plans. Control of fisheries development is nevertheless necessary within the framework of a participatory fisheries planning policy, notably for a better adequacy of investments and available fisheries resources.

Box 1. Regional and sub-regional fisheries bodies in West Africa

Many regional structures specific to the fisheries sector have been set up. Apart from CECAF, they are all recently established and do not often have the financial and human resource means necessary to carry out their duties.

- The *Fishery Committee for the Eastern Central Atlantic Region (CECAF)* was created in 1967 in accordance with the FAO Constitutive Act and in application of a FAO Council resolution. It includes the coastal countries from Morocco to Zaïre and 10 non-African countries operating in the region. The Committee is empowered to give its views to governments of Member States to help them define the scientific basis of measures aimed at ensuring the conservation and improvement of marine resources in the area under its authority. [...]
- The *Sub-Regional Commission for Fisheries (SRFC)* comprising Cape Verde, the Gambia, Guinea, Guinea Bissau, Mauritania and Senegal, was created in 1985 and constitutes a basis for cooperation in the field of fisheries management and development for those countries characterised by a geographical and biological interdependence on fish stocks. It allows, eventually, the elaboration of joint policies and favours cooperation in the field of access to fishing areas between Member States. [...]
- The *Ministerial Conference on Fishery Cooperation among African States bordering on the Atlantic Ocean* whose first meeting took place in Rabat in April 1989 comprises those states from Morocco to Namibia. On this occasion, the States of the region expressed their common will to reinforce and develop their cooperation in the fields of resource evaluation and preservation, and in fish production. For that purpose, they insisted on the development of marine scientific research and the reinforcement of professional and technical training. [...]
- The *Regional Fisheries Committee for the Gulf of Guinea (COREP)* was created in 1984 by Congo, Gabon, Equatorial Guinea, Sao Tome and Principe and Zaïre. This Committee aims at coordinating, harmonising, and developing the exploitation of the common stocks found in the Exclusive Economic Zone (EEZ) of Member States and of managing them. Up until now Equatorial Guinea has not ratified the Convention, which reduces the size of the Committee to four countries. The secretariat is in Libreville, Gabon. For various reasons, the Committee is not yet really functional.
- The *International Commission for the Conservation of Atlantic Tunas (ICCAT)* was created in 1966. It is composed of 22 members of which 9 are West African. The species the Commission deals with tuna and related species. Considering that these species are highly migratory, ICCAT is essentially interested in deep sea fisheries.

Mention should be made also of the Lagos Treaty of 28 May 1975 which led to the creation of the Economic Community of West African States (ECOWAS). This treaty aims at establishing a progressive integration among the signatory countries and the free movement of persons and goods.

(B. Horemans, 1996)

4. Management of inland fisheries

Traditional management practices, the strategies for which are similar to contemporary systems, existed (and remnants still exist) in many West African fisheries. Most of the traditional practices were inadvertent strategies, but there were also intentional strategies. Inadvertent strategies with potential consequences for management include water tenure, food taboos, superstition or ritual prohibitions on fishing certain areas, and attitudes averse to fish and fishing. The intentional strategies were gear restrictions, off-days, and habitat modification.

In the traditional systems, elders, fishers and other user groups collectively select who should have the authority, or more correctly stewardship, to formulate and enforce the rules and guidelines for the exploitation of the fisheries resources adjacent to or within their locality for the welfare of all concerned. Everyone was expected to adhere to these rules and guidelines. Such practices seemed to have worked well, mostly because of strong group coherence, emphasis on social obligations, consensus-based decision-making, a high degree of social conformity and social sanctions within the group. The supplanting of these traditional systems and the undermining of community level institutional arrangements can be attributed to the need for institutional restructuring, the rise of the nation state and the so-called technological modernisation that has swept through the region over the last 40 years.

In the riverine regions of the main waterways of southern Benin, fishing is subject to many unwritten laws administered by a structured administrative fisheries hierarchy. In the southwest, this body, considered as the "Head of the Water", is composed of leading fetishists and headed by the "Zounon" - a traditional chief with strong fetish charisma. The structure in the south is not as strong, but, like the southwest, every fisherman respects the customary rules and the elders enforce them. These rules protect and conserve the resources and the environment. They became efficient because it is believed that the authority of the leaders comes through the water divinities, who are recognised and worshipped by all.

The efficiency of these traditional systems was progressively weakened by colonial order that stripped the traditional chiefs of their political power. The rights to coerce subjects were gradually lost. The fishermen then began to break the by-laws because of the judicial vacuum created by the weakened social order. By 1963 the supervision of the inland fisheries was entrusted to a Directorate of Fisheries. This Directorate, realising the over-exploitation of certain fisheries resources and the difficulties in controlling the fishermen, decided to involve the fishermen in the management of the resources through fisheries committees. These committees are composed of representatives from the users of the resources.

A similar traditional approach, shaped by the belief in divinities, is applied in the fishing grounds of the River Senegal. Here it is believed that the land and water are owned by gods that live on them and, therefore, cannot be owned by human beings. So each area of the valley has its own water spirits, represented by the "Dialtabe", a traditional leader who enjoys the respect of the fishermen on all matters connected with water. Their rules, among others, forbid the use of destructive fishing methods and gear and the disorderly siting of landing points on the river.

The first attempt by the government to regulate the inland fisheries of the River Senegal was the enactment of a law in August 1955 to regulate fishing in the lower Senegal River area and in 1963 a law was enacted to regulate the whole inland fisheries of Senegal. This law created fishing zones and fisheries advisory bodies. These bodies are comprised of heads of riverine villages and fishermen's representatives who are deliberately selected to outnumber the village heads by 25%.

These bodies are responsible for checking that fishermen conform with the fishing gear standards for the area, ensuring that fishermen do not tamper with nursery grounds, and for preventing and settling conflicts. Their role has now been weakened by a lack of dynamism, a result of the poor organisation of the fishermen and finance problems.

For a long time, the Aby Lagoon fisheries of the Cote d'Ivoire experienced disciplined customary management. The controls, however, became weakened with the advent of colonialism. By 1980 there had been a period of rapid modernisation of fishing gear and a new generation of fishermen emerged. Collective village fishing was replaced by individual ownership and operations for maximum profit. Foreigners also entered the Lagoon fishery. These changing conditions undermined the authority of the local leaders who were progressively disregarded by the more 'liberal' new players. Fishing effort therefore increased and the local authority lost control; control was then transferred to government.

However, the government also lost control in 1982 when the first signs of over-exploitation appeared. The fishermen appealed to the public authorities for help to manage the fisheries. Fishing with large nets was eventually banned for six months, fishing licences were introduced, mesh sizes for collective gear were increased, and beach seine lengths were reduced. Eventually, when catches increased, the measures were no longer enforced. Then, in 1987, the catches dropped again and by 1990 the situation had deteriorated so badly that conflict broke out between the local youth and foreign fishermen, who were accused of being responsible for the over-exploitation. The foreigners were then barred from the Lagoon.

The unsatisfactory results from the measures moved the fishermen and the public authorities to examine the participatory or co-management approach. The reasoning behind the pursuit of this approach, the conditions, and the role of the participants were discussed and agreed at a seminar held in 1995. The action plan is now being gradually implemented around the Aby, Tendo, and Ehy Lagoons.

5. Participatory approaches in marine fisheries development and management

Traditional fisheries management systems appear to be more prevalent in inland fisheries than in the coastal areas. However, there is a move towards increasing co-management not only in inland fisheries but also in marine fisheries.

Although there are considerable opportunities in the conventional approaches to fisheries development and management, alternative techniques also merit examination. One such technique is the active involvement of fishers and other players in the sector. Participatory Rapid Appraisal (PRA) methods have opened up new avenues to involve users in the diagnosis, planning, execution and evaluation of their activities. This technique has been used successfully in the search and execution of management strategies for local fisheries infrastructures. However, due to decades-long appropriation of local control by national governments and the long-standing distrust between government officials and the fisherfolk, the latter's participation in the management of the resource has not received much attention. However, attitudes are now changing as there is an urgent need to respond to resource over-exploitation and conflicts, which can be addressed through user participation in fisheries management. The high interest of the users in increased participation offers a very good opportunity to achieve success in marine fisheries development and management.

5.1 Infrastructure management

Since 1992, a new concept of infrastructure management by the users has taken root in the region, modelled on the Gambian experience of autonomous management of coastal fisheries infrastructures, known as Community Fisheries Centres (CFCs) (see Box 2).

Seven coastal CFCs have been constructed in the Gambia between 1983 and 1993. From 1983 - 1988 the first centre was managed by the Department of Fisheries. A joint management approach by the Department and a constituted Fisheries Centre Management Committee (FCMC) of representatives of User Groups (fishermen, fishmongers, processors, boat-builders, etc.) was tried from 1988 - 1992. In 1992, after the construction of a further five centres, the government decided to devolve management authority to the strengthened FCMCs, which included resource personnel from the Department as facilitators and liaison channels. The village head, "Alkalo", is the *de facto* chairman of the FCMC, and he nominates representatives of Village Development Councils (VDCs), where they exist, to the Committee. The seventh centre was built in 1993. Each of these CFCs is now entirely managed by a FCMC. The FCMCs collect revenue, draw up annual workplans, allocate budgets, execute development programmes, and manage their own bank accounts. Their management skills have been improved by training workshops and discussion sessions organised for them by the Department, with technical assistance from IDAF.

Through the fusion of the PRA techniques and the workshop strategies, the fisherfolk set up frames for sharing experiences through a network provided by the leaders of the seven FCMCs. They set their own agenda and meet once a month in different centres on a rotational basis. This network has now gained *de facto* recognition and the leaders address common issues and problems, and lobby for the collective welfare of their general membership in all the centres. It is now believed that such a structure can serve a very useful purpose in any type of co-management plan to be introduced for the management of resources adjacent to these centres.

Unlike the Gambia, the Village Development Board set up in Tombo, Sierra Leone to work with an artisanal fisheries project was formed five years after the project began. Even then it only received orders from the project staff. Their participation in the development of their fisheries was encouraged in the 11th year of the project. Despite its late involvement, the leaders received training and the community was sensitised on their role in participatory development through workshops and information campaigns. The Board has now been transformed into the Tombo Village Development Association, which is ready to participate in any future artisanal fisheries project. This structure can also serve as a pilot co-management structure in Sierra Leone.

A nucleus for participatory development and management of fisheries resources in Ghana is being developed at Yeji, a town on the mid Southwest part of the Volta Lake in the Brong Ahafo region. Here a Community Fisheries Centre is being built to provide several infrastructure facilities for the fisherfolk. They were involved in the planning of the Centre, and would be responsible, at least as a majority, for the management of the complex.

Other experiences in infrastructure management in the region are found in Guinea (at Kaback and Kamsar) and in Gabon (Owendo), where a privately run centre has been entrusted to representatives of the fisherfolk operating around the Centre.

Box 2. Management of onshore fisheries infrastructures in the Gambia

[...] The implementation of the Community Fisheries Centre (CFC) concept and the integrated approach to the development of artisanal fisheries has materialised in the construction of seven coastal fisheries infrastructures (CFC) in the Gambia between 1983 and 1993. These centres are good examples of community involvement in development.

The physical and organisational structures of the centres have evolved piecemeal within the context of the milieu, with no dogmatic prescriptions, no grandiose slogans or plans. Each centre is managed by a Committee: "The Fisheries Centre Management Committee" (FCMC), constituted by elected representatives of local homogeneous trade and/or activity-related associations (User Groups) and resource persons drawn from the Fisheries Department and, when necessary, invitees serving as facilitators. [...]

The FCMCs are moving towards autonomous management of their local fisheries infrastructures. The empowering of fisherfolk is being facilitated by the organisation and strengthening of User Groups, the involvement of fisherfolk in community activities, the decentralisation of influence, and increased access to resources. [...]

During the last three years, the process has been further accelerated through a self-problem-solving training approach, which involves diagnosis, reflective evaluation and prioritising abstraction using Participatory Rapid Appraisal (PRA) methods and tools. A series of management skills improvement workshops for FCMC members in particular, and for many fisherfolk at fishing community level, have been organised by the Department of Fisheries with assistance from IDAF. [...]

By blending PRA techniques and workshops strategies, the fisherfolk were motivated to explore their own resources and to set up frames for experience learning and networking through the leaders of the seven FCMCs.

The organisational structures are still young and need support as they endeavour to detach themselves from, or reduce considerably, their dependence on external assistance in order to pursue their maturing process towards autonomy. [...]

Autonomous management of CFCs in the Gambia has not yet been formally institutionalised but there is *de facto* recognition. [...]

(B. Satia in IDAF Newsletter N°26)

5.2 Participatory development planning

Facilitating participatory decision-making to respond to a community's socio-cultural and economic environment, moves participatory planning towards greater empowerment. Empowerment encourages the beneficiaries of development plans to set their own objectives and action plans. In promoting this process in the region, the IDAF Programme, in 1995, was involved in the preparation of an action plan for fisheries and aquaculture development in Togo (see Box 3).

The work was executed by a multi-disciplinary team of national and international experts with the very active participation of the various stakeholders in the fisheries sector. On completion of the provisional document, the action plan was reviewed by representatives of the beneficiaries at a national workshop. At the end of this workshop a consensus was reached on the best development policy for the fisheries sector.

In July, 1995 the Programme participated in a national seminar in Cote d'Ivoire on managing the Aby-Tendo-Ehy Lagoon for present and future generations. Over 100 representatives of the users of this lagoon actively participated in the discussions on management measures and in designing a plan of action to implement the measures. The result of this seminar and the follow-up actions now being implemented shows the level of willingness and dedication

created by the direct involvement of the resource users in the Lagoon's management and development planning. The authorities of the Lagoon project that initiated this consultation shared their experience with a similar project at Aguégues in Benin. That project also organised a national seminar in January 1997 on the strategies and mechanisms for achieving sustainable fishing in the water bodies of the area. The degree of participation of the users in this seminar was overwhelming and provided another indication of their readiness to become involved in their own development strategy.

National fisheries development plans have been prepared in Cameroon (1991) and Guinea (1996) through some involvement of the direct users of fisheries resources. This positive trend is spreading rapidly in the region. For example, a national seminar is planned for April 1997 in Benin to discuss a comprehensive fisheries management plan and to draw up action plans.

In order to prepare the fisheries extension agents and other rural workers affiliated to fisheries in the facilitation of participatory planning and decision-making, the IDAF Programme has conducted PRA training courses in Senegal, Cape Verde, Guinea, Sao Tome and Principe, and Zaire. More are planned for Cameroon, Gabon, and Angola. These courses usually involve the fisherfolk as at least one fishing community is selected for practical application of the PRA tools. The trained officials will now provide assistance to the respective stakeholders to identify and use suitable PRA techniques for rural research and project planning.

Box 3. Participatory fisheries development and management planning in Togo

Assisted by FAO and the IDAF Programme, in 1995 the Government of Togo elaborated an Action Plan for fisheries and aquaculture.

The project was executed by a multi-disciplinary team of national and international experts with particular emphasis given to the active participation of the sector's stakeholders. Areas covered include: fishery planning and management, fishing and fish technology, marketing and distribution, statistics, aquaculture, institutional and legal issues.

In helping to formulate and execute the project, the IDAF Programme's philosophy and approach were guided by several tenets, among them:

- sustainability cannot occur without strategies that maintain and enhance natural and human resources;
- open dialogue and partnership in problem diagnosis are critical ingredients to sustaining local involvement;
- local knowledge and experiences are important for sustaining commitment and ensuring that resource technologies being promoted are consistent with local needs;
- a "learning process approach" will, among other things, re-orient the traditional roles of fisheries staff and highlight the value of stakeholders' participation as an essential element in achieving successful development.

The project organised study tours and training programmes for representatives of stakeholders and for national experts on the project team. A collaborative mode of operation was adopted in executing activities and several brainstorming sessions and group discussions were organised for the multi-disciplinary team and with the various stakeholders. Major funding agencies and NGOs were sensitised to the problems and opportunities in the sector. The details of the proposed Action Plan were reviewed in a national workshop attended by 82 participants who reached consensus on the most appropriate development policy for the sector.

The Department of Fisheries is ready to provide technical assistance in the implementation of the recommendations. Some stakeholders are prepared to make voluntary contributions for the realisation of some activities. However, the total financial requirement for implementation of the Action Plan is beyond the resources of the Department of Fisheries and the local people concerned. Development in the sector now depends on the government's ability to provide 'top-down' support for initiatives by making the appropriate budgetary allocations and/or rallying external assistance; and on 'bottom-up' pressure from stakeholders through the mobilisation of local resources. In both directions, the Department of Fisheries has a key role to play.

in (IDAF Newsletter N°28).

5.3 Monitoring and surveillance²

Fisheries in Senegal are very complex and present four main characteristics: they are sequential, multi-species, multi-gear and multi-fleet. Artisanal and industrial fleets exploit about 60 species of diverse age groups, biological and catching characteristics. In response to the situation where different vessels and gear were being used to catch the same species, new laws and regulations have been passed. Among these is the pre-eminent law that defines a reserved inshore fishing zone for the exclusive use of artisanal canoes. However, despite the laws and regulations in place to protect artisanal fishermen, the industrial trawlers continue to make incursions into this reserved zone thus causing irreparable damage to artisanal fishing equipment and even the loss of human life.

Conflicts can also break out among the different groups of artisanal fishermen themselves, within this zone. These conflicts which tend to be spread along the whole of the Senegalese coastline, arise from the difficult 'cohabitation' of passive fishing gear with active gear, as well as from fishermen's differing perceptions of the access rights to fisheries resources (see Box 4).

In order to guarantee compliance with the fishing laws and regulations by the operators within Senegalese waters, the Fisheries Protection and Surveillance Project (PSPS) was initiated in 1981 with the assistance of Canadian government funding.

Box 4. Why participation of fishing communities in MCS in Senegal?

The example of Kayar village, one of the most important landing sites for artisanal fisheries, is a good case in point. Fishing is practised mainly during the dry season (from December to May), principally by two communities: the local population and fishermen from Saint Louis or Guet-Ndar who migrate to Kayar only for the dry season. The two communities of fishermen have had difficulty living together for several decades (since 1953 at least, as accounted for in various documents). The situation reached flashpoint in 1986 when a deadly conflict broke out. Analysis of the problem revealed that the conflict was not exclusively due to the use of fixed nets by fishermen from Saint Louis, even though it is true that this was one of the factors behind the break-out and perpetuation of hostilities (CRODT, 1986). It was apparent that the respective stands taken by the two fisherfolk communities was because each had a differing perception of the existing access rights to the sea and its resources.

Fishermen from Kayar who are mostly fisher-farmers only exploit the fishing zone of their village on a seasonal basis. However, they consider this zone as their sole property since they project their 'landowner' concept of homeland appropriation onto the marine sector. For these fishermen, preserving the local fisheries resource is an essential condition to maintaining fishing activities for future generations. Moreover, they do not want outsiders participating in Kayar fisheries activities.

On the other hand, fishermen from Saint Louis are the only group of fishermen in Senegal whose sole subsistence relies on fishing. For these fishermen, migration is an important component of their way of life. Therefore, they consider free access to fishing zones as an inalienable right and a vital condition for the survival of their traditions and way of organising the socio-economic aspects of their lives.

It was in order to guarantee compliance with the Fishing Law by the different 'operators' in waters within the jurisdiction of Senegal and so to prevent conflicts, that the Fisheries Protection and Surveillance Project in Senegal (PSPS) was initiated in 1981 with the assistance of Canadian aid.

(M. Kébé, 1997)

² This section, as well as sections 5.4 and 5.5, are largely based on a report prepared by Dr. M. Kébé from CRODT, Senegal, for the present paper.

The system established has three components: administrative, scientific and operational. The Oceanographic Research Centre of Dakar-Thiaroye (CRODT) ensures that scientific monitoring takes place by making an inventory of resources and by designing fisheries management strategies. The operational component is supported by the Navy and Air Force equipped with high seas patrol boats, coastal monitoring buildings and one marine patrol aircraft.

In 1991, coastal monitoring intensified with the establishment on the coast of six monitoring centres. Before effectively setting up these centres, the PSPS organised information and sensitisation sessions for the presidents of Economic Interest Groups (GIEs) of artisanal fishermen living in the areas concerned.

The centres are equipped with radar and radios. PSPS management has a powerful radio station which enables it to maintain a permanent system of coordination. It communicates twice a week with the monitoring structures of the other countries of the Sub-Regional Commission for Fisheries (Cape Verde, Gambia, Guinea Bissau, Guinea and Mauritania). These various means help to efficiently control the entire coastal zone reserved for fisheries and to reduce the risk of accidents and destruction of equipment resulting from industrial boat incursions.

The coastal monitoring component of PSPS' activities is planned in three phases. The first consists of working closely with artisanal fishermen who would need to provide a motorised boat for transporting officials to the site where the radar has detected the suspicious presence of industrial fishing boats. Thus, they would follow PSPS members and local fisheries service agents to sea in order to ascertain the facts at firsthand. Purchase of high speed coastal patrol boats is planned for the second phase. The buoying of the six nautical mile zone is scheduled for the last phase. However, it should be noted that, contrary to forecasts, the first phase has not yet been completed.

At least a dozen violations by industrial fishing units, that can be considered harmful to the conservation of fisheries resources in Senegal, have been reported to PSPS. Among them are: non-conformity of the legal net mesh size, fishing in restricted access zones, non-boarding of observers, trans-shipment at sea without authorisation and the non-possession of a fishing licence. In five to six years, 180 boats have been held and more than USD6 million in fines have been levied.

At present the involvement of fishing communities in coastal monitoring is of little consequence. This involvement may even disappear entirely with the advent of the second phase of the coastal monitoring component, during which the PSPS will be equipped with high speed coastal patrol boats.

However, the involvement of fishing communities in coastal monitoring is particularly important to the monitoring and surveillance programme in the village of Fass-Boye on Grande Cote. It appears that for a long time, the small local population and the geographical remoteness of this village have encouraged infractions which have become increasingly frequent, often resulting in serious accidents (Kebe an Ndiaye, 1993). Many trawlers would come and fish regularly near the coast with all their lights out, destroying everything in their path. The local population mobilised themselves to combat this, but they failed because of a lack of appropriate means. Fishermen joined the monitoring centre in force as soon as it was established. Thus, they were frequently found in front of the radar screen monitoring the position of these industrial fishing boats. Consequently, they are now involved in the different decision-making processes related to interventions at sea. It appears that this has greatly contributed to reducing the number of incursions into zones reserved solely for artisanal fisheries.

5.4 Control of fishing effort

The Franc CFA devaluation of 1994 had different consequences for different economic operators. The general belief was that export-oriented producers, such as fishermen landing high value demersals, would increase their earnings because of the higher local value of the foreign currency revenue paid by the exporting companies. This opportunity was, unfortunately, hijacked by the buyers or 'middlemen' who used to hide the real buying price from their clients i.e. the factories, thus keeping large profit margins for themselves. As a result the price of, for example, a 12 kg crate of seabream fell from 4,000 FCFA³ to 1,800 FCFA.

The angry fishermen at the Yoff and Kayar landing sites went on strike to protest against the unscrupulous buyers. These strikes forced the Kayar local committee of the National Committee of Artisanal Fishermen of Senegal (CNPS) to set up a Commission to control the quality and selling price of fish products destined for export.

The Commission comprises of about fifty fishermen from Saint Louis and Kayar. Discussions with Dakar factory owners at the beginning of operations enabled the Commission to adopt a series of measures aimed at organising better the marketing of the catch landed at Kayar.

The selling price of high value species is fixed by the Commission. This guarantees more regularity and a better utilization of the catch landed. Thus, a 12 kg crate of seabream can no longer be sold to buyers (middlemen) for less than 6,500 FCFA.

In return, the Commission undertakes to sell only good quality fish. It is on this condition that buyers have agreed to pay the proposed price. This pricing policy applies to seabream and dentex. The fishing period for these species coincided with the setting up of the Commission which at the time took no decisions concerning other species (scorpion fish, sole and grouper), the prices of which remain unfixed. In the event that fishmongers disagree with the prices proposed by the Commission, fishermen charter vehicles to sell the catch directly at the central fish market in Dakar or elsewhere.

Every transaction concerning seabream and dentex has to be carried out through the Commission. The consequences are as follows:

- it is possible to avoid abuses noticed in the past. For example, a buyer arrives in Kayar with an order for 200 crates but says that he/she needs only 20 crates. He/she waits for prices to decrease following a fall in the demand and then purchases the remainder from women to whom the fish was sold owing to the slackness of sales;
- however, this measure penalises fishermen's wives who, according to this regulation, cannot buy the fish cheaper than the price fixed by the Commission and therefore, cannot expect to make any profit on eventual transactions;
- moreover, because of the rigidity of the prices fixed by the Commission, buyers can no longer finance fishermen, in order to obtain preferential prices.

Another constraint imposed by the Commission is the limits regarding the quantities landed, a measure which represents a tangible resource management policy. Thus, the catch per trip for

³ USD1 = 570 FCFA (April 1997)

each active line fishing unit in Kayar is limited to two crates of seabream, i.e. 24 kg. In the past, fishermen could return with more than 14 crates and the surplus was sold off in the local market. Henceforth, it should be possible to maximise the value of the catch and also to avoid over-production.

To ensure that the rules it has enacted are being complied with, the Commission has placed three persons at forty-metre intervals along the entire beach in order to control the quantity landed and the quality of the fish supplied.

Furthermore, to ensure effective monitoring of this new situation, and to overcome any problems, the Commission meets every evening to analyse the market situation and to take the measures necessary to control activities. The meetings are held at the Kayar Fisheries Management and Development Centre. It should be noted that the sanctions envisaged include a fine of 30,000 FCFA and the confiscation of a canoe's catch.

5.5 Participation in international fishing agreement negotiations

Until recently, artisanal fishermen were not involved in the negotiation of any fishing agreements that Senegal signed with either other African countries or with the industrialised countries. For a long time the arguments dominating the major speeches meant that compared to industrial fisheries, artisanal fisheries were forced into the background. The role of artisanal fisheries was addressed only so far as it was considered an "outdated" activity - an occupation which created few jobs and one which only supplied the local market; while industrial fisheries was considered of superior importance, one making a significant contribution to the balance of trade.

The fishing agreements address four major issues:

- the creation and growth of national fleets which has resulted in competition for well targeted species among those fleets operating in waters within the jurisdiction of Senegal;
- the fish, particularly demersals, caught by artisanal fisherfolk are becoming scarce because of overfishing by motorised boats/industrial trawlers;
- artisanal fisheries in Senegal are dynamic and in the past few years this has resulted in an increase in the fishing effort for some fishermen (by making canoes larger and adapting ice containers for longer fishing trips on ice canoes);
- foreign boats cause serious damage to fishing communities (fatal accidents to artisanal fishermen following collisions with motorised/industrial boats during their incursions into the areas reserved for canoes, and the destruction of fishing gear).

With the creation in 1987 of the CNPS, which benefits from the material and technical assistance of a Senegalese NGO, Research Centre for the Development of Fisheries Intermediary Technologies (CREDETIP), fishermen are fast becoming a pressure group to be reckoned with. They are now able to defend their rights before the local authorities in charge of fisheries development. Thus, they took advantage of a seminar organised in Dakar in 1991 by the International Collective in Support of Fishworkers (ICSF) and CREDETIP to present their points of view on the ways and means necessary to ensure the survival of artisanal fisheries in Senegal,

as well as the grassroots development of fisherfolk communities. They had requested to be involved - just like their counterparts in the Industrial Shipowners Association - to defend their interests in negotiations concerning fishing agreements. They are demanding an extension of the zone reserved for artisanal fisheries from 6 to 12 nautical miles, compensation for families in case of accidents, the installation on board European vessels of equipment which enables the detection of canoes, and the sharing of control of fishing zones between fishing communities and the national coastguard.

It was in 1994 that artisanal fishermen became involved for the first time in the negotiations of international fishing agreements. They were thus able to participate in the different meetings organised for the latest fishing agreement between Senegal and the European Union which covers the period 1994 - 1996. The CNPS is not satisfied with the terms of the agreement although some of its requirements have effectively been taken into account, notably a reduction in the European fishing effort.

The participation of CNPS in the EEC-ACP Parity Assembly held in Dakar in 1995 gave fishermen the opportunity to express their concerns about the negative impact of the transfer of European boats to developing countries and the subsequent marginalisation of artisanal fisheries despite its importance in the economic and social development of Senegal. The European Parliament voted in, in September 1995 a resolution on "Fair Fisheries Agreements" in which it encourages artisanal fisherfolk's involvement in fishing agreement negotiations. Its Fishery Commission invited CNPS representatives to Brussels in February 1996 to express its views about the fishing agreement between Senegal and the European Union. The CNPS is also supported by the "Coalition for Fair Fisheries Agreements" which comprises more than 15 NGOs of European origin.

The artisanal fishermen members of the CNPS feel that Senegal will only be able to take full advantage of these international fishing agreements if the following conditions are fulfilled:

- authorising access by foreign boats to waters within the jurisdiction of Senegal based on the condition of stocks;
- extending to 12 nautical miles the area reserved for artisanal fisheries;
- making a regular inventory of the activity of industrial fishing boats;
- setting up a Joint Commission between the State and the CNPS for settling conflicts and ensuring safety at sea;
- using the financial penalties imposed to develop the sector; to exploit fishery resources in a more rational way for the benefit of the whole Senegalese population.

As for the Senegal - EU fishing agreement currently being negotiated, artisanal fishermen have again been involved. However, they regret that they do not have access to the texts regulating this type of agreement.

6. Perspectives and constraints for marine fisheries co-management in West Africa

6.1 Constraints

Four main elements have to be considered when differentiating between inland and marine fisheries. First, marine resources are often shared between several countries, which means that any management effort initiated by one country may be jeopardised without similar efforts in the other countries. This is particularly apparent with regard to highly migrant species like tuna. Second, some fisheries are sequential. Therefore, different operators fish the same species at different stages of maturity which then becomes a potential source of conflict. This is often the case between estuarine and coastal shrimp fisheries operators. Third, the migration pattern that characterises several fishing communities in West Africa may sometimes weaken individual communities' feeling of responsibility as far as the sustainability of the resource is concerned. Finally, there is an increasing concentration of fishing units in urban areas where they can benefit from services and good outlets, but where the concept of land tenure has generally been eroded.

The issue of the migration of fishermen needs to be carefully addressed, as a strong organisation can play a valuable role in the controlling of fishing effort, as observed in the case of Beninese migrant fishermen in Pointe-Noire, Congo (see Box 5). However, there is no control when migrating fishermen from Senegal, Ghana and Nigeria enter their fishery. One reason for this may be the level of social integration of these migrant communities into the host country, and absence of a feeling of security.

The following points also merit attention:

- boundaries are less well-defined in marine fisheries than in inland fisheries;
- there are many more user groups in marine fisheries (artisanal, industrial, nationals, foreigners) using many fishing techniques (active and passive gear, etc.);
- there is less control over inputs and outputs in marine fisheries.

In marine zones it is also difficult to find an equivalent of the concept of "Customary Marine Tenure" which is found in some inland fisheries. This is due to the physical shape of the West African coast which is very straight. The exceptions to this are the archipelago area in Guinea Bissau and the estuary of some rivers (Gambia, Casamance, Niger, Volta). Fish Aggregating Devices (FADs) employed in Cape Verde and Sao Tome and Principe could be considered as another form of "marine tenure".

In Customary Marine Tenure there is a need for the territorial division of coastal space, applicable customary laws, and clearly defined ownership or at least control over water. Unfortunately, these conditions are weakened by open access.

The best illustration of open access in the marine waters of West Africa is the activities of the migrant fishermen, who have no restriction of movement. Senegalese are found in Mauritania, Gambia, Guinea, Guinea Bissau; Ghanaians in Gambia, Sierra Leone, Liberia, Togo, Benin, Côte d'Ivoire; and Nigerians in Cameroon, Gabon, and Equatorial Guinea. These migrants may pay a fee to or rely on local suppliers for inputs and then sell fish on to local fishbuyers (middlemen); this level of increased effort, measured in fishing units, is not controlled. Migration is, however, almost non-existent in island states (Cape Verde, Sao Tome and Principe), and in Southern

African countries, Zaire and Angola.

The migration of different groups of fishermen has had an effect on the socio-cultural life of local populations; some of the negative influences have been:

- erosion of respect towards elders;
- declining influence of religion and beliefs;
- disintegration of the social community in urban centres.

Another problem facing marine fisheries management is the difficulty of finding alternative employment in coastal settlements. It is often easier to develop small-scale agriculture, animal husbandry, horticulture and other income-generating activities around inland water settlements.

Box 5: Organisation of the Beninese migrant fishermen in Pointe Noire, Congo

A detailed study of 500 Beninese migrant fishermen who have fished in the pelagic fishery of Pointe Noire in Congo for the last 30 years (Jul-Larsen 1993), shows that the numbers of both fishermen and of their big canoes have remained stable for last 10 to 15 years. For several reasons, the Beninese have managed to take the dominant position away from the Ghanaian migrant fishermen of the same origin, and from the same villages, as those Ghanaians already established have only managed to settle with great difficulty, and in small numbers. The study shows that the main reason behind the demographic stability is a very efficient and well-organised internal political institution among the foreign fishermen. They all depend heavily on this institution, which regulates their stay and all important transactions related to their work. This institution is the Association of Benin Fishermen that supervises credit relations, arbitrates in economic conflicts, and regulates labour contracts. The Association also ensures that their stay in Congo is legitimate, by assisting members in obtaining residence permits from the Congolese authorities. The Association even assists in the importing of essential fishing equipment when required. This particular type of fishery is relatively capital-intensive, and impossible to enter unless one is accepted as a member of the Association. Thus it can be said that to some extent the Association controls the demographic development of its own community. Other foreigners are not allowed to join, and the local Congolese fishermen are not organised enough to enter the same fishery. Similar organisations to the one in Pointe Noire are observed among most migrant groups of fishermen along the West African coast (Odotei 1989, 1991), and there are good reasons to assume that recruitment to these particular types of migrant fisheries in different foreign centres is strongly controlled by the fishermen themselves. Thus, even in a situation where open access seems to prevail, the internal regulation of recruitment to the fisheries functions as an important management model.

(E. Hviding and E. Jul-Larsen, 1995)

6.2 Opportunities

Effective fisheries management is complex, but it can be eased by directly involving the fishing community concerned and an opportunity to do so is being created by the new policies in the region which are both establishing and strengthening fisherfolk organisations. Members of the new and old organisations are benefiting from skills and management training programmes. Their power is also strengthened by sensitisation sessions on sustainable resource use. These programmes provide forums that are able to create more awareness of the serious impact of heavy and over-exploitation on the respective fisheries resources.

Many of these organisations are becoming better organised and more receptive to the fisheries administrations' new trend of devolving responsibility for the management and development of artisanal fisheries. Their empowerment in countries such as the Gambia, Guinea, Senegal, Gabon, Cote d'Ivoire and Ghana will give them the confidence to better participate in the design and implementation of fisheries management measures.

Once they take control or begin to show signs of willingness to be directly involved in the management and development of the resources, as in the countries mentioned above, appropriate training programmes can be easily drawn up to improve their individual and collective skills, literacy and numeracy levels. However, some resource users already have education levels that are adequate to effectively understand the more scientific basis for management issues. This was demonstrated at the national seminar organised for Aby Lagoon in the Cote d'Ivoire, where the justification for the introduction of drastic measures was based on scientific research information. This seminar also utilised the increasingly valued local knowledge and experience of the users of artisanal fisheries resources.

6.3 Strategies

Fisheries administrators and resource users have a special interest in removing fisheries from the open access arena. Apart from the desirability of removing inefficiencies generated within the sector, there is another strong concern. If the fisheries sector is to remain open access, it may be difficult to persuade other agencies and resource users to restrict their activities, since any incremental benefits will be dissipated in the same way as resource rent.

Fisheries are not the only open access resource in the coastal area. Often access remains free and open to key resources, such as coastal forest, mangroves and the inshore zone (used for the dumping of waste). As a result, other users of the coastal area may have a significant negative effect, not only on the fisheries sector, in the form of, for example, habitat destruction, aquatic pollution, but may also damage other valuable functions of the ecosystem.

These features mean that ICZM requires a mix of regulatory and economic methods by which to allocate resources. The measures to limit access to fisheries resources are direct and indirect and any future strategy should be a combination of both.

Management needs to be approached as a political rather than an administrative process. Many issues should be considered, e. g. employment, food supply, traditional rights, cultural values and income fluctuations and distribution. This process needs to be participatory if it is to achieve legitimacy. It also needs to balance interests and to provide a mechanism by which decisions can be made fairly, if consensus cannot be reached. Policy instruments that may be used in this process include awareness creation, local participation, targeting of benefits, training and education.

7. Conclusion

The artisanal fisheries sector in West Africa is threatened by reduced or depleting fish stocks, a degrading environment and an increasing population pressure. One approach to overcoming these threats is the organisation and sensitisation of the users of the fisheries resources to participate in their management.

Some positive results have been achieved by the users in the management of inland fisheries bodies. Local structures have been set up around lagoons and rivers and these are now involved in joint government and user management initiatives, now referred to as the 'co-management approach'. This approach mixes the 'top-down' and 'bottom-up' approaches in the development of fishing communities and so far, has shown positive results in the management of some inland fisheries bodies.

Similar initiatives are now being developed for the marine artisanal fisheries sub-sector. The resource users are being encouraged by public authorities to take over the responsibility of managing stocks, fishing effort and infrastructure. The activities and structures being utilised show that some fishing communities and fisherfolk organisations are now ready to effectively participate in the management of the resources they exploit.

The fisherfolk organisations involved in the consolidation of the participation of users in co-management, require incentives, especially the means and authority to apply and enforce enacted rules and regulations. It has been proved that these incentives can be provided from fishing agreement compensations and state or bilateral material assistance. The incentives will restore confidence between the state and the fisherfolk, who have always considered fisheries resources as common property. Open access encourages migrant fishermen, who are found all over the region. This group should therefore also be involved in the management system which should deal with whole fishing communities rather than only nationals, who are only a weak minority in some countries in the region. The migrant fishermen's involvement will give them a sense of belonging which will encourage them to conserve the resources for sustainable use.

Sustainable use of resources requires up-to-date scientific information which can be used as an effective tool to defend the sometimes drastic management measures. This gives researchers a key role in co-management, especially in the more complex marine artisanal fisheries. The current approach to the empowerment of fisherfolk in handling their own development will give them confidence and will encourage them to release more reliable information on the sector, which would help researchers and policy-makers to design and implement coherent co-management plans.

Experience has shown that the users of the artisanal fisheries resources often have the will and sometimes the structures to take up co-management responsibility for conserving the reducing or depleting resources. However, to strengthen their resolve and their awareness of the issues involved, such as the regulation of fishing effort and population pressure, they need training, technical assistance, more sensitisation and better organisation. These elements will make their empowerment more meaningful and will also facilitate their role in the implementation of the FAO Code of Conduct on Responsible Fisheries, which is the challenge ahead.

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Trends in the management of continental fisheries in Benin: The case of Lake Nokoue

Cyriaque Atti-Mama

Socio-economist

Hydraulic Department Parakou, Benin

Abstract

Fisheries management on Lake Nokoue has undergone three successive stages since the pre-colonial era i.e. traditional management, state management and, since 1993, co-management.

Traditional management, whose ultimate objective is the conservation of fisheries resources, is based on the values of a pre-colonial society, i.e. the belief in and fear of the sea gods and respect for the words of the elders. Respect for the measures and bans decreed by the authors of this management were guaranteed by the threat of sanctions, and social cohesion and control. This system of traditional management had been well served until the introduction of new values that came with the advent of colonialism.

State management of fisheries resources by the government, both colonial and post-colonial, was only marginally successful. First, because most of the time, the government lacked the political means to carry out its policies, and second, because the management measures recommended were based on concepts that were quite alien to those concerned, and hence acceptance was difficult.

The government was well aware of the many problems occurring on the lake but traditional management structures were slowly being eroded and management by the state had so far proved inefficient. Consequently, in a further attempt to rectify the situation the government encouraged fishermen to organise themselves and tried to make them shoulder the responsibility of resource management and the resolution of conflict. The fishermen, however, realised that the various associations which already existed in their communities were too corporatist to be able to solve all the problems apparent on the lake.

In response to this, the authorities helped to set up what are known as fishing committees and this development has been the most significant aspect of the Lake Nokoue experience in co-management. A fishing committee is a community structure comprising all the fishermen in a locality, village or district. Each committee is headed by an executive committee, comprising of five to eight elected members who represent the various fishing occupations practiced within the locality. These fishing committees, currently numbering 37, quickly appeared to be an appropriate response to the needs of the government and fishing communities.

Most members of the executive and some committee members understand its function and take their role seriously. All the committees carry out activities at varying levels of efficiency, activities directly related to fisheries management, i.e. sensitising and educating fishermen, mesh-

checking, seizing and destroying prohibited gear, resolving conflicts among fishermen, re-forestation and demarcating fish breeding zones. Actions carried out by the committees are appreciated by the entire community with the exception of those fishermen who use prohibited gear and, who therefore feel that their interests are threatened.

However, the achievement of a genuine co-management arrangement between the government and fishermen requires supplementary efforts from both partners. The Fisheries Department should:

- define more clearly its role with the nascent fishing committees;
- promote these committees all over Lake Nokoue and subsequently on other water bodies;
- enlarge the base of the committees by including other members apart from fishermen;
- lay strong emphasis on the sensitisation and education of fishermen;
- provide these committees with basic working tools.

With regard to fishermen, it is essential that their responsibility for fisheries management involves effective participation and the acceptance of voluntary service in anticipation of the participation of the entire community.

1. Introduction

1.1 Background and objective of the study

In November 1995, the Integrated Development of Artisanal Fisheries in West Africa (IDAF), organised a workshop in Conakry (Guinea) on participatory approaches and the practice of traditional fisheries management in West Africa. Eight documents were presented on nine communities from seven countries in the region. During this workshop, two conceptual presentations were made, the first by Dr. R.S. Pomeroy of the International Centre for Living Aquatic Resources Management (ICLARM) on "artisanal fisheries and co-management", and the second by Mr. S. Sverdrup-Jensen of the Institute of Fisheries Management, the North Sea Centre (IFM) on "analysis of co-management systems in fisheries: a research framework".

At the end of the workshop, recommendations were made including increasing knowledge on co-management experiments in West Africa, especially in Benin and Cote d'Ivoire. The present study addresses these concerns; its objective is to take stock of the trend away from traditional management towards co-management of fisheries resources on Lake Nokoue in Benin. Case studies carried out in African and Asian countries will allow ICLARM/IFM to have an increased and varied knowledge of co-management.

The present report on the case study of Benin includes an introduction, two sections and a conclusion. The introduction serves as background to the study, defines its objective and the methodology used. The first section details the features of Lake Nokoue, the operators concerned and the activities of fishermen, and examines trends in the ownership of water bodies. The second and more important section describes traditional management, the transition phase with the takeover of management by the Fisheries Authority and the co-management experiment with fishing committees. The conclusion returns to the major points of the study.

1.2 Methodology

The study was carried out in four interdependent phases: documentation, reconnaissance visits to the areas, field work and reporting.

Documentation was limited and directed towards the subject of the study. It is essentially based on presentations made during the Conakry workshop, recorded in the Technical Report No. 74 of the IDAF Programme and the Bourgoignie book (1972) on "Watermen".

Reconnaissance visits to the study area included a tour of Lake Nokoue and discussions with the local fisheries administration and fishermen on the practical organisation of the field work. 17 villages were selected for the survey. They are divided as follows: five east of the lake, five in the south and seven on the lake (lake villages).

Field work represents the most important aspect of the study. The main sources of information were: direct observation, interviews and discussions.

Direct observation was made when we passed through the water body and when we called at fishing villages. Essentially this made it possible to observe the occupation of the water body by the various fishing boats: the fishing operations, species of fish caught, the types of relationships between various individuals (fishermen, women fishmongers and others), as well as life in the villages, especially within the lake villages.

Data collection was based on semi-structured interviews and discussions with target groups. We distinguished two types of informants:

- secondary informants, i.e. officials from the Development and Fisheries Authority, officers and technicians specialising in fishing who are working in the field and are closely associated with fishing at the professional level and through their daily activities;
- major informants, i.e. eminent people and chief medicine men from the fishing villages, custodians and repositories of traditional values and knowledge, be they members or non-members of fishing committees.

2. Characteristics of fisheries on Lake Nokoue

2.1 Biological and physical features

Lake Nokoue is one of the largest inland water bodies in Benin, and covers 12,000 ha. It is situated north of the capital, Cotonou. It is bound on the west by Abomey-Calavi, on the east by the Porto-Novo lagoon to which it is linked by a channel, in the north by the flood plains of the Oueme and So rivers, and in the south by Cotonou, and is connected to the Atlantic Ocean by a channel. The habitat that Lake Nokoue offers is varied and is composed of sandy, sandy-muddy and muddy bottoms.

Lake Nokoue is in the humid tropical climate zone of southern Benin. The temperature of these waters which alternates between fresh and brackish, varies between 27° and 29°C. It has an average depth of 1.5 m. Fishing is carried out throughout the year but the waters yield more when the level is low, i.e. from November to June. The catch from the lake is multi-species with largely sedentary species, to which can be added two migratory species introduced through the channel link to the sea. Out of the thirty species caught, three are predominant, i.e. cichlidae, clupeidae and crustaceans, representing 85% of total production from the lake (22,000 tons in 1995).

Today it is difficult to say whether Lake Nokoue's fish resources are decreasing or not, because of the poor statistical data gathered over a long period. However, it is easy to state that the resources suffer heavy pressure with the increase in the number of fishermen and the entry of new people into the fishery due to insufficient measures to limit the access to the fishery.

2.2 Technical features

Fishing on the lake is carried out on an artisanal basis using various simple technologies. The various types of gear are often operated by individuals or reduced crew (two-three persons) in dugout canoes.

The fishing techniques used on Lake Nokoue can be grouped into five categories: fixed nets, castnets, traditional fish farming (fishing holes, *acadja*), hoop nets and longlines. Formerly, nets were handwoven, which kept the quantity low and facilitated mesh size control. Today, however, while the importation of nets has solved the problem of availability, it has also flooded the market with small mesh size nets which destroy aquatic fauna.

Among the fishing techniques used on Lake Nokoue, one should particularly mention the traditional fish farming technique, "ACADJA". It is a form of extensive fish farming which originates from Benin. The *acadjas* are a field of leafy branches installed in a lagoon with a maximum depth of 1.60 m (working in the 'field' requires standing in the water, with one's head above water) and soft muddy bottoms which enable the branches to be easily driven into it. The *acadja* system both fertilises the area, bringing in food to the fish, and serves as a nursery and protected zone against predators. In fact, the slow decomposition of the branches releases fertilising substances which are utilised by the algae which are then grazed upon by the fish. The area thus created permits species such as tilapia to reproduce throughout the year, unlike the unmanaged areas where they reproduce 2 or 3 times a year. The large *acadjas* installed in Lake Nokoue are generally fished twice a year while the small ones installed in the rivers can be fished up to eight times a year. A second technique is the fish hole, a type of extensive fish culture pond that floods when the lake water level rises and in which fish reproduce and attain maturity.

2.3 User group characteristics

Operators on Lake Nokoue

Users of Lake Nokoue are as varied as they are multi-sectoral. However, they can be grouped into three categories:

Main users (fishing-related activities)

- fishermen;
- women fishmongers;
- carriers of branches for *acadja*¹;
- ferrymen.

¹ *Acadja* is a form of extensive fish breeding with its origins in Benin. *Acadja* comprises branches submerged in water over an area of 1 to 2 hectares. The environment thus created favours the reproduction and development of the lake's target species.

The government, development and social agents

- local government officials (sous-prefets, mayors, village chiefs);
- officials of the Department of Fisheries;
- officials of the Regional Centre for Action for Rural Development (CARDER);
- NGOs.

Other users

- traders (both sexes) of products unrelated to fisheries (e.g. petroleum products, construction materials, lumber);
- tourism agencies (due to the lacustrine features of some villages in Lake Nokoue).

It is worth noting that the fisheries sector is surrounded by two state structures. They are on a national level, the Department of Fisheries, entrusted with policy-making, the policing of fishing, and the search for financing; its direct action in the field is limited to marine fisheries. The other structure, on a regional level, are the Centres for Regional Rural Development, which have within them a fisheries division and which conduct fisheries-related activities through fisheries agents directly under their authority. Between these two structures, both directly linked to the Ministry of Rural Development, there is no structural liaison, only collaborative relations.

Among the different types of operators on Lake Nokoue, we shall concentrate on those whose activities are directly linked to fishing.

Fishing activities and marketing of fisheries products

About 13,500 fishermen from Toffin ethnic groups (most of them living in the lake villages), Xwlah, Pedah and Aizo (neighbouring villages) operate on Lake Nokoue. The main activity of the fishermen living on the lake is fishing, complemented, in ever increasing proportions, by the traffic in petroleum and manufactured products across the water from Nigeria. For this category of fishermen, fishing is a somewhat commercial endeavour and all efforts, including technical innovations, are undertaken daily to get the maximum benefit from this activity. However, for those living on the outskirts of the lake, fishing and agriculture constitute the predominant activities.

The processing of and trading in fresh products from Lake Nokoue is the responsibility of fishermen's wives. Consequently, a strong bond based on trade and financial support is established between the fishermen and their wives. A large proportion of the crayfish and fish caught in the lake is sold fresh in Cotonou due to the proximity of the town to the lake. The remainder is processed (smoked or fried) and sold directly to consumers.

2.4 Trends in the ownership of water bodies

It is important to note that on Lake Nokoue, ownership has been dynamic and has undergone considerable evolution from the period when traditional societies were predominant until now. Even though the fishermen currently operating on the lake accept that water bodies are a gift from nature and are therefore free and available to everybody, the practice of the *acadja* technique is beginning to introduce changes to this notion.

Indeed, over the years, the areas marked out as under *acadja* have become the exclusive property of the individual or joint property of the family which developed them. Consequently, they are transferable and are an integral part of one's inheritance for one's descendants. Therefore, at present, while the areas not occupied by *acadja* are still free and accessible to everybody, the areas covered with *acadja* can and are often sold for between 120,000 and 400,000 FCFA² per hectare depending on whether those areas are plentiful with fish or not.

Moreover, demographic pressure and the desire to protect resources are such that today, it is no longer possible for a fisherman from a village to install his *acadja* in the waters of another locality. The waters adjacent to a locality are considered, through the practice, as an extension of their territory and therefore the exclusive property of the locality. Thus, a practice prevails which will put an end to the expansionist tendency of the Toffin (lake dwellers) who had the freedom to fish wherever there was water and fish.

The main biological, physical, technical and socio-economic characteristics of Lake Nokoue are summarised in Table 1.

² 1 US dollar = 520 FCFA (June 1996)

Table 1: Biological, physical, technical and socio-economic characteristics

| TITLE | INDICATORS | EXPLANATION |
|---|--|--|
| <i>Bio-technical attributes</i> | | |
| Mono- or multi-species fisheries | Multi-species catches | |
| Migratory or sedentary fisheries resources | Largely sedentary + 2 migratory species | Cichlidae (sedentary) clupeidae, penacides (migratory) |
| Exploitation level of resources | Resource under heavy pressure | |
| Housing conditions | Varied dwelling, sandy bed, sandy silty, silty, largely occupied water stretch, wholesome fish | |
| Single or multiple gear fishing | Multiple gear | Wedge nets, trailing nets, launched nets, hoop barriers, varied traps, square dipping nets |
| Artisanal or industrial fisheries | Artisanal fisheries | Wedging and lifting (straight nets), laying and removal (hoop nets, palangers), casting and lifting (cast net) |
| Level and combination of technology | Simple and varied technology, artisanal fisheries | Usually single gear with monoxyll boat, crew: 2 persons |
| Scattered or localised fishing models | | Partly daily fishing with sale of catches at fishing locations |
| <i>Market features</i> | | |
| Subsistence or commercial fishing | Largely commercial | 80% sold |
| Market structure | Scattered markets dominated by sellers (fishermen's wives) | |
| Market orientation | Local with internal shift market | |
| Value of products | Average and high | |
| <i>Socio-economic features</i> | | |
| Homogeneity/heterogeneity of users | Mostly homogeneous | |
| Dependence on fishing for subsistence | 60% | |
| Degree of user motivation | Commercial fisheries | |
| Attitudes to risk, innovation, collective action | Strong | |
| Information and skill level of fishing and management | Local sources of information | |

3: Management of fisheries on Lake Nokoue

The history of fisheries management on Lake Nokoue reveals three different modes of management, i.e. traditional management, management by the fishing authorities (government) and co-management.

3.1 Traditional management

This mode of management reflects the pre-colonial period when African societies were very hierarchical and subjected to a host of oral rules based on the values and principles characteristic of each environment. Fishing, being part of socio-economic reality, also had a form of organisation and management attached to it.

The bases of traditional management

In traditional African societies, especially among the fishermen of Lake Nokoue, three factors seem to have constituted the bases or strength of traditional management of fisheries, i.e. the belief in and fear of the gods, respect for the words of the elders and social control.

In the fisherman's environment, belief in the gods crudely referred to as witchcraft, and generally known in the south of Benin as voodoo, is a common feature of a traditional society. In this society, not only did everyone believe in the existence of these deities but they were also much feared because of the belief that if their laws were contravened, the gods would become vengeful and punitive. It should be observed that most of the measures for the management of fisheries were prescribed in the names of these deities or were even considered as the deities's laws. With regard to Lake Nokoue, there is a supreme water deity called *Anassi Gbegou* originating from a dry land in Weto village, west of the lake. As in every pantheon, the lake is believed to exist under the supreme *Anassi* deity with lesser gods reigning over each village of the lake.

Next to fear of the gods, respect for the words of elders and notable persons from the village constitute the second pillar on which management procedures rested. In African societies, the individual is brought up from infancy to have the highest respect for the words of the elders and the aged because, through their age and wisdom, they are assumed to embody and infallibly defend the interests of the community. Fishing taboos are elaborated by the council of notable persons from each locality or all the lake villages.

The third factor considered as a base of traditional management of fisheries on Lake Nokoue is the society itself which, thanks to its cohesion, exerts control on each individual through respect of the norms defined and accepted by all, and reinforced by the cohesion.

The players in traditional fisheries management

The elaboration of rules and management measures is not the responsibility of everyone but a small number of people who are guaranteed legality, and are invested with the power to legislate for others and to ensure respect for the measures. These people are traditional chiefs, high-ranking

medicine men, notable persons and heads of families. The initiative to enact a law regarding fisheries either comes from the traditional chief, seen as the guarantor of temporal power and social legality, or to the chief medicine man, regarded as the representative and mouthpiece of the gods on earth. Others include notable persons representing each large family in order to ensure representation and facilitate enforcement by all. The measures so elaborated have the power of the law behind them and to violate them is to threaten the community's cohesion and trample on the laws of the deities, the supreme guarantors of this cohesion.

Traditional management measures

The traditional management measures on Lake Nokoue are both divine by virtue of being closely linked with the water deities, and human because they are also made to protect the dominant activity of man on the lake. The objectives of these measures are to:

- avoid offending the water deities, providers of fish to the lake;
- preserve the resource by allowing it to reproduce and attain maturity;
- avoid the use of destructive gear and techniques.

The list of prohibitions included in tables 2 and 3 indicate both the spirit and scope of the measures.

Table 2: Traditional prohibitions pertaining to water bodies and their use

| PROHIBITIONS RELATED TO MANAGEMENT | PROHIBITIONS UNRELATED TO MANAGEMENT |
|---|---|
| - A day on which fishing is prohibited | - Prohibition of a menstruating woman from entering the water |
| - Periodic closure of fishing | - Prohibition of whistling on water |
| - Prohibition of the use of small mesh size nets | - Prohibition of fighting on water |
| - Compliance with a measure of spacing for openings of pots | - Propitiatory sacrifices to water deities (aim: to attract more fish into the lake) |
| - Prohibition of fishing in sacred places | - Prohibition of shedding human blood on the lake as a result of fighting |
| - Prohibition of fishing in shallow waters | - Prohibition of smoking on water - Prohibition of moving on water with light at night |

Table 3: Breakdown of prohibitions related to management

| FACTORS OF MANAGEMENT AND CORRESPONDING MEASURES | |
|--|--|
| Fishing gear | -Prohibition of the use of small mesh size nets |
| Preservation of reproductive zones | -Prohibition of fishing in areas designated as sacred -Prohibition of fishing in shallow waters |
| Opening and closing of fishing | -Periodic opening and closing of fishing -Prohibition of fishing on one out of every four days |
| Restriction of fishing effort | -Fishing activities carried out by men only (women and children do not fish) |

Fishermen's total belief in, adherence to and respect for the above-mentioned prescriptions are partly due to the factors on which their elaboration (respect for deities, words of wisdom, efficiency of social control) and the objective interests targeted (perpetuation of the community by safeguarding its major economic activities) are based.

However, beyond these factors which ensure compliance with rules, the fear of sanctions in the event of contraventions, is also a determining factor in guaranteeing adherence of these measures.

Sanctions

Sanctions are varied and proportional to the gravity of the offence committed, as shown in table 4.

Table 4: Offences and corresponding sanctions

| OFFENCE | GRAVITY | CORRESPONDING SANCTIONS |
|--|--------------|---|
| Fishing on a prohibited day, fishing in shallow waters and sacred places | Serious | Popular uprising, demolition of the house of the offender, refusal to sell foodstuffs to him, refusal to buy fish caught by the offender. <i>Fine:</i> 1 sheep, 1 pig, 2 chickens, 10 litres of local gin, maize flour, palm oil, kola nuts, pepper and 10,000 FCFA. |
| Fishing during the closure of fishing due to a ceremony | Moderate | <i>Fine:</i> 1 chicken, palm oil, kola nuts, 2 litres of local gin. |
| Use of pots with narrow openings or small mesh size nets (rare). | Less serious | Seizure of the pots or nets. |

as well as the grassroots development of fisherfolk communities. They had requested to be involved - just like their counterparts in the Industrial Shipowners Association - to defend their interests in negotiations concerning fishing agreements. They are demanding an extension of the zone reserved for artisanal fisheries from 6 to 12 nautical miles, compensation for families in case of accidents, the installation on board European vessels of equipment which enables the detection of canoes, and the sharing of control of fishing zones between fishing communities and the national coastguard.

It was in 1994 that artisanal fishermen became involved for the first time in the negotiations of international fishing agreements. They were thus able to participate in the different meetings organised for the latest fishing agreement between Senegal and the European Union which covers the period 1994 - 1996. The CNPS is not satisfied with the terms of the agreement although some of its requirements have effectively been taken into account, notably a reduction in the European fishing effort.

The participation of CNPS in the EEC-ACP Parity Assembly held in Dakar in 1995 gave fishermen the opportunity to express their concerns about the negative impact of the transfer of European boats to developing countries and the subsequent marginalisation of artisanal fisheries despite its importance in the economic and social development of Senegal. The European Parliament voted in, in September 1995 a resolution on "Fair Fisheries Agreements" in which it encourages artisanal fisherfolk's involvement in fishing agreement negotiations. Its Fishery Commission invited CNPS representatives to Brussels in February 1996 to express its views about the fishing agreement between Senegal and the European Union. The CNPS is also supported by the "Coalition for Fair Fisheries Agreements" which comprises more than 15 NGOs of European origin.

The artisanal fishermen members of the CNPS feel that Senegal will only be able to take full advantage of these international fishing agreements if the following conditions are fulfilled:

- authorising access by foreign boats to waters within the jurisdiction of Senegal based on the condition of stocks;
- extending to 12 nautical miles the area reserved for artisanal fisheries;
- making a regular inventory of the activity of industrial fishing boats;
- setting up a Joint Commission between the State and the CNPS for settling conflicts and ensuring safety at sea;
- using the financial penalties imposed to develop the sector; to exploit fishery resources in a more rational way for the benefit of the whole Senegalese population.

As for the Senegal - EU fishing agreement currently being negotiated, artisanal fishermen have again been involved. However, they regret that they do not have access to the texts regulating this type of agreement.

6. Perspectives and constraints for marine fisheries co-management in West Africa

6.1 Constraints

Four main elements have to be considered when differentiating between inland and marine fisheries. First, marine resources are often shared between several countries, which means that any management effort initiated by one country may be jeopardised without similar efforts in the other countries. This is particularly apparent with regard to highly migrant species like tuna. Second, some fisheries are sequential. Therefore, different operators fish the same species at different stages of maturity which then becomes a potential source of conflict. This is often the case between estuarine and coastal shrimp fisheries operators. Third, the migration pattern that characterises several fishing communities in West Africa may sometimes weaken individual communities' feeling of responsibility as far as the sustainability of the resource is concerned. Finally, there is an increasing concentration of fishing units in urban areas where they can benefit from services and good outlets, but where the concept of land tenure has generally been eroded.

The issue of the migration of fishermen needs to be carefully addressed, as a strong organisation can play a valuable role in the controlling of fishing effort, as observed in the case of Beninese migrant fishermen in Pointe-Noire, Congo (see Box 5). However, there is no control when migrating fishermen from Senegal, Ghana and Nigeria enter their fishery. One reason for this may be the level of social integration of these migrant communities into the host country, and absence of a feeling of security.

The following points also merit attention:

- boundaries are less well-defined in marine fisheries than in inland fisheries;
- there are many more user groups in marine fisheries (artisanal, industrial, nationals, foreigners) using many fishing techniques (active and passive gear, etc.);
- there is less control over inputs and outputs in marine fisheries.

In marine zones it is also difficult to find an equivalent of the concept of "Customary Marine Tenure" which is found in some inland fisheries. This is due to the physical shape of the West African coast which is very straight. The exceptions to this are the archipelago area in Guinea Bissau and the estuary of some rivers (Gambia, Casamance, Niger, Volta). Fish Aggregating Devices (FADs) employed in Cape Verde and Sao Tome and Principe could be considered as another form of "marine tenure".

In Customary Marine Tenure there is a need for the territorial division of coastal space, applicable customary laws, and clearly defined ownership or at least control over water. Unfortunately, these conditions are weakened by open access.

The best illustration of open access in the marine waters of West Africa is the activities of the migrant fishermen, who have no restriction of movement. Senegalese are found in Mauritania, Gambia, Guinea, Guinea Bissau; Ghanaians in Gambia, Sierra Leone, Liberia, Togo, Benin, Côte d'Ivoire; and Nigerians in Cameroon, Gabon, and Equatorial Guinea. These migrants may pay a fee to or rely on local suppliers for inputs and then sell fish on to local fishbuyers (middlemen); this level of increased effort, measured in fishing units, is not controlled. Migration is, however, almost non-existent in island states (Cape Verde, Sao Tome and Principe), and in Southern

African countries, Zaire and Angola.

The migration of different groups of fishermen has had an effect on the socio-cultural life of local populations; some of the negative influences have been:

- erosion of respect towards elders;
- declining influence of religion and beliefs;
- disintegration of the social community in urban centres.

Another problem facing marine fisheries management is the difficulty of finding alternative employment in coastal settlements. It is often easier to develop small-scale agriculture, animal husbandry, horticulture and other income-generating activities around inland water settlements.

Box 5: Organisation of the Beninese migrant fishermen in Pointe Noire, Congo

A detailed study of 500 Beninese migrant fishermen who have fished in the pelagic fishery of Pointe Noire in Congo for the last 30 years (Jul-Larsen 1993), shows that the numbers of both fishermen and of their big canoes have remained stable for last 10 to 15 years. For several reasons, the Beninese have managed to take the dominant position away from the Ghanaian migrant fishermen of the same origin, and from the same villages, as those Ghanaians already established have only managed to settle with great difficulty, and in small numbers. The study shows that the main reason behind the demographic stability is a very efficient and well-organised internal political institution among the foreign fishermen. They all depend heavily on this institution, which regulates their stay and all important transactions related to their work. This institution is the Association of Benin Fishermen that supervises credit relations, arbitrates in economic conflicts, and regulates labour contracts. The Association also ensures that their stay in Congo is legitimate, by assisting members in obtaining residence permits from the Congolese authorities. The Association even assists in the importing of essential fishing equipment when required. This particular type of fishery is relatively capital-intensive, and impossible to enter unless one is accepted as a member of the Association. Thus it can be said that to some extent the Association controls the demographic development of its own community. Other foreigners are not allowed to join, and the local Congolese fishermen are not organised enough to enter the same fishery. Similar organisations to the one in Pointe Noire are observed among most migrant groups of fishermen along the West African coast (Odotei 1989, 1991), and there are good reasons to assume that recruitment to these particular types of migrant fisheries in different foreign centres is strongly controlled by the fishermen themselves. Thus, even in a situation where open access seems to prevail, the internal regulation of recruitment to the fisheries functions as an important management model.

(E. Hviding and E. Jul-Larsen, 1995)

6.2 Opportunities

Effective fisheries management is complex, but it can be eased by directly involving the fishing community concerned and an opportunity to do so is being created by the new policies in the region which are both establishing and strengthening fisherfolk organisations. Members of the new and old organisations are benefiting from skills and management training programmes. Their power is also strengthened by sensitisation sessions on sustainable resource use. These programmes provide forums that are able to create more awareness of the serious impact of heavy and over-exploitation on the respective fisheries resources.

Many of these organisations are becoming better organised and more receptive to the fisheries administrations' new trend of devolving responsibility for the management and development of artisanal fisheries. Their empowerment in countries such as the Gambia, Guinea, Senegal, Gabon, Cote d'Ivoire and Ghana will give them the confidence to better participate in the design and implementation of fisheries management measures.

Once they take control or begin to show signs of willingness to be directly involved in the management and development of the resources, as in the countries mentioned above, appropriate training programmes can be easily drawn up to improve their individual and collective skills, literacy and numeracy levels. However, some resource users already have education levels that are adequate to effectively understand the more scientific basis for management issues. This was demonstrated at the national seminar organised for Aby Lagoon in the Cote d'Ivoire, where the justification for the introduction of drastic measures was based on scientific research information. This seminar also utilised the increasingly valued local knowledge and experience of the users of artisanal fisheries resources.

6.3 Strategies

Fisheries administrators and resource users have a special interest in removing fisheries from the open access arena. Apart from the desirability of removing inefficiencies generated within the sector, there is another strong concern. If the fisheries sector is to remain open access, it may be difficult to persuade other agencies and resource users to restrict their activities, since any incremental benefits will be dissipated in the same way as resource rent.

Fisheries are not the only open access resource in the coastal area. Often access remains free and open to key resources, such as coastal forest, mangroves and the inshore zone (used for the dumping of waste). As a result, other users of the coastal area may have a significant negative effect, not only on the fisheries sector, in the form of, for example, habitat destruction, aquatic pollution, but may also damage other valuable functions of the ecosystem.

These features mean that ICZM requires a mix of regulatory and economic methods by which to allocate resources. The measures to limit access to fisheries resources are direct and indirect and any future strategy should be a combination of both.

Management needs to be approached as a political rather than an administrative process. Many issues should be considered, e. g. employment, food supply, traditional rights, cultural values and income fluctuations and distribution. This process needs to be participatory if it is to achieve legitimacy. It also needs to balance interests and to provide a mechanism by which decisions can be made fairly, if consensus cannot be reached. Policy instruments that may be used in this process include awareness creation, local participation, targeting of benefits, training and education.

7. Conclusion

The artisanal fisheries sector in West Africa is threatened by reduced or depleting fish stocks, a degrading environment and an increasing population pressure. One approach to overcoming these threats is the organisation and sensitisation of the users of the fisheries resources to participate in their management.

Some positive results have been achieved by the users in the management of inland fisheries bodies. Local structures have been set up around lagoons and rivers and these are now involved in joint government and user management initiatives, now referred to as the 'co-management approach'. This approach mixes the 'top-down' and 'bottom-up' approaches in the development of fishing communities and so far, has shown positive results in the management of some inland fisheries bodies.

Similar initiatives are now being developed for the marine artisanal fisheries sub-sector. The resource users are being encouraged by public authorities to take over the responsibility of managing stocks, fishing effort and infrastructure. The activities and structures being utilised show that some fishing communities and fisherfolk organisations are now ready to effectively participate in the management of the resources they exploit.

The fisherfolk organisations involved in the consolidation of the participation of users in co-management, require incentives, especially the means and authority to apply and enforce enacted rules and regulations. It has been proved that these incentives can be provided from fishing agreement compensations and state or bilateral material assistance. The incentives will restore confidence between the state and the fisherfolk, who have always considered fisheries resources as common property. Open access encourages migrant fishermen, who are found all over the region. This group should therefore also be involved in the management system which should deal with whole fishing communities rather than only nationals, who are only a weak minority in some countries in the region. The migrant fishermen's involvement will give them a sense of belonging which will encourage them to conserve the resources for sustainable use.

Sustainable use of resources requires up-to-date scientific information which can be used as an effective tool to defend the sometimes drastic management measures. This gives researchers a key role in co-management, especially in the more complex marine artisanal fisheries. The current approach to the empowerment of fisherfolk in handling their own development will give them confidence and will encourage them to release more reliable information on the sector, which would help researchers and policy-makers to design and implement coherent co-management plans.

Experience has shown that the users of the artisanal fisheries resources often have the will and sometimes the structures to take up co-management responsibility for conserving the reducing or depleting resources. However, to strengthen their resolve and their awareness of the issues involved, such as the regulation of fishing effort and population pressure, they need training, technical assistance, more sensitisation and better organisation. These elements will make their empowerment more meaningful and will also facilitate their role in the implementation of the FAO Code of Conduct on Responsible Fisheries, which is the challenge ahead.

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Trends in the management of continental fisheries in Benin: The case of Lake Nokoue

Cyriaque Atti-Mama

Socio-economist

Hydraulic Department Parakou, Benin

Abstract

Fisheries management on Lake Nokoue has undergone three successive stages since the pre-colonial era i.e. traditional management, state management and, since 1993, co-management.

Traditional management, whose ultimate objective is the conservation of fisheries resources, is based on the values of a pre-colonial society, i.e. the belief in and fear of the sea gods and respect for the words of the elders. Respect for the measures and bans decreed by the authors of this management were guaranteed by the threat of sanctions, and social cohesion and control. This system of traditional management had been well served until the introduction of new values that came with the advent of colonialism.

State management of fisheries resources by the government, both colonial and post-colonial, was only marginally successful. First, because most of the time, the government lacked the political means to carry out its policies, and second, because the management measures recommended were based on concepts that were quite alien to those concerned, and hence acceptance was difficult.

The government was well aware of the many problems occurring on the lake but traditional management structures were slowly being eroded and management by the state had so far proved inefficient. Consequently, in a further attempt to rectify the situation the government encouraged fishermen to organise themselves and tried to make them shoulder the responsibility of resource management and the resolution of conflict. The fishermen, however, realised that the various associations which already existed in their communities were too corporatist to be able to solve all the problems apparent on the lake.

In response to this, the authorities helped to set up what are known as fishing committees and this development has been the most significant aspect of the Lake Nokoue experience in co-management. A fishing committee is a community structure comprising all the fishermen in a locality, village or district. Each committee is headed by an executive committee, comprising of five to eight elected members who represent the various fishing occupations practiced within the locality. These fishing committees, currently numbering 37, quickly appeared to be an appropriate response to the needs of the government and fishing communities.

Most members of the executive and some committee members understand its function and take their role seriously. All the committees carry out activities at varying levels of efficiency, activities directly related to fisheries management, i.e. sensitising and educating fishermen, mesh-

checking, seizing and destroying prohibited gear, resolving conflicts among fishermen, re-forestation and demarcating fish breeding zones. Actions carried out by the committees are appreciated by the entire community with the exception of those fishermen who use prohibited gear and, who therefore feel that their interests are threatened.

However, the achievement of a genuine co-management arrangement between the government and fishermen requires supplementary efforts from both partners. The Fisheries Department should:

- define more clearly its role with the nascent fishing committees;
- promote these committees all over Lake Nokoue and subsequently on other water bodies;
- enlarge the base of the committees by including other members apart from fishermen;
- lay strong emphasis on the sensitisation and education of fishermen;
- provide these committees with basic working tools.

With regard to fishermen, it is essential that their responsibility for fisheries management involves effective participation and the acceptance of voluntary service in anticipation of the participation of the entire community.

1. Introduction

1.1 Background and objective of the study

In November 1995, the Integrated Development of Artisanal Fisheries in West Africa (IDAF), organised a workshop in Conakry (Guinea) on participatory approaches and the practice of traditional fisheries management in West Africa. Eight documents were presented on nine communities from seven countries in the region. During this workshop, two conceptual presentations were made, the first by Dr. R.S. Pomeroy of the International Centre for Living Aquatic Resources Management (ICLARM) on "artisanal fisheries and co-management", and the second by Mr. S. Sverdrup-Jensen of the Institute of Fisheries Management, the North Sea Centre (IFM) on "analysis of co-management systems in fisheries: a research framework".

At the end of the workshop, recommendations were made including increasing knowledge on co-management experiments in West Africa, especially in Benin and Cote d'Ivoire. The present study addresses these concerns; its objective is to take stock of the trend away from traditional management towards co-management of fisheries resources on Lake Nokoue in Benin. Case studies carried out in African and Asian countries will allow ICLARM/IFM to have an increased and varied knowledge of co-management.

The present report on the case study of Benin includes an introduction, two sections and a conclusion. The introduction serves as background to the study, defines its objective and the methodology used. The first section details the features of Lake Nokoue, the operators concerned and the activities of fishermen, and examines trends in the ownership of water bodies. The second and more important section describes traditional management, the transition phase with the takeover of management by the Fisheries Authority and the co-management experiment with fishing committees. The conclusion returns to the major points of the study.

1.2 Methodology

The study was carried out in four interdependent phases: documentation, reconnaissance visits to the areas, field work and reporting.

Documentation was limited and directed towards the subject of the study. It is essentially based on presentations made during the Conakry workshop, recorded in the Technical Report No. 74 of the IDAF Programme and the Bourgoignie book (1972) on "Watermen".

Reconnaissance visits to the study area included a tour of Lake Nokoue and discussions with the local fisheries administration and fishermen on the practical organisation of the field work. 17 villages were selected for the survey. They are divided as follows: five east of the lake, five in the south and seven on the lake (lake villages).

Field work represents the most important aspect of the study. The main sources of information were: direct observation, interviews and discussions.

Direct observation was made when we passed through the water body and when we called at fishing villages. Essentially this made it possible to observe the occupation of the water body by the various fishing boats: the fishing operations, species of fish caught, the types of relationships between various individuals (fishermen, women fishmongers and others), as well as life in the villages, especially within the lake villages.

Data collection was based on semi-structured interviews and discussions with target groups. We distinguished two types of informants:

- secondary informants, i.e. officials from the Development and Fisheries Authority, officers and technicians specialising in fishing who are working in the field and are closely associated with fishing at the professional level and through their daily activities;
- major informants, i.e. eminent people and chief medicine men from the fishing villages, custodians and repositories of traditional values and knowledge, be they members or non-members of fishing committees.

2. Characteristics of fisheries on Lake Nokoue

2.1 Biological and physical features

Lake Nokoue is one of the largest inland water bodies in Benin, and covers 12,000 ha. It is situated north of the capital, Cotonou. It is bound on the west by Abomey-Calavi, on the east by the Porto-Novo lagoon to which it is linked by a channel, in the north by the flood plains of the Oueme and So rivers, and in the south by Cotonou, and is connected to the Atlantic Ocean by a channel. The habitat that Lake Nokoue offers is varied and is composed of sandy, sandy-muddy and muddy bottoms.

Lake Nokoue is in the humid tropical climate zone of southern Benin. The temperature of these waters which alternates between fresh and brackish, varies between 27° and 29°C. It has an average depth of 1.5 m. Fishing is carried out throughout the year but the waters yield more when the level is low, i.e. from November to June. The catch from the lake is multi-species with largely sedentary species, to which can be added two migratory species introduced through the channel link to the sea. Out of the thirty species caught, three are predominant, i.e. cichlidae, clupeidae and crustaceans, representing 85% of total production from the lake (22,000 tons in 1995).

Today it is difficult to say whether Lake Nokoue's fish resources are decreasing or not, because of the poor statistical data gathered over a long period. However, it is easy to state that the resources suffer heavy pressure with the increase in the number of fishermen and the entry of new people into the fishery due to insufficient measures to limit the access to the fishery.

2.2 Technical features

Fishing on the lake is carried out on an artisanal basis using various simple technologies. The various types of gear are often operated by individuals or reduced crew (two-three persons) in dugout canoes.

The fishing techniques used on Lake Nokoue can be grouped into five categories: fixed nets, castnets, traditional fish farming (fishing holes, *acadja*), hoop nets and longlines. Formerly, nets were handwoven, which kept the quantity low and facilitated mesh size control. Today, however, while the importation of nets has solved the problem of availability, it has also flooded the market with small mesh size nets which destroy aquatic fauna.

Among the fishing techniques used on Lake Nokoue, one should particularly mention the traditional fish farming technique, "ACADJA". It is a form of extensive fish farming which originates from Benin. The *acadjas* are a field of leafy branches installed in a lagoon with a maximum depth of 1.60 m (working in the 'field' requires standing in the water, with one's head above water) and soft muddy bottoms which enable the branches to be easily driven into it. The *acadja* system both fertilises the area, bringing in food to the fish, and serves as a nursery and protected zone against predators. In fact, the slow decomposition of the branches releases fertilising substances which are utilised by the algae which are then grazed upon by the fish. The area thus created permits species such as tilapia to reproduce throughout the year, unlike the unmanaged areas where they reproduce 2 or 3 times a year. The large *acadjas* installed in Lake Nokoue are generally fished twice a year while the small ones installed in the rivers can be fished up to eight times a year. A second technique is the fish hole, a type of extensive fish culture pond that floods when the lake water level rises and in which fish reproduce and attain maturity.

2.3 User group characteristics

Operators on Lake Nokoue

Users of Lake Nokoue are as varied as they are multi-sectoral. However, they can be grouped into three categories:

Main users (fishing-related activities)

- fishermen;
- women fishmongers;
- carriers of branches for *acadja*¹;
- ferrymen.

¹ *Acadja* is a form of extensive fish breeding with its origins in Benin. *Acadja* comprises branches submerged in water over an area of 1 to 2 hectares. The environment thus created favours the reproduction and development of the lake's target species.

The government, development and social agents

- local government officials (sous-prefets, mayors, village chiefs);
- officials of the Department of Fisheries;
- officials of the Regional Centre for Action for Rural Development (CARDER);
- NGOs.

Other users

- traders (both sexes) of products unrelated to fisheries (e.g. petroleum products, construction materials, lumber);
- tourism agencies (due to the lacustrine features of some villages in Lake Nokoue).

It is worth noting that the fisheries sector is surrounded by two state structures. They are on a national level, the Department of Fisheries, entrusted with policy-making, the policing of fishing, and the search for financing; its direct action in the field is limited to marine fisheries. The other structure, on a regional level, are the Centres for Regional Rural Development, which have within them a fisheries division and which conduct fisheries-related activities through fisheries agents directly under their authority. Between these two structures, both directly linked to the Ministry of Rural Development, there is no structural liaison, only collaborative relations.

Among the different types of operators on Lake Nokoue, we shall concentrate on those whose activities are directly linked to fishing.

Fishing activities and marketing of fisheries products

About 13,500 fishermen from Toffin ethnic groups (most of them living in the lake villages), Xwlah, Pedah and Aizo (neighbouring villages) operate on Lake Nokoue. The main activity of the fishermen living on the lake is fishing, complemented, in ever increasing proportions, by the traffic in petroleum and manufactured products across the water from Nigeria. For this category of fishermen, fishing is a somewhat commercial endeavour and all efforts, including technical innovations, are undertaken daily to get the maximum benefit from this activity. However, for those living on the outskirts of the lake, fishing and agriculture constitute the predominant activities.

The processing of and trading in fresh products from Lake Nokoue is the responsibility of fishermen's wives. Consequently, a strong bond based on trade and financial support is established between the fishermen and their wives. A large proportion of the crayfish and fish caught in the lake is sold fresh in Cotonou due to the proximity of the town to the lake. The remainder is processed (smoked or fried) and sold directly to consumers.

2.4 Trends in the ownership of water bodies

It is important to note that on Lake Nokoue, ownership has been dynamic and has undergone considerable evolution from the period when traditional societies were predominant until now. Even though the fishermen currently operating on the lake accept that water bodies are a gift from nature and are therefore free and available to everybody, the practice of the *acadja* technique is beginning to introduce changes to this notion.

Indeed, over the years, the areas marked out as under *acadja* have become the exclusive property of the individual or joint property of the family which developed them. Consequently, they are transferable and are an integral part of one's inheritance for one's descendants. Therefore, at present, while the areas not occupied by *acadja* are still free and accessible to everybody, the areas covered with *acadja* can and are often sold for between 120,000 and 400,000 FCFA² per hectare depending on whether those areas are plentiful with fish or not.

Moreover, demographic pressure and the desire to protect resources are such that today, it is no longer possible for a fisherman from a village to install his *acadja* in the waters of another locality. The waters adjacent to a locality are considered, through the practice, as an extension of their territory and therefore the exclusive property of the locality. Thus, a practice prevails which will put an end to the expansionist tendency of the Toffin (lake dwellers) who had the freedom to fish wherever there was water and fish.

The main biological, physical, technical and socio-economic characteristics of Lake Nokoue are summarised in Table 1.

² 1 US dollar = 520 FCFA (June 1996)

Table 1: Biological, physical, technical and socio-economic characteristics

| TITLE | INDICATORS | EXPLANATION |
|---|--|--|
| <i>Bio-technical attributes</i> | | |
| Mono- or multi-species fisheries | Multi-species catches | |
| Migratory or sedentary fisheries resources | Largely sedentary + 2 migratory species | Cichlidae (sedentary) clupeidae, penacides (migratory) |
| Exploitation level of resources | Resource under heavy pressure | |
| Housing conditions | Varied dwelling, sandy bed, sandy silty, silty, largely occupied water stretch, wholesome fish | |
| Single or multiple gear fishing | Multiple gear | Wedge nets, trailing nets, launched nets, hoop barriers, varied traps, square dipping nets |
| Artisanal or industrial fisheries | Artisanal fisheries | Wedging and lifting (straight nets), laying and removal (hoop nets, palangers), casting and lifting (cast net) |
| Level and combination of technology | Simple and varied technology, artisanal fisheries | Usually single gear with monoxyl boat, crew: 2 persons |
| Scattered or localised fishing models | | Partly daily fishing with sale of catches at fishing locations |
| <i>Market features</i> | | |
| Subsistence or commercial fishing | Largely commercial | 80% sold |
| Market structure | Scattered markets dominated by sellers (fishermen's wives) | |
| Market orientation | Local with internal shift market | |
| Value of products | Average and high | |
| <i>Socio-economic features</i> | | |
| Homogeneity/heterogeneity of users | Mostly homogeneous | |
| Dependence on fishing for subsistence | 60% | |
| Degree of user motivation | Commercial fisheries | |
| Attitudes to risk, innovation, collective action | Strong | |
| Information and skill level of fishing and management | Local sources of information | |

3. Management of fisheries on Lake Nokoue

The history of fisheries management on Lake Nokoue reveals three different modes of management, i.e. traditional management, management by the fishing authorities (government) and co-management.

3.1 Traditional management

This mode of management reflects the pre-colonial period when African societies were very hierarchical and subjected to a host of oral rules based on the values and principles characteristic of each environment. Fishing, being part of socio-economic reality, also had a form of organisation and management attached to it.

The bases of traditional management

In traditional African societies, especially among the fishermen of Lake Nokoue, three factors seem to have constituted the bases or strength of traditional management of fisheries, i.e. the belief in and fear of the gods, respect for the words of the elders and social control.

In the fisherman's environment, belief in the gods crudely referred to as witchcraft, and generally known in the south of Benin as voodoo, is a common feature of a traditional society. In this society, not only did everyone believe in the existence of these deities but they were also much feared because of the belief that if their laws were contravened, the gods would become vengeful and punitive. It should be observed that most of the measures for the management of fisheries were prescribed in the names of these deities or were even considered as the deities's laws. With regard to Lake Nokoue, there is a supreme water deity called *Anassi Gbegou* originating from a dry land in Weto village, west of the lake. As in every pantheon, the lake is believed to exist under the supreme *Anassi* deity with lesser gods reigning over each village of the lake.

Next to fear of the gods, respect for the words of elders and notable persons from the village constitute the second pillar on which management procedures rested. In African societies, the individual is brought up from infancy to have the highest respect for the words of the elders and the aged because, through their age and wisdom, they are assumed to embody and infallibly defend the interests of the community. Fishing taboos are elaborated by the council of notable persons from each locality or all the lake villages.

The third factor considered as a base of traditional management of fisheries on Lake Nokoue is the society itself which, thanks to its cohesion, exerts control on each individual through respect of the norms defined and accepted by all, and reinforced by the cohesion.

The players in traditional fisheries management

The elaboration of rules and management measures is not the responsibility of everyone but a small number of people who are guaranteed legality, and are invested with the power to legislate for others and to ensure respect for the measures. These people are traditional chiefs, high-ranking

medicine men, notable persons and heads of families. The initiative to enact a law regarding fisheries either comes from the traditional chief, seen as the guarantor of temporal power and social legality, or to the chief medicine man, regarded as the representative and mouthpiece of the gods on earth. Others include notable persons representing each large family in order to ensure representation and facilitate enforcement by all. The measures so elaborated have the power of the law behind them and to violate them is to threaten the community's cohesion and trample on the laws of the deities, the supreme guarantors of this cohesion.

Traditional management measures

The traditional management measures on Lake Nokoue are both divine by virtue of being closely linked with the water deities, and human because they are also made to protect the dominant activity of man on the lake. The objectives of these measures are to:

- avoid offending the water deities, providers of fish to the lake;
- preserve the resource by allowing it to reproduce and attain maturity;
- avoid the use of destructive gear and techniques.

The list of prohibitions included in tables 2 and 3 indicate both the spirit and scope of the measures.

Table 2: Traditional prohibitions pertaining to water bodies and their use

| PROHIBITIONS RELATED TO MANAGEMENT | PROHIBITIONS UNRELATED TO MANAGEMENT |
|---|---|
| - A day on which fishing is prohibited | - Prohibition of a menstruating woman from entering the water |
| - Periodic closure of fishing | - Prohibition of whistling on water |
| - Prohibition of the use of small mesh size nets | - Prohibition of fighting on water |
| - Compliance with a measure of spacing for openings of pots | - Propitiatory sacrifices to water deities (aim: to attract more fish into the lake) |
| - Prohibition of fishing in sacred places | - Prohibition of shedding human blood on the lake as a result of fighting |
| - Prohibition of fishing in shallow waters | - Prohibition of smoking on water - Prohibition of moving on water with light at night |

Table 3: Breakdown of prohibitions related to management

| FACTORS OF MANAGEMENT AND CORRESPONDING MEASURES | |
|--|--|
| Fishing gear | -Prohibition of the use of small mesh size nets |
| Preservation of reproductive zones | -Prohibition of fishing in areas designated as sacred -Prohibition of fishing in shallow waters |
| Opening and closing of fishing | -Periodic opening and closing of fishing -Prohibition of fishing on one out of every four days |
| Restriction of fishing effort | -Fishing activities carried out by men only (women and children do not fish) |

Fishermen's total belief in, adherence to and respect for the above-mentioned prescriptions are partly due to the factors on which their elaboration (respect for deities, words of wisdom, efficiency of social control) and the objective interests targeted (perpetuation of the community by safeguarding its major economic activities) are based.

However, beyond these factors which ensure compliance with rules, the fear of sanctions in the event of contraventions, is also a determining factor in guaranteeing adherence of these measures.

Sanctions

Sanctions are varied and proportional to the gravity of the offence committed, as shown in table 4.

Table 4: Offences and corresponding sanctions .

| OFFENCE | GRAVITY | CORRESPONDING SANCTIONS |
|--|--------------|---|
| Fishing on a prohibited day, fishing in shallow waters and sacred places | Serious | Popular uprising, demolition of the house of the offender, refusal to sell foodstuffs to him, refusal to buy fish caught by the offender. <i>Fine:</i> 1 sheep, 1 pig, 2 chickens, 10 litres of local gin, maize flour, palm oil, kola nuts, pepper and 10,000 FCFA. |
| Fishing during the closure of fishing due to a ceremony | Moderate | <i>Fine:</i> 1 chicken, palm oil, kola nuts, 2 litres of local gin. |
| Use of pots with narrow openings or small mesh size nets (rare). | Less serious | Seizure of the pots or nets. |

The aim of the sanctions is to punish the offence. However, the ultimate aim seems to be to make the individual aware of the harmful consequences of contravening rules, and to make him redress the wrong. For a more serious offence, e.g. a fishing trip on a day of rest, the stages of sanction are as follows:

1. Popular disapproval.
2. Laying the loincloth of Zangan³ fetish in front of the individual's house.
3. Refusing to sell food to him.
4. Refusing to buy fish caught by him.

If the person rejects these sanctions and leaves the village, the same sanctions await him as soon as he arrives in another village. Consequently, there is no respite for him until all the sanctions are enforced. The sign of accepting one's guilt of an offence and the wish to redress it, is tying a palm frond around the neck and prostrating oneself before the chief medicine man and traditional chief, after which the relevant fines are quoted to him as indicated in the above list. As soon as the stipulated fines are paid, ceremonies are organised to appease the water deities and the individual is re-integrated into society. In the final analysis, the sanctions seem to be aimed at ensuring harmony and social integrity.

This form of traditional management which had once worked perfectly in a particular era, now appears to be showing signs of uncertainty. From the survey carried out on Lake Nokoue, the non-practice of traditional management is due to the reasons:

- introduction of monotheist religions which has caused a regression in the belief in voodoo;
- decline in degree of regard for sacred values and their consequent de-mystification;
- change in traditional values due to contact with the outside world and other sets of values;
- lack of respect for the words of the elders;
- demographic pressures with consequent increase in fishing effort.

In the light of all the pressures on the traditional management system, the government, through the Fisheries Authority, has tried to contain its inadequacy and has endeavoured to find some alternative solutions to the modern-day problems facing fisheries.

3.2 State management of fisheries

The state takeover of fisheries management is historically placed between traditional management and the ongoing co-management experiments. The terms for describing this form of management are as many as they are varied. Reference is often made to official management, normative and conventional management. However, whatever the terms used, such management seems to be based on a centralised approach whereby all the tools are concentrated in the state through the

³ Zangan, Chief of Zangbeto whose duty is to ensure the security of the village.

fisheries authority or the structure established for that purpose.

Reasons for state intervention

The implication of government agencies in fisheries management seems to be based on two main reasons: management needs, following the reduction of traditional control and the need for the state to exert its normative and regulatory function for the benefit of the whole of society.

The introduction of new religions and values, the increase in the number of fishermen exerting a strong pressure on resources, and dwindling social cohesion, have undermined the bases of traditional management and reduced its control over fishing activities. Consequently, a number of problems have arisen in the fisheries sector, e.g. unequal access to the resource, use of gear with destructive meshes, and a lack of respect for regulatory measures.

During the period of colonisation, and even more so in the early years of independence, successive governments decided to reorganise the entire social and economic life of African states. From this perspective, no sector in society could escape from state control and organisation. In fisheries, this resulted in the establishment of management structures, i.e. the Department of Forestry initially and subsequently, in 1963, the Fisheries Department. Prior to 1963, the Department of Forestry was responsible for fisheries.

State management tools

The two management tools employed by the state are legal and administrative in nature. Based on the premise that water bodies are state property, it became the prerogative of the state to conceive and elaborate legal tools to back up their management. With regard to inland artisanal fisheries in Benin, the legal texts regulating the practice of fisheries contain:

- the definition of the conditions for fishing in inland waters, Order No. 20/PR/MARC/SA of April 25, 1966;
- fixing of authorised mesh sizes and minimum spacing between pot openings, Decree No. 5/MARC/ME of January 16, 1976;
- identification of prohibited products in particular stretches of water due to unsuitable mesh size, Official Gazette No. 207 IF/APA of January 30, 1950.

These texts are mostly statutory (decrees, orders and decisions) and are made by state organs and local fisheries departments. They aim, as a last resort, to preserve resources and wholesome fishing practices.

The administrative tool is usually the Department of Fisheries, comprising a central structure (central departments) and decentralised departments across the country. The duties of this structure are: the definition of a development strategy for the sector, the elaboration of rules, and follow-up and control of the application of the texts in force. It should be noted that as its prerogative, the Fisheries Authority is required to play the dual role of extension agent and fisheries police.

Another management tool which the state has to hand is the establishment of cooperative fishing structures and the processing of produce from fishing.

Results obtained

With state management, a considerable amount of laudable effort has been made and the fisheries sector began to realise positive advantages. However, it is necessary to acknowledge that the degree of success attained through conventional management was limited, as all the good intentions and even those statutes elaborated with a lot of care, have not produced the expected results because of the following limiting factors:

- absence of an efficient extension system;
- scarcity of expert staff;
- scarce financial resources;
- non-involvement of fishermen in the elaboration of statutory texts;
- statutes not adapted to the socio-economic realities of the fishermen concerned, because these texts do not take into account existing traditional provisions.

Moreover, the fact that the fisheries authority desires to play the dual role of extension agent and agent of repression has ended up creating suspicion between the authority and fishermen, making compliance difficult. This mixed success of administrative fisheries management causes persistent problems and still requires a more efficient form of management.

3.3 The joint management experience with fishing committees

As much as traditional management was locally based, conventional fisheries management is centralised within government agencies. Co-management is different, and diversified, as regards the contribution of the major parties participating in the fisheries sector.

In Benin, this experiment has been running since 1993 in the east and southeast of Lake Nokoue. Today, there are 37 fishing committees, each headed by an executive committee. A fishing committee is defined as a community structure, comprising all the fishermen in a locality, with the aim of promoting sustainable fishing activities. The establishment of these fishing committees is an initiative of the fisheries authority which received signals from fishermen in favour of managing resources via such structures. The objectives of the fishing committees are to (Adegbite 1995):

- contribute to the rational exploitation of fisheries resources;
- sensitise and inform lakeside dwellers on the legal provisions in force;
- ensure compliance with the traditional prescriptions aimed at protecting the environment and resources;
- serve as a framework for coordination and conciliation in the resolution of socio-professional problems which may arise within its jurisdiction, village or district.

Reasons for the launching of co-management

As far as the fisheries authority is concerned, four prime reasons seem to have motivated the establishment of fishing committees:

- the vacuum created by the decline of traditional management;
- the failure of administrative management;
- the existence of many socio-economic and environmental problems on the water body;
- the need for a form of organisation involving fishermen in order to end fishing-related problems.

This initiative was accepted by fishermen. Actually, the fishermen's problem had always been how to find a form of efficient organisation through which a 'global' resolution of fishing problems could be achieved. Their own attempts at forming an association (the executive committee of *acadja* owners, association of the owners of set gill nets, cooperatives) were largely unsuccessful because of divergent and conflicting interests, and failed to resolve important issues affecting the resource. Therefore, on balance, the fishermen felt the need for such an organisation and the proposal by the Fisheries Authority to establish fishing committees in each village or district seems to have coincided with a real need to address some serious issues affecting local fisheries. Consequently, the government and fishermen decided to join forces to put an end to a situation which was a source of concern to both parties. Could this awareness be deep and absolute?

Operation of the executive committees on fisheries

The executive committee on fisheries comprises five to eight fishermen elected democratically after the holding of a meeting organised by the decentralised structures of the fisheries authority in the administrative region concerned. These fishermen represent each of the various fishing activities practised in that locality. These executive committees which direct the lives of all the fishing committees, meet twice a month at normal times and every week at the peak of fishing activities. During the meetings, members examine the problems associated with the fisheries and take decisions which are binding or define what actions to take. At this level and if necessary, contact is made with the Specialist Fisheries Officer to elicit his opinion or inform him of developments. Subsequently, proposals are made known to the whole fishing committee for final discussion and the passing of a motion. The local authorities (village head, mayors, representatives of village groups) are advised on the practical provisions for execution of measures.

Evaluation of the activities of fishing committees from April 1993 to June 1996

Field work enabled us to visit one-third of the fishing committees established; all were functioning properly. Most members of the executive committees and some members of the wider fishing committee understood the importance of their function and took their roles seriously. Moreover, it should be noted that depending on the composition of the team, some executive

committees were more dynamic than others, thus making their committees more dynamic. Some have become proficient in administrative and financial management. They also write up circulars for committee meetings, minutes of meetings with a copy sent to the regional fisheries authority, and establish contributions within the executive committee with a view to extending the same principle to the entire committee. All the committees carried out activities directly related to fisheries management even though these were at diverse levels of efficiency. Some of the activities are:

- the organisation of sensitisation sessions on the proper type of gear to use;
- checks on net mesh size;
- the seizure and destruction of small mesh size gear used by some fishermen;
- the removal of barriers to collaboration with fisheries officials;
- the resolution of conflicts among fishermen;
- the re-afforestation of the lakeside;
- the demarcation, in conjunction with the fisheries authority, of *acadja* zones, with a view to freeing up spaces for fishing with nets.

The actions carried out by the committees in a locality are appreciated by the entire community and even by members whose activities are not directly connected to fishing. Nevertheless, it is necessary to emphasise that a substantial minority of fishermen, especially those who use prohibited gear and who feel their interests are threatened, disapprove of the actions undertaken. Thus, subscription to the ideals of fishing committees is still uneven, depending on the interests of individual fishermen concerned.

Problems within the fishing committees

At present, the smooth running of the fishing committees is hampered by many problems, the most important of which are the following:

- the need for a change of mentality among fishermen; they still need to understand the reasons why it is worthwhile participating in fisheries management. Only a few fishermen are currently involved, and this restricts cohesive decision-making and actions taken by the fishing committees;
- lack of interest among members of the executive committees: many of them are not willing to devote some of their time to the implementation of fishing controls;
- many of the committees encountered feel that they have not been given enough powers since no official rank has been bestowed on them from the competent authorities;
- absence of work tools especially motorised boats for the rapid movement of a team to tackle control operations on water; dugout canoes are inadequate;
- absence of fishing committees in many villages on the lake. This limits the effectiveness of any concerted action taken by the other fishing committees.

In essence, these various problems do not entirely block the actions of the committees,

neither do they wholly facilitate the attainment of objectives, they simply limit the overall success of the co-management system.

The role of the National Fisheries Authority in supporting the fishing committees

The support given by the Fisheries Authority to the fishing committees comes from the decentralised structures of the Regional Centre for Action on Rural Development (CARDER) for Oueme region, the Lagoon Fisheries Project (PPL) linked to the National Fisheries Authority and selected NGOs. Support from the National Fisheries Authority, initiators of the fishing committees, has been in the form of:

- the organisation of training sessions for members of the fishing committees, on their duties and operations;
- monitoring of activities and training of fishing committee members in the field;
- moral and physical support during the resolution of conflicts before they reach the courts.

The considerable support provided to fishing committees by the Authority does not seem to be adequate to stimulate their effective participation and the bringing about of co-management.

First, by bringing the initiative to the attention of fishermen, the National Fisheries Authority does not appear to have measured all the responsibilities which the institution and fishermen would be required to assume. Neither did it establish the minimum conditions favourable to the blossoming of this idea, e.g. the actualisation or elaboration of statutory texts with fishermen. An effort should be made to repeat the process all over the lake, in order to enable the experiment to produce significant effects. The training dispensed is not enough (two sessions in three years); it should take place more frequently and enable the committees, by mitigating the absence of a continuous training programme, to increase their knowledge and understanding of statutory measures. Frequent training sessions would also allow the Authority to stimulate and maintain a dynamic approach to partnership by identifying traditional expertise, previous knowledge as well as an understanding of local institutional arrangements. This would be complemented by appropriate legislation based on scientific counsel, by which the committees would serve as instruments of control and enforcement.

Strengths and weaknesses of the fishing committees

Despite the present difficulties facing the fishing committees and the limited support received from the fisheries administration and other bodies, the fishing committees do possess some assets which constitute their strength:

- the fact that the establishment of fishing committees corresponds to a real organisational need;
- the participation of fishermen and even non-fishermen in sensitisation sessions and operations, organised by the executive committees, to control compliance with the use

of stipulated types of net mesh (even though the membership base for fishermen needs to be enlarged in future);

- even though the actions of the fishing committees are modest, they contribute to the resolution of some problems (e.g. a better understanding of statutory measures, equitable use of the water body between the owners of *acadja* and fishermen on free waters);
- use of the traditional security structure and social control, e.g. the "Zangan".

Among the weaknesses or factors limiting the effectiveness of fishing committees, it is pertinent to mention the following: absence of materials with which to work, the need for a change of mentality and for motivation of committee members. To all this must be added the absence of immediate interest for members of the executive committees, as the necessary discussions and actions regarding sensitisation, control of compliance with the use of appropriate net mesh, encroach upon members' time.

4. Conclusion and recommendations

A traditional system of management used to exist on Lake Nokoue. This management system whose ultimate objective is the conservation of the fisheries resources, is based on the socio-cultural values specific to this region: the belief in and fear of water deities and respect for the words of the elders. The practice of introducing controlling measures and prohibitions by the participants in this system is helped by the imposing of sanctions following an infringement, and by social cohesion and control. This system of traditional management has proved effective in matters concerning compliance with the rules on fish preservation for the entire community until new sets of values were introduced, notably with colonisation.

Attempts by colonial and post-colonial governments had limited success as their policies and the management measures they introduced, were based on a reality quite different from that experienced by the fishermen concerned, and consequently did not receive their support. This is the basis for the ongoing co-management system being experimented with on Lake Nokoue, one based on diversified and participatory management of fisheries resources.

However, in order for this experiment to result in a real partnership between the government and fishermen, both parties must fulfil certain requirements:

For the government, efforts should be made to:

- define more clearly its role in the new structure;
- increase the number of fishing committees all over Lake Nokoue and subsequently on other water bodies;
- open up the membership base of the structure to more partners;
- lay special emphasis on the sensitisation and training of fishermen;
- provide these structures with basic work tools depending on the needs as defined in conjunction with the committees.

As regards fishermen, it is essential for them to accept the responsibility of participation and consent to some measure of voluntary service in anticipation of the sharing of such responsibility by the entire community.

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The traditional management of artisanal fisheries in Côte d'Ivoire: The case of Aby Lagoon

Gabin Kponhassia

Ph.D., Consulting Sociologist

assisted by

Angaman Konan

Chief, Fisheries Project

Aby Lagoon, Adiake

Abstract

Fisheries management on Aby Lagoon in Cote d'Ivoire has been a long, ongoing process characterised by cyclical developments. In fact, the system in place in the period before 1979 can be considered one of traditional management. During this period the fishery resources was presumed to be sufficient and available. The populations along the lagoon were made responsible for its management, and they regulated access according to traditional conventions (e.g. threat of sanctions and social control). However, in 1980 the government intervened in the Lagoon's management because it believed the Lagoon's fishery resources to be over-exploited. This first period of state intervention had the support of the European Development Fund and beach and purse seines were accordingly provided to fishermen. Later the government funded the 'Project for the Development of Artisanal Fisheries in Aby Lagoon' (Aby Lagoon Fisheries Project). Since then, many management plans have followed, one after another, each with their attendant crises.

After these numerous crises which are in effect indicators of the inadequacy of the management measures adopted by the government, the Aby Lagoon Fisheries Project initiated in 1992 another strategy, namely the participatory approach. A key element in this approach was the creation of Consultative Committees for Fisheries Surveillance (CCSPs). These committees were responsible for maintaining communication between the fisheries administration and the local populations, ensuring the implementation and respect of measures established by consensus. In this new approach stakeholders were given opportunities to become acquainted with methods of participatory management through seminars, and workshops.

The analysis of the different 'ups and downs' within fisheries management on the Aby Lagoon reveals a permanent effort, since 1992, to encourage the participation of the population. Unfortunately, this effort is held back, as the populations have a jaundiced opinion of the project, as well as of its initiatives, based on their past experience.

1. Introduction

Since 1980, fisheries management in Cote d'Ivoire has followed the conventional approach, one which confers the entire management responsibility on government. At present, as the limitations in the management capacities of the government are progressively coming to light, it is advisable to identify other alternatives which would more actively involve rural and lagoon communities, and fisheries operators in the management of resources. Co-management requires the delegation of responsibilities and, therefore, of authority; a decentralisation of management, and of decision-making organs and can be placed somewhere between administrative centralisation and traditional informal management.

The present study analyses the efforts made to involve stakeholders in the management of Aby Lagoon. This is accomplished by:

- describing the history of the management of Aby Lagoon according to the fishermen;
- determining the factors that favoured the launching of ongoing co-management experiences;
- identifying key contextual variables as well as decision-making dispositions; and
- detailing the strengths and weaknesses of co-management initiatives.

Methodology

To achieve these objectives, the following methodology was used:

- In addition to written information, the poor level of literacy among the rural communities of Aby, Etueboue and Eboinda, the sensitivity of the information desired, and the concern for detail, dictated the use of a qualitative approach. The three villages of Aby, Etueboue and Eboinda were selected on the basis of the data available through the Fisheries Project, on the importance of fishing activity, population involvement and participation, acceptance of the innovation that co-management represents, and the centralisation of decision centres.
- Semi-structured interviews with individuals and focus groups were undertaken. Informers can be divided into two main groups:
 - major informers: Village chiefs, notables, executives, well-known fishermen and businesswomen. These experienced individuals were supposed to recount a retrospective history of the Lagoon's fishing evolution and the processing of its products;
 - secondary informers: those in charge of consultative committees, the young, all the players directly or indirectly involved in fisheries.
- The discussions were structured around the following:
 - 1) Social organisation (describe the social history of the organisation).
 - 2) Socio-demographic and economic data.
 - 3) Traditional management of fisheries.
 - 4) Modern management of fisheries.
 - 5) The meaning of co-management, according to communities.

2. The Aby Lagoon complex: Presentation and generalities about production and level of exploitation

2.1 Presentation of the Aby, Tendo and Ehy lagoon complex

The Aby, Tendo, and Ehy lagoon complex is located in the southeast of Cote d'Ivoire. It extends over an area of 424 square kilometres, and forms a natural border with Ghana. In addition to rainfall, two main coastal rivers, the Bia and Tanoe, supply fresh water to the complex. The Bia and Tanoe have two annual peaks (July and October-November), of which the former season is more pronounced. Assinie, the channel of the lagoon complex is situated to the southeast of Aby Lagoon.

Bathymetric observations indicate that Aby Lagoon is shallow, with depths of between 2 and 7 metres, and with an average of 4 metres. The major rivers which flow into the lagoon rise in areas that have a transition equatorial type climate. This accounts for the two annual peaks; during the high and low rainy seasons. The Bia and Tanoe Rivers flow into the north and east of Aby Lagoon respectively, which in turn flows into the sea through the Assinie channel. Water salinity is minimal in the rainy season and maximal in the dry season. The temperature (26-33°C) is homogenous throughout the water column in the lagoon sector, except in waters of more than 6 metres in depth.

In this environment, which is not yet as polluted as most coastal lagoons, fishing is an expanding traditional activity. About 3,000 fishermen are active, but they are not equally distributed throughout the whole Aby complex. Thus, 80% operate in the Aby area, 15% in the Ehy-Tendo area and only 5% in the Assinie area. Fishermen using individual gear are the most numerous (67.5%) with a marked predominance of gillnet users of all categories. Fishermen using collective gear represent 32.5% (beach seines, collective beach seines).

2.2 Production and level of exploitation

The principal types of gear used in the lagoon complex are given in table 1.

Table 1: Types of fishing gear

| | |
|-------------------------|------|
| BEACH SEINES | 32 |
| COLLECTIVE BEACH SEINES | 22 |
| TILAPIA NETS | 1191 |
| ETHMALOSA NETS | 2555 |
| OTHER GILLNETS | 712 |
| SHRIMP NETS | 359 |
| CAST NETS | 114 |
| LINES AND LONGLINES | 133 |
| TRAPS (NETTING) | 115 |
| BAMBOO TRAPS | 20 |
| POTS | 1103 |
| TOTAL | 6356 |

Source: Frame survey 1992, Adiake Fisheries Project Office

For collective fishing, the main production techniques are large beach seines (Aly nets) and collective beach seines; and for individual fishing (small-scale fishing), ethmalosa gillnets.

Two types of canoes can be seen on the Lagoon: dugout and planked canoes. The sizes of these two types vary between 13 and 18 m for large canoes, 8 and 12 m for medium size canoes and less than 8 m for small canoes. There are 1,000-1,600 canoes on the Lagoon. The breakdown is as follows:

| | |
|---------------------|-------------|
| Large canoes: | 47 |
| Medium size canoes: | 46 |
| Small canoes: | 1,000-1,500 |

The lagoon has both finfish and shellfish. The principal species are:

Pelagic species

- *Ethmalosa fimbriata* (Bonga) of the Clupeidae family. It is fished with beach seines, purse seines and ethmalosa gillnets and represents more than 50% of all landings;
- *Elops lacerta* of the Elopidae family. It is fished with beach seines and ethmalosa gillnets and represents about 5% of the Lagoon's production;

Demersal species

- *Catfish*: This group of the Bagridae family is represented in Aby Lagoon by 3 species, namely *Chrysichthys walkeri*, *Chrysichthys auratus*, and *Chrysichthys filamentosus*. It is fished with beach seines, longlines and bamboo traps, and represents 3 - 20% of the

landings from the Lagoon;

- The *Cichlidae*: This family is represented by 3 types; commonly called Tilapia. They are: *Tilapia guineensis*, *Tylochromis jentinki* and *Sarotherodon melanotheron*. Tilapia is fished with tilapia gillnets, beach seines and traps.

Other species such as Liza, Trachinotus, Pomadasys, Carneau and Gobios can be grouped together in the miscellaneous category. They are fished with seines and specific-use gillnets such as "liche" and mullet gillnets. They represent about 5% of the production.

Crustaceans

- *Callinectes latimanus* (crabs of the Portunidae family): This species is fished with crab pots and represents 1 to 5% of the production, depending on the year;
- *Panaeus duorarum* (shrimps of the Penaeidae family): They are fished with shrimp and ringnets and represent about 1% of the production.

Apart from the *Euryhaline* species such as Liza, Trachinotus and Caranx, which make periodic incursions into the Lagoon, all the other species are sedentary.

2.3 Economic operators involved in the production activity

Businesswomen are among the socio-economic operators who influence the dynamism of the fisheries sector. Although the women do not appear to exert a decisive influence on fisheries exploitation strategies, they show a certain capacity for adaptation to the changes occurring in the fisheries.

For village folk fishing is in some cases a very important source of wealth when looked at from three points of view: First, as a source of income (access rights paid by foreigners), second as a source of food, and third, as a source of employment for the population (fishing and marketing).

The production potential of Aby Lagoon stimulates a growing level of economic activity, and there are for example, many economic operators and fish distribution channels. This study deals with the distribution channel for smoked fish.

The users of Aby Lagoon are both varied and multi-sectoral. However, they may be classified into three categories: the main users, administration, and others, as detailed in table 2.

Table 2: Categories of fisheries participants

| Main users (activities related to fishing) | Administration | Other users |
|---|--|---|
| <ul style="list-style-type: none"> - Fishermen - Fish businesswomen - Carriers | <ul style="list-style-type: none"> - Project agents, departmental offices of agriculture and animal resources - Territorial administration agents ("sous-prefet", mayor, village chiefs) | Businessmen and women producing non-fisheries related products (oil products, construction materials, etc.) |

2.4 Usage rights

Aby Lagoon comprises the districts of Adjouan, Ehotile and Essouma, where traditional fishing systems are very similar. However, the dominant district of the lagoon is the district of Ehotile with its decision centre of Etueboue. In the lagoon exploitation is based on both the principle of common property and territorial fishing rights.

Village traditional chiefs limit access to their territories and all forms of fishing require a prior authorisation from the traditional authority of the village. Since 1990¹ access is exclusively reserved for Ivorian fishermen as individuals or as a group. Each village knows precisely its physical land and water limits. Within its limits in the lagoon it holds a non-exclusive right of fishing and an exclusive power to police the waters. The Lagoon's local resident fishermen may fish in all parts of the Lagoon, including the waters of the other villages. However, in the waters which come under the jurisdiction of a village other than that of his origin, the fisherman must comply with the management rules of the host village.

For foreign fishermen, access to the resource is highly regulated. In addition, to involve himself in the activities of the host village, and is subject to authorisation. He must pay taxes, the sum of which varies from village to village. Moreover, he is authorised to fish only within the territorial water limits of the host village. In the case of non-respect of the regulations, he is expelled from the village.

The only recognised territorial restrictions on a village's exclusive right of fishing, is represented by the reserves in which fishing is very tightly controlled. Commercial fishing is strictly prohibited in these areas. In the whole water body, 11 reserves covering a total surface area of 11 km² have been identified.

The reserves fulfil three functions :

¹In 1990 a group of young men, wishing to reverse the phenomenon of overfishing, blocked the access to the lagoon to foreign fishermen. This resulted in a crisis characterised by the looting and destruction of property. In response, the administration prohibited ownership of fishing units by foreign fishermen.

- as spawning grounds;
- as a refuge;
- as nurseries.

2.5 Biological, physical, technical and socio-economic characteristics

Biological attributes

Multi-species fishery: Like most tropical fisheries, in the Aby Lagoon a relatively high number of species are caught (approx. 10) and regularly landed throughout the year. This is due to the climate and the hydrologic characteristics of the Lagoon. Its flora and fauna are strongly influenced by the sea from where the fish species with marine affinity (such as *Elpos lacerta*) originate. The lagoon is fed with fresh water, which accounts for the presence of species which are able to tolerate low levels of salinity at 5% (*Hepsetus odoe*, *Hemichromis fasciatus*) and those species that are exclusively estuarine (Tilapia, Trachinotus, *Ethmalosa*, *Chrysichthys*).

Migratory or sedentary marine resources: The principal species caught in the lagoon is *Ethmalosa fimbriata*, a sedentary resource like the majority of other species (Tilapia, Trachinotus, *Chrysichthys*). However, it is worth noting the importance of anadromous resources which divide their life cycle between the sea and the lagoon (shrimps) and other species like *Dentex canariensis* and *Sardinella aurita*.

Level of resource exploitation: Landings are dominated by the *Ethmalosa* (Clupeidae) which represent about 70% of the catch. It is known that this species is strongly influenced by environmental factors, such as rainfall and salinity. During the period 1979 - 1990 the stock levels were unstable, with notable variations in the catch per unit effort. Since 1991, there appears to be a trend of stagnation and even a decrease in stock levels, a trend which needs to be confirmed.

Habitat conditions: Very little fish disease has been reported. However, the fish habitat is threatened by the invasion of the water body by floating plants (*Eichornia crassipes* and *Pistia stratiotes*). The other hindrance is the difficulty of communication between the sea and the lagoon because of the progressive closure of the pass, thus threatening the migratory flow of shrimps and of *Elops lacerta*, both of which are juvenile in the lagoon and adult in the sea.

Physical and technical attributes

The border: The border between the three lagoons is well known and clearly demarcated and recognised by the fisheries administration and by the different cantons which surround them.

- the waters of the Aby Lagoon are brackish: marine and the Bia River (fresh water) influence;
- the Tendo-Ehy Lagoon: the waters are fresh: influence of the Tanoé River;
- the waters of the delta zone are very salty: strong marine influence.

Gear types used: The gear, varied and diverse, may be grouped into two categories:

- collective gear, their usage demands the presence of more than two persons (for example the beach seine uses on average 23 persons and the group seine an average of 8 persons);
- individual gear: bottom-set gill nets for *Ethmalosa* and *Tilapia*, crab nets, traps, and long lines, etc.

Artisanal fishing: Subsistence level fishing has evolved very rapidly into commercial artisanal fishing using fishing tools which have also evolved, away from gear made with vegetable fibres and used collectively, to higher performance gear that uses nylon thread. This new gear is more efficient and generally is made of smaller and smaller mesh sizes, in the search for ever-increasing profits.

Level and combination of technologies: The smoking of fish, especially *Ethmalosa*, is widespread. Also, due to the development of road infrastructure in Cote d'Ivoire, and the proximity to the capital, Abidjan (100km of tarred road), the market for fresh (iced) fish has also grown.

Models of dispersed or localised fisheries: Artisanal fisheries are characterised by a dispersion of landing sites, and in fact each village constitutes a landing site. The processing and marketing of fish products is traditionally the domain of fishermen's wives.

Market attributes

The fishery on Aby Lagoon is mainly commercial. Of the target species, the proportion set aside for own consumption is relatively small. In general, it represents four per cent of the production of a fishing unit. Therefore 96% is sold.

Structure of the market: the presence of both sellers and buyers is strong. None really hold a negotiating power to the point of imposing their views on the other. However, privileged relations between fishermen and buyers do exist, and are sometimes very personalised. It is worth noting that the weekly Adiaké market, where the dominant product is smoked fish, appears to be the most important market, with a concentration of buyers and sellers in one place and sales taking place in a relatively short space of time (half a day). Adiaké is a local market which serves a large hinterland as the products moves within a radius of approx. 300 km. The proximity to Ghana gives Adiaké access to an international market within short range. In fact, Ghanaian buyers also frequent this market and can sometimes return home with significant quantities of smoked fish.

Generally speaking, the pelagics (*Ethmalosa*) have a low market value. However, the average price can be high for the high value species (*Tilapia*, *Trachinotus*, *Chrysichthys*, etc).

Socio-economic attributes and knowledge of the fishery

Although the ethnic population distribution of the resource users in the four distinct cantons (Canton Ehotilé and Adjouan in Aby Lagoon, Canton Adouvlé in Tendo-Ehy Lagoon, and Canton Essouma in the delta zone) gives the impression of heterogeneity, it is worth mentioning that these four population groups are becoming a part of the intervention strategies of the administration. This user participation is being claimed more and more willingly by the populations, thus favouring collective concerted action.

In general, the user groups have a good knowledge of the resource and the hydrology of the lagoon complex, a knowledge which is both empirical and practical. Unfortunately, this knowledge is not as up-to-date as it should be, because of the very rapid evolution of the environment (demographic, technological, economic, political, and even administrative).

The essential biological, physical, technical and socio-economic characteristics of Aby Lagoon are summarised in table 3.

Table 3: Biological, physical, technical and socio-economic characteristics

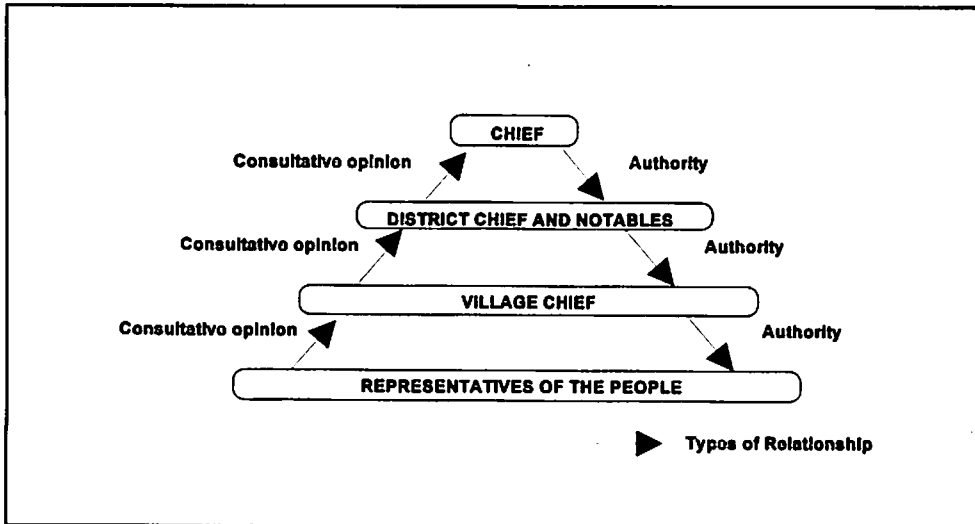
| Biological, Physical and Technical Attributes | Indicators |
|--|---|
| Mono or multi-species fishery | Ethmalosa, Tilapia, Chrysichthys, Shrimps, etc. 10 species regularly landed |
| Migratory or sedentary marine resources | Sedentary with anadromous species (Shrimps and <i>Elops lacerta</i> , for example) |
| Level of exploitation of the resource | Unstable resource (Ethmalosa) with variable levels of catch per unit effort. The trend shows an improvement of CPUE (Beach seine 958kg/trip, Ethmalosa gill net 113kg/trip) |
| Condition of habitat | Generally good, but risk of floating plants and choking up of the sea-lagoon pass |
| Borders | Geographically identified with, in addition, a particular hydrology |
| Fishing with one or more gear type | Gear very varied and diversified (collective and individual), some conflicts related to 'cohabitation' |
| Artisanal or industrial fisheries | Artisanal fisheries with low investment and technological sophistication operating within a very limited radius |
| Level and combination of technology | Preservation by smoking and marketing of fresh (ice-packed) fish |
| Models of fishing; dispersed or localised | Landing sites (villages) distributed all along the Lagoon. Fishing is regular and daily |
| Market Attributes | Indicators |
| Subsistence or commercial fishing | Commercial fishing with only an average of 4% for own consumption |
| Market structure | A mix of buyers and sellers with a personalised buyer-seller relationship |
| Market orientation | Local towns of the interior; access to international market due to Ghana's proximity |
| Value of products | General trend indicates a low price because of the market dominance of Ethmalosa |
| Socio-economic Attributes | Indicators |
| Homogeneity/ heterogeneity of users | Culturally homogeneous, no marked social differences, improved lodging, except for migrant fishermen, harmonious religious cohabitation |
| Dependence on fishing for subsistence | Strong family integration, primary source of income for the household |
| Degree of motivation among users | Commercial fishing with 'capitalistic' tendencies (frantic search for profit) |
| Attitude to risk, innovation and collective action | Sensitive improvement, which moves from weak to strong |
| Level of information and knowledge of fishing and management | Significant practical and empirical knowledge, but needs to be evaluated and updated (because of very rapid evolution) |

2.6 Social organisation

The social and political organisation of the Aby Lagoon populations is identical in its major components, because the populations concerned belong to the same Akan/Ashanti cultural group. In these societies, kinship is the framework which maintains relationships between individuals, via a matrilineal system.

With regard to social organisation, there is a distinct division of labour according to sex. Women generally deal with the actual processing and marketing of agricultural and fishery products, while men are engaged in income earning or food-producing agriculture, as well as fishing. Furthermore, apart from their personal economic activities, the 'youth' (from 15 to 35 years) are obliged to take an active part in the achievement of community interest works. As for fishing, the youth are asked, for instance, to undertake the surveillance and control of fishing activities within the village territory.

As far as political organisation is concerned, these traditional societies belong to the category of societies where chieftancies hold a central power recognised and respected by all. The pyramidal structure of traditional power on Aby Lagoon is illustrated in the diagram below.



At district level, a chief of district, sometimes under the authority of a 'king', holds the power of decision-making over all questions concerning the whole district. At village level, the village chief, surrounded by his notables, takes decisions concerning the village, after consultations with representatives of his people (for instance with a 'Youth Leader').

Chieftaincy normally passes from brother to brother, or maternal uncle to nephew on the mother's side. However, when a new chief is to be appointed, representatives of each family gather and the most competent person is chosen, without strict consideration of the successional order. After appointment at the local level, the chieftancies are then recognised by the territorial administration on the orders of the "prefet" (Government appointed Divisional Administrator).

Despite the rigid appearance of these traditional structures, it is important to note that discussion is the tool largely used to solve the conflicts which can sometimes break out between

different social groups. Also, other individuals, who do not appear in the diagram, are very much involved at different levels of the decision-making process. They are the "executives" who are 'natives' of the village and who conduct their professional activities outside the village (administration or private enterprise executives).

Due to the evolution of modern societies, in terms of modernisation, education, demographic pressure and attachment of monetary value to transactions, a certain degree of erosion in the traditional social order is being observed with contradictions, disputes and sometimes power conflicts arising between the elders and the young. This has happened over recent years, but does not mean that these structures have lost their effective role in the shaping of local development policies and especially in the Lagoon's management. For instance, on Aby Lagoon where the Ehotile district is the most represented, the headquarters of the Etueboue district still has a 'disruption mechanism' which it can call upon should development policies which are considered inappropriate, be imposed on them from outside.

3. History of Aby Lagoon management

The history of Aby Lagoon is particularly rich in terms of traditional fisheries management and development. Since the 1950s and even up to the present day, the fisheries have adapted to incessant changes which took place in the systems and modes of exploitation, as a result of factors often exogenous to fisheries. Among these factors one can notably mention technological innovations (e.g. synthetic fibres and engines), the attachment of monetary value to transactions, the promotion of the co-operative movement, the provision of capital to help develop an advanced and technically improved artisanal fisheries, the construction of modern infrastructures, the introduction of institutional rules to control fishing effort, or the evolution of traditional socio-political structures. All these elements have made incursions, in varying degrees, into the traditional systems of production and management of the fisheries resource, without significantly modifying the sector.

3.1 Traditional management of fisheries on Aby Lagoon

On Aby Lagoon, and before the advent of modern government led to some erosion in the strength of their beliefs, the populations followed a system of fisheries management based on myth. For them, the Lagoon represents the 'bed' of the deities, which needed to be treated respectfully, almost worshipped, to avoid bad omens. This belief was once so strong that fishing periods were authorised by the chief of the district only after certain rituals (sacrifices, libations) had been carried out. These were opportunities for feasts, and the major players in these intense and decisive moments in the life of the community were, among others, the District Head and his notables, chiefs of the village and their notables, and famous fetishists. These individuals, custodians of legality, were qualified to preside over the opening and closing ceremonies and to set out the code of conduct for the exploitation of Aby Lagoon after they had communicated or consulted with the deities that own and reside in the Lagoon. Thus, these persons determined the prohibitions to be adhered to, if a good fishing season was to ensue.

Traditional prohibitions, their relation to management, and the corresponding sanctions for violations are listed in tables 4 and 5.

Table 4: Traditional prohibitions

| 'DON'TS' RELATED TO MANAGEMENT | 'DON'TS' UNRELATED TO MANAGEMENT |
|---|--|
| - Fish on forbidden days (usually one day a week) | - A woman who has her period cannot enter the Lagoon |
| - During the periodic closure of the fishery | - It is forbidden to whistle at night on the Lagoon |
| - Determination of sacred areas or reserves | - No propitiatory sacrifices to water deities should be made (in order to attract more fish into the Lagoon) |
| - It is forbidden to fish in deep waters | |

Table 5: Sub-division of the 'Don'ts' related to management

| MANAGEMENT ELEMENTS | CORRESPONDING MEASURES |
|------------------------------|---|
| Preservation of reproduction | - It is forbidden to fish in areas/places declared sacred and in reserves |
| Opening, closing of fishing | - Periodic closing and opening of fishing - It is forbidden to go fishing one day a week |
| Limitation of fishing effort | - Fisheries activities are carried out only by men and children |

The non-respect of these measures exposes the individual or the group to different sets of sanctions. In the case of fishing on a forbidden day, fishing in deep waters, or in holy places, the sanctions are severe. They include popular uprising, destruction of gear, payment of money or in kind (chicken, liquor).

Incidentally this management system, which functioned so well, began to die out following contact with Ghanaian fishermen, who injected a new dynamism into the traditional fishing activity on Aby Lagoon.

3.2 Endogenous innovation of artisanal fisheries on Aby Lagoon

From the 1950s onwards the populations of Aby Lagoon began changing their fishing techniques following encounters with Ghanaian fishermen. They replaced their nets made from natural fibres with nets made with cotton reels, then with nylon, and finally with industrially made yarns. These new gear types enabled them to increase their catches, and as the fishing effort developed, changed the distribution of fisheries wealth to the benefit of seine owners.

The result of these developments was that by the end of the 1970s, a more and more

pronounced division between two types of fishing was observed on the Lagoon: modern collective fishing (Aly nets, collective beach seines, purse seines) targeting profitability-oriented production, and individual traditional fishing (gillnets, cast nets, longlines). Individual fishing gradually became a subsistence activity carried out in a rural context, where job opportunities were becoming scarce because of a lack of available capital. The outcome of this division was a weakening of traditional fisheries management systems and an over-exploitation of the resource, which then justified the intervention of the state.

3.3 State intervention in the management of fisheries on Aby Lagoon

The end of the 1970s and the beginning of the 1980s represent the first cycle in the recent evolution of fisheries on Aby Lagoon. This period coincides with an unfavourable economic climate in Cote d'Ivoire. The degradation of the macro-economic indicators between 1978 and 1981 is evidence of a crisis in the agricultural sector (falls in the price of raw materials, low agricultural production, and the destruction of many plantations following drought and bush fires). All this undoubtedly increased fishing pressure around Aby Lagoon.

During this period, a new fisheries development policy evolved within a global framework aimed at achieving food self-sufficiency. This policy was based on the promotion of the associative movement, and especially co-operative oriented groups (GVCs). Thus, from 1979 to 1980 the National Bureau of Rural Promotion (ONPR), in collaboration with the National Bank for Agricultural Development (BNDA), initiated a loan programme for Aby Lagoon GVC fishermen to enable them to acquire motorised purse seines to replace the collective beach seines, with the support of the European Development Fund. Very rapidly purse seines took the place of collective beach seines and thus facilitated access to new resources. In 1979, the first institutional tool for fisheries management on Aby Lagoon was established, with the implementation of a follow-up programme for compiling catch statistics by the Oceanographic Research Center (CRO) in collaboration with the fisheries project office. Its objective was to improve resource knowledge for the appropriate exploitation of Ivorian lagoons. The involvement of the CRO certainly had an impact on the orientation of the 1980s fishing policies for the Lagoon, as the scientific data helped support the hypothesis that the exploitation level was close to its maximum potential. The dynamism of fishing on the lagoon was characterised by technically improved but debt-ridden artisanal fishermen who needed to increase their fishing effort to cover not only important fixed costs but also the ever increasing price of fuel.

Within this new context, the project tried to become more actively involved in fisheries management and in 1989, the project requested the assistance of the CRO to examine strategies for fishery regulation through a combination of closed seasons, controlling effort in terms of gear types and numbers, and stipulating a minimum mesh size, as small mesh nets were being used to maximise catches and earnings (Charles-Dominique, 1989).

3.4 Co-management experience

After state intervention in 1980, a fisheries project was established on Aby Lagoon in 1985 in an attempt to overcome the problem of resource over-exploitation which became evident in 1981 and 1982, and also to increase the number of social development programmes.

In 1987, the project closed fishing for six months. On re-opening, fishermen were expected to obtain and pay for fishing licences. These were mostly bought by foreign fishermen who had evaded the controls exerted over rural communities. However, the situation continued to worsen and in 1990 when many uncertainties surfaced: unemployment, closing of school, democratisation and demographic pressures in the countryside. Finally, there was an explosion which took the form of violent events, and the witch hunt and expulsion of foreigners from the Lagoon, which then became the preserve of only local inhabitants.

Therefore, to restore communication between the populations and the new project management team, Consultative Fisheries Surveillance Committees (CCSPs) were established as a mechanism for enhancing community involvement and communication regulation. The CCSPs were born out of the agreement of the communities and the fisheries administration to create a consultation framework to resolve the problems afflicting marine resource management of the Aby-Tendo-Ehy Lagoon.

The CCSPs are an integral part of the village structure. They comprise persons elected or chosen by the villagers themselves and their function is to represent groups of fishermen, in accordance with its legal status as a regulating and disciplinary power, a status still to be ratified.

The legal status of the CCSPs is still to be defined because of the unclear juridical status of villages in Cote d'Ivoire. In effect, in Cote d'Ivoire, the chief of a village who holds customary authority, is considered to be an auxiliary to the local administration (the "Sous-Prefet") who, however, has no recognised juridical status. For this reason the villages are without a moral 'persona' and it is therefore necessary to work towards conferring on the CCSPs such a 'persona' which would then give them sufficient moral authority to fulfil their mission.

The poor functioning of the CCSPs can also be attributed to:

- a strong bureaucracy. The CCSPs perceive themselves a source of reference for the Fisheries Project Office. This means that they require logistical support from the fisheries project, support which then became a pre-condition for their undertaking any activity;
- a lack of means (motorised canoes, means of defence);
- populations' lack of confidence (the local population consider the CCSPs to be the agents of the fisheries project and as such, did not accept them as impartial participants in the programme);
- low levels of involvement by members in the execution of their tasks under the pretext of poor administrative support, lack of insurance cover for risks, and the low opinion of the local population.

The above notwithstanding, the CCSPs have played a positive role which could have been more appreciable if the right atmosphere and conditions of work had existed. The CCSPs have been responsible for the setting up of fisheries committees; responding to a real need for organisation, and for promoting the participation of fishermen and even non-fishermen in sensitisation sessions and mesh size control operations. Furthermore, in 1994 and in tandem with the CCSPs, the Project commissioned a study on the indicators for a management plan applicable to Aby Lagoon which would arouse community interest and involvement. In 1995, a seminar was held to give an account of the results of that study. The theme was: 'Managing Aby-Tendo-Eby Lagoon with the populations for present and future generations'. The following recommendations were made at the seminar:

Mesh size: As small mesh sizes destroy stocks, and considering the unanimous will to preserve lagoon resources, the seminar recommends:

- for collective gear (beach and collective beach seine) the adoption of a 20 mm bar mesh in twisted thread (bag in nylon twine 210/18 and wing in nylon twine 210/15) for the entire body of the net;
- for ethmalosa gillnets the adoption of a minimum 20 mm bar mesh;
- for carp nets the adoption of a minimum 35 mm bar mesh;
- for cast nets a 25 mm bar mesh.

Seine length: As it is necessary to protect the resources by limiting fishing effort, the seminar recommended that the length of seines should not exceed 1,600 m on Aby Lagoon and 1,000 m on Tendo-Ehy Lagoon.

Reserves: Because of the significant contribution of bays to the renewal of lagoon resources, with regard to spawning, and as refuges and nurseries, the ten bays, namely Etuossika, Melekoukro, Assomlan, N'guieme, Akounougbe, Eboinda, Eboho, Tiapoum, Mama and Adiake were declared reserves and the seminar recommended the prohibition of commercial fishing in them, and that the village(s) be responsible for surveillance.

Deep water fishing: With regard to the prohibition of fishing in deep waters, which is in fact a tacit agreement between all the lagoon villages, the seminar took note of this measure and suggested that the application of this regulation be subjected to customary norms until the implementation of the new management dispositions.

Fishing period: Taking into account the reproduction cycles of lagoon species, the lack of selectivity as a result of fishing gear (beach and collective beach seine) and the specific hydrology of each large fishing area, the seminar recommended a closed fishing period of four months minimum each year for collective nets, starting from May, with the option of changing this period each year.

Fight against fishing with poisonous products: Considering that fishing with the use of poisonous products (gamaline, lindane) represents a real danger not only for lagoon stocks but also to human health, the seminar recommended:

- to vigorously fight this practice which is already forbidden;
- to quickly take actions to prevent, sensitise and inform the fishermen of Aby Lagoon of the negative effects of irresponsible fishing methods;
- to set up surveillance brigades equipped with appropriate means, especially with regard to logistical support and communication devices;
- the administration and judiciary to take immediate dissuasive sanctions against offenders;
- the populations to mobilise to completely eradicate this plague.

Fishing licences: For a better tracking of the number of fishermen participating in the fishery, the seminar recommended the introduction of fishing licences. The administration would bear the cost of printing the licences at no extra charge to the fishermen.

Consultative committees for the tracking of fishing activities

With regard to the participatory approach adopted for the design and approval of management measures on Aby-Tendo-Ehy Lagoon, the seminar recommended the creation of three levels of consultative committees: village committees, sub-prefectural committees and prefectural committees. Their mission is to make sure that at each level, the measures proposed by the seminar participants are implemented.

The village committee: Comprises the village chief, as the person responsible for resolving fishing problems within the village, the representative of each fishing profession and the representative of women fish smokers. Its mission is to see to the implementation of the measures adopted as a result of the seminar and to take part in all the controls required by the implementation of these measures. A village committee represents a first level of conflict resolution. It keeps lists of all the individuals engaged in fishing, records of fishing means employed (gear, canoes), sends regular reports on its work as well as its remarks to the technical structure in charge of fisheries and to the sub-prefectural committee. It also prepares and forwards applications for fishing licences to the sub-prefectural committee.

The sub-prefectural committee: Comprises the "Sous-Prefet", the district chiefs, the village chiefs, (the persons responsible for authorising fisheries activities in the villages) and the fisheries technical agent. Its mission is to ensure the evaluation of measures applied in the field and additionally, to resolve all conflicts related to fishing activities, and to provide a first line of control in the granting of fishing licences which are then forwarded to the prefectural committee for a final decision.

The prefectural committee: Comprises the "Prefet", the "Sous-Prefets", the district chiefs, the fisheries administration and the Regional Director for Agriculture and Animal Resources. Its mission is to approve applications for fishing licence and is responsible for the evolution of the management programme and its periodic evaluation. It solves, in last resort, fishing-related conflicts, and its decisions are irrevocable.

Accreditation

The seminar recommended that the government enacts decrees to recognise and accord official status to the consultative committees.

4. Concluding remarks

Since 1992 there has been an appreciable effort by communities to become involved in the management of fisheries. To achieve an even higher degree of success with this new approach, it is advisable that the resolutions of the seminar be effectively followed up and applied, thus making all participants in the process responsible for its success.

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Artisanal fisherfolk's involvement in fisheries rehabilitation in Senegal: Co-management perspectives

Moustapha Kébé
Head of ISRA/PASE
Dakar - Senegal

1. Introduction

Resource management by a particular community has given rise to many debates during the past few years. Irrigation and forestry used to be the focal sectors of analysis as far as questions related to systems of management were concerned (Hilton, 1992; McCay & Acheson, 1987; Korten, 1986; Ostrom, 1992; Thomson, 1992). Recently, however, the analysis has been extended to include concerns about mountain agriculture and fauna.

Fisheries management by a local community is made difficult by the complexity of the fisheries and aquatic resource systems in place, and the socio-cultural characteristics of particular fishing communities. However, recent research conducted on artisanal fisheries in Asia, the South Pacific and Africa shows that artisanal fishing communities can, given the right conditions, manage fisheries resources in a sustainable way (Berkes, 1989; Jentoft & Kristoffersen, 1989; Jentoft & McCay, 1995; Pinkerton, 1989, 1993; Pollnac, 1989; Pomeroy & Williams, 1994; Ruddle, 1989).

The government and artisanal fishing communities in Senegal have, in the last three to four years, initiated several schemes, involving users in fisheries resource management. This paper aims to analyse the degree of this involvement, in effect a co-management perspective on marine fisheries resources.

First, we will review the underlying thinking behind marine fisheries development in Senegal. Then we will assess the main activities, aimed at involving artisanal fisherfolk in the defining of and following-up on fisheries policy (coastal monitoring, control and limitation of the fishing effort, and negotiation of fishing agreements). Finally, we will analyse co-management perspectives for fisheries resources in Senegal.

Co-management can be defined as the sharing of responsibilities and authority between a government and the local fishing communities in order to rehabilitate a fishery or other natural resource (Pomeroy, 1995). There are different types of partnership, and varying degrees of power and integration within management systems at both the local and government levels. At the local level, there is the acceptance and official recognition of traditional management systems and a certain degree of common management of the resource is also possible. In this case, a well-known group of fishermen or an organisation, with the assistance of the government, lays down and sees that the rules governing regulations, norms and modes of control concerning fish catching or use of resources are adhered to.

The information presented in this paper was collected from existing documentation. The preliminary work was completed by using interviews conducted with agents of the fisheries administration, researchers and artisanal fishermen. The following questions will be addressed: (i) the existing property rights; (ii) the extent and level of involvement of user groups in the decision-making process; (iii) the nature of the representation of user groups in the decision-making process; and (iv) the type of existing development organisation.

2. The reasoning behind marine fisheries development in Senegal

2.1 Problems facing fisheries development

Marine resources are renewable natural resources whose condition and numbers fluctuate greatly and which are extremely vulnerable to any form of exploitation. They fall under a system of common property rights, with little controlled or even free access. With such characteristics, the fisheries sector generally needs the intervention of government to determine usage rights and norms according to the objectives of the existing fisheries policy.

When there is no intervention by public authorities, the competition between users to appropriate the highest incomes generated by the resource can create serious biological, economic and social problems. A lack of control of the system, added to individuals' behaviour to minimise their own risk, results in the development of a sub-optimal fishing effort which can cause both a waste of fisheries resources (biological overfishing) and other production-related problems (overfishing or overcapitalisation) (Kébé & Dème, 1995).

Therefore, with specific regard to fisheries, even supporters of a free economy, recognise that government intervention is both to be encouraged and considered legal. Indeed, the government *has to* intervene, on the one hand to counteract the dynamics which may lead to over-exploitation, and on the other, to encourage the dynamics of economic progress which will bring about changes to "traditional structures" (Chaboud and Fontana, 1992).

It is a fact that those countries with important fisheries stocks or for which fisheries represent a sector of potential development, are today seeking to optimise the exploitation of their resources by trying to restore the balance between their different types of strategy.

The creation of EEZs (Exclusive Economic Zones) as well as the dynamism of artisanal fisheries in many African countries has led to the reconsidering of the priorities that the sharing of resources represents. The question therefore, is to define the conditions under which the sharing of the resource would take place, first of all between the national economic agents, and then between the natives and foreigners.

In addition, most countries have returned to a more liberal or less planned conception of their economic policy. Indeed, the serious deficits in public institutions call for a change in level of interventionism by the State. The liberal measures currently in force are supposed to favour private initiatives. In Senegal, these measures have been reinforced through the decentralisation policy which recently entered its most decisive phase, with the setting up of local councils. Everywhere there is a new dynamism among rural producers' organisations (farmers, stock breeders and fishermen), with important producers emerging and the establishment of NGOs working in the agricultural (in the broadest sense) sector. These different players, who see themselves vested with new powers for shaping, financing and achieving the development of their homelands, need more and more precise information to make enlightened decisions, especially with regard to the strengthening of their management

capacities.

This triple evolution must lead to a new approach in natural resources management, and especially that of fisheries resources which have a great importance for African coastal countries. It is obvious that the sustainable exploitation of these resources depends to a large extent on the capacity of users as a whole to manage them appropriately. No fisheries can be managed efficiently and sustainably without the involvement of fishermen in the preparation of regulatory texts and their application. The State should no longer be the only entity in charge of fisheries management.

As fisheries are characterised by incertitude, it is more sensible, from the point of view of the community, to share the risks over a greater number of players rather than to concentrate them in the hands of one or two centres of decision-making (Chaboud & Kébé, 1989).

2.2 The legal and statutory framework for fisheries in Senegal

For several years now, fisheries have played a dominant role in the economy of Senegal, in terms of both landings (a yearly average of 350,000 tons of fish) and income generated (more than 300,000 jobs created and 135 billion FCFA in export earnings). This level of performance is undoubtedly related to the natural conditions which favour these activities, to an obvious dynamism within the artisanal sub-sector, and also to the apparent political will to help develop the sector (Kébé, 1993).

Fishing occupies a privileged place in the policy for economic recovery of Senegal as it is considered to be a driving sector of growth, necessary to the re-establishment of macro-economic balances. Moreover, artisanal fisheries are currently a priority for the public authorities, especially with regard to achieving food security (Kébé, 1996).

Consequently, a rational management programme for fisheries resources is a major priority for the State which aims to ensure a sustainable and fair development of the sector. Very early on, an integrated system of protection and resource management under Senegal's jurisdiction was set up.

In fact, since gaining its independence in 1960, Senegal has adopted a series of laws which determine the extent of the different fishing zones. The Fisheries Law (Law 87-27 of August 18, 1987 cancelling and replacing Law 76-89 of July 2, 1976), is currently under revision and reserves a zone of six nautical miles for artisanal fisheries. On Petite Côte, this zone extends up to seven nautical miles. This delineation is intended mainly to protect resources (it is the reproduction zone) and to prevent conflicts between artisanal and industrial fishermen.

The activities of fresh sardine fishing fleets whose gross capacity is more than 250 tons, and bottom or surface longliners and trawlers whose gross capacity is more than 300 tons, is only authorised beyond 12 nautical miles.

Other dispositions of the Fisheries Law concern the definition of boats (trawlers and sardine fleets whose gross capacity is less than 1,500 tons, and longliners, case canoes and canoes); fishing gear (passive and active nets for artisanal fisheries, purse and drifting gear for industrial fisheries, net mesh size); protected animals and fishing rights.

Artisanal fisheries are submitted neither to any prior condition nor to the payment of any taxes or dues except the obligation to register ships at their port of origin, and the wearing of life jackets.

Within the framework of agreements, fishing boats in Senegal, as well as boats flying foreign flags operating in Senegalese waters, must have an authorisation issued by the supervisory ministry in the form of a fishing licence. The law also provides for the right of observers to board any boat.

Like other coastal countries, since the early days of independence, Senegal has tried to draw the maximum profit by authorising access of foreign fleets to its EEZs. As soon as Senegal became independent, it signed a fishing agreement with France. As for the European Union, the first agreement was signed in 1979, and is renewed every fourth year.

3. Fisheries protection and monitoring project in Senegal

3.1 Justification

Fisheries in Senegal are very complex and present four main characteristics: they are sequential, multi-species, multi-gear and multi-fleet. Artisanal and industrial fleets exploit about sixty species of diverse age groups, biological and catching characteristics. Thus, it is possible that ten different types of gear may be used to catch the same species.

Despite the fisheries management laws and regulations in Senegal, industrial trawlers make many incursions into the zone reserved for canoes, thus provoking serious incidents and incurring the destruction of fishing equipment and even the loss of life.

Also, conflicts often result from competition between different groups of artisanal fishermen in their reserved zone (Kébé and Ndiaye, 1993). These conflicts which tend to be spread along the whole of the Senegalese coastline, arise from the difficult 'cohabitation' of passive fishing gear (bottom and surface gill-nets, shrimp nets, cases) with active gear (beach seines, purse seines, encircling nets, shrimp filtering nets, castnets, lines and longlines), as well as from fishermen's differing perceptions of the access rights to fisheries resources.

The example of Kayar village, one of the most important landing sites for artisanal fisheries, is a good case in point. Fishing is practised mainly during the dry season (from December to May), principally by two communities: the local population and fishermen from Saint Louis or Guet-Ndar who migrate to Kayar only for the dry season. The two communities of fishermen have had difficulty living together for several decades (since 1953 at least, as accounted for in various documents). The situation reached flashpoint in 1986 when a deadly conflict broke out. Analysis of the problem revealed that the conflict was not exclusively due to the use of fixed nets by fishermen from Saint Louis, even though it is undoubtedly true that this was one of the factors behind the breaking out and perpetuation of hostilities (CRODT, 1986). It was apparent that the respective stands taken by the two fisherfolk communities was because each had a differing perception of the existing access rights to the sea and its resources:

1. Fishermen from Kayar who are mostly fisher-farmers only exploit the fishing zone of their village on a seasonal basis. However, they consider this zone as their sole property since they project their 'landowner' concept of homeland appropriation onto the marine sector. For these fishermen, preserving the local fisheries resource is an essential condition to maintaining fishing activities for future generations. Moreover, they do not want outsiders participating in Kayar fisheries activities.
2. On the other hand, fishermen from Saint Louis are the only group of fishermen in

Senegal whose sole subsistence relies on fishing. For these fishermen, migration is an important component of their way of life. Therefore, they consider free access to fishing zones as an inalienable right and a vital condition for the survival of their traditions and way of organising the socio-economic aspects of their lives.

It was in order to guarantee compliance with the Fishing Law by the different 'operators' in waters within the jurisdiction of Senegal and so to prevent conflicts, that the Fisheries Protection and Monitoring Project in Senegal (PSPS) was initiated in 1981.

3.2 Modes of operation and means of involvement by fisherfolk communities

The system established has three components: administrative, scientific and operational. The Oceanographic Research Center of Dakar-Thiaroye (CRODT) ensures that the scientific monitoring takes place by making an inventory of resources and by designing fisheries management strategies. The operational component is supported by the Navy and Air Force, equipped with high seas patrol boats, coastal monitoring sites and one marine patrol aircraft.

In 1991, coastal monitoring intensified with the establishment on the coast of six monitoring centres equipped with radar and HF and VHF radio: Kayar, Fass-Boye, Saint Louis, Mbour, Joal and Kafountine. The PSPS management has a powerful radio station that enables it to maintain a permanent system of co-ordination. It communicates twice a week with the monitoring structures of the other countries of the Sub-regional Fisheries Commission (Cape Verde, Gambia, Guinea Bissau, Guinea and Mauritania). These various means help to efficiently control the entire coastal zone reserved for fisheries, and to reduce the risk of accidents and destruction of equipment resulting from industrial vessel incursions.

The coastal monitoring component of the PSPS' activities is planned to take place in three phases. The first consists in working closely with artisanal fishermen who would need to provide a motorised boat for transporting officials to the site where radar has detected the suspicious presence of industrial fishing boats. Thus, they would follow the PSPS members and the local fisheries service agents to sea in order to ascertain the facts at firsthand.

Purchase of high speed coastal patrol boats is planned for the second phase. The buoing of the six nautical mile zone is scheduled for the last phase. However, it should be noted that, contrary to forecasts, the first phase has not yet been completed.

Before setting up effective coastal monitoring centres, the PSPS has organised information and sensitisation sessions for the presidents of GIEs (Economic Interest Groups) of artisanal fishermen living in the areas concerned.

3.3 Major results

The PSPS reports the identification of a dozen infractions likely to be harmful to the preservation of fisheries resources in Senegal. Among them are: the non-conformity of the net mesh size, fishing in restricted access zones, the non-boarding of observers, trans-shipment at sea without authorisation and the non-possession of a fishing licence. For five to six years, 180 boats have been held and more than 3 billion FCFA in fines have been levied.

At present, the involvement of fishing communities in coastal monitoring is of little consequence. Indeed, in most cases, the intervention of artisanal fishermen is limited to the

supply of boats and a crew if required. Even this limited involvement may disappear entirely with the advent of the second phase of the coastal monitoring component during which the PSPS will be equipped with high speed coastal patrol boats.

However, the involvement of fishing communities in coastal monitoring is particularly important in Fass-Boye, on Grande Côte. It appears that for a long time, the small local population and the geographical remoteness of this fishing village have encouraged infractions which have become increasingly frequent, often resulting in serious accidents (Kébé and Ndiaye, 1993). Many trawlers would come and fish regularly near the coast with all their lights out, destroying everything in their path. The local population mobilised themselves to combat this, but failed because of a lack of appropriate means. Fishermen joined the monitoring centre in force as soon as it was established. Thus, they were frequently found in front of the radar screen monitoring the position of these industrial fishing boats. Consequently, they are now involved in the different decision-making processes related to interventions at sea. It appears that this has greatly contributed to reducing the number of violations of the rules by industrial boats i.e. incursions into zones reserved solely for artisanal fisheries.

4. Control and limitation of the fishing effort

4.1 Background

The first consequence of the FCFA devaluation that took place in 1994 was the line fishermen's strike at Yoff and Kayar to protest against the dumping practices by fish buyers representing factory owners. Paradoxically, the prices of high value species for export (grouper, sea bream, pagre) were continuously on the decrease, particularly since the devaluation. For instance, in January 1994 the price of a 12 kg crate of sea bream fell from 4,000 FCFA to 1,800 FCFA.

In response to these strikes, the local committee of the CNPS (National Committee of Artisanal Fishermen of Senegal) set up a Commission to control the quality and selling price of fish products for export.

The Commission has since revealed to both fishermen and factory owners, that the so called fish buyers (or middlemen) representing factory owners, used to hide the real buying price from their clients i.e. the factories, thus keeping large profit margins for themselves. For the CNPS, the challenge was how to become better organised in order to maximise the value of the catch. The practice began in Joal, and during the pulp campaign in 1993 the local committee used to buy up its members' products in bulk at a 'stimulating' price and resell them to factories, in this way replacing the middlemen or buyers.

It should be observed here that there had been a dramatic breakdown in artisanal fisherfolk's information networks, and that this led to their exploitation by the buyers. The crisis that followed the devaluation brought this situation to light. Indeed, it seems that as far as transverse channels of information are concerned i.e. from one fishing community to another, however remote, information circulates fairly effectively. For example, the condition of the resource is widely known and the response times observed when new resources appeared (sole in Kayar in 1985, pulp in Joal in 1988) were very quick. However, vertical information is undervalued, as fisherfolk's knowledge of fish buyers or factory owners' practices was very poor and considered to be of little interest. This surprising imbalance can

be explained by the persistence of old habits (when the product was sold to and consumed by relatives living almost exclusively near the landing site) rather than by trying to surmount the difficulties of taking advantage of market information available on a vertical level.

4.2 Mechanisms set up by fishermen

The Commission in charge of controlling the quality and selling price of products for export comprises about fifty fishermen from Saint Louis and Kayar. Discussions with Dakar factory owners at the beginning of operations enabled the Commission to adopt a series of measures aimed at better organising the marketing of the catch landed at Kayar.

The Commission now fixes the selling price of high value species. This enables them to guarantee a greater regularity and a better return for the catches landed. Thus, a 12 kg crate of sea bream can no longer be sold to fish buyers for less than 6,500 FCFA.

In return, the Commission undertakes to sell only good quality fish. It is on this condition that the fish buyers have agreed to pay the proposed price. This pricing policy applies to sea bream, pagre and dentex. The fishing period for these species coincided with the setting up of the Commission, which at the time took no decisions concerning other species (scorpion fish, sole and grouper), the prices of which remain unfixed.

If buyers disagree with the prices proposed by the Commission, the fishermen charter vehicles to transport and sell their catches directly at the central fish market in Dakar or elsewhere. Every transaction concerning pagre, sea bream and dentex has henceforth to be carried out through the Commission. The consequences are as follows:

- It is possible to avoid abuses noticed in the past. For example, a buyer arrives in Kayar with an order for 200 crates but says that he/she needs only 20 crates. He/she waits for prices to decrease following a fall in the demand and then purchases the remainder from women to whom the fish was sold off owing to the slackness of sales.
- However, this measure penalises fishermen's wives who, according to this regulation, cannot buy the fish cheaper than the price fixed by the Commission and therefore, cannot expect to make any profit on any eventual transactions.
- Moreover, because of the rigidity of the prices fixed by the Commission, buyers *à priori* can no longer continue to finance individual fishermen as they used to in order to obtain preferential prices.

Another constraint imposed by the Commission is the limits regarding the quantities landed, a measure that represents a tangible resource management policy. Thus, the catch per trip for each active line fishing unit in Kayar is now limited to two crates of sea bream i.e. 24 kg. In the past, fishermen could return with more than 14 crates and the surplus was sold off in the local market. Henceforth, it should be possible to maximise the value of the catch and also avoid over-production.

To ensure that the rules it has enacted are being complied with, the Commission has placed three persons at 40-meter intervals along the entire beach in order to control the quantity landed and the quality of the fish supplied.

Furthermore, in order to ensure the monitoring of this new practice and to overcome any problems encountered, the Commission meets every evening to analyse the market situation

and to take the measures necessary to control activities. The meetings are held at Kayar Fisheries Management and Development Center. The construction of these headquarters of the CNPS local committee was funded by the Catholic Committee Against Hunger (CCCF) within the framework of the twinning of Kayar with the city of Lorient. It should be noted that the sanctions envisaged include a fine of 30,000 FCFA and the confiscation of a canoe's catch.

5. Negotiations on international fishing agreements

Until recently, artisanal fishermen were not involved in the negotiation of any fishing agreements that Senegal signed with either other African countries or with the industrialised countries. For a long time the arguments dominating the major speeches meant that compared to industrial fisheries artisanal fisheries were forced into the background. The role of artisanal fisheries was addressed only so far as it was considered an "outdated" practice - an activity that creates few jobs and one which only supplied the local market; while industrial fisheries were of superior importance, one making a significant contribution to the balance of trade (Kébé, 1993).

The fishing agreements address four major issues:

- the creation and development of national fleets resulting in competition for well targeted species, among the fleets operating in waters within the jurisdiction of Senegal and within the framework of fishing agreements;
- the fish, particularly demersals, caught by artisanal fisherfolk are becoming scarce because of overfishing by motorised/industrial boats;
- artisanal fisheries in Senegal are dynamic and in the past few years this has resulted in an increase in the fishing effort for some fishermen (by making canoes larger and adapting ice cases for longer fishing trips aboard ice canoes);
- foreign boats cause serious damage to fishing communities (fatal accidents to artisanal fishermen following collisions with motorised/industrial boats during their incursions into the areas reserved for canoes, and the destruction of fishing gear).

With the creation in 1987 of the CNPS which benefits from the material and technical assistance of a Senegalese NGO, the Research Center for the Development of Fisheries Intermediary Technologies (CREDETIP), fishermen are fast becoming a pressure group to be reckoned with. They are now able to defend their rights themselves before the local authorities in charge of fisheries development. Thus, they took advantage of the seminar held in Dakar in 1991, and organised by the International Support Team to Artisanal Fisheries and CREDETIP, to present their points of view on the ways and means necessary to ensure the survival of artisanal fisheries in Senegal, as well as on the grassroots development of fisherfolk communities. They had requested to be involved - just like their counterparts in the Industrial Shipowners Association - in negotiations concerning fishing agreements in order to defend their interests. They are demanding an extension of the zone reserved for artisanal fisheries from 6 to 12 nautical miles, compensation for families in case of accidents, the installation on board European vessels of equipment which enables canoes to be detected, and the sharing of

control over fishing zones between fishing communities and the national coastguard.

It was in 1994 that artisanal fishermen were involved for the first time in the negotiations of international fishing agreements. They were thus able to participate in the different meetings organised for the latest fishing agreement negotiated between Senegal and the European Union that covers the period 1994 - 1996. The CNPS is not quite satisfied with the terms of the agreement even though some of its requirements have effectively been taken into account, notably a reduction in the European fishing effort. This is why it has initiated a number of bilateral actions with its individual European partners in pursuit of fairer fishing agreements.

The participation of CNPS in the EC - ACP Parity Assembly held in Dakar from January 29 - February 4, gave fishermen the opportunity to express their concerns about the negative impacts of the transfer of European vessels to developing countries and the subsequent marginalisation of artisanal fisheries, despite its importance in the economic and social development of Senegal. In September 1995, the European Parliament voted in a resolution for "Fair Fisheries Agreements" in which it encourages artisanal fisherfolk's involvement in fisheries agreement negotiations. The EU's Fisheries Commission invited CNPS representatives to Brussels in February 1996 to express its views about the fishing agreement between Senegal and the European Union. The CNPS is also supported by the Coalition for Fairer Fishing Agreements that comprises more than 15 development NGOs of European origin.

The artisanal fishermen members of the CNPS believe that Senegal can only take full advantage of these international fishing agreements if the following conditions are fulfilled:

- authorising access by foreign boats to waters within the jurisdiction of Senegal on the basis of the condition of stocks;
- extending to 12 nautical miles the area reserved for artisanal fisheries;
- making a regular inventory of the activities of industrial fishing boats;
- setting up a Joint Commission between the State and the CNPS for settling conflicts and ensuring safety at sea;
- using the financial penalties imposed to develop the sector, to exploit fisheries resources in a more rational way for the benefit of the whole Senegalese population.

As for the Senegal - EU fishing agreement currently being negotiated, artisanal fishermen have also been involved. However, they regret that they do not have access to the texts regulating this type of agreement.

6. Co-management perspectives for marine resources in Senegal

Earlier developments show that workable co-management perspectives for marine resources in Senegal do exist.

Public authorities demonstrate a real will to increasingly involve artisanal fisherfolk in resolving the problems related to the sustainable management of fisheries resources. Priority is now given to the development of artisanal fisheries.

For some time now, the Ministry of Fisheries has initiated a dynamic policy of

negotiation aimed essentially at preserving good relationships between their administration and fisheries professionals. According to the Director of Fisheries, a National Fisheries Council will soon be established with clearly defined missions and responsibilities (The daily newspaper, "Le Soleil" of November 22, 1996). Thus, there would be an even wider collaboration before any decision is taken.

It seems that with the present policy of decentralisation, the State fisheries administration will rely heavily on fishing communities for the improved development of fisheries. Artisanal fishermen are expected to play a leading role in the development of their zones especially regarding resource management and conflict settlement. It can be observed that artisanal fishermen are developing a real awareness of the necessity of preserving resources for future generations, in other words, ensuring the survival of their profession.

At present there are two official organisations of artisanal fishermen: the CNPS which has local committees in the main landing sites along the coastline in Senegal, and the FENAGIE (National Federation of Fisheries EIGs) which is a member of CNCR. FENAGIE was created in 1993 and comprises various organisations of fishermen, stock breeders and farmers.

With the scarcity of fish and subsequent fall in incomes generated by fishing, these organisations have developed a number of strategies aimed at a rational exploitation of resources. The actions that these organisations have been carrying out for some years now, show that fishing communities have real capacities to participate efficiently in the management of fisheries resources.

The CNPS organises periodic meetings to make its members aware of the problems related to fisheries development, particularly so that the FAO code of conduct for a sustainable fisheries can be applied in Senegal. In June 1995, brainstorming sessions on sustainable fisheries and safety at sea were organised with the participation of fisheries organisations and research and professional (artisanal and industrial) administrations.

At the conclusion of these exchanges, it was strongly recommended that Kayar's experience in fishing effort limitation be fully evaluated and publicised. Indeed, fishermen suffer serious financial loss due to the difficulties of selling their surplus catches during the night fishing period to purse seine units in most landing sites along the coastline.

Ongoing and intense brainstorming sessions are also organised within the CNCR on the priorities of rural development.

The example of Fass-Boye village emphasises the importance of the collaboration between the fisheries administration and fishermen for the effective operation of the coastal monitoring centres set up by the PSPS for enhanced levels of efficiency and performance.

But we should not forget that effective involvement of fishing communities in the management of fisheries resources requires means and powers for the application of the rules established. Among others, the allocation of part of the compensation (gained through the levying of fines and taxes) of international fishing agreements to organisations of artisanal fishermen, the transfer of certain prerogatives currently of the State over to these organisations and a decentralised structure for material and technical assistance are all essential elements of any effective co-management structure for Senegalese fisheries.

The role and value of fisheries research should also be reviewed. Today, researchers must support fishing communities in the process of on-going changes. Artisanal fishermen's organisations need more and more pertinent advice and data, and in the appropriate time, to take decisions regarding the sustainable development of the sector. Moreover, collaborating with fishing communities enables researchers to obtain reliable information on the sector

which they can add to their database, and which would help in designing coherent management strategies.

Artisanal fishermen have made great efforts at taking a leading role in shaping fisheries resource management as evidenced by the numerous activities observed at the different landing sites. But there is still much to be done; artisanal fishermen must demonstrate a greater responsibility in the management of resources. In fact, a sustainable and participatory management of resources presupposes a common effort. Taking into account the significance of migration patterns in any fisheries strategy, free access to fisheries resources should be an inalienable right for all artisanal fisherfolk.

Co-management in small-scale fisheries

A synthesis of Southern and West African experiences

Sten Sverdrup-Jensen

Jesper Raakjær Nielsen

*Institute for Fisheries Management and Coastal Community Development (IFM)
The North Sea Centre, Denmark*

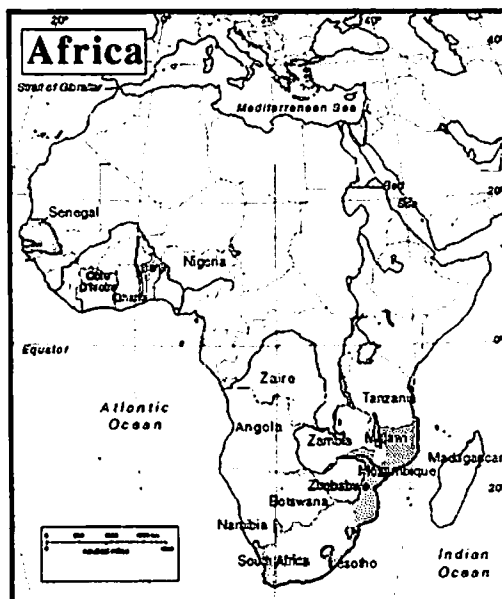
1. Introduction

This article summarizes the findings from eight African countries where case studies of co-management arrangements in artisanal fisheries have been undertaken during the period 1996-97. The countries concerned are Benin, Côte d'Ivoire, Malawi, Mozambique, Senegal, South Africa, Zambia and Zimbabwe (see map page 304). (Atti-Mama 1997, Chirwa 1997, Donda 1997, Hachongela et al. 1997, Hara 1997, Hutton and Lamberth 1997, Jackson et al. 1997, Kebe 1997, Kponhassia and Angaman 1997, Lopes et al. 1997, Scholz et al. 1997, Sowman et al. 1997. All site specific observations referred to relate to these sources).

The case studies form part of a collaborative "Fisheries Co-management Research Project" between the International Center for Living Aquatic Resources Management (ICLARM), the Institute for Fisheries Management and Coastal Community Development (IFM), and National Aquatic Resource System research partners in Asia and Africa (NARS partners). The research project started in 1994 with funding from Danish International Development Assistance (Danida) and is intended to continue until 2003.

Apart from an initiated or intended application of some form of fisheries co-management with each case, the selection criteria for the cases have been (a) artisanal/small scale fisheries only; (b) representation of different resource systems; (c) research partners having a profound knowledge of the case he or she is documenting, originating from related personal involvement in research or development work. Formal representativity by geography, resource system, socio-economic context or other has not been aimed at and also not been obtained.

In all the cases studied, a common research framework (ICLARM and IFM, 1996) has been applied. This makes it possible to make comparisons between the cases and to draw some cautious conclusions about the African experience to date, even if the way in which the research framework has been used/interpreted in the field differs from one research partner to the next.



Map of Africa

In most of the cases, co-management represents a new approach to fisheries management. In some, it has only been applied within the last 3-5 years, and in a few it is merely being considered as an option. Thus, to a large degree, fisheries co-management in Africa is still in an experimental phase. Thus, it would be premature to draw any firm conclusions on outcomes of the co-management arrangements studied in terms of efficiency, equity, resilience and resource stewardship. However, a comparison between the cases at this early stage of their implementation gives an indication as to what appears to be the critical issues in the planning and implementation of co-management arrangements in fisheries, at least in the African context. Hopefully, this information will be of interest also to those involved in fisheries/resource management in other parts of the world, where co-management arrangements in small-scale fisheries is also on the political agenda.

2. Research framework¹

The research framework, which is based on the work of Feeny (1992), Hanna (1995), Oakerson (1992), Ostrom (1990) and Pinkerton (1989, 1993), establishes what are considered key factors which influence the institutional and organizational set-up of co-management arrangements. A graphical representation of the framework is given in Figure 1. Information is collected for a set of contextual variables comprised of a number of key attributes of the fish resources, the fishing technology, the market and the resource users. This is combined with information on the

¹ For further details, see Introduction, page 1.

decision-making arrangements which cover the rights and rules governing access to, and utilisation and management of, the fish resources. The contextual variables and the decision-making arrangements determine the incentives for users to coordinate and cooperate, which in turn leads to patterns of interaction resulting in an outcome such as more or less sustainable and equitable use of the resources.

The framework intends to describe a complex and dynamic process where outcomes, incentives and patterns of interaction can affect the contextual variables and the decision-making arrangements. That means that the "system" is continually adjusting and reacting to changes and, seen from another perspective, that it may be altered to achieve a particular outcome.

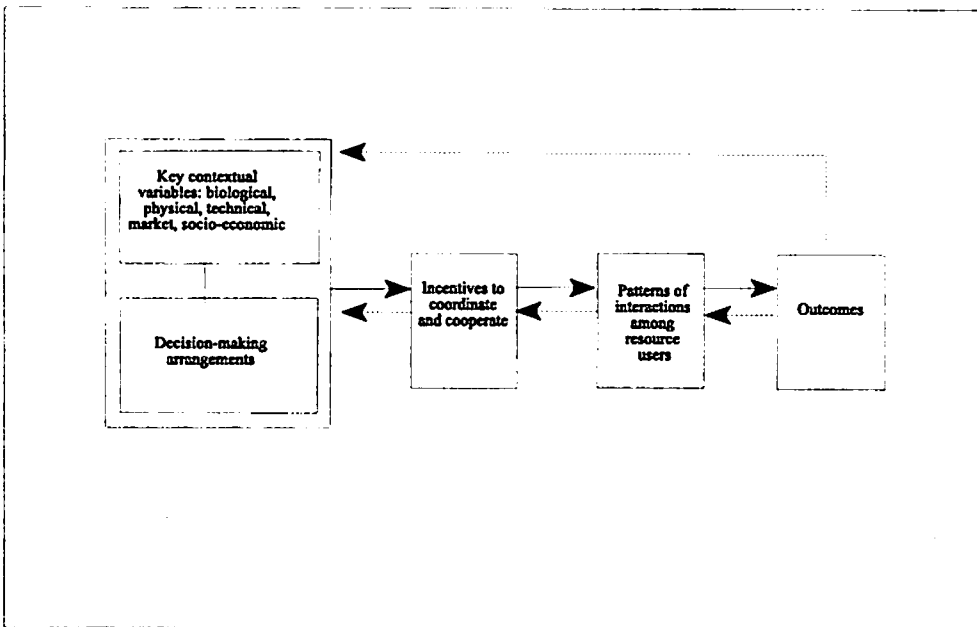


Figure 1: Research framework

3. Contextual setting of African cases

The incentives of fishers and other stakeholders to cooperate among themselves and with government in the management of those fisheries in which they are involved are of two types. On the one hand, the level of cooperation is determined by a number of key factors relating to the local politico-historical, bio-physical, economic and socio-cultural environment of the fisheries and the fishing communities. On the other, the incentives for cooperation are determined by the character of the decision-making arrangements in place for setting collective choice rules and, in particular, the operational rules and thus the legitimacy of the arrangement in the eyes of the fishers.

3.1 Political and historical context

The cases studied differ significantly as regards the political history of the countries and their artisanal fisheries. Nevertheless, in all cases the co-management approach is intended to replace conventional, centralized management systems which have proved inefficient and have failed to provide sustainable sector development or even to protect the productive capacity of the natural resource base. The centralized systems, which in most of the countries replaced existing and often quite successful traditional management systems, were introduced during the colonial era and taken over by national governments upon independence. However, elements from traditional fisheries management systems still exist in many areas.

The centralized approach to fisheries management was maintained after independence mainly because it was the approach which had long been applied by the industrialized countries. In addition, the management problems and requirements for intervention at the time did not necessarily call for a consideration of the need for change in the management approach. The centralized approach was also well suited to the different political regimes which had succeeded colonial rule in Africa, whether it was the socialist planned economy as in the case in Zambia, Mozambique and Benin, autocratic rule which for many years was the situation in Malawi and Côte d'Ivoire, or apartheid as practised in South Africa.

Irrespective of what political systems have been in place in the past, fishers' trust in government authorities has always been at best, moderate. Fishers have hardly ever found themselves at the winning end of relationships with government. Therefore, wherever initiatives to establish co-management have been taken by government authorities, they have been met with profound scepticism by fishers who with good reason are suspicious of the motives and sincerity of government authorities when they propose collaboration and the sharing of management responsibilities. In their experience the government always sets the rules and regulations, and has the responsibility for their enforcement.

In many of the cases studied, the launching of co-management initiatives has coincided with a change of political regime, towards democratic rule. This change has given fishers and other local stakeholders the incentive to give collaborative management arrangements with government a try.

3.2 Bio-physical environment

The bio-physical environments included in the sample represent three different types of ecological systems, cf. table 1.

Table 1: Bio-physical environments of case studies

| | Lake/reservoir | Lagoon/estuary | Coastal |
|------------------|----------------|----------------|---------|
| Benin | | + | |
| Côte d'Ivoire | | + | |
| Malawi (2 cases) | + | | |
| Mozambique | | | + |
| Senegal | | | + |
| South Africa | | + | + |
| Zambia | + | | |
| Zimbabwe | + | | |

In Malawi, fisheries co-management is being tried out on Lake Malombe and Lake Chiuta. Lake Malombe is a shallow, 390 km² freshwater lake which is connected to Lake Malawi, one of the big African lakes, via the Upper Shire River. A total of 45 fishing villages with approximately 5,000 fishers are situated along Lake Malombe/Upper Shire River. Lake Chiuta is a 200 km² shallow freshwater lake shared between Malawi and Mozambique. The southern part is covered with emergent vegetation penetrable only by small canoes.

Zimbabwe and Zambia share Lake Kariba, a 5,500 km² man-made reservoir on the Zambezi River. On the Zambian side some 1,350 fishers live in 67 villages. On the Zimbabwean side 1,240 fishers are scattered in fishing camps within 7 concession areas.

The lagoon systems in Benin and Côte d'Ivoire comprise large, coastal, shallow lakes which are connected to the sea via channels, but also have an inflow of fresh water from rivers implying changing salinity levels with the dry and wet seasons. In Benin, Lake Nokue covers 120 km² with 37 fishing communities around the Lake with 13,500 fishers. In Côte d'Ivoire, the Aby-Tendo-Ehy lagoon complex extends over 424 km². The 3,000 fishers living in this area put most of their effort into the Aby Lagoon.

In South Africa, the estuary of the Olifants River is a small site on the Atlantic coast. The village of Ebenaeser, a fishing community, is situated around the estuary and has approximately 2,500 inhabitants.

The coastal sites are: Kwirikwidge in Mozambique, a fishing village with 2,250 inhabitants situated on the Indian Ocean coast near the town of Angoche in the northern part of the country; the villages Kayar and Saint Louis in Senegal; and in South Africa, the village of Arniston, a fishing community on the Southeast Cape with about 800 inhabitants.

3.3 The resources and the fisheries

Character and status of the fish resources

In most of the cases studied only a few fish species are target species. These are often subject to heavy fishing pressure or are already overfished. This applies to all the ecosystems studied whether the fish stocks were sedentary or migratory. Most often a co-management initiative can be seen to be related to a need for (improved) resource management because the stocks of one or more target species have become depleted. Only in the case of Lake Kariba there is no indication of a resource crisis relating to the target species, either on the Zambian or the Zimbabwean side. Here, the co-management initiative is driven by other concerns.

Character of the fishery

The cases studied comprise artisanal fisheries only. The commercial gear used is predominantly gill nets and seines of various types. Hook and line and cast nets are mostly used for subsistence fishing. Only in the case of Arniston, South Africa, is long line the common gear type used. The use of large seines (open water and beach operated) with increasingly smaller mesh sizes (down to mosquito net) seems to have increased in recent years, and this has contributed significantly to the depletion of stocks.

Boats used in inland fisheries are unmotorized dug-out canoes, plank boats or in the case of Lake Kariba boats made of steel plate. Only on the coastal sites is the use of motorized boats and plank canoes widespread.

3.4 Economic and socio-cultural attributes

Dependence on fisheries

In all the cases studied, the fishers and their families are dependent on the fishery for their livelihood. In most cases, they have no alternative source of income or access to other sources of food production. Therefore they need an income to purchase all necessities. This explains why all the fisheries analyzed are market-oriented. Only fishers in Zambia and Zimbabwe who are of the dominant Tonga tribe and the fishers from Kayar in Senegal follow the tradition of combining (seasonal) fishing with the rearing of livestock and farming.

Homogeneity of resource users

In many of the cases, groups of different ethnic background and religious beliefs exploit the same water bodies and target the same species. In most cases only two ethnic groups are involved, but in the case of Zambia no less than four different groups exploit Lake Kariba. There is no report of conflicts between ethnic groups over access to or exploitation of fish resources. In Zambia some conflicts have arisen between the Tongas and the other groups, but this is specifically regarding access to land in new fishing community settlements. In Senegal, there has been a

serious and long-term conflict between fisher-farmers from Kayar and full-time fishers from Saint Louis over access to the sea and its resources in the Kayar area.

In Côte d'Ivoire local fishers have had serious conflicts with Ghanaian fishers with the same ethnic background, who utilized modern gear which increased fishing effort dramatically and depleted resources in the jointly exploited lagoon system.

In South Africa, in the Arniston case study, the situation is still characterized by a *de facto* segregation of white and coloured people living within the Arniston fishing community. Whites mostly assume the role of boat owner/skipper whereas the Coloured usually work as fishing crew. So far, conflict over access to resources has not been reported, but is highly likely to arise.

Ownership of means of production

In most of the cases two types of ownership co-exist: either the means of production are owned by the fishers/processors themselves or by those not directly involved in fishing activities. The capitalistic system of ownership seems to have led to more advanced technologies being introduced. This has increased fishing effort and in many cases, caused the crisis in resource management. The *akadja* system in Benin in which parts of what used to be common fishing grounds are enclosed and privatized, represents another form of ownership which leads to an increase in fishing effort in those areas still serving as 'common'.

Market characteristics

In most of the case studies, many traders are involved in the marketing of produce, and fishers are not entirely dependent on just one or a few traders. In Southern Africa, fish processing and trading is predominantly a male activity, and the traders seldom live within the fishing communities. In West Africa, fish processing and trading is a female occupation which is often undertaken by the fishermen's wives.

Indigenous knowledge

Where the indigenous knowledge of the fishers has been investigated in the case studies, it seems that fishers possess a very good knowledge of the localization of the fish resources and the technical aspects of the fishing operation. However, little indigenous knowledge seems to exist on the dynamics of fish populations and the reproductive capacity of the various stocks.

Competing resource users/other stakeholders

With the exception of Lake Kariba, conflicts between fishers and other resource user/sector interests in the inland fisheries have not been mentioned. Lake Kariba is a very important area for tourism, with extensive recreational fishing, game viewing and boating. Conflicts between the tourism industry and fisheries over access to the lakeshore and adjacent waters are frequent, especially in Zimbabwe. In addition, conflicts between artisanal fishers and industrial fishers

(*kapenta* operators) on the Lake are many, mostly as a result of the theft of *kapenta*, but also over access to fishing grounds.

In the case studies where fisheries in coastal areas have been investigated, it has been reported from Mozambique and Senegal that conflicts with industrial fishers are frequent, even in inshore waters where the industrial fishers operate without permission. Conflicts between artisanal fishers using different gear types in inshore areas have also been reported from Senegal.

The case notes from Côte d'Ivoire explicitly mention the influence that powerful individuals (in their capacity of politicians) originating from the fishing community may have on the local decision-making process.

3.5 Boundaries

All the inland cases have well defined geographical/physical boundaries. The lagoons, lakes and reservoirs are all surrounded by land. In contrast to their coastal counterparts, the notion that fish resources may not be inexhaustible has simply never occurred to the people in inland fishing communities. The communities have always had rules, often expressed in religious terms, that traditionally protected the resource from over-exploitation.

The Olifants River fishery has particularly clearly defined boundaries; physically they are defined by the River's own banks and in the estuary by the River's mouth. Upstream, there is no boundary, but the target species, the *harder*, is marine and therefore can only make a limited migration upstream. It is therefore the physical conditions i.e. the reach of the saline water which determines the natural upstream migration boundary for the species.

The coastal areas studied - in Mozambique, South Africa and Senegal - are characterized by the absence of well defined physical boundaries and those target fish species that migrate along or from the coast are exploited. However, two of the locations have nearby reefs, Kwirikwidge in Mozambique and Arniston in South Africa, where some of the fish species targeted are sedentary; these conditions are somewhat similar to the lagoon case studies.

3.6 Access rights

In the lagoon case studies, each fishing village has an exclusive fishing territory. Within that territory there may be a closed area, where fishing can only take place for special occasions and with the consent of the village headman. Fishing in the village territory is open to fishers from neighbouring villages if they comply with the local rules and control is left in the hands of the village fishers. In Lake Nokue, Benin, there is a ban on establishing *akadjas* within the village territory. On Lake Kariba fishing concession areas are defined on the Zimbabwean side and fishers are only allowed to fish within the concession area to which they have obtained access rights. On the Zambian side of the Lake, the intention is to establish exclusive fishing territories for each of the lakeshore villages as part of the new co-management policy.

On Lake Malombe, Malawi, there are no exclusive areas and access is open to anyone who has a fishing licence issued by the Fisheries Department. This allows migrant fishers to participate in the fishery but it has become evident that there is a need for a lake-wide fisheries association with representation from all Beach Village Committees to deal with questions of zoning and limitation of access rights.

In the Aby lagoon, Côte d'Ivoire, there is an informal agreement between the villages not to fish in the deep waters outside the village territories as these waters are traditionally considered to be fish sanctuaries. On Lake Kariba, the simple technology applied by artisanal fishers prohibits them from fishing in the deep waters offshore.

In Senegal, there is an exclusive 6 nautical mile zone reserved for artisanal fishers, established primarily to protect juvenile fish and to avoid conflicts between artisanal and industrial fishers. Fishing vessels over 250 tons are only authorized to fish outside the 12 nm zone. Apart from these regulations fishers are free to fish wherever they wish. This has caused some conflict in areas where fisher-farmers claim an exclusive right to the coastal waters adjacent to village land.

4. Institutional arrangements for co-management decision-making

4.1 Origin of co-management projects

The origin of existing or emerging fisheries co-management projects in Southern and West African countries can be found in the ongoing democratization process taking place in many of the countries concerned. This process has led to the decentralization of government policies, accompanied by pressure from international donor agencies to introduce co-management or at least establish a more democratic process in the formulation of fisheries policy objectives. Thus, the institution of co-management arrangements can, in most cases, be characterized as a 'top-down' and often also as a 'donor driven' process.

4.2 Legal framework

Generally, no legal framework is in place to support the co-management arrangements in the case studies reported. Malawi is the only country that comes closest to having fisheries co-management enacted in the national legislation. Empowerment of Beach Villages Committees (BVCs) was gazetted in June 1996 and proposals for incorporating community participation in the Fisheries Act have been detailed and presented to Parliament. However, Chirwa (1997) argues that even if BVCs are democratically constituted, they are not legally sanctioned, as no law exists from which they can derive their authority.

In Mozambique, the Fisheries Master Plan adopted by the Mozambican government, advocates the institution of co-management arrangements in small-scale fisheries. However, the Master Plan policy statements have not yet been translated into national legislation.

South Africa is in the process of adopting a new fisheries policy. It is very likely that the policy process will lead to national legislation, where co-management in one form or another will be enacted as a principle in South African fisheries management (Martin and Raakjær Nielsen, 1997).

With regard to Lake Kariba, national departments in both Zambia and Zimbabwe have management authority over their fisheries. In Zambia, the ongoing Agriculture Sector Investment Programme, which to a large extent is also a policy framework, promotes decentralization. This has moved the fisheries policy in the direction of community-based resource management (Jul-Larsen *et al.*, 1997). In Zimbabwe the co-management approach is inspired by the thinking

embodied in the national Communal Areas Management Programme for Indigenous Resources (CAMPFIRE) programme relating to the wildlife sector, which was established in order to ensure that local communities would benefit from wildlife management policies. The CAMPFIRE concept has been adapted to fisheries with little success. In neither Zambia nor Zimbabwe is there the enabling legislation which ensures the empowerment of user groups and local communities with regard to fisheries management.

In West Africa where several examples of fisheries co-management arrangements exist (Horemans and Jallow, 1997), user groups are not given the necessary authority through enabling legislation. However, there are examples of *de facto* recognition by some governments - Benin and Senegal - even if the co-management principle has not been formally institutionalized.

It is typical of all the cases documented that no collective choice rules are in place which involve user groups in decision-making as to who should participate in making operational rules. Fisheries management in Southern and West Africa is, generally speaking, still controlled by governments although as stated earlier some examples of co-management do exist. User groups are not legally empowered and their negotiating position versus that of governments' is consequently comparatively low, or as Chirwa (1997) points out: "*The local user communities are the recipients rather than the initiators of decisions. They, themselves, are managed, together with their resources*". This statement seems to be applicable to most of the examples of co-management in Southern and West Africa and serves to emphasize the need for enabling legislation regarding co-management in order to empower user groups with management authority.

Under the present management arrangements user groups will often be patronized in possible disputes with government. The latter seems generally reluctant to devolve power and bestow legal rights and authority in fisheries management to user groups. However, devolution of management authority is obviously a sensitive issue for many governments and one that is not easily resolved. In several of the countries concerned, the democratization process is in its infancy and consequently very fragile. Given the political situation in most of these countries, it would be premature to look for major changes in government attitudes towards the relinquishing of power. In addition, devolution of management authority requires changes in laws, policies and administrative procedures, a process which can be both cumbersome and long-winded.

Viewed against this background, it may take years before enabling legislation is put in place in support of fisheries co-management. However, as governments in general terms begin or continue to promote co-management arrangements in fisheries, it is likely that user rights will be gazetted into national fisheries legislation as the democratization process moves forward.

4.3 Management institutions

In Africa, co-management institutions have mainly been established at the local and district level and often exist within a nested system. However, there are also examples of consultative management institutions at the national level e.g. the Fisheries Management Committee recently established in Mozambique (Lopes *et al.*, 1997), the planned Fishery Council in Senegal (Kebe, 1997) and the *de facto* co-management of the hake fishery in South Africa (Martin and Raakjær Nielsen, 1997). This seems to indicate a general move towards establishing consultative co-management institutions at the national level in many developing countries.

Different types of representation are found in the various co-management arrangements in Southern and West African countries, from fishers only in the case of Lake Nokoue, Benin to a generally much broader representation in the majority of cases, comprising fishers, fisheries administrators and local authorities. The case of Aby lagoon in Côte d'Ivoire is the only example where fish processors (female fish-smokers) are represented.

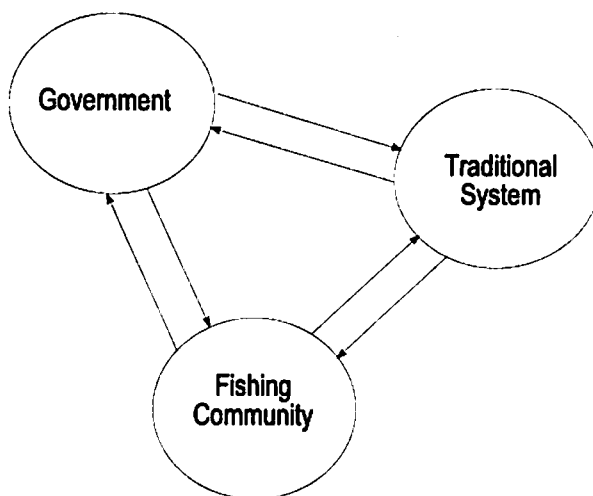


Figure 2: Co-management in the African context

It is a general observation from the cases studied that the co-management institutions established are very often closely linked to existing traditional power structures, usually represented by the local authorities.

Normally, a co-management arrangement is a government (national or local) - user group relationship. However, in the African context the traditional power system plays a very prominent role, particularly in natural resource management. Thus, fisheries co-management often becomes a three-party relationship (see figure 2), where the traditional system often serves as the link between the government and the user group. Because the co-management arrangements are often closely related to traditional customs and practices, religious institutions and a belief in myths and magic may exert an influence on decision-making concerning collective choice and operational rules.

On one hand it can be argued that this type of co-management cannot be viewed as co-management in a strict sense as in reality it is just another form of 'top-down' management. True fishers may not be represented in the arrangement as they seldom hold powerful positions in traditional decision-making arrangements. On the other hand, such tripartite arrangements build upon and involve institutions which are considered legitimate by fishers and fishing communities. To use Weber terminology (Selznick, 1992), the legitimacy of this type of co-management arrangement is based on a combination of traditional and charismatic authority. The sustainability

of such an arrangement will, to a large extent, rely on the personality of the chief and how he is regarded by the local community.

The fact that co-management arrangements in the African context are closely linked to the traditional system is not without its problems. It seems obvious that tensions will occur in the future as the democratization process moves forward. It is likely that in the long-term this process will undermine the authority of traditional leaders and that individuals outside the present power structures may in the course of the democratization process try to increase their own power at the expense of the traditional leaders. The outcome of such developments will have an impact on the resiliency of the co-management institution as it may change perceptions within the fishing community and the government on what are considered to be legitimate management institutions.

The lack of capabilities and/or aspirations among fishers and fishing communities to participate in the fisheries management process explains the lack of participation of true fishers in the decision-making process as described in most of the cases studied. Hutton and Lamberth (1997) emphasize that to be successful, the introduction of co-management in the South African line fishery will require investment in information sharing and education of local fishing communities. As stated by Pinkerton (1989) strong local institutions with human and financial resources are a pre-condition for co-management. In small-scale fisheries in Africa such institutions are hardly ever found. Thus, capacity building is in most cases a prerequisite for implementation of co-management arrangements.

4.4 Management tasks

Generally, co-management arrangements have been established to encourage user groups to become involved in the establishing of operational rules for the fisheries. In a few cases the arrangements also include monitoring, control and/or enforcement of regulations.

Operational rules

With a few exceptions, user groups are only involved in the determination of technical regulations such as gear type restrictions (minimum mesh size and maximum length of seine or gill nets), closed seasons and protected areas. In fact the Olifants River *harder* fishery is the only example among the case studies where user groups are directly involved in allocating access rights/licensing. Usually access rights allocation is a government responsibility, even if a few examples of consultation with user groups in the process do exist as in the Aby Lagoon fishery.

User groups have mainly been involved in the implementation stages and only to a limited extent actively involved in the planning phase. However, the general trend for user groups is also to become more involved in the planning phase.

Enforcement

Control and law enforcement is mainly undertaken by government departments or wings thereof. In Malawi the proposed changes in the fisheries legislation will make the BVCs responsible for enforcing operational rules in conjunction with the Department of Fisheries. In South Africa the

Olifants River Fishing Committee is involved in the control of fishing. In most of the cases the user groups are mainly involved in monitoring activities but there seems to be a move towards more involvement of users in control activities as well.

4.5 Typology of fisheries co-management arrangements

In Table 2 the various co-management arrangements studied have been typologized for user involvement in the setting of operational rules.

Table 2: Typology of co-management arrangements

| Case studies | User involvement in setting operational rules |
|------------------------------|---|
| Aby Lagoon, Cote d'Ivoire | Consultative |
| Arniston, South Africa | No arrangement in place |
| Kayar & St Louis, Senegal | Consultative |
| Kwirikwidge, Mozambique | Instructive |
| Lake Chiuta, Malawi | Consultative |
| Lake Kariba, Zambia | Consultative |
| Lake Kariba, Zimbabwe | Instructive |
| Lake Malombe, Malawi | Consultative |
| Lake Nokoue, Benin | Advisory |
| Olifants River, South Africa | Cooperative |

The classification used is that defined by Sen and Raakjær Nielsen (1996).

Type A: *Instructive*: There is only minimal exchange of information between government and users. This type of co-management regime is only different from centralised management in the sense that the mechanisms exist for dialogue with users, but the process itself tends to be government informing users on the decisions they plan to make.

Type B: *Consultative* Mechanisms exist for government to consult with users but all decisions are taken by government.

Type C: *Cooperative* This type of co-management is where government and users cooperate together as equal partners in decision-making.

- Type D: *Advisory*** Users advise government of decisions to be taken and government endorses these decisions.
- Type E: *Informative*** Government has delegated authority to make decisions to user groups who are responsible for informing government of these decisions.

In accordance with this typology, most African co-management arrangements can be classified as Consultative. Only in two cases does the co-management arrangement involve more than consultation. In the Olifants River case, a cooperative arrangement has been established, and only in the case of Lake Nokoue do user groups drive the process. As fisheries co-management is in its infancy in African fisheries, it is understandable that the process at this stage is mostly government-led.

Apparently, co-management should not be considered a very precise management concept, but rather as a strategy to involve and integrate user groups as participants in the decision-making process. Therefore, from an administrative point of view, it is useful to classify co-management arrangements into three types as suggested by Raakjær Nielsen and Vedsmand (1997):

- (1) *Consultative*, where co-management takes the form of consultation with user groups at a central level;
- (2) *Cooperative*, where co-management is a cooperative process between on one side the government and on the other side the traditional local power structure and the user groups;
- (3) *Delegated*, where management authority (mainly the determination of operational rules) is delegated to user groups at the local/regional level.

It is our hypothesis that the evolution of co-management in Southern and West Africa will be a combination of the three types, often existing within a nested system. In some countries (Mozambique and Senegal) consultative management institutions have been established at the national level to advise the government on general management issues. The same arrangements might soon be the case in Malawi, Zambia and perhaps South Africa as well.

At the regional/local level it is likely that cooperative management arrangements will in the future increase in number, as government faith in co-management arrangements strengthens, and the capacity within the fishing communities to take part in fisheries management increases. Co-management arrangements will then slowly evolve to include more than just the setting of operational rules.

For some tasks, primarily the setting of operational rules, fishers are believed to be taking the lead. This means that delegated co-management will take place. These findings support the argument by Sen and Raakjær Nielsen (1996) that in general, the more specific the tasks (harvesting and market regulation), the lower the level at which decisions are taken.

In general, the information obtained from the case studies indicates that co-management arrangements, whatever the type, occur almost entirely during implementation and very seldom in the planning phase.

5. Incentives for cooperation

The overall rationale behind the introduction of co-management arrangements by governments differs from country to country. In particular, the failure of centralized systems to prevent overfishing of important stocks, the low legitimacy of the existing management institutions and the substantial costs involved for conventional management approaches to be effective, are among the main reasons why the governments of Malawi and Mozambique have set out to try an alternative approach.

The most important incentives for fishers/local communities to cooperate with government are:

- over-exploitation of fish resources;
- conflict between artisanal fishers and semi- or industrial fishers;
- lack of access rights;
- poor living conditions of fishers and fishing communities;
- conflict among artisanal fishers;
- conflict between fisheries and other sector interests;
- lack of representation in fisheries management decision-making.

In all cases conflicts have arisen among several groupings within the fishers/local community. Thus, conflict resolution is a major incentive for fishers/local communities to participate in the decision-making process. Another important incentive also apparent in most of the cases are the poor living conditions of fishers and fishing communities and the fact that target fish species are becoming a scarce resource. The reason for the poor living conditions is, in some cases, a lack of access rights to the resources. Participation in the fisheries management decision-making process is seen as a means of improving living conditions and a way of obtaining access rights.

At government level the most important incentives to cooperate with the resource users are:

- centralized management has not been able to solve resource crisis situations;
- over-exploitation of fish resources;
- poor levels of compliance with regulations (low legitimacy of institutions);
- high costs of resource monitoring, control and enforcement;
- donors promoting the policy of co-management;
- avoidance of conflicts among resource users.

The main incentive for governments to establish co-management arrangements is the fact that governments have not been successful in solving the present crisis affecting most important fisheries. Many governments have realized that they cannot handle the crisis alone and that they need the active involvement and support of the resource users themselves. Governments are also pushed by donors, who generally promote co-management in order to encourage a more democratic process, but also by the fact that there are only limited funds available for monitoring, control and enforcement in most countries.

Broadly speaking, the centralized management institutions are not perceived as legitimate by the users, and compliance with rules and regulations has generally been low. From a government perspective co-management is seen as a means to improve this situation. Co-

management is also seen by governments as a mechanism for conflict resolution as user-group participation in the decision-making process is likely to increase legitimacy of regulations.

6. Outcome of co-management initiatives

All the co-management arrangements studied began just a few years ago, and it would be premature at this stage to draw any firm conclusions as to the outcome in terms of sustainability (resource stewardship), equity (effects on stakeholders in terms of benefit distribution, representation and information), efficiency (in comparison with other management arrangements) and management system resilience. To draw such conclusions the sites would need to be revisited. A monitoring process of this kind has been initiated within the present research project.

However, some general observations have been made that may give some indication as regards outcome. In the case of Malawi, positive results of the co-management approach were reported in terms of increased catches of the main target species both in Lake Malombe and Lake Chiuta (Scholz et al., 1997). New management regulations were adopted by the fishing communities and gazetted in 1996. They included gear type regulations and, in the case of Lake Malombe, the introduction of closed seasons and sanctuaries including fish aggregation devices. In terms of equity, management issues and measures are discussed openly among the fishers, and their feeling is that they are now part of the decision-making process. Where efficiency is concerned, the foundation of the Lake Malombe Fisheries Association in 1996 as a coordinating body for the Beach Village Committees is an indicator of an increase in management efficiency.

In Kayar, Senegal, the restriction on catch per trip for each line fishing unit, established and actively enforced by the local artisanal fishers' committee, represents a successful resource management policy aimed at maintaining sustainable fisheries at the local level.

7. Evaluation and future research needs

7.1 Lessons learnt

Given the fact that the co-management arrangements documented are all of very recent origin, one should be cautious not to draw firm conclusions on lessons learnt regarding the design and implementation of co-management systems. The conclusions reached in this section are only tentative and would need to be both verified and qualified through further research.

Co-management arrangement design

In most of the cases studied, co-management arrangements were established in response to resource depletion. Under such circumstances it would seem critically important that governments should not leave their local partners with management responsibilities that they are not capable of shouldering, be it for reasons of lack of knowledge or lack of resources. Indigenous knowledge among fishers is often related to the fish resources and is concentrated on aspects that are relevant to fish capture, and does not to any large extent comprise the biology of the resources. It would therefore be fairly impossible for local partners, if left alone, to decide on appropriate measures

to facilitate the recovery of fish stocks. It would thus be the responsibility of governments to provide the scientific advice needed, to train the local partners to understand and appreciate the advice, and to ensure that any management measures taken are adequate.

The cases documented have demonstrated that conflicts among stakeholders (fishers) of different ethnic or religious affiliation are not a major problem in co-management arrangements as long as their fishing operations are of the same character or do not interfere with each other. Where both full-time fishers and fisher-farmers fish in the same area, conflicts may easily arise because of the differing perception of access rights and spatial ownership among the two groups. Also, where there is interference between different types of fishing gear in an area, conflicts may easily arise even among fishers of the same affiliation. Co-management arrangements would have to reflect such differences in interests of particular groups of resource users. Mechanisms for conflict resolution would need to be given high priority in the design of the arrangements, and management approaches that would minimize conflict (e.g. zoning of fishing grounds) should be adopted wherever feasible.

The scepticism of fishers, reported across the board, regarding the sincerity of government in the devolving of management responsibility should be taken into consideration in the design of co-management arrangements. Mistrust on either side would probably best be overcome if co-management arrangements were to be initiated in the consultative mode, with focus put on operational rules and their enforcement. As trust grows, and capacity for taking management responsibility increases at the local level, co-management arrangements may move towards more user group-based decision-making.

Traditional leadership systems, having high legitimacy with local people still play a key role in community governance in most African fishing communities. This should be properly reflected in the design of co-management arrangements to ensure the legitimacy of new institutional structures with fishers and other local stakeholders.

In most of the fisheries co-management cases documented, management focus is, for good reason, on the fish resources. However, significant success achieved from co-management of fisheries infrastructure has also been documented from countries in West Africa (Horemans and Jallow, 1997). Based on these experiences, when designing co-management arrangements it should be considered to what extent it would be more appropriate to focus on fisheries sector management, i.e. integrating the management of the resources into the management of the fisheries sector structure, including the infrastructure. This would better reflect the development context in which many co-management arrangements are being tried out.

Co-management arrangement implementation

In the implementation of a co-management arrangement it is important to observe that expectations of those involved in local committees etc., in terms of income or other benefits to be derived, are fully met. The case study from Lake Malombe, Malawi documents the long-term negative effect that the unmet expectations of local people have on the process i.e. they were expecting meeting allowances and free replacements for undermeshed nets, expectations that could not be met.

In the design of co-management systems a balance should be struck between the responsibilities given to institutions, groups and individuals and the means put at their disposal. The cases from Benin and Côte d'Ivoire clearly document that local management committees

often feel that they are not given sufficient powers by governments to undertake what they have been mandated to do, and are also not given the physical means needed to effectively carry out their responsibilities e.g. to control fishing operations. Furthermore, none of the co-management arrangements studied have been able to show evidence that the flow-back of licence fees or other funding mechanisms for use by local management bodies were considered at the design stage.

7.2 Research needs

It is the overall hypothesis of the research project that fisheries co-management systems may in many situations be superior to centralized or community-based systems in terms of sustainability, equity and efficiency. To contribute to the test of this hypothesis, the cases analyzed would need monitoring over an extended period of time. It is only through regular visits to the sites that it would be possible to document the co-management system outcome in these terms.

The analysis has motivated some hypotheses on issues of critical importance to the design of co-management systems. One hypothesis is that conflicts between groups of fishers exploiting the same waters are rooted in the differences in fishing operations, typically the use of different fishing gear. Another hypothesis is that fishers' indigenous knowledge primarily relates to fishing operation and only to a very limited extent to the determinants of fish stock reproduction. A third hypothesis is that co-management systems do not obtain legitimacy among fishers if they do not incorporate (informal) traditional power structures at the village level.

Tests of these hypotheses should go hand in hand with a test of the overall project hypothesis.

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APPENDIX

List of participants

**Second African Regional Workshop on Fisheries Co-management
18-20 March 1997
Boadzulu Lakeshore Resort, Mangochi, Malawi**

| | |
|--|---|
| Afonso, Paula C. Santana Marine Biologist | Instituto de Investigaç o Pesqueira (Institute for Fisheries Investigation), Av. Mao Tse Tung No. 380, Maputo, Mozambique Tel: (258) 1-490307/490536; E-mail: Psantana@magumba.uem.mz |
| Ahmed, Mahfuzuddin Senior Social Scientist/ Program Leader | ICLARM, MC PO Box 2631, Makati City 0718, Philippines Tel: (63) 2-813-7894; Fax: (63) 2-813-7893; E-mail: M.Ahmed@cgnet.com |
| Atti-Mama, Cyriaque Social Scientist | Service Hydraulique-Borgous, B.P. 197, Parakou, Benin Tel: (229) 610974; Fax: (229) 330519; E-mail: DIPFAO@bow.intnet.bj |
| Beaumont, Judy Principal Environmental Officer | Coastal Unit, Department of Environmental Affairs and Tourism, P/Bag 2, Roggebaai 8012, South Africa Tel: (27) 21-4023029/3228; Fax: (27) 21-4182582; E-mail: beaumont@sfri.gov.za |
| Donda, Steve Fisheries Economist | Fisheries Department, P.O. Box 593, Lilongwe, Malawi Tel: (265) 721074/083/766; Fax: (265) 721117; E-mail: Sdonda@malawi.net |
| Hachongela, Patricia Senior Rural Sociologist | Ministry of Agriculture, Food and Fisheries, Policy and Planning Division, P.O. Box 50197, Lusaka, Zambia Tel: (260) 1-2505321/250504; Fax: (260) 1-254623/253520; E-mail: MAFFEWU@zamnet.zm |
| Hara, Mafaniso M. Research Fellow | Centre for Southern African Studies, UNC, P/Bag X17, Bellville 7535, South Africa Tel: (27) 21-9593040; Fax: (27) 21-9593041; E-mail: Mhara@ems.uwc.ac.za |
| Harris, Jean Marine Ecologist | Natal Parks Board, Hluhluwe Game Reserve, Research Cen- tre, P.O. Box 25, Mtubatuba, 3935, South Africa Tel: (27) 35-5620490; Fax: (27) 35-5620113; E-mail: C/O dbalfour@NPB.CO.za |

| | |
|--|---|
| Horemans, Benoit Officer-in-Charge | IDAF Programme, C/O FAO, P.O. Box 1369, Cotonou, Benin Tel: (229) 330925; Fax: (229) 330519; E-mail: DIPAF AO@bow.intnet.bj |
| Hutton, Trevor PhD Student/Honorary Research Associate | Zoology Department, University of Cape Town, 9 St Clark Road, Plamstead 7800, Cape Town, South Africa Tel: (27) 21-6503613; Fax: (27) 21-6503001; E-mail: THUTTON@botzoo.uct.ac.za |
| Jallow, Alhaji Socio-Economist | IDAF Programme, C/O FAO, B.P. 1369, Cotonou, Benin Tel: (229) 330925; Fax: (229) 330519; E-mail: DIPAF AO@bow.intnet.bj |
| Kafumbe, Frederick S. Principal Fisheries Development Officer | Department of Fisheries, PO Box 710005, Mansa, Zambia Tel: (260) 2-821207; Fax: (260) 2-821761/859/872 |
| Konan, Angaman Chief, Fisheries Project | Projet de Développement de la Pêche Artisanale en Lagune Aby, B.P. 84, Adiaké, Côte d'Ivoire Tel: (225) 537029 |
| Kromer, Jean Louis Adviser/Co-ordinator | IFAD, IDPPE, CP 2473, Maputo, Mozambique Tel: (258) 1-494973; Fax: (258) 1-494974; E-mail: JLK@IDPPE.uem.mz |
| Lopes, Simeão Socio-Anthropologist | Small Scale Fisheries Institute-IDPPE, Av. Marginal No. 2374, PO Box 1087, Maputo, Mozambique Tel: (258) 1-494977/490807/490604; Fax: (258) 1-494974; E-mail: LOPES@IDPPE.uem.mz |
| Malasha, Isaac Research Fellow | CASS, University of Zimbabwe, Box MP 167, Mount Pleasant, Harare, Zimbabwe Tel: (263) 4-303211 x 1340; Fax: (263) 4-333407; E-mail: CASS@esonet.zm |
| Martin, Richard Public Policy and Development Consultant | 8 Ralph Street, Ravensmead, Cape Town, South Africa Tel: (27) 21-4483075; Fax: (27) 21-4481980; E-mail: rmartin@iafrica.com |
| Matiya, George G. Fisheries Officer | Fisheries Department, P. O. Box 593, Lilongwe, Malawi Tel: (265) 721074/083/766; Fax: (265) 721117 |
| Mayekiso, Monde Chief Director | Sea Fisheries (SA), Foretrust Building, Hammerschlag Way, Foreshore, Roggerbaai 8012, South Africa Tel: (27) 21-423018; Fax: (27) 21-4023217 |
| Mikkola, Heimo Resident Representative | FAO, PO Box 30750, Lilongwe 3, Malawi Tel: (265) 783255; Fax: (265) 783263; E-mail: FAO-MWI@field.fao.org |

| | |
|---|--|
| Muriritirwa, Wellington Research Fellow | CASS, University of Zimbabwe, PO Box MP167, Mount Pleasant, Harare, Zimbabwe Tel: (263) 303211 CODE 263; Fax: (263) 4333407; E-mail: CASS@esanet.zm |
| Nabuyanda, Delay Provincial Fisheries Development Officer | Department of Fisheries, PO Box 630450, Choma, Zambia Tel: (260) 1-278032/460; Fax: (260) 1-278457 |
| Nilsson, Henrik Socio-Economist | FAO/ALCOM, Box 44, Domasi, Malawi Tel: (265) 523052; Fax: (265) 522397; E-mail: Hnilsson@malawi.net |
| Njaya, F.J. Fisheries Officer | P O Box 47, Mangochi, Malawi Tel: (265) 584211; Fax: (265) 584352 |
| Normann, Anne Katrine Researcher | Institute for Fisheries Management (IFM), PO Box 104, DK-9850 Hirtshals, Denmark Tel: (45) 98942855; Fax: (45) 98944268; E-mail: akn.ifm@NScentre.dk |
| Nyikahadzo, Kefasi Fisheries Socio-Economist | Lake Kariba Fisheries Research Institute, P.O. Box 75, Kariba, Zimbabwe Tel: (263) 612936/7; Fax: (263) 612938 |
| Russell, Edward Director | Community Resource Optimisation Programme (CROP) (NGO), 2 Camp Road, Gillitts 3610, South Africa Tel: (27) 82-9005291; Fax (27) 31-7640772 E-mail: CROPEddy@iafrica.com |
| Raakjær Nielsen, Jesper Senior Researcher | Institute for Fisheries Management (IFM), PO Box 104, DK-9850 Hirtshals, Denmark Tel: (45) 98942855; Fax: (45) 98944268 E-mail: jrn.ifm@NScentre.dk |
| Salo, Ken Coordinator | Environmental Unit, Peninsula Technikon, PO Box 1906, Bellville 7535, South Africa Tel: (27) 21-9596491; Fax: (27) 21-9596118; E-mail: kensalo@scinet.pentech.ac.za |
| Scholz, Uwe Team Leader | Malawi-German Fisheries and Aquaculture Development Project (MAGFAD), PO Box 206, Zomba, Malawi Tel: (265) 522397; Fax: (265) 522397; E-mail: MAGFAD@unima.wn.apc.org |
| Sverdrup-Jensen, Sten Director | Institute for Fisheries Management (IFM), PO Box 104, DK-9850 Hirtshals, Denmark Tel: (45) 98942855; Fax: (45) 98944268 E-mail: ifm@nscentre.dk |

Vedsmand, Tomas
Research Scientist

Institute for Fisheries Management (IFM),
PO Box 104, DK-9850 Hirtshals, Denmark
Tel: (45) 98942855; Fax: (45) 98944268

The papers in this book document cases of co-management in Africa. The papers were presented at the Second Regional Workshop in Africa on fisheries co-management research, which took place in March 1997 in Mangochi, Malawi. Co-management as a form of resource management is gaining ground worldwide, so also in fisheries. Co-management implies that the user-groups participate in the decision-making on how to protect and exploit the resources, and to some extent also in the monitoring, surveillance and control of the fisheries. Co-management is increasingly seen as an alternative to centralized fisheries management, because ideally, it integrates the experiences gained by user-groups with scientific advice and policy considerations at central level.

Cases from Malawi, Zambia, Zimbabwe, Mozambique, South Africa, Benin, Côte d'Ivoire and Senegal are presented, covering different kinds of bio-physical environments: lake/reservoir, lagoon/estuary, and coastal fisheries.

A research framework for fisheries co-management is provided in the introductory chapter, and the book concludes with synthesis of Southern and West African experiences of fisheries co-management.