

**A Case Study of Inland Fisheries Management in the Lucheringo-Rovuma-Messinge  
River Systems, Northern Niassa, Mozambique:  
From Open Access to Common Property?**

**Antonio Jose Augusto Abacar**

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LUCHERINGO-ROVUMA-MESSINGE RIVER SYSTEMS, NORTHERN NIASSA,  
MOZAMBIQUE: FROM OPEN TO COMMON PROPERTY?**

by

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## ABSTRACT

There is growing realisation world wide that the attainment of environmental sustainability is contingent upon reinstatement of community authority over management of natural resources. In acknowledgement of this imperative the government of Mozambique has formulated policies and enacted legislation to promote Community-Based Natural Resource Management.

The research reported here considers the prospects for achieving CBNRM in a fishery located in a remote part of the country on the border between Mozambique and Tanzania. The central hypothesis addressed is that the fishery in historical terms was operated under a common property regime and that, under a number of forces, this has changed to an open access regime. The challenge facing government is to return the fishery to a common property regime.

A conceptual framework which illustrates transformation of the fishery was developed. This was used to structure the research. Central question posed includes:

- what evidence is there that the fishery may have operated as common property system?
- what evidence is there that it now operates as an open access system?
- what forces promoted such change, if indeed change has occurred?

The findings are that the fishery has changed and now has the characteristics of the prospects for a return to CBNRM. Three issues are considered:

- who is the community?
- what are the resources? and
- what are the management issues?

It is concluded that definition of the 'community' is difficult because of historical precedents of access and use. The resource is shown to be complex including fish, water, land and plants; it also varies in tenure and space. Quite different rights of tenure issues accompany different resources. And management is complicated by international issues and apparent weaknesses in organisational structures, legislation and resources (human and financial). Evidence indicates that the people involved in the fishery are concerned about the state of the fishery and the lack of controls. They express a need for CBNRM.

This study exposes the very complex nature of the fishery and suggests that failure to appreciate and understand this complexity encourages simplistic approaches to introduction of CBNRM. These are likely to fail. It is recommended that in light of the complexity elucidated by this research, the government should engage a strategic planning process with the intention of designing and implementing a process for introducing CBNRM which is constructed in the context of what is a very complex system.

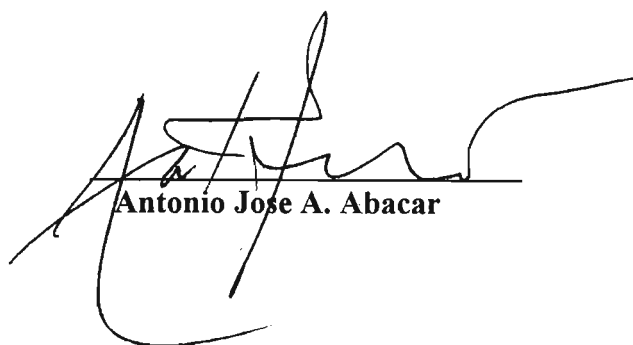
## PREFACE

The research work described in this dissertation was carried out in the Centre of Environment and Development, University of Natal, Pietermaritzburg, under the supervision of Professor Charles Breen of the Institute of Natural Resources.

The field work took place in Mozambique with the assistance of Mr Simon Anstey, the IUCN/SPFFB/Chipange Chetu Project Coordinator and Mr Elias Sotomane, the Provincial Director of Agriculture and Fisheries, Niassa - Mozambique. The field work was carried out in the Northern Sanga District, from August 1999 to January 2000.

During the field work contacts were maintained with the University and the Project Supervisor

This study represents original work by the author and has not been submitted in any form for a degree or diploma to any other University. Where use has been made of the work of others it is duly acknowledged in the text.



Antonio Jose A. Abacar

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## LIST OF ABBREVIATIONS AND ACRONYMS

|             |   |
|-------------|---|
| ACORD       | Agency for Cooperation in Research and Development  |
| ADMADE      | Administrative Management Design  |
| anon.       | Anonymous   |
| CAMPFIRE    | Communal Areas Management Programme for Indigenous Resources  |
| CBCD        | Conservation-Based Community Development  |
| CBFM        | Community-Based Fisheries Management  |
| CBNRM       | Community-Based Natural Resource Management   |
| CITES       | United Nations Convention on International Trade in Endangered Species  |
| DNFFB       | Direccao Nacional de Florestas e Fauna Bravia/National Directorate for Forestry and Wildlife                                      |
| DNP         | Direccao Nacional de Pescas/National Directorate for Fisheries  |
| FAO         | Food and Agricultural Organization  |
| FFP         | Fundo de Fomento Pesqueiro/Fisheries Development Fund   |
| IDPPE       | Instituto de Desenvolvimento da Pesca de Pequena Escala/Institute for Development of Small Scale Fisheries                        |
| IDRC        | International Development and Research Council  |
| IFAD        | International Fund for Agricultural Development   |
| IIED        | International Institute for the Environment and Development   |
| IIP         | Instituto de Investigacao Pesqueira/Fisheries Research Institute  |
| IUCN        | The World Conservation Union  |
| MAP         | Ministerio da Agricultura e Pescas/Ministry of Cultivation and Fisheries  |
| MICOA       | Ministerio para a Coordenacao Ambiental/Ministry for Environmental Coordination   |
| [nd]        | Undated   |
| NGO         | Non-government Organization   |
| NRM         | Natural Resource Management   |
| OPORTUN     | Organizacao para a Promocao e Optimizacao de Terras Unicas do Niassa/Project for Promotion and Optimisation of the Land in Niassa |
| pers. comm. | personal communication  |
| pers. obs.  | personal observation  |
| PPAN        | Projecto das Pescarias Artesanais de Nampula/Project for Artisanal Fisheries  |
| SPAP        | Servico Provincial de Agricultura e Pescas/Provincial Service for Agriculture and Fisheries                                       |
| SPFFB       | Servico Provincial de Florestas e Fauna Bravia/Provincial Service for Forestry and Wildlife                                       |
| UGC         | Unidade de Gestao Costeira/Coastal Management Unit  |
| UMC         | Unidade de Maneio Comunitario/Community Management Unit   |
| UNP         | University of Natal, Pietermaritzburg   |
| WWF         | World Wide Fund for Nature  |
| WWD         | World Commission on Culture and Development   |
| ZEE         | Zona Economica Exclusiva/Exclusive Economic Zone  |

## CHAPTER 1

### INTRODUCTION

#### 1.1 Background and rationale

Fisheries are an important activity in terms of subsistence food production in many parts of Africa, and are a primary and cheap source of dietary animal protein, although this can also be obtained from domestic or wild meat. Fishing is also an important economic activity, both because fish is in demand being a traditional staple relish of the riverside or flood plain people (Nkhata and Kalumiana, 1997), and as such can become an important source of income (Timberlake, 1997).

On the Lucheringo-Rovuma-Messinge River systems, Sanga District, Northern Niassa Province, Mozambique, (Figure 1.1), in the area bordering Tanzania, small-scale fishing and related activities for home consumption are carried out by men, women and children (IUCN in prep.). Fishing potentially represents a significant source of subsistence food, animal protein and cash income in most of this area. However, both the subsistence and commercial value of the fisheries currently appear to be well below its potential (IUCN in prep.).

There are indications of overexploitation of the fish resource (IUCN in prep.). For example, sites which had particularly abundant fish species in the past, now have hardly any trace of these fish. There is belief of general breakdown of the customary management system (IUCN in prep.) which has led to open access. This is associated with little respect for nursery areas and other traditional taboos; the use of small mesh size nets; the migration of fishermen who used to fish only in defined areas; undersized fish on the market; upward trend of fish prices; widespread use of fish poisons (both from plants and chemicals); and increasing diversification to other activities such as hunting for both food and cash. Many of these activities are also illegal according to the government fisheries regulations (National Directorate of Fisheries, Fisheries Policy and the Legal framework, i.e. Fisheries Act (1990). Essentially the fisheries situation in the area appears to be a case of "open access" with no common property regime or government control process in place resulting in overexploitation of the

resource (Shackleton and Tapson, 1998).

The system of transforming open access (use of a commons without controls) to common property management (management of a resource as a common property) is of particular interest. Research from a number of countries has demonstrated the effectiveness of common property regime for natural resource management under well-defined circumstances (Bromley and Cernea, 1989). Institutions for Common Property Resource Management (CPRM) have persisted to a greater or lesser extent in many areas (Barker, 1997), with classic examples of enduring systems including communal pastures and irrigation management functioning in the Swiss Alps (Netting, 1981), communal forest in Japan (McKean, 1986), China (Menziés, 1994) and Nepal (Ghimire, 1993), and marine tenure in coastal fisheries (Berkes, 1987).

Other studies refer to the successful implementation of new systems of management of commons, “land or another resource used simultaneously or serially by the members of a community (Bruce, 1993)” and reversal of open access regimes, e.g. the Senegal Livestock Development Project and the Middle Atlas Central Area Agricultural Development Project in Morocco (Bromley & Cernea, 1989), Wildlife Conservation in Namibia (Jones, 1997; MET, 1998), and CAMPFIRE Programme in Zimbabwe (King, 1993). Thus, despite the likelihood of open access fishery, considerable potential exists in Northern Sanga, Mozambique, for establishing management of fisheries resources under common property regime.

## **1.2 Aims and objectives**

The remoteness of the study area (Chapter 3) and the short period since cessation of civil war are contributing factors in the low levels understanding of the fishery weak foundation on which to promote government policy of CBNRM. This study provides a ‘first level’ of information and understanding. It sets out to determine whether the fishery has changed from a common property resource management to open access and, if so, to understand the context in which this has occurred. This understanding would then be used to support formulation of a strategy for introduction of CBNRM.

**Goal:** The goal in accordance with government policy is to have the artisanal fishery (a fishery that involves local skills) under effective community-based management which promotes sustainable use of the resource.

**Objectives of the study:**

1. Understand CBNRM particularly in the context of artisanal fishery;
2. Understand the changes and the causal factors;
3. Understand current policies, structures, strategies and processes for promoting sustainable artisanal fisheries;
4. Assess the capacity of government to facilitate improved community based fisheries resource management;
5. Determine the prospects for CBNRM and make appropriate recommendations.

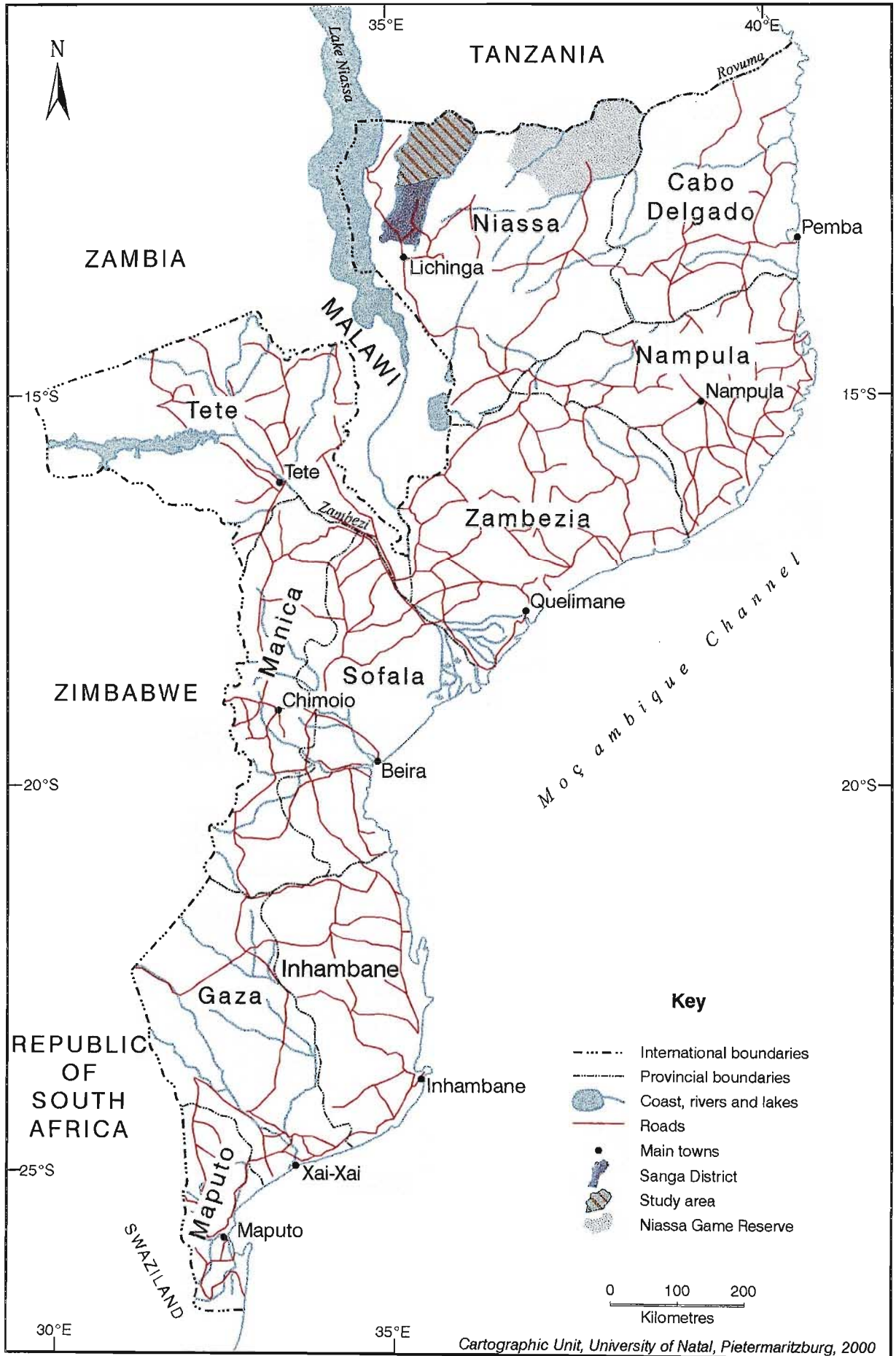


Figure 1.1 Location of the study area within the district of Sanga, Niassa Province, Mozambique.

## CHAPTER 2

### COMMUNITY BASED NATURAL RESOURCE MANAGEMENT (CBNRM)

#### 2.1 The problem

In the African continent, a growing concern outside protected areas is the continuing deterioration of the environment and the escalating levels of poverty in rural areas (Kiss, 1990). The natural resource base makes an important contribution to the economy of rural households and the increase in population pressure has resulted in a simultaneous expansion of natural resource exploitation commonly to levels which cannot be sustained (Kiss, 1990).

These communities cannot, however, afford to discontinue exploitative resource use practices in the interests of ecological conservation alone. Infield (1986), in a case study in KwaZulu-Natal, found that while more respondents from a rural community strongly supported the conservation of wildlife than those who rejected it, the economic constraints on them were too influential and wildlife and natural resources are destroyed out of the necessity for survival. He found that affluence strongly influenced attitudes about conservation, even where people may support the concept. Therefore, he concluded that only by the creation of rural wealth can the pressure on the natural resource base be reduced.

However, global economic trends and Structural Adjustment Programmes are further undermining the already existing capacities and resources of governments to ensure the effective management of state owned resources (Rihoy, 1998). This, coupled with demands brought about through increased democratization, particularly in southern Africa, has strengthened the trend towards decentralization of authority. Today, most governments are exploring options for development of co-management arrangements with communal area dwellers (Rihoy, 1998). The government of Botswana's Tribal Land Boards, for example, are recognized by many as one of the most successful experiences with decentralization of land administration and democratization of the process at the local level (Rihoy, 1998).



The wildlife sector is one that has been experimenting with decentralization of authority over resources through programmes such as LIFE in Namibia, CAMPFIRE in Zimbabwe and ADMADE in Zambia (Rihoy, 1998). These and similar initiatives in Botswana, Malawi, Mozambique and Tanzania, commonly known as Community Based Natural Resource Management (CBNRM), seek to provide the legal, institutional and economic frameworks for communities to become co-managers of communal area resources (Rihoy, 1998). According to Rihoy (1998), this approach is showing positive results.

## **2.2 Community Based Natural Resource Management**

The concept community-based natural resource management, according to Little (1994), entails any of the following characteristics: local level, voluntary, people-centered, participatory, decentralized or village level. Little considers that CBNRM should embody conservation in the area as one of its outcomes and it should be associated with some material benefit on the part of the local communities. “Cases where local communities (in low income areas) manage their resource bases with the prime objective of conservation, rather the improved social and economic welfare are virtually non-existent” (Little, 1994).

Governments have increasingly become aware that centralized administration will not be able to carry out the task of managing fish resources single handedly because they are usually under staffed and lack infrastructure and financial means (Robert, pers. comm. 1999). Eventually, government has turned to local communities for their support. It has been noted that community involvement in common-pool resources management will help cut down on financial demands by government, as the local communities will share responsibilities and benefits (Kothari, 1997). With autonomy conferred on the local communities they should be able, in theory, to define their own preferences, and they would develop at their own pace and in their own way. They would learn their lessons and structure, their own skills in the maintenance of resources (e.g. fish) as a common property (Western *et al.* 1994).

Klemeyer (1994) notes that cultural forms and traditions can be put to certain uses that are vital in fulfilling the difficult duty of bringing about enormous change in human sensitivity in respect to fish

resource conservation as a common pool resource.

Unfortunately, forces beyond control of local communities have weakened the culture that formed the basis of fisheries management generally. A shift from “top-down “ approaches to community-based resource management will afford local communities opportunities to re-build their lost identities, restore their pride in their own innovative capacities, and protect their cultural uniqueness, if they wish to do so (Kothari, 1997).

Kothari (1997) observe that all over the world, people are demanding a greater voice in decision making and have aspirations to re-establish some control over and right to the resources which sustain their livelihoods. This process, the move towards CBNRM, can therefore be viewed as a matter of primary human right and social justice for local communities, including those in northern Mozambique.

### **Definition of CBNRM**

Community Based Natural Resource Management (CBNRM) is a management strategy that has developed in response to the apparent inadequacies in past conservation and development practice (Maughan-Brown, 1998). It recognizes that rural communities have an important role to play in managing wildlife and natural resources, and that resource management can potentially be an instrument of rural development, once communities recognize the economic value of the resource (Le Quesne, 1996). CBNRM is a strategy that was designed to make conservation sustainable by reducing conflict between the managers of adjoining natural resources and local communities; to make management more effective by drawing on local expertise; and to contribute to processes of sustainable socio-economic development (Bell, 1987). CBNRM has developed as a strategy in light of Africa’s development crisis, the apparent failure of development in Africa. A perception exists that CBNRM is able to address social development needs and economic development needs in a sustainable way.

‘Community’ is a term that is used in many contexts and with different connotations. It is important to clarify before further discussion. Typically the word is used to indicate that a group of people, or

section of the population have something in common, as in “a community of interests”. This commonality may be as simple as a physical boundary or geographic area. However there are other important characteristics such as age, race, ethnicity, gender, culture or religion that serve to define a community. A community usually has a psycho-social component. This includes a community sentiment or shared communal values, convictions and goals and there is usually a shared reason for being or acting together (i.e. a perceived community benefit) (Hawtin, *et al.* 1994; Kotze and Swanepoel, 1983; Hamilton, 1992).

CBNRM in the context of this research is defined as local community empowerment through a participatory approach to manage fisheries resources.

### **The key principles of CBNRM and environmental management**

According to Steiner and Rihoy (1995), the key principles underlying CBNRM are still being refined as CBNRM programmes evolve. Attempts have, however, been made to capture the experiences and lessons learnt in CBNRM in southern Africa. This experience has led to the elaboration of five key principles, widely acknowledged as capturing the optimum conditions for resource management under communal property regimes (Steiner and Rihoy, 1995). According to (Murphree, 1993 in Steiner and Rihoy, 1995), these five principles are.

1. **Effective management of natural resources is best achieved by giving the resource a focused value** - to determine whether the benefit of managing a resource exceeds the cost the resource must have as a measurable value to the community.
2. **Differential inputs must result in differential benefits** - those communities living with the resource and thus bearing a higher cost should receive higher benefits than those who do not bear this cost.
3. **There must be a positive correlation between the quality of management and the magnitude of derived benefits** - an incentive for good management must reward greater investment in the resource with greater benefits.
4. **The unit of proprietorship (i.e. who decides) should be the same as the unit of production, management and benefit** - the group which manages the resource should also form the local

management institution.

5. **The unit of proprietorship should be as small as practicable, within ecological and socio-political constraints** - smaller social groups are better at managing themselves and the resource than large anonymous institutions.

CBNRM is one type of institutional mechanism that involves the community in natural resource management and occurs at community level. Importantly, it also occurs within a much broader political and institutional environment in which the environment and natural resources are managed, and development occurs. It is therefore necessary to have an understanding of the broader political institutional environment in which CBNRM occurs. The World Resources Institute has identified what it considers to be the key principles related to this broader environment. These principles were identified in an analysis of the environmental management strategies of African countries (Dorn-Adzobu, 1995). These principles can be extrapolated to also reflect the broader principles needed for an enabling environment for development in terms of CBNRM and include the following:

1. **Institutional choice:** A key role that environmental (and development) strategies are expected to play is to establish a precedent and continuing basis for effective cross-sectoral co-ordination in managing the environment. This entails finding an effective lead institution and preventing inter-institutional conflicts. Specific recommendations include: national policies for the environment (which are cross-sectoral in nature) should be co-ordinated at a level higher than that of line of ministries; the institutional structure must allow for effective co-ordination outside of government, especially with the private sector and civil society.
2. **Political support:** Political support is the most important prerequisite in the quest for sustainable development. Government commitment to strategic planning, comprehension of issues at stake, allocation of resources for institutional development, and the general involvement of the political leadership all determine success of the planning exercise. Every effort must thus be made to ensure support at the highest level, not only for the planning exercise, but for the whole notion of environmental management. That support must also be truly cross-sectoral and come from government, the private sector, and civil society.
3. **Local and sub-national participation:** It is important to effectively include NGOs, indigenous

institutions, and concerned individuals in the planning process. Major considerations include decentralization policies, 'national ownership' of the planning process, NGO participation, and planning and implementation instruments. An effective strategic plan for the environment should include commitments to strengthening the role of 'sub-national' government organizations and increasing their responsibility and should call for constant interaction with community and other stakeholder groups. NGOs often play a useful, even essential role in facilitating such participation.

4. **Donor support:** An important element in most planning exercises is the role of donors, which includes the provision of technical assistance, the co-ordination of activities, and the imposition of conditionalities. Donors must take pains to ensure that their role helps to strengthen the country's (and its institutions) sense of ownership of the strategic planning process and elevate the importance of environmental management (CBNRM in this case) in general.
5. **Capacity development:** Obviously, a determinant of any national environmental (CBNRM in this case) strategy's ultimate success is the relative capacity of the institutions and structures that sustain it. The strategic planning process needs to strengthen the capacities of these institutions and the individuals who staff them through training and other activities.
6. **Implementation:** There is a need for strategic plans that are implemented. To help ensure that this happens, an implementation agenda must be designed as part of the planning process. The key elements of such an agenda are ensuring that a central co-ordination institution is in place; facilitating that institutions attempt to build bridges with other organizations; conducting training needs assessment; adopting innovative approaches in the use of policy instruments; monitoring the performance of the planning and implementation process; and developing public awareness and education programmes.

### **Implementation of CBNRM**

In southern Africa, known examples of CBNRM include the Luangwa Integrated Resource Development Project (LIRDPA), Administrative Management Design (ADMAD) both of Zambia, and Zimbabwe's Communal Areas Management Programme for Indigenous Resources (CAMPFIRE). The links which have developed between Mozambique and Zimbabwe in promotion of CBNRM have

focused attention on the CAMPFIRE approach. CAMPFIRE entails efforts by the government of Zimbabwe to:

- seek the free-will participation of communities in a strategy that embodies long-term resolutions to maintenance of natural resources;
- facilitate group ownership with specified rights of access to common property resources; and
- promote formulation of local level structures to manage the common-property resources for the benefit of the communities themselves and the environment (Madzudzu, 1996; Panos, 1997, cited in Kumchedwa, 1998).

CAMPFIRE has succeeded, in:

- Reviving the understanding among local communities of the interdependence between natural resources and local communities themselves;
- Eradicating or curbing poaching of wildlife;
- Facilitating local level natural resource institutions;
- Rejuvenating conservation of common property resources; and
- Improving socio-economic status at both household and village levels (Murphree 1994).

CAMPFIRE has faced some limitations such as:

- Failure of council members to devolve real responsibility and power to more local communities to manage their own wildlife resources;
- Corruption through embezzlement of funds (IIED, 1994).

Notwithstanding its failures, CAMPFIRE “is becoming a test bed for people-centered conservation...”(Panos, 1997). It offers a number of lessons for the southern Africa region.

CAMPFIRE has demonstrated that local communities who are daily in touch with, for example, the fish resource are the best custodians of the resource (Panos, 1997). “There is a tradition among these and many other indigenous groups, of stewardship of the land and its natural resources for survival and responsibility to the younger generations” (Klemeyer, 1994).

Hara (1996) citing Ostrom (1990) warns of “blueprints” in community-based conservation in which policy makers and donors alike prescribe to the local communities what is to be done in a particular situation. Metcalfe (1994) highlights that CAMPFIRE avoided using the technique of “blueprint” in its implementation. He gives an example of one ward where 80% of the revenue collected from safari contracts was given to the communities without specifying the use of the money. Voluntarily, the concerned villages expressed their choice for some of the money to acquire a grinding mill, clinic and schools while keeping a portion as household income. “The village became involved in its own land-use planning and the people built wildlife into range management plans (Metcalfe, 1994). This calls for “empowering people to mobilize their own capacities, ... make decisions and control activities that affect their lives” (Cernea, 1985 cited in IIED, 1994).

CAMPFIRE demonstrates how to address the issue of rights of exclusion and inclusion among the local communities. Metcalfe (1994) observes that non-members, or those who did not register, did not benefit from the collections from CAMPFIRE which means that members have the right to exclude those outside, and in turn non-members have a duty to abide by the ruling. This, as will be seen, is an important condition for fish resources to be sustained as common property (Emmerson, 1980; Schlager, 1990; Cousins, 1992). Each community should identify as a unit of production and this unit must be holding the proprietorship, responsibility for management and benefits and decision making (Murphree, 1993 cited in Metcalfe, 1994; Madzudzu, 1996). CBNRM will not succeed in the local villages so long as management boundaries in regard to rights to access to resources as common property remain obscured (Metcalfe, 1994). The government should officially grant community-based rights and demarcate the spatial boundaries of the existing systems (Lynch and Alcorn, 1994). “When existing systems are rooted in the local ecology and already possess legitimacy in the minds of local people, recognition facilities are more environmentally and culturally appropriate for evolution and development” (Lynch and Alcorn, 1994).

CAMPFIRE has also demonstrated that production units should be identified in the local villages. These production units have to be small enough, encompassing a homogeneous community (Madzudzu, 1996), in order to maintain resources within limits as set up by the social, economic, political and ecological constraints (Murphree, 1993 in Metcalfe, 1994). “A communal resource management is

enhanced if it is small enough for all members to meet face to face, to enforce conformity with rules through peer pressure, and to create a long-standing identity”(Metcalf, 1994). This issue of membership and of meeting face to face has particular relevance in a fishery situated on the border of the two countries (Mozambique and Tanzania) as will be shown later.

If the problem of over-fishing as a result of uncontrolled fishing, in essence treating the fish as an open resource, is to be addressed CAMPFIRE experience has shown that the local communities have to formulate rules, monitor and enforce them effectively (Metcalf, 1994), i.e. return the resource to common property from open access. Appropriators who violate operation rules should be brought to book by other appropriators (Hara, 1996) and, if necessary, by the government.

Management of the process of natural resource management is central to a CBNRM programme (Maughan-Brown, 1998). The underlying rationale for CBNRM is that through the sound management of resources and the effective utilization of these resources, development can be facilitated. By adopting a more socially responsive approach to conservation it is argued that conservation will be more sustainable in the long term. The need for sound management and environment sustainability is made all the more pertinent by the fact that conservation is being used as a vehicle for development (Maughan-Brown, 1998). The long term viability of development based on natural resources is, therefore, dependent on the sustainable use of these resources. Natural resources should be managed to promote the maximum sustainable development to the community. The management of natural resources should facilitate Murphree’s third principle of CBNRM - that there must be a positive correlation between the quality of management and the magnitude of derived benefits. The long term sustainability depends, amongst other things, on the sustainable use of environmental resource (Goodland, 1995).

As mentioned earlier, the CBNRM programme initiative in most African countries, in many respects, is showing positive results. However, whilst these programmes advocate strong ‘ownership rights’ for communities, they have been relying upon state permission to experiment rather than a mandate for decentralization and tenurial security. Some observers consider that South Africa, and to some degree Namibia, are currently in the process of taking the ‘next step’ in the approach through the



development of a policy and legislative framework that devolves full tenurial rights to communities (Rihoy, 1998).

The idea of community involvement is linked to Murphree's fourth principle of CBNRM - the idea that the unit of the proprietorship should be the same as the unit of production (Murphree, 1993). It is argued by Bak (1995) and O'Donoghue (1993) that the knowledge and participation of local communities in resource management is essential, because of their extensive knowledge of their own environment (Bak, 1995, O'Donoghue, 1993, Breen *et al.* 1998). Under the right circumstances, communities can potentially be effective institutions for resource management (Murphree, 1993).

It has been noted that in many instances CBNRM will, during its initial stages of formulation and implementation, be heavily oriented towards a 'top-down' approach (Murphree, 1993). This will occur when communities do not have the capacity, expertise or the resources to initiate such programmes themselves. External interventions are commonly necessary to initiate CBNRM strategies. However, if CBNRM is to become sustainable in the long term, relatively independent of external interventions, it is critical that the programme moves towards an orientation that is 'bottom-up'.

Increasingly confidence is being placed in participatory community-based development processes as a way of addressing environmental issues from so-called 'bottom up' perspective (Taylor, 1998). A development intervention will have most chance of success if there is meaningful and lasting human development that builds capacity and empowerment, thus allowing CBNRM to become self-sustaining 'community-based'. For this to happen, development must be a learning process, and there must be extensive and meaningful participation of the people implementing and affected by the planning and management of the programme (Swanepoel, 1989). Murphree (1993) believes that "the management of communal property resources can act as a powerful catalyst for communal institution development". To make development a learning process, people must be guided, given skills and encouraged to take the initiative (Swanepoel, 1989). Individuals can learn through their engagement with the process of planning and managing a programme but, where necessary, formal adult education is also effective in empowering individuals and developing human resources (Hamilton, 1992).

The success of CBNRM programmes in Africa will depend on the extent to which management and conservation strategies can come to reflect a broader community of people (Taylor, 1998). Taylor emphasizes this point and states that “this reorientation to wider public participation, sometimes called community-based development, is crucially important if the legacy of authoritarian, top down colonial practices are to be successfully overturned”.

It is therefore critical that a CBNRM programme intervention shows an evolving level of participation by the community and external agents. At initiation of a project external involvement will predominate, with limited community participation. However, as the programme develops there should be increasing community capacity, that is promoted by strategies to develop human capacity during the programme intervention. Ideally a point should be reached in the programme life at which community involvement supercedes external involvement. If this point is achieved, it will mark part of a successful evolution from a ‘CBNRM programme intervention’ to a more autonomous ‘CBNRM programme’.

### **2.3 Tenure and CBNRM**

A system of tenure has been defined as “...simply a bundle of rights,... rights to use land, trees and their products in certain ways and sometimes to exclude others” (Bruce and Fortmann, 1989). The system basically defines the rights and obligations of an individual or group regarding certain resources governed by the tenurial system. Three distinct tenure regimes, or property rights systems, have been distinguished as follows “freehold”, “leasehold” and “communal” tenure. Tenure systems are not necessarily mutually exclusive and sometimes coexist within the same production system. It is not at all unusual for a village to have a certain tenure over an area, while an individual or family has tenure over part of the same land” (Bruce and Fortmann, 1989). In fisheries for example, fish may be common property (communal tenure) where individuals may have exclusive rights (household or freehold tenure) to fish a particular area either continuously or intermittently. A fourth tenure regime, or rather the absence of any clear system of rights and obligations, open access, can also be identified as a distinctive tenure system.

Private property refers to the individual's right to exclude others from a resource or resources. Common property refers to the individual's right not to be excluded from the group's resources. State property refers to the right of the state to exclude individuals or groups of individuals from some resource or resources (Murombedzi, 1990).

Common property regime is thus based on some concept of equitable access to a resource by all members of a clearly defined group. Group membership is strictly defined either in lineage or residence terms or by some other criteria that is understood and accepted by all group members. Communal tenure thus defines a common property regime (Murombedzi, 1990).

Communal tenure, indeed all tenure regimes, are dynamic institutions that are always changing more in response to external circumstances than to any internal dynamics within the system itself. It has been demonstrated for instance that the communal land tenure system existing in Zimbabwe today is more an artifact of colonial interventions than the result of internal dynamics within that system (Cheater, 1989). It is also evident that the tenure systems pertaining to most resources in Zimbabwe were potentially determined to protect the interest of certain groups while at the same time depriving others of access to those resources. The research reported here focused primarily on the tenure system regarding natural resources, more specifically fisheries, on the Lucheringo-Rovuma-Missinge river systems northern Niassa, Mozambique.

Communal tenure has been indicated for inevitably leading to resource degradation because of its inability to control the behaviour of individuals within that group regarding the utilization of the group's common resources. The chief architect of this position was Hardin (1968), who advanced the "Tragedy of the Commons" paradigm whose basic premise is that individuals will attempt to maximize their benefits from common properties at the expense of the resources themselves and the group as a whole. The main critics of this position point out that it really defines an open access regime rather than common property. These critics (Ciriacy-Wantrup and Bishop, 1975; Lawry, 1989; Ostrom, 1987) note that any common property regime by implication refers to the existence of some institutional arrangement to regulate both access to the commons and the rights and obligations of individuals within the group regarding the commons. It is also pointed out that due to the introduction

of foreign norms regarding the utilization of these resources (e.g. hunting, colonisation), such institutional arrangements have everywhere atrophied through a process of disuse (Lawry, 1989; Marks, 1984; Berry, 1989; Scoones and Wilson, 1989).

The response of local people to the expropriation of hitherto common properties has inevitably been to exploit these on individual basis. In other words the substitution of state property for common property has at the same time introduced the rationality, albeit without the legitimacy, of open access to local communities. In the case of wildlife, exploitation has tended to take the form of “stealing” the resource from the state by individuals whenever they can (Murphree, 1990), as is thought to be the case of fisheries in the Lucheringo-Rovuma-Missinge river systems, in northern Niassa, Mozambique, by outsiders. One can also speculate that a class of individuals specializing in poaching, has come into existence and that these engage in various forms of exchange with other members of the group who do not have similar inclination or access, or who for various other reasons cannot or will not engage in poaching.

Local responses to new definitions of common property have varied from attempts on the part of the rich peasantry to expropriate and privatize the commons, thus beginning a process of proletarianisation that is distinguished by several factors, (Cheater, 1989; Murombedzi, 1990; Breen *et al.* 1998) to attempts on the part of a section of the peasantry to expropriate private land through “squatting” or “illegal settlement”.

At the same time, a process of differentiation is occurring among the peasantry. This process dates back to colonial and pre-colonial times but has obviously been accelerated by independence and the introduction of increased access to markets, credit facilities and cash income remittances for some peasant households (Scoones and Wilson, 1989; Cousins, 1992) and also information and technology (Breen *et al.* 1998). Such differentiation inevitably results in a redefining of individuals’ relationships with common properties.

All these processes thus point to the need to redefine individual and group rights to common properties if the current trend of degradation and decimation is to be halted and reversed. The search for

solutions should be based upon the recognition that viewed in proper perspective, the problem of resource degradation is in essence, the problem of the unnatural 'death' of common property management institutions. To emphasize this point Murombedzi (1990) traces the historical origins and functions of common property institutions and how they served to regulate sustainable utilization of the resources. He goes on to show how colonialism destroyed these institutions and how resource degradation inevitably resulted. Finally, he concludes demonstrating the need for reintroducing appropriate local level common property resource management institutions in Zimbabwe's communal lands.

'Community development' has commonly been conceptualized in Africa as an extension to total levels of central government institutions (Murphree, 1993). For CBNRM to be effective, it is important that communities have proprietorship of a natural resource (Murphree, 1993). Giving land tenure to a community does not guarantee sound management of natural resources. Similarly it doesn't guarantee that a CBNRM programme will succeed. Sound management is also not necessarily dependent on tenurial reform. Many areas of common property around the world are well managed, for example the sea shore. Land is nevertheless considered to be an important way of achieving effective community-based management. This is stressed by Murphree (1993):

"The evidence is that communities can become effective institutions for sustainable resource management, but only if they are granted genuine proprietorship, that is, the right to use the resources, determine the mode of usage, benefit fully from their use, determine the distribution of such benefits and determine rules of access. Any policy which excludes these components will frustrate the goals of making communities effective institutions for effective management".

Tenure gives ownership of resources to community. Ownership entails the community having the right to the value of the resource. The "focused value" of the resource was outlined as an important principle of CBNRM by Murphree (1993). Communities also need tenure to establish rights of inclusion and exclusion in a development programme. Tenure also gives a community the right to decide whether to use the resource at all, the right to determine the mode and extent of their use, and the right to benefit fully from this use in the way that they choose (Murphree, 1993). Since no resource

can be viewed in isolation, communities which claim and practice control over resources are nevertheless accountable to society (Breen, pers. comm. 1999). In essence all resources have features of common property even though they may also have characteristics of private property.

Looking back to the early days, to better understand the origins of the common agenda for reform, it is useful to consider some of the key factors which triggered the process not only in wildlife but also for other natural resources such as fisheries, for this particular case. As pointed by Steiner & Rihoy (1995), these factors are as follows:

1. **The threat of the species extinction, widespread poaching and loss of habitat:** by the early 1980s poaching of high-value species, encroachments into protected areas and loss of habitat had - in many countries - reached crisis levels. Development needs and poverty began to compete with conservation, with the latter clearly set to lose.
2. **The growing inability of the State to protect its wildlife estate:** the financial crisis facing many governments in Africa and the low political priority accorded to conservation in the face of other social and economic priorities, undermined the ability of the Departments to deploy adequate staff and resources for wildlife management and protection.
3. **Wildlife conservation and its colonial legacy:** population growth and associated development needs fueled the historical conflicts between local communities and protected areas/ wildlife managers. Equity issues and compensation for a historical wrong required new answers and strategies.
4. **Linking conservation and development:** two developments contributed to this new concept. Participatory forms of planning and management had proven a success in development, thus suggesting replication for wildlife management (Steiner & Rihoy, 1995).

The factors which lead to environmental degradation are many and complex (de Wit, 1998). They may arise simply because of population pressure, over-reliance on single commodities and indebtedness de Wit (1998), pointed out that one way of identifying the causes of degradation is to analyze the structure of property rights and property rules. The management of common property regimes is many times misunderstood, leading to policy prescriptions which can easily give rise to serious instances of land and natural resource degradation (de Wit, 1998).

Fishing in the study area is considered by some village members (Saide, pers. comm., 1999) to be characterized by an open access. It is argued that open access leads to over-exploitation and can happen *de facto* in any property regime. Property right regimes consist of property 'right' and property 'rules' (Bromley, 1991). Property rights are foundations of resource use, management and conservation (IFAD, 1995). Property rights are privileges, and limitations for use of a particular resource (Tietenberg, 1996). While property rules are the rules under which these rights, privileges and limitations are exercised (Bromley, 1991).

Many natural resources are not subject to efficient property rights regimes and therefore their true value is not reflected in the market place. Environmental problems arise when one or more of the conditions of efficient property rights regimes are not met (Pearce *et al.* 1994). From the summary in Table 2.5 it is evident that no one property rights regime is exclusively good for the environment, although open access and state property regimes fare the worst. The former lacks all incentives for conservation and the latter is vulnerable to personal motives of bureaucrats managing the state systems.

Table 2.5 A typology of property rights regimes and conditions for efficiency:

|                    | Open access                        | Common property  | Private property  | State property                              |
|--------------------|------------------------------------|--|---|---|
| Universality       | No                                 | Defined for the group                                      | Yes   | No  |
| Exclusivity        | No                                 | Applies for the group                                      | Yes   | No  |
| Transferability    | No                                 | Applies for the group                                      | Yes   | No  |
| Enforceability     | No                                 | Yes: legal and social sanctions                            | Yes: legal and social sanctions   | Yes: legal sanctions                        |
| OVERALL EFFICIENCY | Very low: No incentive to conserve | Many regimes are efficient, but inherent risk of breakdown | Efficient but market failure occurs in presence of externalities and public goods | Often inefficient due to Government failure |

Source: Pearce *et al.* (1994, cited in de Wit 1998).

In the case of a common property regime, access to the scarcity rents are assigned to a group rather than an individual (IFAD, 1995). The crucial point is whether social and legal structures recognize and enforce the common property rights regime. It is a basic axiom that there is no property without

authority. When this system of authority breaks down, management of resources can no longer exist. Common property regimes possess such an inherent risk of breakdown. Social and legal structures within and around the group can fail when placed under strain. In these circumstances the property right structure degrades into a system of *res nullius*, or *open access*. It is in this setting that the well known tragedy of the commons occurs (Hardin, 1968). However, various analysts (Larson and Bromley, 1990; Dasgupta, 1982; Runge, 1981) have pointed out that this is not really a tragedy of the commons, but a tragedy of open access. Although most land in the world belongs to someone, *de facto* open access may prevail where any institution lacks the resources for effective management. It can be concluded that the critical issue is not so much which property right regime prevails, but how well property rights are defined (see also Hanna and Munashinghe, 1995).

The greatest challenge to CBNRM programmes has been the establishment of a management framework that convinces communities that they have regained control over a resource (Steiner and Rihoy, 1995). Most implementors now favour a dynamic approach to local level institution building. Blueprints for CBNRM have not worked and implementation experience suggests that communities should be given maximum opportunity to shape the structure and functioning of their management entities, with Government confining its role to creating an enabling policy environment and providing facilitation. The central question, however, remains how such a process can be best supported and by whom. While the emergence policy framework appears to offer increasing scope for such community driven processes, it must be recognized that all programmes have encountered significant problems in providing institutional development support to communities (Steiner and Rihoy, 1995).

A review of discussion papers and programme documents reveals the emergence of four factors as driving forces (Steiner and Rihoy, 1995). Again, Zambia and Zimbabwe were the first to experiment with new approaches during the early 1980s. Followed by Botswana and Namibia in the early 1990s. In each case, it was the ministry responsible for wildlife management that led the effort. This had a number of **implications**, which are central to understanding some of the subsequent developments:

1. The initial driving force behind these programmes was a **crisis situation** - caused loss of wildlife, land-use conflicts, financial constraints etc. While reformers advocated fundamental changes traditionalists remained skeptical and reluctant to transfer wildlife management to



communities.

2. The **focus on wildlife** meant that broader natural resource management issues have not featured prominently in the programmes so far. Forestry, water, land-use planning and other related issues, which 'belong' to other departments, have yet to become integrated within the programmes.
3. In promoting new institutions for resource management at the local level, departments have created the **potential for conflict** with other established local government and development structures.
4. Attempting to rely on department staff to provide institutional development services and community development support proved problematic. Turning 'policemen' into 'extension workers' did not convince communities nor did it acknowledge the complexities of local level capacity building (Steiner and Rihoy, 1995).

Many people remain dependent on a productive natural resource base for a living. The long-term health of the natural environment is threatened, however, by increasing exploitation of land, forest, and water resources (fisheries) and by a growing population. As the ability of ecosystems to recover diminishes, so too do the employment and lifestyle options open to local people. Millions of livelihoods and irreplaceable storehouses of biodiversity may be lost forever.

To halt the erosion of their local resource base, the people living in affected communities often must overcome physical and social barriers. Many live in remote areas far from markets and urban centres. Others belong to ethnic groups with limited political influence. Within communities, some groups, like women and children, may be further marginalized by the existing power and gender relations.

Therefore, if we are to reverse the situation for example in fisheries, the approach will be to assist local people (women and men) living in ecosystems that face increasing resource exploitation to manage and use their natural resources sustainably. This will be done in a way that recognizes that men, women, ethnic groups, and different social classes use natural resources in diverse ways and for distinct purposes. The initiative in sustainable natural resource use will take the following approach:

community-based natural resource management (CBNRM) approaches that are innovative,

equitable, sustainable, and replicable;

policy-related research to ensure that local and national policies are gender sensitive and consistent with sustainable natural resource management systems at the community level;

research and management processes that are participatory;

technological, social, and organizational innovations that respond to priorities defined by the men and women of local communities.

the integration of natural science components, such as resource assessment and production technologies, with a social science perspective that address decision-making processes, institutional development; and

a regional network on research methods and approaches for analyzing environmental problems and as a means to build and strengthen CBNRM practices.

The above initiative in sustainable natural resource use will support research that concentrates on:

enhancing livelihood options, food security, and improvements in the well-being of the different members of communities;

how to reverse the practices that lead to degradation of the natural resource base;

providing a clear understanding of power and gender relations within communities to promote policies and programmes that enable women and other disadvantaged groups to contribute more actively to the effective management of a community's natural resources;

developing an understanding of local and national policies that promote and enhance CBNRM;

developing new gender sensitive methods, processes, technologies, and policies in support of CBNRM; and

adopting and refining innovations developed under support by other donors, governments, non-governmental organizations, and local communities.

The shift towards community-based approaches to conservation that has occurred across Africa since the late 1980s (Hulme and Murphree [n.d.]) has been a belated step in the right direction. Such initiatives have made conservation marginally more relevant to the needs of local society; have pushed the conceptualization of the role of rural Africans in conservation from 'potential criminals' to 'communities who can participate in wildlife and resource management'; have led to a recognition that

conservation does not automatically entail that Africans be separated from habitats that are to be conserved; and, have partially opened up conservation resources to market forces (Hulme and Murphree [n.d.]). However, its greatest contribution is not what it has achieved in terms of conservation outcomes but the opportunity it has created for the establishment of ‘a new conservation’ that has social legitimacy. This step sees a role for Africans not merely as bit players who share in local level benefits and may be passively involved in wildlife management, but as citizens with a right to engage in the specification of the goals of conservation, the formulation of policy and demanding that the state accounts for the results of conservation action (Hulme and Murphree [n.d.]).

The ‘new conservation’ faces many challenges and, if it is to be operationalised, would have to overcome many problems. It does, however, present a vision of the direction in which African conservation could evolve. It represents a radical challenge to those who currently hold sway in conservation policy and practice - from rangers and wardens at the local level, to senior conservation bureaucrats, politicians and NGOs at the national level and environmental agencies and aid donors at the international level - and it can be anticipated that they will be reluctant to cede control and influence (Hulme and Murphree [n.d.]). It faces severe obstacles in many African countries where governance has been weak, or bad, and citizens have been conditioned to see themselves as subjects (Hulme and Murphree [n.d.]).

It is the only “long-term future” to which conservation should aspire to evolve. To continue to seek to achieve conservation goals through coercion in states that are poorly and repressively governed is immoral as it reinforces the processes of poor governance (Peluso, 1993, in Hulme and Murphree [n.d.]).

#### **2.4 CBNRM and fisheries management**

Inland fisheries provide significant contributions to animal protein supplies in many rural areas. In some regions freshwater fish represent an essential, often irreplaceable, source of high quality and cheap animal protein crucial to the balance of diets in marginally food secure communities (FAO, 1998).

In most inland fisheries produce is consumed locally, marketed domestically or in nearby towns, and often contributes to the subsistence and livelihood of the poor people in the rural areas (FAO, 1998). In some areas, such as along Rovuma river, specifically in the study area, increasingly fishery products are also traded internationally generating additional wealth. The extent of participation, including a significant number of women and younger people in fishing, fish processing and trading can be high in some rural areas, and this can be considered as a very important source of employment that can alleviate poverty in these areas (FAO, 1998).

Fish in the ocean, lakes and rivers cannot easily be owned. An individual or community may lay claim rights of capture and even to demarcate where such capture may occur and under what conditions, but as the fish are mobile and can move into or out of the demarcated space it is almost impossible for the individual or group claim ownership of the fish (Breen, pers. comm. 1999). Tenure in river fisheries may, consequently, have more to do with the land and water, and rights to capture, and less to do with fish.

The application of CBNRM to fisheries must, therefore, focus on tenurial rights of water and the associated land, and the rules of capture. Because fish can move into and out of areas, as does water, it is also inconceivable to envisage CBNRM being applied to a river fishery in isolation from what happens upstream and downstream (Breen, pers. comm. 1999), including control which may be exercised over flow in the river.

Aquatic systems exhibit a high degree of interconnectedness. This reflects their natural ecosystems properties and their relationships with people. Some of the driving forces of systems functioning originate remotely from the system, the flows in a river originates distant from any point in that river; the fish move in response to flow; and human activities reflect this continuous and often unpredictable situation. It can reasonably be expected that introducing CBNRM to a fishery will be complex.

## CHAPTER 3

### THE STUDY AREA

#### 3.1 Introduction

Since the cessation of warfare and the subsequent establishment of a democratic government in Mozambique, there has been a strong move to re-establishment in rural areas. One such initiative is focused on the Niassa Province, as shown in Figure 1.1. The SPFFB together with IUCN and the participation of other local organizations (e.g. ACORD and OPORTUN), are promoting CBNRM as a way of achieving sustainable use of natural resources in the study area. The fishery along Lucheringo-Rovuma and Messinge rivers and related flood plains is one sector receiving attention.

#### 3.2 Location

The area is located in the north eastern region of Niassa Province, falling within the District of Sanga (Figure 3.2). To the West of the study area lies the Messinge river and District of Lago and to the east is the Lucheringo river. To the north is the Rovuma river which forms the border between Mozambique and Tanzania; in the south is Macaloge town where most people live and practice agriculture.

#### 3.3 General features

##### 3.3.1 Physical features:

##### **Topography and the drainage systems**

Key topographic and striking natural features in the study area are the outstanding Inselbergs, Sanga Mountain (1,790 metres) and Logorongu Mt rising from the Rovuma plain to 1,105 metres and the bordering rivers of Messinge, Rovuma and Lucheringo, which are also the most prominent drainage systems in the area. The rest of the area is incised by broad shallow valleys formed by many other river systems that drain the area. The Messinge and Lucheringo valleys are, however, dominant. The

area between the rivers and the mountains comprises undulating terrain with clear drainage systems.

The Rovuma river rises in Tanzania, and forms the border between Tanzania and Mozambique (Figure 1.1), winding about 730 km from its confluence with Messinge river to its mouth in the Indian Ocean (Amaral 1990). The Messinge and Lucheringo rivers are perennial and principal tributary rivers of the Rovuma river.

There are a number of floodplains and lakes extending adjacent to the Rovuma river, which provide a good combination of natural biota and fishing grounds, particularly during dry season, when the water levels are low (pers. obs.). Among these, are the Matomondo, Lukongoele and Chijunichana lakes (Rovuma floodplains); and Makawanga, Mwawte and Namissinge lakes in the interior.

### **Geology and Soils**

There are open floodplains and many inselbergs in the area, revealing that these were produced by the slow energetic erosive forces in the past. Amaral (1990), pointed out that these orogenic movements which extended the Great Rift Valley towards Mozambique, have been responsible for the geologic faults, lying in a north-east to south-west direction in the region. These led to the formation of the mountain ranges, between which lies Sanga mountain in the western part of the district. Other geologic faults, also extending in the same direction, led to the formation of the depressions and valleys where the Messinge, Lucheringo and the Lugenda rivers run towards Rovuma river (Amaral, 1990).

Tello & Dutton (1979) stated that geologically, the major part of this region is considered to be part of the "Mozambique belt" with Karoo and post-Karoo. The geology and soils of the area are well described in the "Atlas Geografico de Mocambique 1979". However, there has been no detailed soil survey of the area, but the fertile alluvial soils along the rivers and water courses, consist predominantly of sandy loam and poorly drained soils (Tello & Dutton, 1979).

The fertile alluvial soils make much of the area good for crop production, especially along the rivers and water courses. The most common crops produced in the area include maize, cassava, sweet

potato, millet, peanuts and beans. Others (cash crops) include tobacco and sugar cane (pers. obs.).

## Climate

According to Esboco do Reconhecimento Ecologico de Mocambique, cited in Amaral (1990) there are two well defined seasons in the area. These are the rain season, from December until March. April is a transitional month; and a dry season from May until November (see Table 3.3.1). The proportion of the rain which falls during the dry season in relation to total annual is relatively small.

Table 3.3.1 Medium monthly rainfall values (mm) of three areas in Niassa Province.

| Months   | Posts               |         |          | Months    | Posts                |         |          |
|----------|---------------------|---------|----------|-----------|----------------------|---------|----------|
|          | V. Cabral (Lchinga) | Litunde | Maniamba |           | V. Cabral (Lichinga) | Litunde | Maniamba |
| January  | 270,5               | 324,8   | 290,0    | July      | 1,8                  | 2,3     | 1,5      |
| February | 180,1               | 226,9   | 268,6    | August    | 0,0                  | 4,0     | 3,4      |
| March    | 287,7               | 273,8   | 290,1    | September | 0,7                  | 2,5     | 1,6      |
| April    | 71,0                | 101,9   | 154,4    | October   | 13,6                 | 19,3    | 24,6     |
| May      | 40,6                | 16,9    | 31,7     | November  | 34,3                 | 45,8    | 74,9     |
| June     | 1,7                 | 3,8     | 24,9     | December  | 194,4                | 210,0   | 215,2    |

Source: Esboco do Reconhecimento Ecologico-Agricola de Mocambique, 1995 in Amaral (1990).

The maximum temperatures are noted between October and December ( Table 3.3.2) and the lowest temperatures between June and August (see Table 3.3.3).

Table 3.3.2 Maximum Mean temperatures (oC) in three areas in Niassa Province.

| Months   | Posts               |         |          | Months    | Posts                |         |          |
|----------|---------------------|---------|----------|-----------|----------------------|---------|----------|
|          | V. Cabral (Lchinga) | Litunde | Maniamba |           | V. Cabral (Lichinga) | Litunde | Maniamba |
| January  | 25,1                | 26,9    | 25,6     | July      | 21,5                 | 23,9    | 22,8     |
| February | 25,8                | 27,3    | 25,6     | August    | 22,7                 | 24,7    | 24,2     |
| March    | 24,9                | 26,8    | 25,4     | September | 25,8                 | 27,0    | 26,3     |
| April    | 24,5                | 26,5    | 24,9     | October   | 28,8                 | 29,7    | 29,6     |
| May      | 23,2                | 27,7    | 24,3     | November  | 27,8                 | 30,8    | 28,8     |
| June     | 21,8                | 24,2    | 23,0     | December  | 26,6                 | 28,7    | 26,3     |

Source: Esboco do Reconhecimento Ecologico-Agricola de Mocambique, 1995 in (Amaral,1990).

Table 3.3.3 Minimum Mean temperatures (oC) in three Posts in Niassa Province.

| Months   | Posts                |         |          | Months    | Posts                |         |          |
|----------|----------------------|---------|----------|-----------|----------------------|---------|----------|
|          | V. Cabral (Lichinga) | Litunde | Maniamba |           | V. Cabral (Lichinga) | Litunde | Maniamba |
| January  | 16,0                 | 18,1    | 17,2     | July      | 9,8                  | 11,7    | 11,1     |
| February | 16,0                 | 17,5    | 17,1     | August    | 10,2                 | 12,7    | 12,0     |
| March    | 15,8                 | 17,1    | 16,1     | September | 12,3                 | 14,4    | 13,8     |
| April    | 14,3                 | 16,2    | 15,3     | October   | 14,9                 | 15,1    | 16,3     |
| May      | 12,0                 | 14,2    | 12,9     | November  | 15,7                 | 15,5    | 17,7     |
| June     | 9,6                  | 12,2    | 12,0     | December  | 15,9                 | 15,4    | 17,1     |

Source: Esboco do Reconhecimento Ecologico-Agricola de Mocambique, 1955 in Amaral (1990).

It is difficult to classify the climate of a vast area with very variable topography, but generally the climate, can be classified as humid, mesothermic, with deficient rains in winter (Amaral, 1990).

The implication is that, the highly variable climate makes agricultural production, particularly crop production for nutritional needs unreliable in areas like Madeira (Figure 3.2). The population is thus highly vulnerable in terms of food insecurity and malnutrition. These factors lead one to appreciate that people's perspectives are shaped by these persistent shortages.

### Infrastructure

The study area has limited and relatively poor infrastructure. It is connected to the main settlement areas (Matchedje, Madeira and II Congresso on the Rovuma - Matchedge administrative post, north) to the administrative post of Macaloge (in the south) by the unrehabilitated old 'Portuguese' road, cutting across the area (Figure 3.2). The road is impassable during the rainy season, when it quickly deteriorates. However, under a CBNRM programme locally known as "Chipange Chetu" (Our wealth) initiated in 1999, the roads are being rehabilitated.

Because of the deterioration of the internal road network system, mainly due to destruction of bridges during the war, there is no public transport, or communication system such as telephone operating in the area. This isolates the area and its people from the other areas in the Province. It also complicates research and development. For example, in order to travel from Matchedje to other areas adjacent to Rovuma (further north-east), the researcher had to walk for six days through the forest and bush



grassland. There are no facilities along the way he had to camp. There were many interesting experiences with wildlife, particularly leopards and elephants!

### 3.3.2 Biotic features

#### Vegetation

The vegetation of the region, is not well known. According to Amaral (1990), studies of the vegetation that cover the whole area are limited and mostly not available. However, due to the nature of the soils and the climatic conditions, the area is dominated by *Brachystegia* species making up a miombo woodland type of vegetation. These include *Brachystegia floribunda*, *Brachystegia appendiculata*, *Brachystegia apertifolia*, *Afromosia angolensis*, *Bauhinia petersiana*, *Pterocarpus angolensis*, *Combretum gueinzii*, *Securidaca longepedunculata*, *Pseudolachnostylis maprouneifolia*, *Terminalia sericea*, *Albizzia versicolor* and *Lonchocarpus capassa*.

#### Fauna

The civil war was a period when mammal populations within the area were severely depleted, as was the case in other parts of the country. This was because both sides in the conflict used wildlife resources to support their war efforts. Elephant ivory and rhino horns were sold to raise cash to buy arms while game meat was used to feed not only soldiers present in Niassa, but also exported to feed soldiers stationed in other provinces (Tilley and Abacar, 1996). The current CBNRM programme and law enforcement due to presence of SPFFB staff within the area is having some effect in terms of reducing the incidence of illegal hunting of wildlife (Anstey, pers. comm. 1999).

The area is still reported to have a high diversity of game animals, including species like elephant, buffalo, hippopotamus, eland, sable, kudu, hartebeest, zebra, impala, lion, leopard, etc, including protected species such as wild-hunting dogs (Anstey, pers. comm. 1999).

### 3.3.3 Social features

#### Origins of the people

The Yao or Ajauas are said to be the indigenous african people who lived between the Rovuma and the Lugenda region (Figure 1.1), and they are frequently referred to in Portuguese documents since 18<sup>th</sup> century (Amaral, 1990).

The dominant second language now spoken by these people throughout the area is Kiswahili. The dominance of Swahili intensifies in the northern villages of the area. Proximity to Tanzania where Kiswahili is the national language, undoubtedly accounts for its dominance. This dominance was probably intensified as a result of the migration to Tanzania during the civil war. Kiswahili use is most pronounced amongst young people. This is probably because many young people now living in the area were born and grew up in Tanzania. Yao, and to a lesser extent Portuguese languages, are mixed in with Kiswahili. Portuguese is more dominant in towns because of the presence of government staff.

The dominant religion (Islam) is integrated with the traditional worship of the spirits of the forefathers. Traditional healers are consulted on a variety of issues and can be called upon to deal with evil spirits (pers. Obs.). Islam represents more than 90% of the local population, with a minority of Christians (Anstey, pers. Comm. 1999).

#### Organization

The 1997 human population census, estimated the population of Sanga District to be 33,500 people. The approximate population in the study area is 4,000 people. There are 5 to 6 individuals per household; the overall population density in the area is about 1 person per square kilometer (Anstey, pers. comm. 1999).

The area is presided over by a traditional chief who locally in Yao language is known as “Mwenye”, and a number of head men also known as “N’dunas”, each of whom is responsible for a particular family group, and are answerable to Mwenye (pers. obs.). However, Mwenye answers directly to the

local government authority either in Matchedje or Macaloge Administrative Posts, (Figure 3.3.3).

In the past, traditional authority had substantial responsibility including resolution of social problems, processing development applications, allocation of land rights and maintenance of law and order.

Structures for the participation of people in decision making have been in place in the form of tribal and regional authorities.

The people in a series of small villages that are concentrated in the south and far north along the road to the Rovuma river (Figure 3.2).

### **Consequences of the war**

The insecurity associated with war encouraged people to live in close settlements (villages) and mobility was reduced. With the cessation of war agriculture is again practiced further from home, and in some areas slash and burn practices have been reestablished.

Sharing a river as a boundary between Mozambique and Tanzania means that the river and its resources are viewed as the property of both countries. There is continual human movement back and forth across the river. Weak definition and enforcement of the boundary allows those who are 'strong' to gain access to and control over the use of resources (refer to Chapter 6). In this case the 'strong' may be from an adjoining country where markets are greater and more easily engaged.

### **Economy**

The socio-economic status of northern Sanga, is characterized by high levels of unemployment; low levels of adult literacy and formal education; high dependency on foreign currency; and low population densities (Rachide, pers. comm. 1999).

Agriculture is the predominant economic activity for the majority of the households, however they are defined as deficit farmers since production levels do not constantly meet the households nutritional needs (Rachide, pers. comm. 1999). Most households are heavily dependent on external sources of

income, either through barter and/or fish sale, particularly in Matchedje area and N'kolesi (north-east of the study area). Fishing also play an important part of the local socio-economy, but the people of this area appear to be primarily agriculturalists and sometimes hunters (pers. Obs.).

This is a 'typical' remote rural area in the district; unemployment and poverty are common-place and infrastructure is poor including schools and clinics.

The high levels of mobility, since cessation of war, are a feature of the dominant north-south trading pattern that is a fundamental characteristic of the area (pers. obs). The most important traded resource appears to be fish going north in exchange for a variety of goods coming south (Plate 7). Cross-border trading in one form or another appears to be much more important than that with the rest of Sanga District. The limited trade south is centered on Macaloge and Unango towns where goods are purchased with Mozambican currency. The normal mediums of exchange further north are either by using Tanzanian shilling or bartering.

The dominant subsistence activity for people living in the area is agriculture. There are no farming activities that can be described as 'commercial', although some tobacco and sugar cane are also cultivated and only products in excess of household needs are sold or bartered. The principal crops grown are maize, cassava, banana, sweet-potato, rice, beans, millet and peanuts.

A typical pattern of production found in most villages is that families have a primary home located within the nucleus of the village. Around the home typically cassava, cowpeas and a few bananas are grown. The main areas for agriculture production are on cultivated areas located on the seasonally flooded plains of the rivers and streams. Normally a seasonal hut and one or more members will be maintained on these cultivated areas. After harvest of the main staple crops normally in June and July, the family moves back to the village home (pers. obs.).

Malaria has always been a danger in the area, followed by diarrhoea resulting from poor water quality, especially during the rain season (November-April). Other illnesses result from respiratory diseases, tuberculosis and sexually transmitted diseases (anon., 1997).

The presence of tse-tse fly has probably contributed to relatively low numbers of domesticated stock in the area, a few families have goats.

### **Administration**

The civil war between Frelimo and Renamo resulted in a collapse of the state functions and its structures within the area. The government administrative structures of the area are still re-establishing after the elections of 1994. To a certain extent there is some dual administration (Frelimo and Renamo) that reflects the situation in other parts of Niassa province. A new development this year (1999) is the inclusion of traditional authorities into the system of local management committees taking responsibility for the management of wildlife resources in the area. This is as a part of an overall processes of decentralization and promotion of CBNRM.

### **Traditional structures**

The Portuguese reinforced the traditional structures of power. These were based on the male head, such as the chiefs. The chiefs were coopted into the administrative system during the Portuguese time by using different inducements. These included providing them with a salary, exempting them from the need to pay tax, and decreasing their civil power (N'tabalika, pers. comm. 1999). In return, traditional local customs such as holding ceremonies to encourage rains were maintained and sometimes encouraged (N'tabalika, pers. comm. 1999).

### **Government**

The study area falls under the District Administration of Sanga, with the headquarters in Unango, in the south, where the offices of the District Directorates of Agriculture and Fisheries, Education and Health are located. The local administrations in the study area (Macaloge and Mathedje localities/wards) are directly answerable to the District Administrator of Sanga District.

## **NGOs**

There are no NGOs based in the area, but the IUCN is currently involved in the implementation of a CBNRM programme in collaboration with the provincial government responsible for Wildlife and Forestry (SPFFB) in the area. Other NGOs such as OPORTUN and ACORD based in Lichinga town of Niassa, are also involved in the programme.

## **3.4 Implications**

The evidence indicates that there have been a number of driving forces which have directed the fishery from one which in all probability was operated under a common property regime, to one in which a control in individual and the user group definition loses clarity is that to an open access regime.

Super imposed on this is the move by government to 'return' the fishery to a common property regime. This study is intended to inform that process.

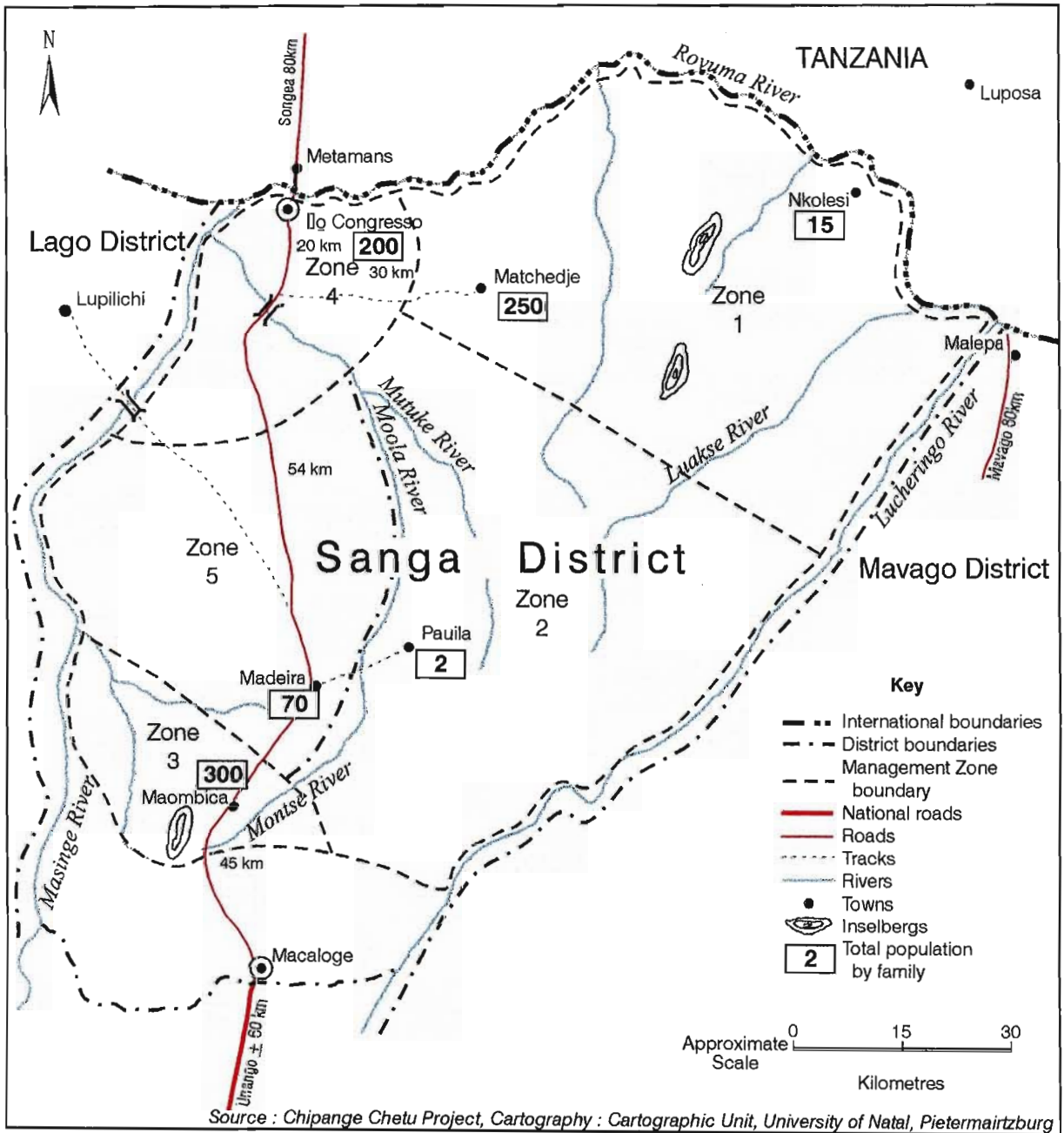


Figure 3.2 Proposed management zones (Chipange Chetu Project) in the study area.

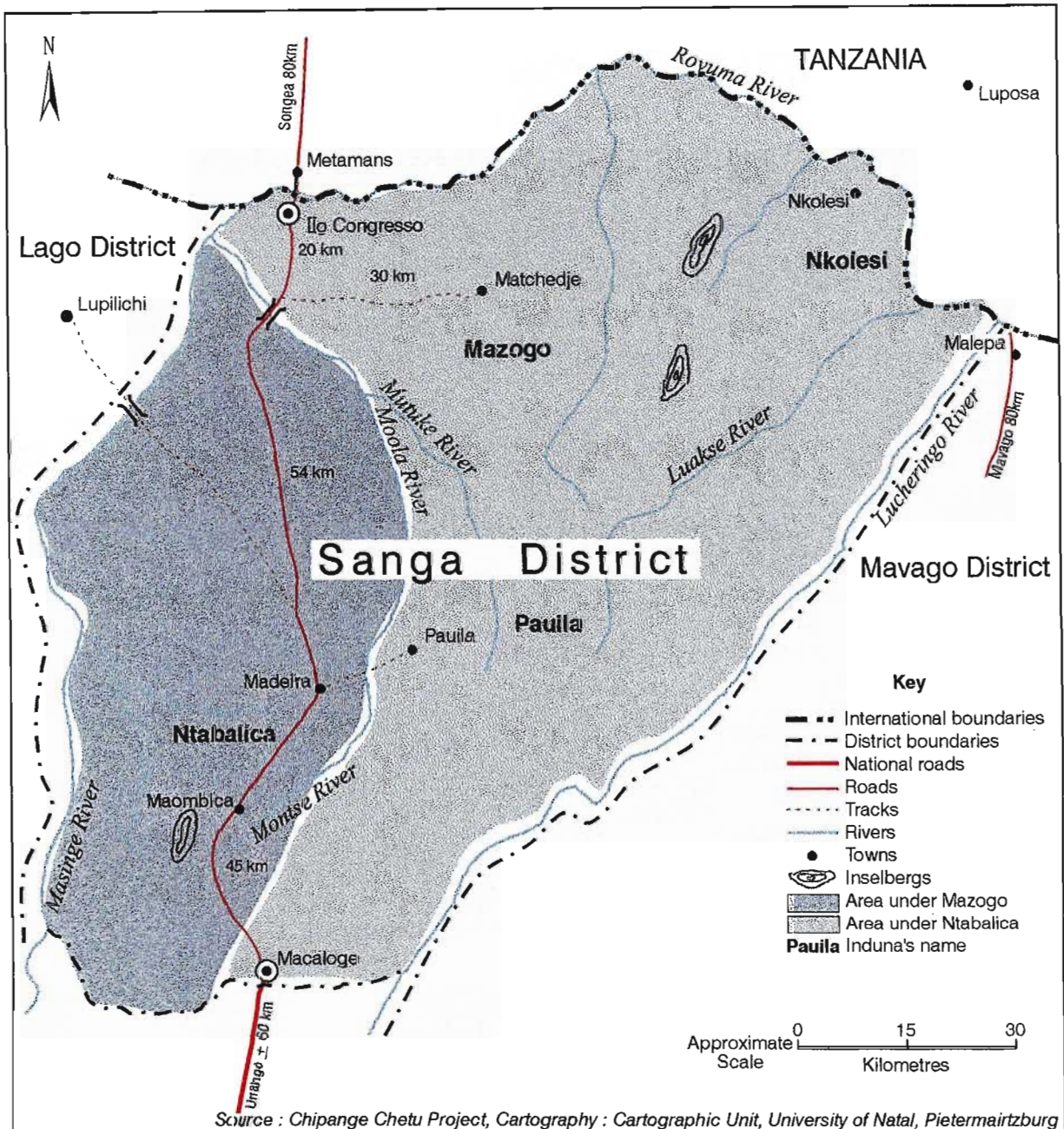


Figure 3.3.3 There are two traditional authority zones in the study area, both fall under Mwenye / Malingalile. The names and Nduna's are shown. In recent times "self-proclaimed" Nduna have claimed land on their return from Tanzania.



## **CHAPTER 4**

### **CONCEPTUAL FRAMEWORK**

#### **4.1 Introduction**

Mozambique is emerging from the destructive impact of 25 years of war and is going through a period of significant changes: from single to multi-party politics; from a centralized to free market economy; and from refugees and war to new investments and developments (anon., 1999). This process of change includes the development of new policies and legislation to change the role of the state, communities and the private sector in the management of natural resources, bringing in a new transitional era. Emphasis lies on the devolution of management and control to communities and the development of new partnerships between stakeholders.

The transition towards community management approaches over natural resources (CBNRM), has represented a significant change in theoretical thinking about the future of the local communities in the rural society.

#### **4.2 National trend**

The country has a colonial history stretching back 500 years with independence attained in 1975. Unlike most other countries in the region the colonial power lacked both administrative and financial capacity to impose a new administration in the country, and largely operated under forms of indirect rule with the result that in most of the country customary systems remained relatively unaffected (anon., 1999). The customary systems came under greater threat with the adoption of socialism after independence which viewed customary institutions as archaic remnants of the past. Land and natural resources became state property, administered, managed and regulated centrally by the government.

In reality the state never had either the institutional capacity or funds to undertake this role, and the indigenous systems persisted. Since the end of the conflict in 1992 a more conciliatory approach has

been adopted, but all land and natural resources remained the state property, and security of tenure for the communal sector remains weak (anon., 1999).

The country has one of the lowest population densities in the region and is comparatively resource rich. Approximately 7% of the country is currently cultivated, forest cover is estimated at 600,000 square kilometers and half of the country supports less than 15 people/km<sup>2</sup>. These features suggest that CBNRM has considerable potential in the country both in rural development and biodiversity conservation.

In Niassa Province, northern Mozambique, although the 25 years of conflict had considerable impact on wildlife populations, the intractable problem seems to be of open access towards wildlife and fisheries (Anstey, pers. comm. 1999). The primary threat to the fisheries resource base over the last 5 years appears to be the increasing exploitation of fish and utilization of fish poisoning by both plants and chemicals, indicating lack of control and weak management systems. Essentially the fisheries situation in the area appears to be a classic case of open access with no common property regime or government control process in place to promote sustainable use. Therefore, the process of developing management strategies and transforming the presumed open access to some other kind of management state (common property resource management) that would establish control over use of the resource will be of particular interest.

In open access systems, individuals strive to optimise their individual benefits. The tendency is to view others as competitors for the resource. Competitive advantage is gained through increasing effort and changing technology. Thus the strategies and actions are modified continuously to increase personal gain. The individual monitors his or her own stream of benefits (not the state of the resource), compares these with requirements and adapts strategy (effort, process and technology) accordingly.

In CBNRM people (a group of users) share a vision of sustained flow of benefits for the resource; a flow which is equitably distributed amongst stakeholders. Their strategies are, therefore, centered on securing the long-term future of the resource; identifying and using technology and effort which is appropriate; and monitoring the state of the resource (rather than simply the state of the return to the

individual); and ensuring equitable distribution of costs and benefits.

Breen *et al.* (1998) have described a management process which reflects CBNRM (Figure 4.1). The process is “driven” by a partnership between users (stakeholders) and regulators (government). They jointly define their vision for the resource and the manner in which it is to be used; they then describe this in quantifiable terms (Desired State of the resource ). With this in place they are able to set measurable and achievable goals and objectives; and identify the tasks to be actioned. Monitoring access in a manner which enables the participants to audit whether their vision of Desired State is being achieved. Since the future is uncertain and knowledge and understanding is imperfect, the process has to anticipate the future and operate continuously. This process has been defined as Strategic Adaptive Management (Rogers and Bestbier, 1997).

CBNRM (and CBFM) initiatives are not projects with a defined beginning and end. They are not time based (Maughan-Brown ,1998). They are continuous processes. Thus, it is not simply a case of introducing CBNRM projects. Rather it is necessary to introduce a culture of adaptive management which continuously seeks to anticipate the future and act accordingly. The culture of the organization, in this case the partnership, is a strong determinant of success in a changing environment (Senge, 1994 and Breen *et al.* 1998).

The hypothesis of this research is that the fisheries in the study area have been transformed from a common property to open access system under the influence of historical and contemporary forces (Figure 4.2). It is further reasoned that intervention to effect a return to a common property system should be based on an understanding of stakeholders perceptions of the resources and how use is managed.

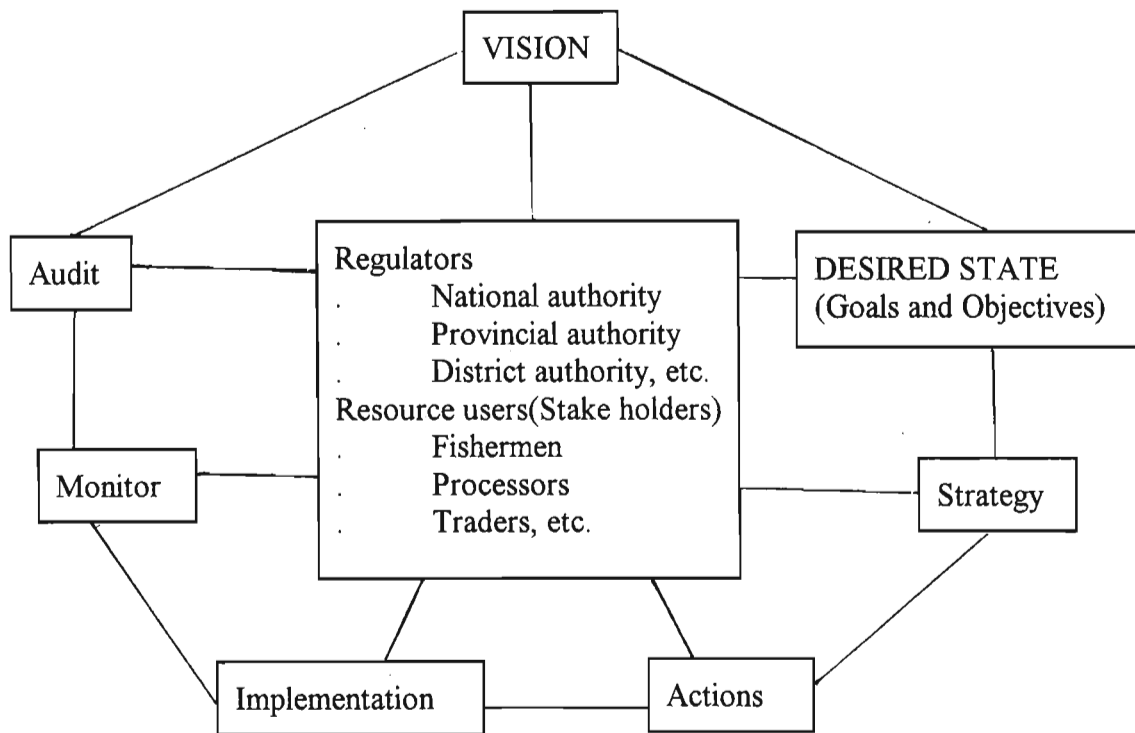


Figure 4.1. Adaptive management process. In CBNRM the process is under joint control of regulators and resource users. In open access systems each individual implements the process individually. Adapted from Breen, *et al.* (1998).

### 4.3 Management state

In pre-colonial times communities managed the use of the resources as common property systems (Murombedzi, 1990). Colonization brought with it many changes including marginalization from resources and inequalities in rural society which reflected patterns of resource use (Breen *et al.* 1998). There is evidence that, at least in some instances, fisheries were common property systems (Murombedzi, 1990). Colonization undermined community resource use systems, opting the way for increasingly self-centred approaches to resource use and to individuals claiming resources as a private property or at least the property of a select few and, in other instances, to allow uncontrolled access. Thus the fishery in the study area may have been a common property system; and it may have been transformed to an open access system. Clearly it is desirable to understand changes and the present management system in order for government to design its strategies for intervention. This forms

the focus of the research reported here. In order to provide a structure for this research an attempt was made to conceptualise the manner in the fishery has changed, which molded this change. This conceptual framework (Figure 4.2) is based on impressions gained in discussion with people from the area, and with people who have visited and/or worked in the area. The framework provided a rationale for formulation of the questionnaire and for the discussion held with stakeholders during the fieldwork phase of the research.

The framework postulates a change from community based fisheries management to open access. Primary driving forces are considered to be colonisation, with amounting influences of religion, which led to changes in traditional controls, norms and values and finally to altered behaviour. Population growth and a change to monetary economies led to growing market which, because of the weakening of controls, enabled individuals to optimise personal benefit independently of group benefit.

The purpose of the research was to determine whether there is evidence that the fishery was under common property regime; whether it is now an open access regime; and what factors have directed such changes. This understanding is used to consider prospects for reverting to community-based fisheries management (CBFM).

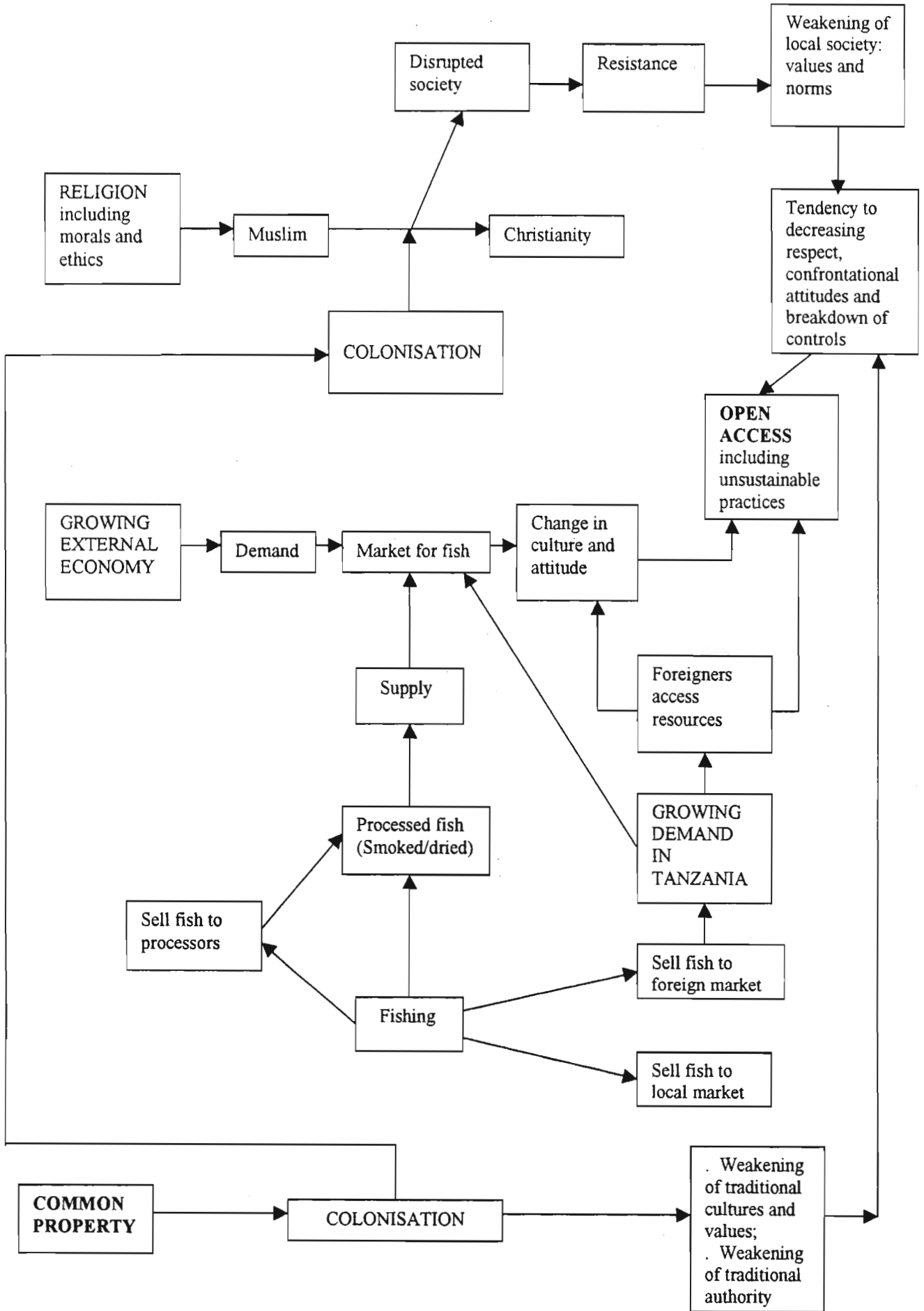


Figure 4.2 A conceptual framework depicting the postulated Change from a fishery based on common property to open access.

## *CHAPTER 5*

### **METHODS AND PROCEDURES**

#### **5.1 Introduction**

The properties of the study area and its people determined in a major way the approach, methods and scale of this research. So, too did the time allocation (5 months) placed on the process by rules regulating the Master's degree.

The study area is remote and poorly serviced. Most people are illiterate and those exploiting the fish resource are from different communities and different countries. The only meaningful way of gathering information about local people's perceptions is by way of personal interviews. The distances between villages, the absence of passable roads and lack of public transport, placed further constraints on what could be done.

This study should, therefore, be interpreted as a preliminary investigation which can guide future, better resourced (personnel, finance, equipment and time) studies.

#### **5.2 Developing a conceptual framework**

A conceptual framework reflecting fisheries management and CBNRM was constructed (Figure 4.2). This was used to establish the philosophical basis of the research, namely that of using CBNRM to catalyse a change from open access to common property resource use. It also provided a framework for reviewing the literature and structuring the interviews.

The researcher was familiar with the area having been based in Niassa Game Reserve (Figure 1.1) situated to the east of the study area. He lived on the Reserve for three years as an employee of DNFFB (Ministry of Agriculture and Fisheries) with technical and financial support of IUCN and Niassa Investments (a private sector company involved in the management of the Reserve). During this

period certain impressions formed. The hypothesis was constructed speculating a change, since colonisation, from a common property resource management system to one of open access.

It is the stated intention of government to reinstate community-based resource management. This, together with the provisional understanding of the fishery elucidated through construction of the conceptual framework, enabled the researcher to establish a research process based on interviews. The intention was to reject, modify or confirm the conceptual framework (Figure 4.2) and to consider prospects for returning the fishery to a common property resource management process.

### **5.3 Literature review**

The government of Mozambique is promoting Community-Based Natural Resource Management. It was necessary, therefore, to develop a comprehensive understanding of CBNRM. Of particular relevance are the process, the role players and their functions, and how these change over time. The literature was reviewed with this in mind. It was also directed at understanding property regimes, as ownership and access have been considered important in successful CBNRM.

The understanding developed enabled the researcher to consider the preparedness of government to facilitate the process of reestablishing CBNRM of the fishery.

Reports from the DNP, IDPPE, IIP and documents from other relevant departments related to natural resource management and community involvement programmes such as DNFFB and UMC (Community Management Unit/DNFFB), UGC (Coastal Management Unit/MICOA) were studied for relevant information on fishing, history and the welfare of the communities under study.

### **5.4 Network**

Effective implementation of CBNRM requires integration vertically from national to local levels of government, and horizontal integration between role players at the various levels. It would be impossible to develop the intended understanding in the absence of a network which facilitated



establishing contacts, conducting interviews, and discussing interpretations of findings.

Networking was developed with the provincial body responsible for fisheries (Department of Fisheries, Niassa), Provincial and District Directorates of Agriculture and Fisheries, IUCN, and other CBNRM programme implementors. This facilitated gathering of data and developing understanding of fisheries management systems. Through the network it was possible to organise public meetings, group discussions, and to hold structured and unstructured interviews with focus groups and key informants. The nature of the network and methods used depend on the type and quality of information required, socio-economic and political setting, time frame and resources available and the type of research problem. For acquiring accurate insights these methods can be combined.

### **5.5 Surveys: questionnaire and approach**

The steps followed in setting up interviews are shown in Figure 5.1.

General impressions and discussions with colleagues led to formulation of the conceptual framework. This was used to direct the literature review and to formulate questionnaires (Appendix 1, 2, and 3). The framework directed enquiry to determine:

- whether recollections of the fishers were that the fishery operated as a common property system, in which there were both a defined community of users and controls over use;
- whether there was evidence to support the hypothesis that the fishery currently operates as an open access system;
- the nature of forces which have brought about such change; and
- whether people were satisfied with the present situation and if not, why not.

The level of illiteracy in the study area were such that information had to be gathered by way of interviews. Structured and unstructured interviews were held. These are defined as follows (Saunders, *et al.* 1997).

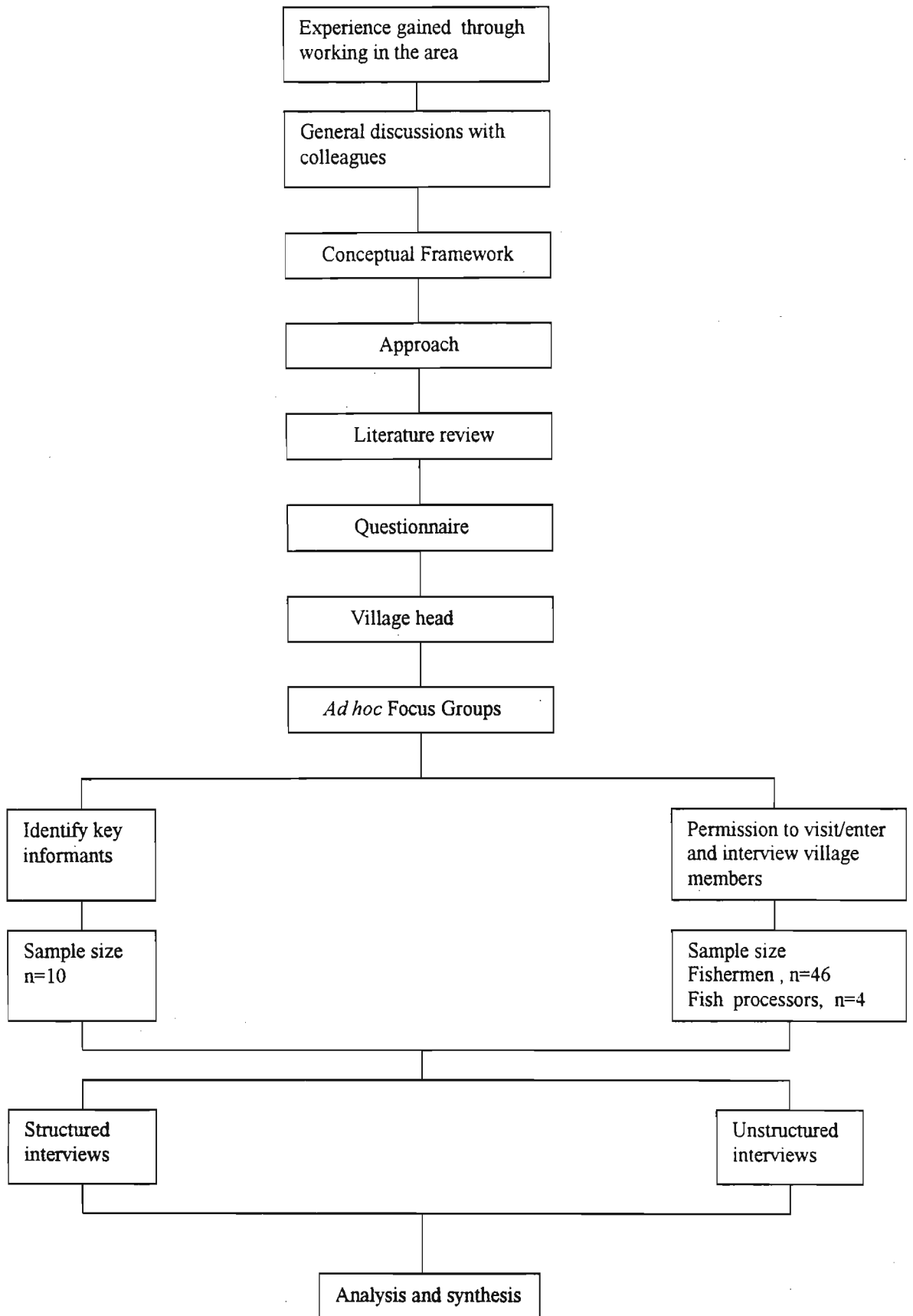


Figure 5.1 The sequence of steps leading to design, implementation and synthesis.

### **Structured interviews**

Structured interviews are those that use questionnaires based on a predetermined and standardised or identical set of questions. Each question is read and the response is recorded on a standardised pre-coded (usually) schedule.

With structured interviews the researcher is able to make direct comparisons between respondents given the commonality of questions asked and the standardisation of the interview experience. In so doing it enhances the degree of reliability of findings (Cohen and Marion, 1994).

Structured interviews have been criticised by a number of writers (Chambers, 1983; Cohen and Marion, 1994; Neuman, 1994). However, this criticism is one way of collecting accurate data as long as the interview is able to establish a good rapport, ask the questions in an acceptable manner and respondents choose to co-operate (Kitwood, 1977 cited in Cohen and Marion, 1994).

### **Semi-structured interviews**

Semi-structured interviews are non-standardised interviews. In these interviews the researcher will have a list of themes and questions to be covered, although these may vary from interview to interview. This means that the researcher may omit some questions in particular interviews given the specific organisational context which is encountered in relation to the research topic. The order of questions may also be varied depending on the flow of the conversation. On the other hand, additional questions may be required to explore research issues and objectives, given the nature of events within particular organisations. The nature of the questions and the ensuing discussion requires that data are recorded by note taking or, perhaps, by tape recording the conversation.

### **Unstructured interviews**

Unstructured interviews are informal. They are used to explore in depth a general area in which the researcher is interested. These are also referred to as in-depth interviews. There is no predetermined list of questions to work through in this situation, although the researcher needs to have a clear idea about the aspects to be explored. The interviewee is given the opportunity to talk freely about the events, behavior and beliefs in relation to the topic, so that this type of interaction is sometimes called

non-directive. It has been labelled as an informant interview since it is the interviewee's perceptions which guide the conduct of the interview. In comparison, respondent interview is one where the interviewer directs the interview and the interviewee responds to the questions of the researcher (Saunders *et al.* 1997).

Table 5.1 The use of different types of interview in research categories (Saunders *et al.* 1997)

|                       | Exploratory | Descriptive | Explanatory |
|-----------------------|-------------|-------------|-------------|
| Structured            |             | ✓✓          | ✓           |
| Semi-structured       | ✓           |             | ✓✓          |
| In-depth/Unstructured | ✓✓          |             |             |

✓✓ = more frequent;      = less frequent;

## 5.6 Survey process

Once the questionnaire had been formulated and the approach designed the process of conducting the survey was initiated.

On arrival in a village the researcher would approach the headman (N' duna) to introduce himself, his purpose for being there and to request permission and support for the research. The N' duna would then call together senior advisors forming a focus group, normally numbering between two and four people. A focus group interview followed in which there was intense open-ended discussion around issues identified in the framework and questionnaire. Such interviews are a valuable way of collecting qualitative information and is considered to be an effective way of collecting information (Cellier, 1994; Cohen and Marion, 1994).

These *ad hoc* focus groups assisted the researcher to identify people in the village that could be interviewed. These were in two categories, key informants and artisans.

Key informants are defined as individuals who are likely to provide needed information, ideas and insights on particular subjects (Kumar, 1989). It is possible to collect useful information from a few

members of the community who are particularly knowledgeable about certain matters.

For this study it meant those people who are chiefs or community leaders in the village (have social or political influence), experienced fishermen, and those who are involved in the natural resource management programme e.g. Chipange Chetu project and are professionals. Nichols (1991) mentions that key informants are most reliable on factual matters.

Unstructured interviews were conducted with the key informants and the focus groups. Responses were grouped according to similarities. This provided a basis for describing perceptions, knowledge on fisheries management practices in the past as compared to the present situation, as well as gaining insight into the driving forces involved.

### **5.7 Selecting the sample**

Respondents were chosen using the chain referral sampling method. This entailed asking a preceding respondent to recommend others who should be interviewed (Babbie, 1995). This procedure, initiated in focus group meetings, led to identification of people to be interviewed. The process allowed a continually expanding sample to be developed. Not all people recommended could be interviewed, as some they were not available at the time.

The identified and recommended respondents were interviewed and after the interviews they, in turn made their recommendations. This sampling method was considered appropriate for this type of field research because it was critical to choose people with a comprehensive understanding of fisheries resource use and knowledge about the issues and problems related to fisheries management. According to Babbie (1995) the sample derived through this approach is termed a purposive sample.

An analysis of interviewees is presented in Table 5.2.

## 5.8 Personal observation

The study required long walking trips from five to seven days. During these trips, it was possible for the researcher to form general impressions by both direct observation and through *ad hoc* conversations with people along the way. These enabled the researcher to seek explanations for observed activities (see Plates 1, 2, 3, 4, 5, 6, 7, 8, 9 and 10) and attitudes, in relaxed and unthreatening situations.

It was necessary to have guides who could assist the researcher on the field trips providing direction, translation, interpretation and introductions. Potential guides who were identified by the village headmen during the focus group meetings volunteered to participate in the research. The researcher remunerated them when the field work was completed. Six guides drawn from two villages, Madeira and Machedje, participated in the study.

## 5.9 Interpretation

Responses to questions and information drawn from notes taken in the field were aggregated according to how they informed the four key issues identified in the research framework, namely:

There is inevitably some degree of subjectivity in interpreting and assessing the responses of interviewees, particularly when the process is based on unstructured or semi-structured interviews. However, the greater the number of similar responses the more likely it is that the view expressed has a strong foundation in society. The results are expressed as the number of respondents holding a common view. This allowed the researcher to discern whether views expressed were commonly held among key informants and/ or artisans, or whether they were 'outlier' opinions of one or two individuals. In this way the researcher was able to assess the information assembled.

Table 5.2 Stakeholder interviewed/met during the study.

| COMMUNITY MEMBERS   | EXTERNAL NETWORK  |
|---|---|
| <p>Key Informants</p> <p><b>Village representatives</b></p> <ul style="list-style-type: none"> <li>- Madeira Village Secretary (1)</li> </ul> <p><b>Traditional Chiefs</b></p> <ul style="list-style-type: none"> <li>- Mwenye/Sultan (1)</li> <li>- N'dunas (4)</li> </ul> <p><b>Village council/committee members</b></p> <ul style="list-style-type: none"> <li>- Madeira local council/committee (2)</li> <li>- Matchedje local council/committee (2)</li> </ul> <p>TOTAL = 10</p> <p><b>Artisans</b></p> <ul style="list-style-type: none"> <li>- Fishermen (46)</li> <li>- Fish processors (4)</li> </ul> <p>TOTAL = 50</p> | <p><b>National Directorate for Fisheries Administration</b></p> <ul style="list-style-type: none"> <li>- Co-National Director for Fisheries</li> </ul> <p><b>Institute for Development of Fisheries of Small Scale</b></p> <ul style="list-style-type: none"> <li>- PPAN, Project Co-ordinator</li> <li>- Sociologist</li> </ul> <p><b>DNFFB/UMC (Community Natural Resource Management Unit)</b></p> <ul style="list-style-type: none"> <li>- National Director</li> <li>- UMC Co-ordinator</li> </ul> <p><b>IUCN</b></p> <ul style="list-style-type: none"> <li>- Country representative</li> </ul> <p><b>Provincial Directorate of Agriculture and Fisheries</b></p> <ul style="list-style-type: none"> <li>- Provincial Director</li> </ul> <p><b>Provincial Department for Fisheries</b></p> <ul style="list-style-type: none"> <li>- Chief of the Department</li> </ul> <p><b>Local Government</b></p> <ul style="list-style-type: none"> <li>- Chief of Macaloge Administrative Post</li> <li>- Secretary of</li> <li>- District Director for Agriculture and Fisheries</li> </ul> |
| <p>INTERNAL NETWORK</p> <p><b>Chipange Chetu Project staff in the villages</b></p> <ul style="list-style-type: none"> <li>- Head of the Game Guards</li> </ul> <p>Community/Village Game Guards</p> <ul style="list-style-type: none"> <li>- Lilumba Village</li> <li>- Maombika Village</li> <li>- Madeira Village</li> <li>- Matchedje Village</li> <li>- Paula Village</li> </ul>  | <p><b>IUCN-Niassa</b></p> <ul style="list-style-type: none"> <li>- Project Co-ordinator (Chipange Chetu)</li> </ul> <p><b>SPFFB/IUCN Chipange Chetu Project</b></p> <ul style="list-style-type: none"> <li>- Head of Game Scouts</li> <li>- Game Scout</li> </ul>   |



Plate 1. A fishing trip can usually take one to two weeks. Smoked/dried fish is packed in baskets ready to be transported on foot or bicycle to market in Tanzania.



Plate 2. Women are recognised for their contribution in fishing activities, particularly in fish processing and trading. Fish at a local market is sold in parcels of 5,000 Meticaïs.





Plate 3. Women spend much of their time collecting fire wood and guarding the camp against theft. Men do most of the smoking.



Plate 4. A 30 m gill net was set over night. The types of fish caught are shown.



Plate 5. A fishing foray usually involves at least two people, one being an experienced fisherman.

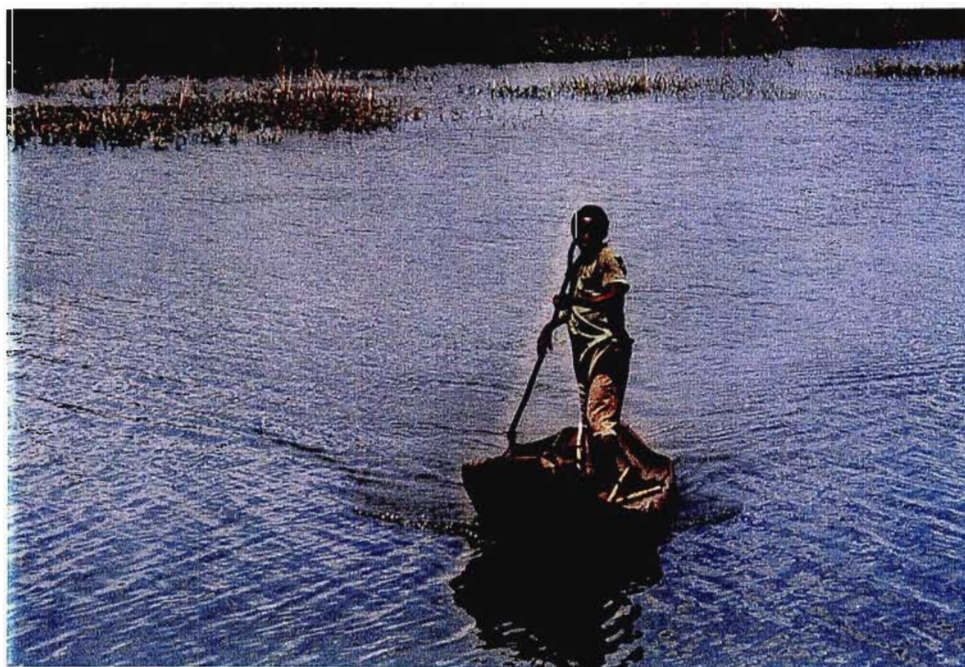


Plate 6. Fishing practices are also adopted by young boys. The bark of a tree is used for construction of fishing crafts for use on the lakes on the Rovuma river floodplain.



Plate 7. Fish is bartered for food products e.g. maize, and is transported across the border to Tanzania.

In this picture, a person sits on a bag of maize and smaller bags are placed in the buckets.



Plate 8. Plant parts e.g. fruits, constitute a well used resource for fish poisoning.



Plate 9. Dug-out canoes, are the most used fishing craft on the rivers (both in the Messinge-Rovuma-Lucheringo River Systems).



Plate 10. Some of the fishing camps have to be abandoned during the dry season as fishermen follow the fish migrations.

## *CHAPTER 6*

### EVIDENCE OF CHANGE

#### 1 Introduction

his research was constructed on the hypothesis that the fishery was originally conducted in the context of common property and that this has changed to open access. The forces driving this change were postulated as colonisation, religion (christianity) which accompanied colonisation and growing monetary economies, especially in neighbouring Tanzania (Figure 4.2). These forces are considered to operate through disruption of local governance which was not replaced effectively by the colonial government. The result has been a breakdown in community-based management of the fishery and the opening of access to all, with little or no control.

Interviews with people from the study area and from government and non-government organizations were used to:

- assess justification for postulating community-based fishery management prior to colonisation;
- gain understanding of who constitute the community of users;
- elucidate the forces which have shaped the fishery;
- determine whether the fishery can be characterised as open access;
- determine the role of government, or the lack thereof, in shaping the fishery up to the present; and
- assess the prospects for government acting as the lead ‘agent of change’ for the reinstatement of CBNRM;

#### 6.2 Evidence for common property management

The process of change from common property to open access is postulated to have taken generations. Thus, if there is to be evidence of the fishery operating as a common property system it is likely to be found in the recollections of community elders. The elders experience more accurately the breakdown of traditions and the erosion of power base than the young. This is

particularly so since the war of liberation (1964) and the subsequent civil war saw many of the young adults grow up in a disrupted society and in neighbouring Tanzania. It is hence expected that the young would not have strong experiences or even know about how the fisheries used to be managed.

The interviews with the ten key informants provide an historical perspective. Responding to a question about ownership of fish in the past, seven of the ten said the fish belonged to the people. They said that because of controls exercised by the elders it was easy to monitor who was fishing and to regulate access by people from outside the community. They emphasised that the chief designated where fishing could occur and who could fish.

When asked how fishing was performed, four of the ten responded by saying that fishing was performed in a group and the chief determined this (Figure 6.2.1). They elaborated that people from outside of the community had to approach the chief for permission to fish and if such permission was granted, he would specify where and when this could occur. These fishermen would make a gift of fish to the chief, particularly when leaving the area.

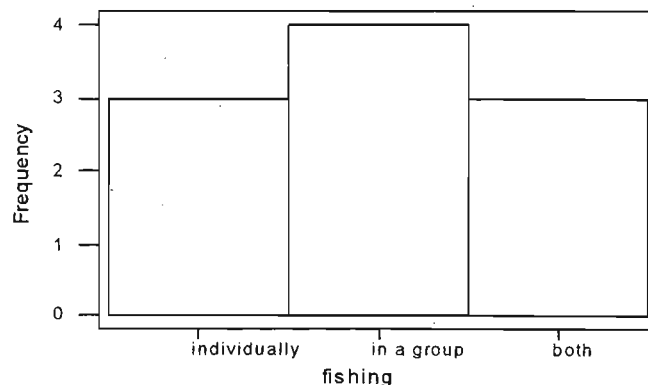


Figure 6.2.1 Histogram showing how fishing was performed in the past (responses, in frequency numbers).

These respondents pointed out that in the past, groups of fishermen would have 'exclusive rights' to fish a particular area. This might be a floodplain lake, a channel or a stretch of shoreline. Location was selected according to accessibility and availability of fish.

One informant noted that in the past the chief was respected as he was responsible for maintaining order and justice. As most chiefs were also 'involved with rituals' failure to comply could bring bad luck in fishing and perhaps even more serious misfortune. This latter view was also advanced by seven respondents as a contributing factor to the effectiveness of controls administered by the chief (Figure 6.2.2).

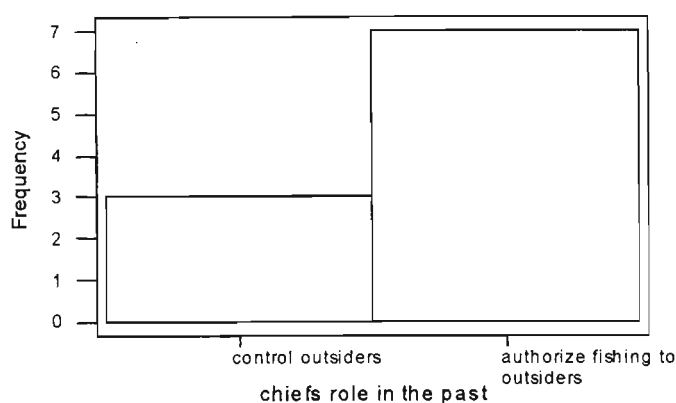


Figure 6.2.2 Histogram showing the chiefs role in relation to use of fisheries in the past (responses, in frequency numbers).

Common property resource management is characterised by clear distinction of a 'group of users' to whom the 'property' is common; rules which govern access to and use of the property (resource); and an administration system. In the minds of the key informants there was a clearly defined group of users/owners. The people in the domain of a chief, owned and used the resources.

The user group was, however, not restricted to members of the chief's people; people from elsewhere, including from across the river (Tanzania) could access the resource. This basic acknowledgement of the rights of people from 'the other side of the river' provide a complicating factor in introduction of CBNRM by the present government. This will be elaborated later.

The key informants recollect clearly that there were effective controls (Figure 6.2.2). Some of these were tangible e.g. designation of an area and who could fish there; others were intangible, being based on superstition. They also recollect a time when there was a firm administration by the chief and his elders (Figure 6.2.3).

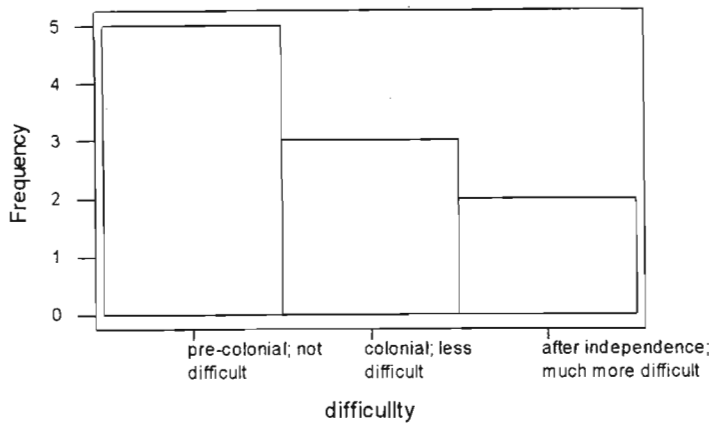


Figure 6.2.3 Histogram showing the recollection of the chiefs role over pre-colonial, colonial and the period after independence (responses, in frequency numbers).

It is reasonable to conclude that the fishery was a common property system. That there are still recollections of this is important because the present government can be perceived as reintroducing CBNRM and not introducing something which is totally new.

### 6.3 Forces promoting change

#### Introduction

Inherent in Figure 4.2, is the postulate that the fishery has changed from a common property to an open access system. This is thought to have occurred in response to a number of forces which have caused progressive breakdown in group identity, regulations (including norms and values) and administration. In this section the responses of those interviewed is used to assess this hypothesis.

#### Colonialism

Figure 4.2 in Chapter 4, implicates colonialism as one of the major forces directing change from a fishery based on common property to one that allows open access to resources. From the arrival of the colonists in the late 1800's, there was an attempt to introduce western cultures and to vest ownership of resources in the state (anon., 1999). It is postulated that this resulted in weakening of traditional cultures and values, as well as the weakening of traditional authority. With weakened traditional authority, there would be a tendency to decreasing respect, confrontational attitudes and



breakdown of controls over people and resources that they used. This would result in open access to these resources, particularly if a growing economy created a rising demand for the resources.

In Mozambique and other countries like Malawi, the history of management systems of fisheries resources traces two important periods (IDPPE, 1999a), the colonialism era and post-colonialism era.

In the colonial era, there are no references to the existence of a consistent or specific institutional board for management of fisheries (IDPPE, 1999a). This implies a continuing role for traditional authorities. The government's role in management of fisheries resources was only through the issuing of fishing licenses and supervision by the government institutions in coordination with the local chiefs. This effectively divided responsibilities and authority.

The government licensing process determined access to resources and not the traditional tribal 'licensing process'. That this was in 'co-ordination' with chiefs indicates clearly that there was an intended shift in authority from the community to government. Inevitably this would be accompanied by changes in attitudes of people to local authorities and to use of resources as will be shown later. This is especially so since, as indicated above, government's ability to effect the controls had been weak as there did not appear to be properly constituted institutions to do so.

## **Religion**

When asked to indicate whether the introduction of new religions, particularly during the colonial period, influenced the relationships between people, social ties and the manner in which people use resources, four of the ten key informants (40%) responded positively.

When probed further they explained that this was one of the reasons that most of the people who were born and grew up during that time, can not write or speak the official language (Portuguese). They said there was a fear that one could be taken to prison and by not being able to speak Portuguese one could not express opinions. They mentioned that this was one way of trying to escape from eating pork meat which is forbidden in Muslim religion, and consequently to resist changing their religion from Muslim to Christianity.

Seven respondents explained that resistance was founded in their religious commitment to not eating pork. This was so strong that many would not attend school. With resistance came a weakening of the local society, values and norms and the tendency to decreasing respect, confrontational attitudes, and breakdown of controls. With weakened local society, there was a breakdown in CBNRM and opportunities arose for open access to fisheries resources (Figure 4.2).

## **Culture**

When asked what else they thought has also changed among people over time, seven of the ten key informants responded that culture has also changed. They attributed this to the influence of new cultures from outside which were adopted by local people, particularly during the colonial period. Sixteen of the forty six who fish supported this view.

On further enquiry, they also indicated that the change in culture among people occurred not only with the introduction of new cultures during colonial period but also, during the time of war when people were forced to move from one area to another and from Mozambique to another country (Tanzania). They met different people, with different forms of living and relationships among them and with the resources that they use. People became more adapted to these in order to survive in these particular areas. And, since they adopted these, they brought them back when they returned to Mozambique.

During conversation, one of the ten key informants mentioned that some of the natural disasters such as droughts are due to ancestral anger and judgement, resulting from the marked, deliberate move from adhering to the former cultural practices and societal values.

## **Attitude**

Asked about what else they thought that has changed among people, all ten of the ten key informants responded that the attitude of people has changed over time. Only half of those who are involved in fishing identified changes in attitude.

All of the key informants also mentioned that in the past, particularly during colonial period and more recently during the period of war when most people were forced to move out of the country,

in this case Tanzania, people have undergone a dramatic shift in attitude and thinking in respect of traditional methods and practices and use of natural resources (fisheries). They said people no longer respect their chiefs in the community; and since they have come back from the refugee areas in Tanzania, the *former* N'dunas behave like Mwenyes (chiefs) and are now regarded as Mwenyes in the community. This indicates a fragmentation and breakdown of traditional social structures. Fishermen from outside the area particularly Tanzania, do not respect local authority; therefore they do not ask permission or report to the local authority when fishing outside their country or area, as it used to be in the past. This change of attitude indicates progression towards open access to the fish resources.

This change may reflect that most people who are involved in fishing are young (Figure 6.2.4). About half of these are less than thirty years of age and a quarter are less than 25 years old. These people have known little other than war and displacement. Consequently, they may not know exactly how people related to each other and what protocols were supposed to be followed in relation to the use of natural resources. This also suggests that the authority of traditional chiefs, which to some extent regulated fisheries in the past, had dramatically weakened as new social structures (e.g. N'dunas becoming Mwenyes) developed under the influence of colonization and war.

When talking to chief Malingalile, known as the “Sultan” of the area, that is the chief of the chiefs, he observed that:

*‘The former traditional structures are now eroded and where they still exist, people do not adhere to them as it was the case in the past. Most of the powers which were vested on these traditional chiefs have also been taken over by the modern system of living. Those who were formerly N’dunas, seconding the chief (Mwenye) of a given area, are now also regarded as Mwenye. He also indicated that in contemporary time, the chiefs role revolves only around social mediation (to intervene with social problems), but in terms of natural resources use (fisheries) and its allocation, this responsibility is handled by the government (District Directorate of Agriculture and Fisheries and Conservation Agency), which they do very little in terms of their legal provision and control’ (Chief Malingalile, pers. comm. 1999)’.*

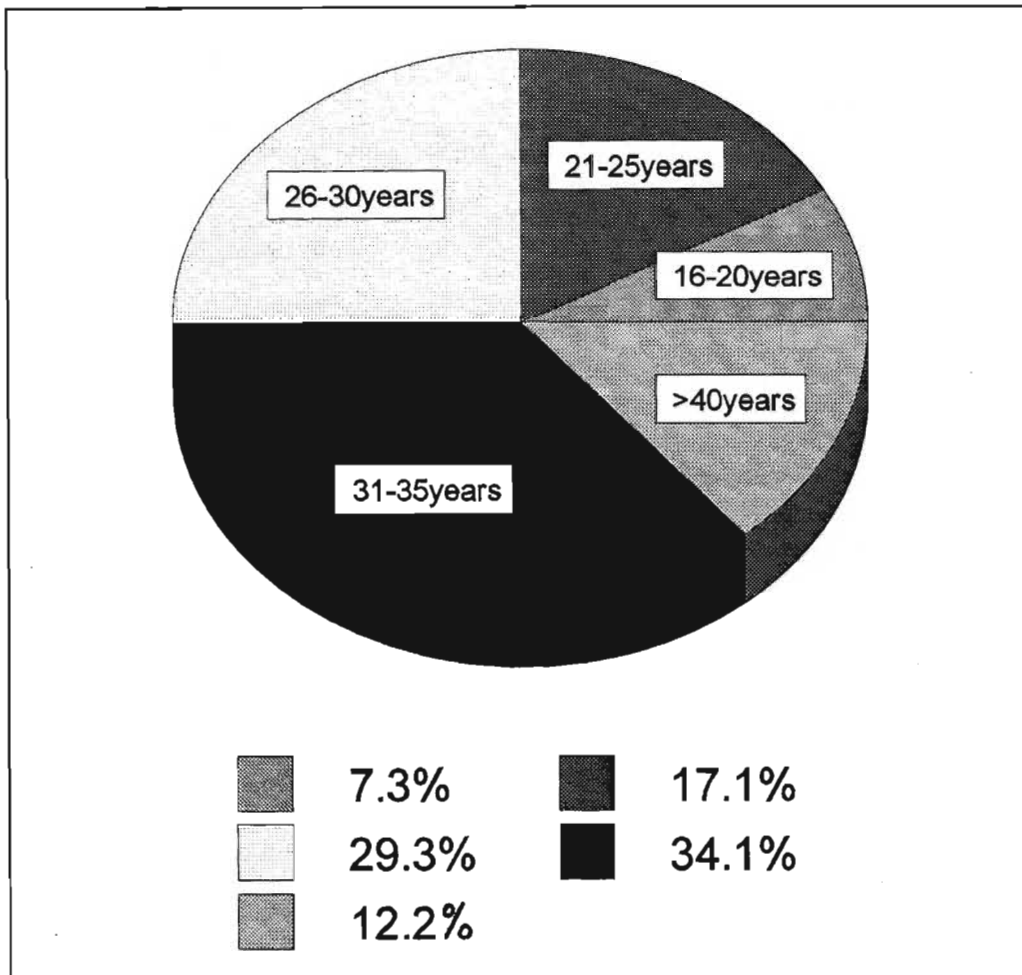


Figure 6.2.4 A Pie chart depicting the age structure (percentage) of the people (n = 46) involved in fishing, interviewed during the study.

### Economy

Mozambique is one of the poorest countries in Africa (Maughan-Brown, 1998). This has been exacerbated by many years of internal strife. Remote rural areas with poor infrastructure and services are home to amongst the poorest people.

Tanzania, which borders the study area, has practically 'settled down' since it achieved independence. Whilst it is still a very poor country in relative terms, it is much more wealthy than the neighbouring part of Mozambique. There appear to be higher levels of disposable income in Tanzania than in nearby Mozambique. This gains support from fishermen, most of whom (three of the four who indicated that they process/sell fish) mentioned that they dispose of (sell and/barter)

their fish to people from Tanzania. On further enquiry they elaborated saying that local people have neither money nor goods to exchange for fish.

Twenty six of those who fish stated that increasing numbers of people from Tanzania were harvesting fish in Mozambique; and twenty of these observed that fish stocks and catches were declining and that technologies such as gill nets and poisons were being adopted. Four people who process fish (smoking) were interviewed. Three of these stated that most their fish is purchased by traders from Tanzania. One interviewee observed that there are fewer fish than in the past and this causes problems because fish has to be kept longer before being taken to the market and quality deteriorates (Plate 1). He also mentioned that the use of poisons spoils the quality of fish and suggested that fishermen should be told not to use poisons.

This evidence points clearly to markets in Tanzania driving change in the fishery. Entry of new and more people indicates breakdown in group coherence and introduction of technologies and practices identified by the two respondents to be deleterious, elaborates breakdown of controls and administration systems. It can be concluded that the market is a contributing factor in directing change in the fishery from common property to open access.

#### **6.4 Evidence for open access**

Open access systems are characterised by ineffective or absence of regulations, including both the regulations and the administration thereof. This results in a breakdown of the 'user group' so that anyone can access the resource, and each individual decides where, when and how to use the resource and how much to harvest.

The interviews with both key informants and fishermen (Appendices 1 and 2) provided a number of insights: Responding to a question about whether the former organizational structures were still effective, all of the ten key informants responded negatively. When asked further about what they thought the reasons were for the breakdown of these traditional structures, six blamed it on the legacy of colonial administration and war (after-independence). They said that during the colonial administration, structures were set up which undermined the local traditional institutions in regard to the power that they were given under traditional organization systems.

When asked about what they thought has changed in relation to control and regulation, all key informants responded that currently there are no control systems regulating use of the resource; of forty- six of those who fish, forty-three (93%) responded similarly. They said in the past, particularly during the colonial period, the colonial government set up administrative structures that undermined the local traditions and practices; and more recently, during war time when people fled out of the country (e.g. to Tanzania), there has been a dramatic shift in attitude and thinking in respect to traditional methods and practices. They said people no longer respect the traditional rules and regulations governing the use and access to fisheries. They elaborated saying people no longer seek permission from the chief, and non-traditional methods such as use of chemical products (e.g. pesticides) have been introduced with the purpose of maximizing the fish catch.

When asked to indicate what effects the new administrative structures have, four of the ten key informants indicated that they had changed the traditional institutions which regulated resource use in the past. Modern institutions are now developed in line with a western type of governance. They indicated that even where traditional institutions still exist, people do not adhere to them as was the case in the past. Most of the powers which were vested on these traditional institutions have been taken over by the modern systems of governance. One of the ten key informants also indicated that the power and influence of chiefs is currently limited to mediation. He elaborated by saying that control over use of natural resources is now the responsibility of the government. He commented that as the regulatory power shifted from local institutions to government, it was accompanied by centralization of control. All ten key informants mentioned that people's attitude towards fisheries has now changed from seeing fish as a resource vital for survival to seeing fishing as an open access requiring venture capital.

When asked what implications these attitudinal changes have had within the community and toward fisheries, three of the ten key informants claimed the attitudinal change resulted from the lack of controls. They said that because everybody minds his own survival and his 'pockets', people focus on self-interest and this situation has led to the overall erosion of cultural identity of the community and group ownership over the resource. They felt that the intrusion of foreign practices (pesticide/chemical poisoning by people from outside the areas) has also impacted local traditions and practices negatively.

Three of the ten key informants mentioned that, after war, when people came back from the refugee

camps in Tanzania, those who had been N' dundas behaved like Mwenyes, and are now regarded as Mwenyes in the community. When asked further, why the N' dundas behave like Mwenyes three key informants said that there was dispute over power as well as areas of settlements after returning from Tanzania. They said this was because some of the N' dundas did not want to go back to their original places and therefore they settled wherever they wished to. In so doing they could gain more power. This redistribution of power has affected traditional authority and fractured society with a resulting weakening of traditional norms and values, and organizational structures.

## CHAPTER 7

### PROSPECTS FOR INTRODUCTION OF CBNRM

#### 7.1 Introduction

Reversal of the trend from open access to common property resource management requires intervention. Government intervention is necessary. The likely success of such intervention depends as much on the willingness of the people to change as it does on the preparedness of government to act as an ‘agent of change.’

In this Chapter the prospects for successful transformation to CBNRM are considered.

#### 7.2 Willingness of local people

Evidence presented in Chapter 6 indicated that some local people, particularly the elders, have recollections of the fishery as a common property system. Thus, government would not be introducing a foreign concept; rather they would be returning control to “people” who used to exercise it, and reinforcing their accountability for so doing. Social changes which have occurred in the interim are directing establishment of new institutions for resource management.

If people were satisfied with the present situation it would complicate transformation to something else. The interviewees were asked to respond to a number of questions which would indicate their level of satisfaction with the *status quo*.

Asked to indicate what changes have occurred in relation to fisheries resources, all ten of the key informants stated that fisheries have declined over time. Forty-three out of forty-six of those who fish, confirmed this view.

On enquiry whether the fishermen migrate from one area to another, thirty-eight of the forty six responded positively. When asked further about the reasons for migration, they mentioned that they do migrate because they have to follow the fish availability. When asked how many days they



spend on a fishing trip, half of the forty-six (50%) fishermen, mentioned that this can take ten to fifteen days, particularly in the dry season.

When investigated further, six of the ten key informants indicated that currently there are many more fishermen from outside than from the local communities; Thirty-eight of forty-six people involved in fishing supported this view.

When asked about the type of gear used they mentioned that gill nets, poison plants, hooks and more frequently fishing traps were used in the rivers. All forty-six fishermen mentioned that poison plants (e.g. fruits, Plate 8), were more frequently used during the dry season on the lakes. Furthermore, more than half of the fishermen, thirty-one of the forty-six, mentioned that fish poisoning involves the use of chemicals (pesticides) which according to them, are from abroad (Tanzania). Fifteen of these mentioned that acid fluids from car batteries were also used by people from outside the area e.g. Macaloge and Unango.

Asked about the problems experienced in fishing, thirty-one of the forty-six (67%) people involved in fishing mentioned that competition with other fishermen was the major problem. Fifteen of these went on to state that the attitude of users from outside the area (e.g. Tanzania, Macaloge, Unango) was also a problem. They said that the attitudes of users from outside was bad because they were responsible for most fish poisoning, particularly the use of chemicals and acid fluids. They also observed that fishermen from Tanzania do not respect fishing areas on the Mozambican side.

When asked whether there were ways in which the current situation could be improved, thirty-three of forty-six of those who fish (72%), said that the creation of local committees and co-management of fisheries could be the solution. Thirteen of forty-six (28%) mentioned that going back to older systems through support of traditional controls could also be one way in which the current situation could be improved.

In conclusion, the responses of the fishermen show that there is:

- a breakdown of traditions;
- a breakdown of controls;
- an adoption of inappropriate technology;

- an over-exploitation and foreign exploitation of the resource (fish);
- an open access to resource;
- an awareness of the current situation and problems affecting the resource/fishing areas; and
- a readiness to change (the situation) towards a desired/preferred management system (Figure 4.1).

The call for reinstatement of controls, and greater involvement of the traditional authorities conform with the intention of government. It can be concluded, therefore, that the local people are willing to embrace change towards CBNRM as they are clearly dissatisfied with the present open access system.

### **7.3 Government initiatives**

#### **Institutional reform**

In the post-colonial period, the government started to establish reforms to reinforce the sector. New government institutions for management and administration of fisheries were established and legislation was revised so as to legalize the authorities of these institutions.

This period in Mozambique saw the establishment of the Economic Exclusive Zone (ZEE), the creation of the National Directorate of Fisheries (DNP), which is the institution responsible for fisheries, the integration of the whole fisheries sector in the Ministry of Agriculture and Fisheries in 1994 (Figure 7.3), and the elaboration of the Master Plan for Fisheries. After restructuring took place in 1994, the structure for fisheries sector was as follows:

- The National Directorate of Fisheries (DNP). This is the institution responsible for the fisheries sector including licensing, inspecting and management of fisheries. At the provincial level the DNP is represented by the Provincial Services for Fisheries Administration (SPAPs);
- The Institute for Development of Fisheries of Small Scale (IDPPE). This is responsible for socio-economic and technological research, for identification of projects and other forms of development;

- The Institute for Fisheries Investigation (IIP), responsible for investigation and evaluation of fisheries resources.

In 1994 the Commission for Fisheries Administration (CAP) was established to assess and advise the minister of Agriculture and Fisheries on aspects related to the regulations/rules, management and conservation of fisheries resources. The commission is comprised of the representatives of the institutions related with the administrative issues (DNP), fisheries investigation (IIP and IDPPE), artisanal fisheries, semi-industrial and industrial fisheries. It meets four times a year (IDPPE, 1999a).

In Mozambique, as in countries such as Malawi for example (IDPPE, 1999a), the resource management regimes were centralized before the introduction of co-management programmes. The State was responsible for formulation and implementation of laws, regulations and other control measures. In both cases (formulation and implementation of management plans) there are no references about the existence of specific local structures responsible for managing the resources (fisheries) in such a way to increase the productivity and reduce the risks of the fishing operations. There is also no evidence for this on the Rovuma.

Factors such as the reduction of fish production index, 36 321 in 1987 to 19 195 in 1993, (IDPPE, 1999a); the intensive use of inappropriate fishing gear harmful to resources and habitat; the aggravated conflicts between the users, and the lack of closed seasons for fish reproduction purposes were some of the factors that indicated the difficulties faced by the Central Government and the need for revision of policy for management of fisheries resources. This provided a motivation (for new models for intervention based on involvement of local communities in the management of fisheries resources through a co-management approach (IDPPE, 1999a).

In Mozambique the co-management programme started in 1995. It resulted from the evaluation of the management systems for fisheries resources carried out during the preparation of the current Master Plan for Fisheries Management (PDP) (Falcao and Hilario, pers. comm. 1999).

The evaluation concluded that the management systems for fisheries resources in force at the time were inadequate and ineffective. It noted a tendency of increasing incidents of over-fishing,

violation of fishing areas, the use of inappropriate fishing technique and fishing crafts that are not recommended by fisheries policy and legislation. As a strategy for minimization of these problems, the Master Plan for Fisheries (PDP) recommends adoption of systems of co-management, whereby responsibilities are shared between the government authorities and the local communities (Falcao, pers. comm. 1999).

## **Policy**

According to the Fisheries Policy (Decreto/Decree no. 17/96), the intention is to integrate the fisheries activities into the objectives of the economic development of the country and the programme of the government in order to achieve:

- food security;
- sustainable economic growth;
- reduction of unemployment rate; and
- reduction of poverty;

The Fisheries Policy has the following sectoral objectives:

- improve the internal supply of fish to cover part of the food shortages in country;
- increase the generated foreign exchange by the sector;
- improve the living conditions of the fishing communities;

To achieve these objectives the Fisheries Policy addresses the following principles:

- the fisheries resources are State property. The State has the responsibility to ensure that the fishing activities do not endanger the sustainability of the resource and that the benefits from this activity to the country are maximized;
- the fishing harbours of Maputo, Beira, Quelimane and Angoche, and other related infrastructures are State property. The State has responsibility for achieving its development in time and space in accordance with the needs of the productive sector and the framework that ensures the long term sustainable investment;

The role of the State in the implementation of the Fisheries Policy is as follows:

- manage fisheries resources and promote of fishing activities;
- regulate and control the productive activities;
- provide an enabling environment to encourage private initiatives and establish mechanisms and incentives for the development of productive activities;
- provide public services concerning licensing, supervision and control of the fishing activities;
- generate income through collection of specific fees by concession of licenses for fishing practices and complementary activities.

Since Mozambique was colonised by Portuguese, it imported most of its fish from Angola, which was also a Portuguese colony. Local fisheries did not therefore, receive the formal attention of the government (Saluda, 1997 in Namanha, 1999). Fisheries developed autonomously with little or no control. With independence in 1975, came restrictions on importation of fish from Angola. Attention focused on local fisheries. The emphasis was, however, on marine and estuarine fisheries. Inland fisheries continued largely uninfluenced by the government. Companies, known as “EQUIPESCA” were established to exploit the fish and other marine resources, particularly prawns (Saluda, 1997 in Namanha, 1999). The National Secretariat of Fisheries, set up by the socialist government, developed policies and regulations, but the focus was on control and harvesting. Inspection was the regulatory system. There was no attempt to constitute an integrated management system until 1998.

The Fisheries Management Plan known as “Programa de Gestao das Pescarias Artesanais” focuses on improving the supply the fish to internal markets and improving quality of life. It is reasonable to envisage that in the absence of enforcement of sustainable harvest levels, this could lead to unsustainable harvesting of the resource.

The proposed management plan does, however, also state that the political and economic objectives of the government are to ensure conservation of fisheries while optimising the economic benefits. Social, other than economic (in a narrow sense) benefits, are not implicitly recognised. However, the policy directs towards co-management of fisheries, along the lines of CBNRM. This could secure the flow of social benefits associated with the fishery (Namanha, 1999).

According to IDPPE the government objectives are:

- to conduct socio-economic research and implement biological base-data collection to provide base information so that local communities will be enabled to manage fisheries resources based on the local initiatives.
- to promote formation of artisanal co-management committees in the areas exhibiting indications of over-fishing.
- to establish policy and legal framework for fisheries and institutions based on harmonising formal and informal fisheries i.e. establishment of fisheries management.
- to improve fisheries conflict management occurring within fishery resource areas.
- to improve communication between fisheries administrative institutions and personnel such as researchers and communities using the fish resource in the fisheries areas (IDPPE, 1999b).
- for the implementation of the fisheries co-management programme, the National Directorate of Fisheries suggests the following immediate activities:
  - to train and enhance capacity of the government officers in fisheries resource evaluation and socio-economic research;
  - to enhance capacity and mobilize communities in resource evaluation and dialogues among communities and institutions;
  - to establish data-base collection system;
  - to establish functional co-management systems.

In the 1999 seminar, it was declared that, until the date that the Master Plan is established and published, fisheries management will be based only on a licensing system and prohibition of fishing especially along the coastal zones (IDPPE, 1999a). The emphasis on inland fisheries is not particularly strong.

Preparation of fisheries management plans at present includes two components:

- Socio-economic and biological research, and
- Formation of “local Fisheries Management Committees” (IDPPE, 1999a), which would be the day-to-day “informers” or “educators” of the communities on fisheries management and utilisation.

## Legislation

Although the Government recognizes the participation of local communities in fisheries management in the country, there is very little that has been done to develop legislative support for this. Therefore, the institutional structures that have been promoted (Co-management committees) are functioning informally and without any specific legal institutional status (Falcao and Hilario, pers. comm. 1999). Co-management of fisheries is defined as the sharing of responsibilities, authority and competency between the government (fisheries research and administration) and the users of the resources (private sector and the communities) in the management and control of fisheries resources use and other aquatic resources (IDPPE, 1999b).

- The legislation for administration of fisheries in Mozambique establishes that this must be based on a 'sectoral and vertical vision' of the organizational structures and functions in which responsibility is centered.
- In relation to sustainable development of fisheries resources, it is up to the MAP to approve the development plans related to the type of fisheries, however, this needs to be done in consultation with the social, economic and professional groups concerned with the fisheries activities (Artigo 6 and 7 do Regulamento das Pescas, Decreto 16/96 de 28 de Maio). The way in which participative management for artisanal fisheries development is integrated in the planning process is still not formalised.
- In relation to process regulating access to fisheries resources, the fisheries law makes it obligatory that fishing activities and the associated operations of artisanal fishermen be licensed (Lei das Pescas, 1990).
- In relation to conservation and management of fisheries resources with particular reference to artisanal fisheries, the MAP has the following competencies (Artigo 35, idm.):
  - to prescribe schemes to limit access to fisheries and fishing efforts;
  - define closed seasons (e.g. periods when fishing is not permitted);
  - prohibit inappropriate fishing methods;
  - prohibit and regulate fishing practices to marine mammals and other protected and rare species;
  - determine other conservation measures needed for the preservation of fisheries resources;
- The fisheries law prohibits the use of explosive materials or toxic substances to facilitate

the capture, weaken or kill fish species (Lei das Pescas 1990).

The co-management of marine fisheries resources with respect to artisanal fisheries has never been the specific object of legislation in Mozambique (Fabiao, pers. comm. 1999). Only in terms of Fisheries Policy and Strategy for Implementation, approved by the Resolucao no. 11/96 de 28 de Maio, it is expressed as the Government Policy to establish “Co-management systems with direct involvement of communities in the definition and control of application of regulatory measures for fisheries activity”.

Rules for supervision applicable for artisanal fisheries:

- The supervision of fisheries activities in jurisdictional waters of Mozambique is centred on the MAP. It can delegate to the other organs of the state responsibility to perform these functions (Lei das Pescas 1990). The regulations of Marine Fisheries, define explicitly that the ‘fishing supervisor’ can be a staff member of the Ministry of Agriculture and Fisheries, at professional level of fish supervisor, or any other person with legal authority may supervise the fulfilment of the requirements established by the fisheries legislation (Article 2, no. 2 u) do Regulamento da Pesca Maritima, Decreto 16/96 de 28 de Maio).
- The Law for Forestry and Wildlife (DNFFB) states clearly the possibility for the supervision to be carried out also by legally designated supervisors, community agents, within the regulatory terms of its own portofolio (Lei de Florestas e Fauna Bravia, 1999)

### **Management Strategy**

According to the implementation strategy of the fisheries policy, the management and supervision of fisheries would be driven through the implementation of the following actions:

- Regulation and establishment of restrictions to fisheries activity for the areas of marine and inland waters and/or for populations of aquatic species, justified by:
  - interest for conservation of aquatic and environmental living resources;
  - objectives of economic efficiency for resource exploitation;
  - protection of the economic position of the groups that perform the fishing activities.



- regulation of fisheries based on biological evidence and economic justification, through discussions with interested economic operators;
- promotion of community involvement for management of aquatic resources and their respective exploitation, so as to facilitate the introduction of natural resource utilization patterns which are biologically sustainable and socio-economically efficient.
- promotion for development of fisheries activities with emphasis on fish production in marine and inland fisheries with the aim of supplying the internal market;
- promotion of development of aquaculture in marine and inland fisheries;
- supervision and control of fishing activities through:
  - utilization of vessels based in the main fishing harbours for inspection;
  - boarding of inspectors in the fishing vessels;
  - guaranteeing the presence of fish inspectors in the more vulnerable zones, for systematic control of infringements with particular reference to border zones of Cabo Delgado, Maputo and Niassa;
  - establishment of more efficient systems of communication between land and sea;
  - establishment control and monitoring systems for sport fishing activity;
  - creation of regulations and appropriate inspection systems for inland fisheries with particular emphasis to Lakes Niassa and Cahora Bassa in Tete;
  - active participation and action in marine and inland fisheries supervision and multi-ministerial competence;
- inspection and guarantee of quality of fish products through:
  - the inspection and certification of the quality;
  - the verification of the hygiene and sanitary conditions of fish handling and processing;
  - the provision of required laboratory analysis services by the industrial fisheries;
  - the creation of regulations and control systems for quality to be maintained by the fisheries industry.

### **Institutional capacity (IDPPE, IIP, DNP)**

In Mozambique the programme of co-management consists of two main components:

- one related to conducting the required socio-economic and biological studies, to be carried

out by the Institute for Development of Small Scale Fishing (IDPPE) in coordination with the Institute for Investigation of Fisheries (IIP); and a secondly

- that of promoting forums known as co-management committees, for coordination and implementation of recommendations from research.

There are three pilot project areas in the Provinces of Nampula, Zambezia and Inhambane.

According to Fabiao (pers. comm. 1999) there are three functioning co-management committees. One in Nampula Province (Districts of Angoche, Moma and Mogincual) integrated in the Project of Artisanal Fishing in Nampula (PPAN) and two in Inhambane Province (Districts of Vilankulos and Inhassoro). The co-management committee of the area of the PPAN is distinguished from others mainly because it functions in coordination with small committees based in the fishing centres, known as local committees. There are 17 local Committees (Fabiao, pers. comm. 1999). According to him, although they are in their infancy, they have been contributing progressively to the control of fishing activities; to consolidation of social relationships between the artisanal fishermen in the zones of their influence; gradual reduction of the rate of utilization of mosquito nets for fishing and of conflicts between artisanal fishermen in the area of PPAN; to the marking and subsequent release into the water of approximately 55 turtles; and to the introduction of the ban for lobster in Inhambane. These are considered good examples that illustrate the type of actions and the outcome of the management programme in the pilot areas (IDPPE, 1999b).

The persistence of certain problems, as referred to by the artisanal fishermen in the synthesis report (IDPPE, 1999b), have been constituting the major obstruction for the effectiveness of the co-management programme for fisheries resources in Mozambique. These problems can be classified into four main groups, namely:

- **Legal**

The lack of legal support of the co-management committees does not allow a clear definition of their role and competency.

- **Financial**

Although the committees have been increasing efforts to create an autonomous financial system (e.g. collection of fees for issuing of fishing permits to the migrant fishermen) for their normal functioning, there are indications that this is not yet effective and secure.

- Conflicts for operation

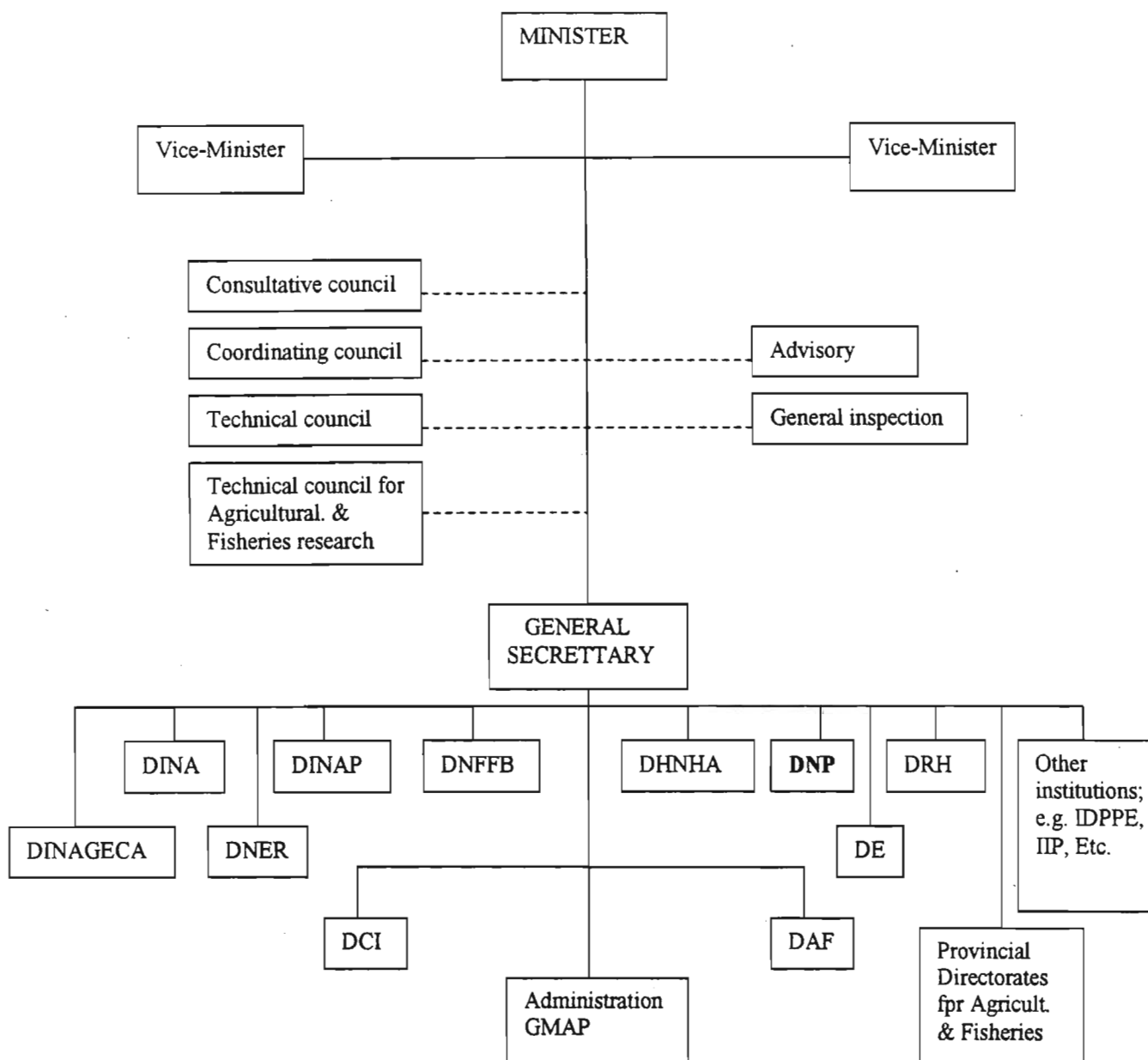
There is an on going problem of violation of areas for artisanal fishing by the industrial fleet, mainly on the Sofala Bank. This issue is being discussed in various forums of management in the pilot zone, but no decisive measures have been taken to minimize the problem. According to IDPPE (1999b), data collected in the zone of PPAN have shown that the number cases of destruction of artisanal fishing gears by the industrial fleet have remained the same.

- Institutional coordination

The weak coordination between the institutions of the sector, and between these and the committees in the process of implementation of the co-management programme is reported to be another restraint. According to the National Seminar Synthesis Report 1999, this restraint had three dimensions:

- The relative absence in the sector of relevant institutions notably National Directorate of Fisheries, Provincial Services for Fisheries Administration, Provincial and District Directorates of Agriculture and Fisheries.
- The lack of an effective methodology and clear coordination between the institutions of the sector that participate in the process; and
- The weak involvement of artisanal fishermen of the pilot zones in the meeting of the Fisheries Administration Commission (CAP).

(Source: Fabiao, R. and Hilario, pers. comm. 1999; IDPPE, 1999b).



**LEGEND:** DINAGECA (National Directorate for Geography and Cartography); DINA (National Directorate for Agriculture; **DNE** (National Directorate for Rural Extension; DINAP (National Directorate for Veterinary); DNFFB (National Directorate for Forestry and Wildlife); DHNHA (National Directorate Hydraulic Agriculture); **DNP** (National Directorate of Fisheries); DE (Department of Economy); DRH (Department for Human Resources); DCI (Department for International Cooperation); DAF (Department for Administration and Finance); GMAP (Gabinet for the Ministry of Agriculture and Fisheries).

Figure 7.3 Organogram for the Ministry of Agriculture and Fisheries, showing reporting issues (—) and lines (-----) of communication and authority. Those departments with special responsibilities for fisheries are shown in bold. DNP (National Directorate of Fisheries).

Source: Direccao Nacional de Pescas.

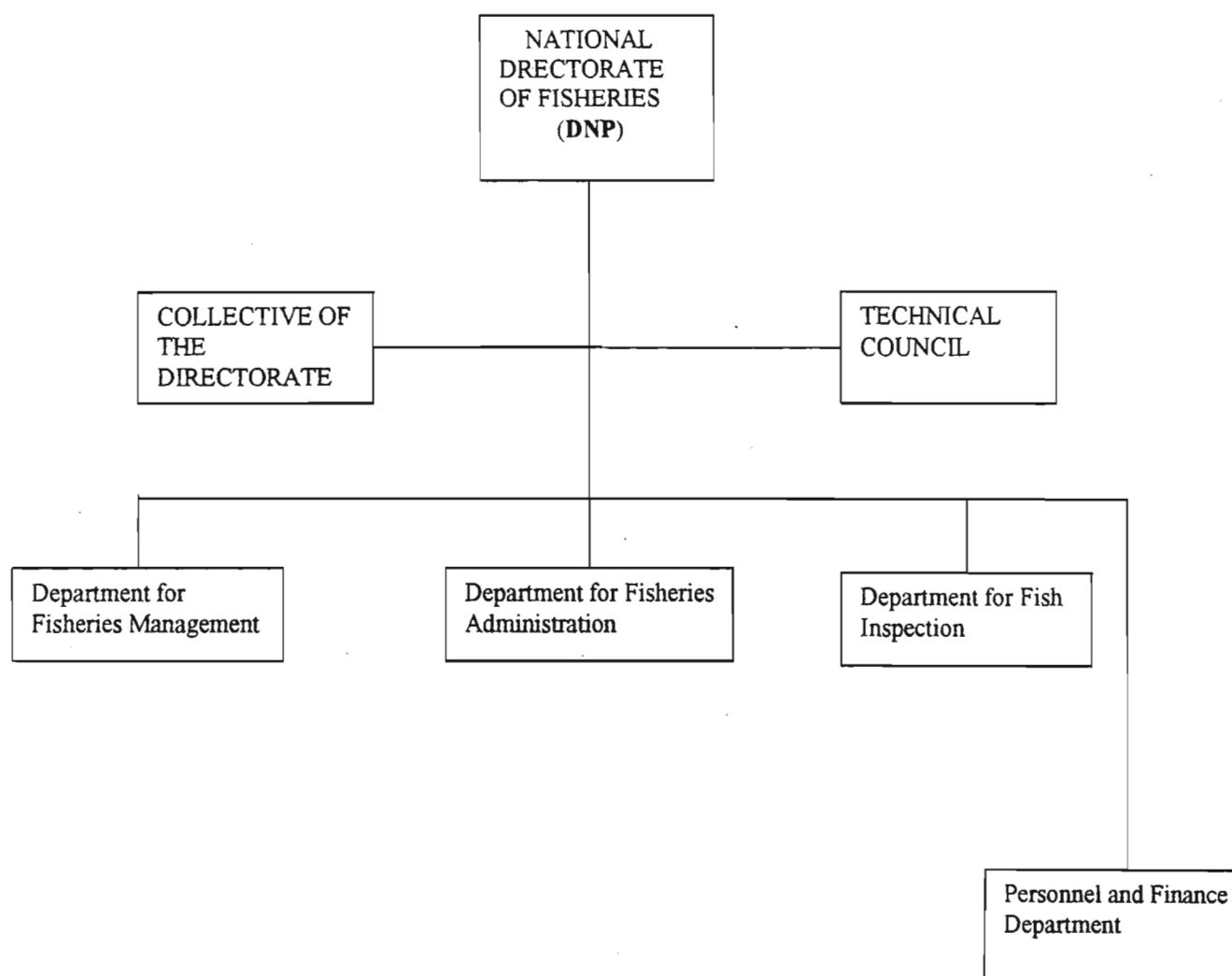


Figure 7.3.1 Organogram for National Directorate of Fisheries, Ministry of Agriculture and Fisheries.

Source: Direccao Nacional de Pescas

## Human Resources

According to the annual Report (IDPPE, 1998), up to 1998, the IDPPE had a total number of 173 workers, from which 140 were national permanent staff, 29 temporary staff, and 4 were foreigners. The staff component is presented in Table 7.3.

Table 7.3 Personnel of IDPPE

| DESIGNATION  | Head-Quarters |      | Delegations |       | Stations |      | Total |      |
|--|---------------|------|-------------|-------|----------|------|-------|------|
|  | 1997          | 1998 | 1997        | 1998  | 1997     | 1998 | 1997  | 1998 |
| <b>Nationals</b><br>Director/Del. of the Station<br>Technicians/Extensionists<br>Technical Assistants<br>Temporary Workers | 14715         | -    | -           | 47128 | 80812    | 207  | -     | -    |
| SUB- TOTAL (1)   | 63            | 57   | 90          | 103   | 28       | 9    | 181   | 169  |
| <b>Foreigners</b><br>Technicians<br>Cooperation<br>Volunteers  | 4             | 4    | 4           | -     | -        | -    | 8     | 4    |
| SUB - TOTAL (2)  | 4             | 4    | 4           | 0     | 0        | 0    | 8     | 4    |
| TOTAL (1) + (2)  | 67            | 61   | 94          | 103   | 28       | 9    | 189   | 173  |

Source: IDPPE, 1998.

When talking to Gopole (pers. comm. 1999), working with the Department of Fisheries in Lichinga, Niassa (Administration Sector), he mentioned that the department had seven members, in the province. These include, the head of the Department, a representative for Inspection Sector (a Veterinary Surgeon) and two Fish Inspectors, a representative of the administration sector, a servant and one guard (Figure 7.3.2).

**PROVINCIAL SERVICES FOR AGRICULTURE AND FISHERIES - DPAP, NIASSA**

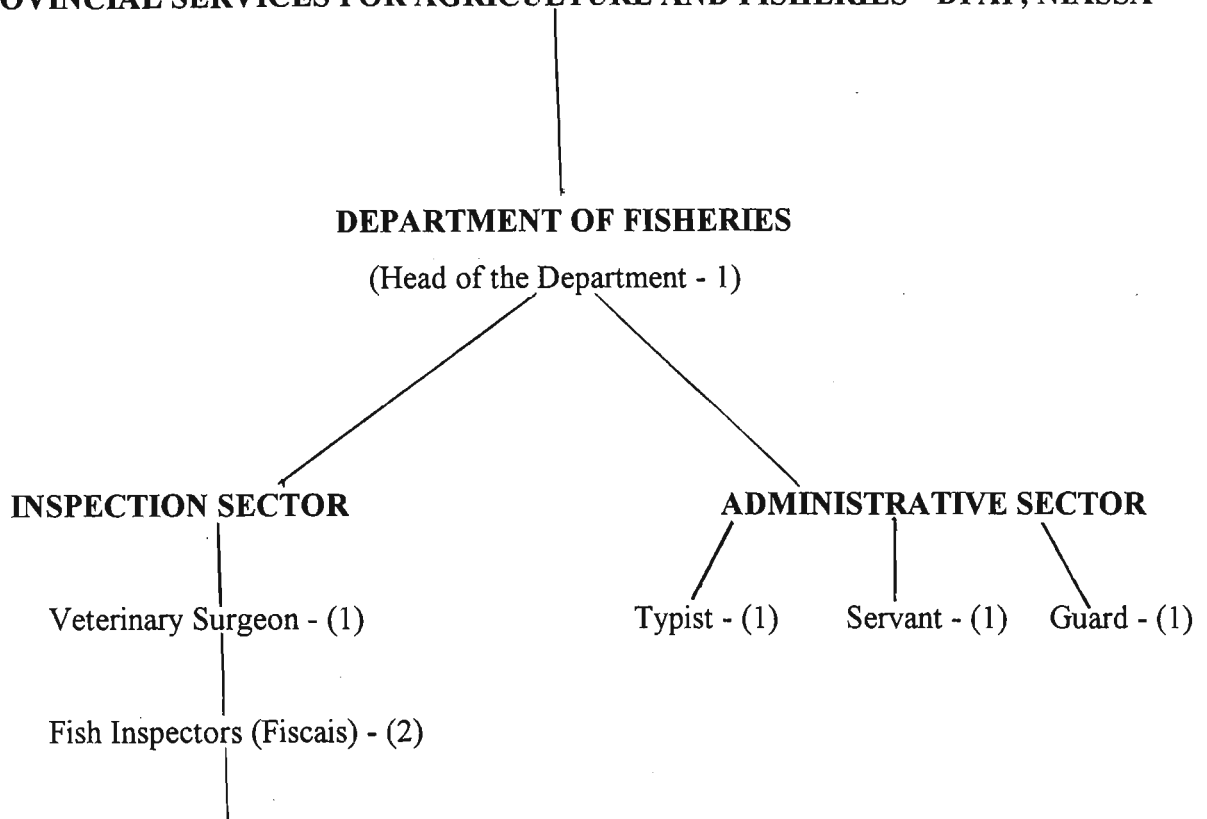


Figure 7.3.2 Staff of the Department of Fisheries, Provincial service for Administration of fisheries in Niassa.

However, among the staff no one has undergone training in fisheries management. There is only one staff member who is holding a degree in Veterinary Science who works in the Inspection Sector. The Department of Fisheries has no staff representatives at the district level.

From this, one can say that there is no clear understanding of the connection that should exist between the District Directorate of Agriculture and Fisheries, (in this case Unango District), and the Department of Fisheries at provincial level. This can also lead one to conclude that the co-ordination between the Department of Fisheries and the District Directorate of Agriculture and Fisheries is also not clear.

Talking to the Director Directorate of Agriculture and Fisheries in Unango district, he mentioned that the Directorate of Agriculture and Fisheries, had promoted the creation of seven fisheries associations in the villages, Table 7.3.2, to represent and co-ordinate fisheries activities at the village level. He further mentioned that, four years have passed since the associations were created, but because of lack of funds these have not made much progress (Rachide, pers. comm. 1999). Since these

meetings, it is doubtful that these still exist.

Table 7.3.2 Village Fisheries Associations, Sanga District

| Name of the village: | Number of Associations: |
|----------------------|-------------------------|
| Maombika             | 2                       |
| Nova Madeira         | 2                       |
| II-Congress          | 2                       |
| Matchedje            | 1                       |

Source: (Mr Abdallah Rachid, pers. comm. 1999).

### Infrastructure, transport and logistics

Mr Robert, who is the head of the Department of Fisheries-Lichinga, mentioned that the Department lacked statistical information and did not know exactly what is happening in most of the rivers and lakes where fishing takes place, particularly in the northern part of the Province. He stated that, since the department lacks transport and infrastructure in these areas, it becomes difficult to travel. He further mentioned that the department has logistic problems and couldn't even buy writing paper for the office (Robert, pers. comm. 1999).

The available funds to support the development of activities in 1998 were from two different sources: The government budget (current and investment) and from external funds obtained through the International Cooperation, (IDPPE, 1998). According to IDPPE, the availability of funds from the current government budget was 518.7 million Meticais (circular No. 2/RF-DAF/98 e da nota No. 466/97/SEO-DAF/98) for the year 1998 and these were allocated to three different levels, such as:

- Expenses for the personnel.....282.7
- Expenses for Goods and Services.....194
- Other expenses.....48

However, a total expenditure of 600.8 million of Meticais was incurred, corresponding to 16% deficit of the total amount of money that was provided. The expenditure breakdown is shown in Table 7.3.3, below.



Table 7.3.3 - Government budget and total expenditure, 1998 (million of Meticaís):

| EXPENSES                      | Approved Amount | Real Expenditure | Balance | Percentage |
|-------------------------------|-----------------|------------------|---------|------------|
| Personnel                     | 282.7 + 20 ??   | 402.5            | 0       | 142*       |
| Other expenses with personnel | 42              | 42               | 0       | 100        |
| Goods and Services            | 194             | 156.3            | 40.7    | 81         |
| TOTAL                         | 538.7           | 600.8            | 15.3    | 242        |

\*The 13th salary not included, however this was paid in January, 1999.

Source: IDPPE, 1998.

### Investment budget

The proposal for the investment budget for 1998 was 10,259 million Meticaís, Only 7,743.4 million corresponding to 76% of the proposed budget was approved. From this amount, 2,087.4 million (27%) was from the government budget and this was allocated to the Project of Artisanal Fisheries in Nampula Province -PPAN, (PES/96/011) and 5,656 million (about 73%) through income from the Fisheries Promotion Fund (FFP) and allocated according to the Projects for Institutional Development (PES/96/020) and Management of Fisheries Resources with the participation of fishing communities (PES/96/010), (IDPPE, 1998).

According to IDPPE (1998), of the total amount (3,450 million of Meticaís) provided by FFP for investment, and 2,729.2 million was spent, as shown in Table 7.3.4, as follows:

Table 7.3.4 FFP (Fundo de Fomento Pesqueiro) and total expenditure, 1998 (Million of Meticaís):

| RUBRIC                           | Provided Budget | Expenses | Balance | Percentage |
|----------------------------------|-----------------|----------|---------|------------|
| Salaries and Wages               | 1591.4          | 1591.4   | 0       | 100        |
| Other expenses for the personnel | 125.5           | 96.1     | 29.4    | 76.6       |
| Goods                            | 246             | 245.7    | 0.9     | 99.9       |
| Services                         | 1486.5          | 796      | 690.6   | 53.5       |
| Total                            | 3450            | 2729.2   | 720.9   |            |

(1) From the money that was presented in the Table above, are 10%.

Source: IDPPE, (1998).

However, the real expenditure in 1998, is of 3,520,646 US\$, as shown in Table 7.3.5 below:

| Entity               | Location         | Period    | Total Budget | Real Expenditure 1998 |
|----------------------|------------------|-----------|--------------|-----------------------|
| Cooperacao Irlandesa | Inhassoro/Niassa | 1997-98   | 221,000      | 112,179               |
| Project SUD          | Inhaca           | 1998      | 60,615       | 60,615                |
| IFAD                 | Angoche/Moma     | 1994-2002 | 6,020,000    | 1,734,705             |
| OPEC                 | Angoche/Moma     | 1995-1999 | 2,000,000    | 1,527,089             |
| Cooperacao Espanhola | Palma            | 1998-1999 | 487,500      | 82,692.3              |
| Cooperacao Francesa  | Inhambane        | 1998-2000 | 829,500      | 1,338                 |
| Total                |                  |           | 9,618,615    | 3,520,646             |

Source: IDPPE, 1998.

## Conclusion

When considering the prospects for introducing CBNRM to the fishery the following conclusions can be drawn:

- the community is ready for change. They are concerned about the state of the resource and its use. They indicate a willingness to embrace CBNRM;
- whilst government has good intentions and has adopted appropriate policies, it is not well prepared for introducing CBNRM. There are organisational and legislation weaknesses, and there is a lack of well trained and adequately resourced staff.

## CHAPTER 8

### DISCUSSION

#### 8.1 Introduction

Community Based Natural Resource Management has three core components: one or more resources, a defined community; and management including structure and process (Figure 8.1). The fishery in the study area has changed from a common property resource use system to one of open access. In this Chapter consideration is given to the implications for the introduction of CBNRM for the resource (fish), the community, management and transformation.

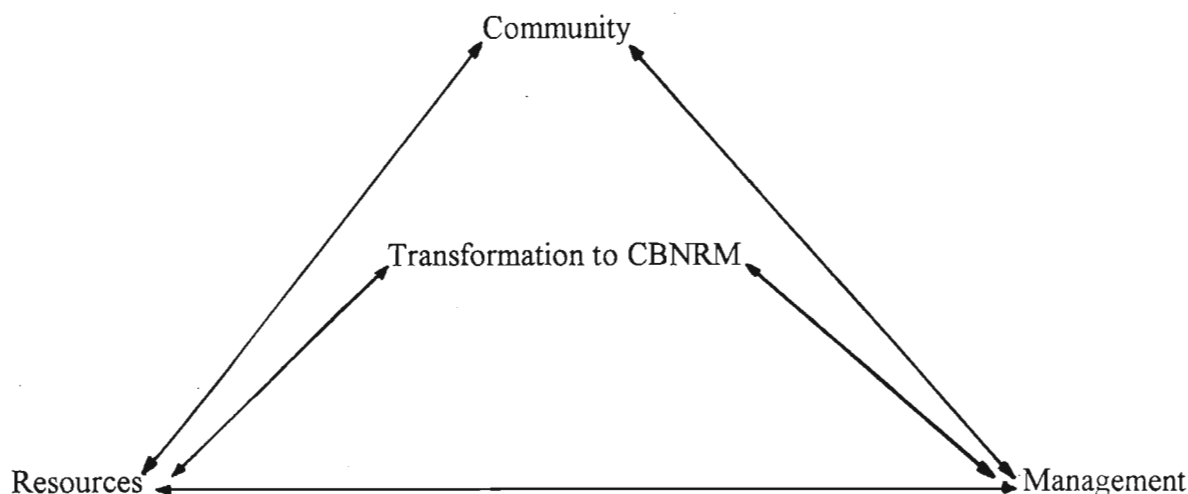


Figure 8.1 The core components of CBNRM.

#### 8.2 Community

Isar (1998) considering the relationship between culture, cultural conservation and development observed:

‘Today, the global organisation does not dream of building the local from the global. It must be the other way around, and we must build the global from the local. Together we have to find the local solutions that will then build upwards and across, through networks, governments and international organisations, into global solutions. Or, to put it somewhat differently, in today’s interconnected

world order, the same principles and forums that make sense at the smallest scale; equity, transparency, responsibility, practicality; also work at the largest scale. If there is to be a forum for global governance and for all overarching intelligence to guide the world through the challenges of the 21<sup>st</sup> century, it will surely embody these principles rather than looking like a national government at large.’

A local solution to what appears to be unsustainable patterns of resource use requires a sense of local identity, of belonging, in essence a sense of community. Matowanyika (1998) noted that:

‘Recreating new landscapes that are in harmony with the real cultural and natural heritage and realities of the region, is, therefore, a major challenge. It requires a clear understanding of the issues and especially the social institutions.’

The persistence of social interactions is a prerequisite for a sense of community, for it is these which bind the norms and values of people which, in turn, bond members of the community.

The term landscape implies a physical scale; so too does community, particularly when used in a rural context because ‘land is the motif through which a community’s heritage is passed from one generation to the next’ (Maluleke, 1998). The rivers of the study area are dominant features of the landscape and provide an important part of the physical template on which rural communities are organised. It is the rivers and the resources they sustain (particularly fish) which drew people to a common geographical focus. The ‘catchment’ from which these people are drawn is complex. Perhaps in the pre-colonial era, before the political boundaries of Tanzania and Mozambique were drawn, the resource users from north and south of the Rovuma river were one despite the inexactness of border identities (Bunn and Auslander, 1998). Since then there appear to have been periods of separation, consequent upon colonisation, ‘unification’ when people sought safety in Tanzania; only to be followed by separation as people moved back to Mozambique.

The landscape has changed. The growing economy in Tanzania has provided a market for fish so that people are drawn in increasing numbers towards the resource. This has blurred the physical boundaries which defined the community of users. In so doing, it has contributed ‘development’ which is ‘divorced from its human or cultural context’ (Isar, 1998), and thereby has been a driving force weakening culture and a sense of community.

Intentional weakening of traditional authority and separation of people from resources through state acquisition of tenure (Murombedzi, 1990; Gaborone, 1998) have been important determinants of attitude and behaviour and the erosion of culture worldwide (Bishop, 1998; Gaborone, 1998; Isar, 1998 and Vaalbooi, 1998). This has also happened in the study area to the extent that there is declining evidence of cultural cohesion.

It is clear that, at the present time, it would be difficult to define 'the community' in geographical or cultural terms. Neither the physical nor the 'social' territories (Matowanyika 1998) are evident. It is difficult to imagine how CBNRM can be introduced until the 'community of users' can be defined. This will be a major challenge given that the resource occurs at the interface between two sovereign states, and there is a precedent of use which has been based on the premise that people can cross borders and harvest resources as if they were the property of both states.

The definition of 'community' will be an important local step on which the broader scale picture of sustainable resource use within the region can be built.

### **8.3 Resources**

It is tempting to conceptualise the resource under consideration to be fish. This is too narrow. There cannot be fish without water so the availability of water in time and space e.g. the distribution of water in the landscape, cannot be separated from the distribution of fish. This, in turn, determines the direction of fishing effort in time and space; so land from which to access the water and then the fish, and on which to establish fishing and processing camps becomes an integral part of the necessary resource base. So too do materials required for construction of camps, for processing (smoking), and for building boats/canoes.

The success or failure of the fishery is, therefore, contingent upon the sustainable supply of a complex of resources. Some of these, particularly land and vegetation growing thereon, are easily defined in space because of their 'fixed' nature. Others such as water and fish which vary extensively in space and time, are not.

One can envisage CBNRM returning tenurial rights over land and vegetation. The state assumed ownership of all land and resources thereon both during the colonial period and during the period

of socialist rule after independence. The return of the land to the people in the study area could bring and/or reinstate control over access to water, and thus to fish, and other resources required to capture fish and process them so that they can be transported to distant markets. If indeed people from further afield in Mozambique and Tanzania have established rights of use through precedents, then servitude of some kind might have to be considered. There is some indication in the responses of those interviewed that historically there may have been arrangements which allowed access by people who were from 'outside the community.' It was recorded that such people would seek permission from the Mwenye (Chapter 7).

The scarcity of water in southern Africa is such that river flow is increasingly regulated, and flow is progressively decreased (Davies and Day, 1998). The urgency for achieving efficient, equitable and sustainable use of water has resulted in water being regarded as an asset of the state. In some countries legislation removes private ownership of water and replaces it with rights of use (South African Water Act no. 36 of 1998). It is probable that tenurial rights over land and water will be quite different.

In 1998 South Africa introduced legislation governing the use of marine living resources (Marine Living Resource Act no. 18 of 1999). Although the title of the Act refers to marine living resources, it also considers the situation in estuaries. This Act designates these living organisms as the property of the state and the state will regulate access and harvest. Although it is not quite so explicit in legislation in Mozambican government it is evident that the intention of the Mozambican government is to retain ownership of marine living resources and probably also fresh water living resources (Regulamento da Pesca Maritima, Decreto 16/96 de 28 de Maio). The present system of licensing and inspection (Namanha, 1999, Chapter 5) indicates that, notwithstanding intentions to promote CBNRM the state will retain ownership of these resources. The community may be delegated for managing access and offtake.

This study shows that the resource situation is complex. It is probable that tenurial rights will be different for different resources. Some of the resources e.g. water are nationally scarce and resource allocation will increasingly be under the influence of national priorities; allocation of others will be more under the influence of local priorities. But, since fish are intricately linked to the supply of fresh water, management of use will have to consider the bigger picture of water availability. Local solutions will have to be integrated into much larger national scale solutions.

When it comes to the use of fish the 'social landscape' (Matowanyika, 1998) extends far beyond the local. This must inevitably impact on the definition and culture of communities with whom the government intends to engage CBNRM.

#### **8.4 Management**

Management requires an organisational structure and a process. The complex nature of the community and resource use system indicates that achieving effective community-based management is critically dependent upon support at various levels of government. Reinstating some form of local management structures, and the sense of ownership which comes with regaining authority over access to and use of resources, is not likely to be sufficient. Two factors are important.

Firstly, the 'social landscape' has to be defined. This relates particularly to participation of Tanzanians in the fishery in the future. National considerations are principal determinants of such decisions and it is obvious, therefore, that whilst local considerations are important they are likely to be secondary to the greater national considerations. Nevertheless, the organisational structure must permit management of international relations at both national and local scales. The present organisational structure shows a number of weaknesses in this regard. At the local level the committees are constituted jointly by the Mozambique government and local (Mozambique) citizens. There is no provision for formal interaction with resource users from Tanzania; There also seems to be weakness in the organisational structure of the department of fisheries, particularly at local level, where roles and responsibilities in respect of CBNRM are not clear. Given the complex nature of both the 'community' and the resources it is evident that organisation will have to be strengthened at the local level. Close collaboration between departments will be necessary if a consistent philosophy and approach are to be expounded and if confusion is to be minimised.

Secondly, the complexity of managing a fishery of this nature to achieve sustainable use should not be underestimated. This is especially so when it has to be transformed from what appears to be a situation of open access and overutilisation, to one where access is regulated and, in all probability, harvests (and therefore returns) are decreased. Since it is the intention of government to introduce CBNRM, government is the 'change agent.' Maughan-Brown (1998) and Namanha

(1999) have drawn attention to the importance of government being properly prepared for intervention.

The findings of Namanha (1999) who researched a fishery in Tete province, are confirmed in this study (Chapter 5). Government has developed appropriate policy to facilitate introduction of CBNRM and mechanisms for coordination are in place at higher levels of government. But deficiencies exist in respect of fisheries policy, the legal basis to support CBNRM and in the capacity to implement the process.

Due to the generally poor consideration given to inland fisheries in sectoral policies, the effectiveness and implementation of policies is weak. Sectoral policies contain little mention of inland fisheries and are uncoordinated in their coverage of international issues (e.g. trans-frontier policies). Regional initiatives on fisheries management, including the action plans and international agreements addressing fisheries issues, are focussed more on assessment and planning than on the ground implementation.

At national level, the sustainable use and management of river fisheries in the country is undoubtedly constrained by policy weaknesses and omissions which together fail to present adequate incentives for conservation of the resource. These include:

- weak integration of fisheries policy and legislation at national and international levels;
- multiple, uncoordinated and fragmented institutions, legislation and policies touching on inland fisheries issues
- unclear policies in respect of private and community access and rights to inland;
- poor and weakly enforced controls, and low penalties for activities contributing to inland fisheries degradation (e.g. fish poisoning).

This study and that of Namanha (1999) have shown that government does not currently have the capacity (members and expertise) that will be required to introduce CBNRM in river fisheries.

It is constructive to draw a comparison of the situation in Mozambique with that in Zimbabwe and Namibia. The CAMPFIRE programme which started in Zimbabwe in 1986 was established to enable local people to manage wildlife present in communal areas, and to retain benefits from the use (consumptive and non-consumptive) such as wildlife. According to Katerere (1997), 'the legal



basis of resources supporting the objective of CAMPFIRE is the delegation of appropriate authority for the management of wildlife resources (which are under State ownership) to district councils, as provided under the 1982 amendment to the Parks and Wildlife Act (1975). The CAMPFIRE programmes also provide financial and technical support towards the development of formalized management capacity within the participating communities, and operate under clear principles of revenue distribution’.

He also, highlights two key problems with the CAMPFIRE programme:

- it is based on policy not law. The designation of appropriate authority status to district councils is purely at the discretion of the Minister of Environment and Tourism, and the further devolution of responsibility to ward and village-based wildlife management committees is at the discretion of the district councils.
- the second problem relates to the institutional unit of production (the community). Tenure insecurity and politically fragile applications of the appropriate authority mechanism marginalizes communities in the management of their wildlife resources.

In contrast, Namibia has recently passed the Nature Conservation Amendment Act (1996) which provides communal residents with direct rights over their wildlife resources, following the registration of a community conservancy. Registration of a conservancy requires the community in question to form a ‘committee’ to manage funds, and to have a ‘constitution’ stating the objectives of the conservancy and defining its boundary. Namibia’s new law provides for the sustainable management and utilisation of game in communal areas and for members of the community to derive direct benefits from such use and management.

The act has given local communities important legal status (Katerere, 1997). In this way Namibia’s conservancy programme addresses some of the shortcomings of current CBNRM initiatives in southern Africa. In Namibia communities have moved from being mere ‘gate keepers’ to becoming ‘true resource managers’ participating in planning and decision making. They have genuine ‘rights’ over their natural resources and ‘control’ how the resources are to be managed.

For the government of Mozambique to overcome the problems of open access towards fisheries resources experienced in the study area and move to a desired management state (e.g. common property resource), they must be prepared to have well-defined rights regimes in place. However,

the endogenous (within the community) movement from open access to a desired state of CBNRM is not enough to reverse the trend to open access on the Rovuma river systems, because two countries and different, heterogeneous groups of people are involved. Therefore, trans-frontier coordinated management strategies involving the governments of Tanzania and Mozambique will be required. Although current policies that direct towards co-management of fisheries in Mozambique, along the lines of CBNRM programmes, are a necessary prerequisite so too is the institutional framework accompanying the property rights structures the two countries.

### **8.5 Transformation**

The transformation of the fishery from a common property system to one of open access has occurred gradually over many years. This research has shown that the fishery has increasingly become an economic activity, as market demands in Tanzania create opportunities to engage a cash economy. People's expectations of what the fishery can provide have grown; and so too has their dependency on it for meeting household requirements. There is also evidence that the fishery, as it is currently practiced, cannot sustain the levels of harvest. A reduction of off take is indicated. This will be associated with a decline in disposable income amongst a people who are desperately poor and who urgently require development opportunities. It is possible that introduction of CBNRM to the fishery will worsen the situation, unless it is accompanied by new economic opportunities. If the fishery is to be brought back to sustainability it will have to be viewed as one element of a development process directed at achieving a sustainable diversified economy.

What are the relationships between CBNRM and development? The differences are fundamental. CBNRM, as the name implies, addresses the management of one or more resources by a recognisable group of people. Management, in this context, can be defined as 'directing the use of' one or more resources. Development, on the other hand, can be defined as 'realising the potential', the latent potential, within the system (Geddie, 1996). Whilst CBNRM has had its origins in endeavours to enable communities to realize the potential wealth of wildlife resources, in the case of the fishery this is already being done. What is required is better management of the use of the resource. CBNRM is, consequently, an appropriate approach; the intention being to alter the 'pattern of use' from one in which each individual makes decisions without concern for the implications for other users or the state of the resource, to one in which decisions are made on

the grounds of equity, efficiency and sustainability.

The introduction of CBNRM in the fishery will, however, not necessarily contribute to development; it may have quite the opposite consequence. Should this occur, or be sensed by local people to be a likely consequence of CBNRM, one can appreciate the likelihood of resistance to change. The implications are obvious. What is urgently required is a development strategy which leads to the realisation of new potential; preferably potential which is substantially greater than the likely reduction in potential consequent upon bringing the fishery to levels of sustainable use. Failure to successfully address development could easily result in CBNRM losing credibility, with undesirable consequences.

Much of Africa's rural population desperately need development which leads to a sustainable improvement in their quality of life. CBNRM is a sub-set of development; it cannot replace development. It has more to do with a way of doing things (management) than it has to do with realising potential (development). CBNRM should not be confused with development. Failure to recognise and acknowledge the differences leads to attempts to introduce management processes without giving due attention to the greater goal of development. Fisheries appear to be inherently different from 'wildlife', in that, by large, communities have retained access to them. Their use of the resource has reflected the changing economy. By contrast people have been marginalised from wildlife and by large their use of this resource has not reflected changes in the economy. Thus, whilst introducing CBNRM for wildlife may introduce development, this is less so in fisheries.

This research focussed on the network between the wish of the government to introduce CBNRM and the existing operation of a fishery. The findings indicate that in addition to a number of problems reflecting the complexity of the fishery and the preparedness of government to act as the agent for change, there is insufficient appreciation of the differences between introducing a new management style and promotion of development. The latter will prove the more daunting challenge.

## *CHAPTER 9*

### CONCLUSION AND RECOMMENDATION

#### Conclusion

##### Historical common property systems

The findings of this study indicate that the fishery used to operate under a common property regime.

This is based on evidence that:

- there was a strong sense of community;
- there were customary rules, ritual practices and restrictions placed on resource use
- traditional authorities were acknowledged and respected;
- beliefs, attitudes and behaviour patterns were strongly influenced by the sense of community, superstitions and traditional authority.

##### Current open access systems

This study shows that the fishery presently operates as an open access system. This conclusion is based on evidence that:

- traditional leaders have been progressively stripped of their authority and influence (including those based on superstitions and rituals);
- government has had neither the resources nor the capacity to effect control;
- there is little or no control over access, harvesting levels and technology;
- there is no sense of a 'community of users';
- there is growing conflict amongst users. This is based on origins of artisans and technology.

##### Forces directing change

The research identifies a number of forces which have directed change. They originated at least as far back as the period of colonisation, and they have been reinforced during the period since independence by government policies and civil strife. Identified forces include:

- government intervention weakening traditional authority;
- government intervention promoting christianity (pre-colonial era) in place of lim;

- new values, beliefs and attitudes, gained through greater and more prolonged mixing of people from different communities, which have led people to either overtly (e.g. 'New' chiefs) challenge traditional authority or covertly ignore customary rules and beliefs; and
- growing markets which drive exploitation of fish resources.

### Satisfaction with the present situation

The findings of the study indicate key informants, artisans and government are concerned about the present situation. These concerns are articulated around:

- the declining resource base (unsustainable use);
- the adoption of inappropriate technologies;
- the lack of protection of nursery areas;
- the declining respect;
- the lack of control;
- increasing numbers of artisans from Tanzania fishing in Mozambican waters; and
- capacity and resources to introduce CBNRM.

There is consensus that action should be taken to remedy the situation, with some suggesting a return to community control i.e. the need to re-establish a common property system. Considerable complexity presents the process of redefining the 'community of users' given historical precedence of use by people from Tanzania.

### Prospects

Evidence suggests that the resource base is declining. In the open access system which prevails, one can reasonably anticipate growing competition for increasingly scarce resources. Conflict will increase and likely become more intense.

There are strong memories of the fishery as a common property system and there is growing concern about the present open access system. These are strong foundations on which to promote change, but the system is shown to be very complex. There will be no quick, easy or cheap solutions. A well considered, long term process (not a project) is required to bring about lasting change. A strategic planning process which leads to preparation and implementation of a business plan, should be initiated as soon as possible. The changes which have to be brought about are fundamental relating to the integration of social, economic and environmental sustainability.

## **Recommendation**

There are many recommendations which could be made addressing various issues (e.g. tenure, use, and access) but, these are unlikely to make a difference at the scale required. Major intervention is necessary. For this reason one recommendation is made here.

The single recommendation is that the government should acknowledge the complexity of the situation and should establish a strategic planning process which leads to an implementable plan with achievable objectives directed towards re-establishing:

- a sense of community;
- an institutional structure and capability which sustains the sense of community and promotes management of use of resources; and
- sustainable use of the spectrum of resources used in the fishery.

## REFERENCES

- Amaral, M. G. 1990. *O Povo Yao (The Yao People)*. Centro de Documentacao e Informacao do IICT, Lisbon.
- Anon., 1997. Recolha de Dados nas Localidades de Unango e Macaloge (Data Collection in Unango and Macaloge Localities). In *Perfil Distrital de Seguranca Alimentar e Nutricao (The District Profile for Food Security and Nutrition) in Sanga District, January 1997*. Niassa, Mocambique.
- Anon., 1999. *The Resource tenure toolbox: a stakeholders guide to natural resource tenure in southern Africa: draft 21 June*. Manuscript. Photocopy.
- Bak, N. 1995. The unstainable of 'sustainable development' in a southern African context. *Southern African Journal of Environmental Education*, no. 15.
- Babbie, E. 1995. *The practice of social research*. 6<sup>th</sup> ed. Wadsworth , Belmont. pp. 284 - 310.
- Barker, J. M. 1997. Common property resource theory and the Kuhl irrigation of Himachal Pradesh, India. *Human organization* 58: 199-208.
- Bell, V. 1987. Conservation with a human face: conflict and reconciliation in Africa land use planning. In Anderson, D. And Grove, R. (1987), *Conservation in Africa: People, policies and practice*. Cambridge University Press, Cambridge.
- Berkes, F. 1987. Common property resource management and Cree Indian fisheries in sub-arctic Canada. In McCay B. J. & Acheson J. M. (eds). *The question of the commons: the culture and ecology of communal resources*. University of Arizona Press, Tuscon , Arizona.
- Berry, S. 1989. "Social Institutions and Access to Resources" in *Africa*, Vol. 59, no. 1: 41-55.
- Bishop, K. 1998. The Seventh Fire - indigenous people and cultural reclamation. In *Voices, Values and Identities: Record of the proceedings, 25-27 August 1998, Kruger National Park, South Africa*. pp. 81-88. South African National Parks, Pretoria.

- Breen, C. M.; Mander, M.; A'Bear, D.; Little, T; and Pollett, T. 1992. *Social conceptions of the roles and benefits of National Parks in a changing South Africa*. Paper presented at a workshop entitled "National Parks in a Changing South Africa, Skukuza, 12 November, 1992. "
- Breen, C. Dent, M.C. and Mander, M. 1998. The Pongolo river floodplain and its people. (Occasional Paper 186). Institute of Natural Resources, Pietermaritzburg.
- Bromley, D. W. and Cernea, M. M. 1989. *The management of common property natural resources: some conceptual and operational fallacies*. (Word Bank discussion papers 57). Word Bank, Washington DC.
- Bromley, D. W. 1990. Property rights, externalities and resources degradation. *Journal of development Economics* 33: 235-262.
- Bromley, D. W. 1991. *Environment and Economy: Property Rights and Public Policy*. Basil Blackwell, Oxford.
- Bruce, J, W. And Fortmann, L. 1989. *Agroforestry: Tenure and Incentives*. Land Tenure Center, University of Wisconsin - Madison.
- Bruce, J. 1993. *A Review of Tenure Terminology*: Land Tenure Center, University of Wisconsin-Madison.
- Bunn, D. and Auslander, M. 1998. From Crook's Corner to Thulamela. In *Voices, Values and Identities: Record of the proceedings 25-27 August, 1998, Kruger National Park, South Africa*. pp. 32-40. South African National Parks, Pretoria.
- Cellier, G. 1994. *The development potential and impact of commercial eucalyptus woodlots in selected areas of Kwazulu, South Africa*. PhD thesis. University of Natal, Pietermaritzburg.
- Chamber, R. 1983. *Rural development - putting the last first*. Longman Scientific and Technical, New York.



- Cheater, A. P. 1989. *Social Anthropology: An Alternative Introduction*. London.
- Ciriacy-Wantrup, S. V., and Bishop, Richard C. 1975. Common property as a concept in natural resources policy. *Natural Resources Journal* 15:713-727.
- Cohen, L. and Marion, L. 1994. *Research methods in education*. 4<sup>th</sup> ed. London, Routledge.
- Cousins, B. 1992. A conceptual framework for the analysis of communal grazing regimes. In: Cousins, B. ed. *Institutional dynamics in grazing regimes in Southern Africa: proceedings of a workshop held in Harare, Zimbabwe*, pp. 13-38.
- Dasgupta, P. 1982. *The control of resources*. Blackwell, Oxford.
- Davies, B. and Day, J. 1998. *Vanishing Waters*. UCT, University of Cape Town, South Africa.
- Decreto 16 de 1996 de 28 de Maio, Regulamento da Pesca Maritima (Decree 16 of 28<sup>th</sup> of May 1996, Marine Fisheries Regulation)*. DNP, Ministry of Agriculture and Fisheries.
- de Wit, M. P. 1998. Understanding the Economics of Common Property, In *Proceedings of the Mini-symposium on Common Property Resource Management, 4-5 August 1998, Nylsley Nature Reserve, South Africa*. pp. 21-33. CSIR, Pretoria.
- Dorm-Adzobu, C. 1995. *New roots: institutionalizing environmental management in Africa*. World Resources Institute.
- Emmerson, D. K. 1980. *Rethinking artisanal fisheries development: Western concepts, Asian experiences*. (World Bank Staff Working Paper 423). The World Bank, Washington, D.C.
- FAO, 1998. Report of the First Session of the Advisory Committee on Fisheries Research, Rome, Italy, 25-28 November 1997. *FAO Fish. Rep.* , (571):36.
- Gaborone, S. 1998. Indigenous peoples of Botswana and cultural reclamation. In *Voices, Values and Identities Symposium: Record of the proceedings 25-27 August, 1998, Kruger National Park, South Africa*. pp. 96-103. South African National Parks, Pretoria.

- Geddie, W. 1996. *Chambers's Twentieth Century dictionary*. W. and R. Chambers, Edinburgh.
- Ghimire, M. P. 1993. *Does the distribution of authority affect the forest quality?: a comparative study of public, community and public forests in Nepal*. PhD thesis. University of California, Berkeley.
- Goodland, R. 1995. *The Big Dam Controversy: Killing Hydro Promotes Coal (and) Nukes: is that better for environmental sustainability?* Washington, D. C.: World Bank.
- Hamilton, E. 1992. *Adult education for community development*. Greenwood, Westport.
- Hanna, S. and Munashinghe, M. eds. 1995. *Property rights and the environment. Social and ecological issues*. Washington, D.C.: The Beijer International Institute of Ecological Economics and The World Bank.
- Hara, M. 1996. *Problems of introducing community-based participation in fisheries management: Lessons from the Lake Malombe and Upper Shire River (Malawi) participatory fisheries management programme*. Unpublished report. Fisheries Department, Lilongwe.
- Hardin, G. 1968. The tragedy of the commons. *Science* 162: 1243-48.
- Hawtin, M., Hughes, G. and Percy-Smith, J. 1994. *Community profiling - auditing social needs*. Open University Press, Philadelphia.
- Hulme, D. and Murphree, M. [n.d.]. *Community conservation and beyond: from criminals to communities to citizens*. Unpublished paper. Centre for Applied Sciences, University of Zimbabwe, Zimbabwe.
- IDPPE, 1998. *Relatorio Anual do IDPPE (IDPPE, Annual Report)*. Maputo, Mocambique. Unpublished report.
- IDPPE, 1999a. *Draft do relatorio final do IDPPE (IDPPE, Report Draft)*. Maputo, Mocambique. Unpublished report.

- IDPPE, 1999b. *Sintese do Seminario Nacional Sobre a Co-gestao das Pescarias Artesanais em Mocambique (Synthesis for the National Seminar Co-management of Artisanal Fisheries)*. Maputo, Mocambique. Unpublished report.
- IFAD, 1995. *Common property resources and the rural poor in sub-Saharan Africa*. Special Programme for Sub-Saharan African Countries Affected by Drought and Desertification. IFAD.
- IIED, 1994. *Whose Eden? An Overview of Community Approaches to Wildlife Management*. A Report of the Overseas Development Administration of the British Government. International Institute of Environmenta and Development, London.
- Infield, M. Mm 1986. *Wildlife Resources, Utilization and Attitude Towards Conservation: A Case Study Hluluwe and Umfolozi Game Reserves in Natal/Kwazulu*. M. Sc Thesis. University of Natal, Pietermaritzburg.
- Isar, R. 1998. The relationship between culture, cultural conservation and development. In *Voices, Values and Identities Symposium: Record of the proceedings, 25-27 August, 1998, Kruger National Park, South Africa*. pp. 9-15. South African National Parks, Pretoria.
- IUCN (in prep) *A resource use assessment of northern Sanga District, Niassa, Mozambique*. IUCN Maputo, Mozambique.
- Jones, B. T. B. 1997. *Parks and Resident People: Linking Namibian Protected Areas with Local Communities*. Ministry of Environment and Tourism, Windoek, Namibia.
- Katerere, Y. 1997. Partnership, profit and power. In *Africa Resources Trust* at: [http://www.art.org.uk/newslettter/ra\\_1997\\_01\\_profits.html](http://www.art.org.uk/newslettter/ra_1997_01_profits.html).
- King, L. A. 1993. *Zimbabwe's CAMPFIRE: A Sustainable Rural Development Strategy*. Presented at the Annual General Meeting of the African Studies Association, Boston. Centre for Applied Sciences, University of Zimbabwe, Zimbabwe.
- Kiss, A. 1990. *Living with Wildlife: Wildlife Resource Management with Local Participation*

*in Africa*. World Bank, Washington, D. C.

- Kitwood, T. M. 1977. "*Values in Adolescent Life: Towards a Critical description*", unpublished PhD dissertation. School of Research in Education, University of Bradford.
- Klemeyer, C.D. 1994. Cultural traditions and community-based conservation. In: Western, D., Wright, R.M., and Strum, S.C. eds. *Natural connections: perspectives in community-based conservation*. pp. 323-347. Island, Washington, D.C.
- Kothari, A. 1997. *Conserving India's Ago-biodiversity: Prospects and Policy Implications*. International Institute for Environment and Development, Sustainable Agriculture Programme, 1997, no. 65.
- Kotze, D. A. and Swanepoel, H. J. 1983. *Guidelines for practical community development*. Promedia, Pretoria.
- Kumar, K. 1989. *Conducting Key Informants Interviews in Developing Countries*. Washington, D. C. Agency for International Development.
- Kumchedwa, K. 1998. *Artisanal fishing in socio-economic development of rural communities in Malawi: a case study of Enclave Villages of Lake Malawi National Park*. MEnvDev thesis. University of Natal, Pietermaritzburg. School of Environment and Development.
- Lawry, S. W. 1989. Tenure Policy Towards Common Property Natural Resources in Sub-Saharan Africa. *Natural Resources Journal* 30: 403-422.
- Le Quesne, T. 1996. *Common property theory and community-based wildlife programmes*. At <http://www.ru.ac.za/natleq.html> >
- Lei das Pescas (Fisheries Law)* 1990 [Lei 3/90 de 26 de Setembro]. DNP, Ministerio de Agricultura e Pescas. Mocambique.
- Lei de Florestas e Fauna Bravia (Forestry and Wildlife Law)* 1990. DNFFB, Ministerio de Agricultura e Pescas. Mocambique.

- Little, A. M. 1994. Capacity Building in Environmental Economics. Assessment of Existing Capacity and Needs, Development Project Report, Vol. 1-A. INR, University of Natal, Pietermaritzburg.
- Lynch, O. J., and Alcorn, J. B. 1994. Tenurial rights and community-based conservation. In Western, D., Wright, R. M., and Strum, S. C. eds. *Natural connections: perspectives in community-based conservation*. pp. 373-392. Island Press, Washington, D.C.
- Madzudzu, E. 1996. A general overview of CAMPFIRE: success and constraints. In: Crichley, W. and Turner, S. eds. *Successful natural resource management in southern Africa*. pp. 155-164. Gamsberg Macmillan, Windhoek.
- Maluleke, L. M. 1998. The Makuleke community : community voice, values and identities. In: *Voices, Values and Identities Symposium: Record of the proceedings, 25-27 August, 1998, Kruger National Park, South Africa*. pp. 51-54. South African National Parks, Pretoria.
- Marine Living Resources Act 18 of 1999*. In: Henderson, P. G. W. 1996. Environmental Laws of South Africa, Vol. 1.
- Marks, A. 1984. *The Imperial Lion: human dimensions of wildlife management in central Africa*. pp. 1-10. Westview, Colorado.
- Matowanyika, J. 1998. Community cultural development: African perspectives. In: *Voices, Values and Identities Symposium: Record of the proceedings 25-27 August, 1998, Kruger National Park, South Africa*. pp. 92-92. South African National Parks, Pretoria.
- Maughan-Brown, A. 1998. *Revisiting Community-Based Natural Resource Management: a case study of the Tchuma Tchato Project in Tete Province, Mozambique*. MEnvDev thesis. School of Environment and development, University of Natal, Pietermaritzburg, South Africa.
- Metcalf, S. 1994. The Zimbabwe communal areas management programme for indigenous resources. In: Western, D., Wright, R.M., and Strum, S.C. eds. *Natural connections: Perspectives in community-based conservation*. pp. 161-192. Island Press, Washington,

D.C.

- McKean, M. A. 1986. Management of Traditional Common Lands (Iriaichi) in Japan. In *Proceedings of the Conference on Common Property Resource Management*. pp.533-589. National Research Council.
- Murombedzi, J. 1990. *The need for appropriate local level common property resource management institutions in communal tenure regimes*. Centre for Applied Social Sciences, University of Zimbabwe, Harare.
- Murphree, M. W. 1990. *Research on the Institutional Contexts of Wildlife Utilization in Communal Areas of Eastern and Southern Africa*. University of Zimbabwe, Centre for Applied Social Sciences, Occasional Paper Series. NRM, University of Zimbabwe, Harare.
- Murphree, M. W. 1993. Communities as Resource Management Institutions, Gatekeeper Series no. 36, Sustainable Programme of the International Institute for environment and Development. London.
- Murphree, M. W. 1994. Decentralizing the Proprietorship of Wildlife Resources in Zimbabwe's Communal Lands. In *Voices from Africa: Local Perspectives on Conservation*. Zimbabwe.
- Namanha, L. 1999. *Artisanal Fishing and Community Based Natural Resource Management: A case study of Chuma Thcatto Project in Mozambique*. M.EnvDev Thesis. School of Environment and development, University of Natal, Pietermaritzburg, South Africa.
- Netting, R. McC. 1981. *Balancing on an Alp: ecological change and continuity in a Swiss Mountain Community*. Cambridge University Press, Cambridge.
- Neuman, W. 1994. *Social research methods: qualitative and quantitative approaches*. Alyn and Bacon, Boston.
- Nichols, P. 1991. *Social survey methods: a field guide for development works*. Oxfam, Oxford.
- Nkhata, D. & Kalumiana, O. S. 1997. *Energy needs and shortfall assessment of the Barotse Flood Plain of the Western Province*. IUCN Regional Office for Southern Africa.

- O'Donoghue, R. B. 1993. Clarifying environmental education: a search for clear action in southern Africa. *Southern African Journal of Environmental Education*, vol 13.
- Ostrom, E. 1987. Institutional Arrangements for Resolving the Commons Dilemma: Some Contending Approaches. *In the Question of the Commons: The Culture and Ecology of Communal Resources*, eds. B. J. McCay and J. M. Acheson, pp. 250-65: University of Arizona Press.
- Ostrom, E. 1990. *Governing the Commons: The Evolution of Institutions for Collective Action*. Cambridge University Press, Cambridge.
- Panos. 1997. *People and parks: wildlife conservation and communities*. Panos Media Briefing 25.
- Pearce, D.; Whittington, D.; Georgiou, S. and James, D. 1994. *Project and Policy Appraisal: Integrated Economics and the Environment*. OECD, Paris.
- Peluso, N. L. 1993. *The Impact of Social and Environmental Change on Forest Management. A Case Study from West Kalimantan, Indonesia*. Community Forestry Case Study no. 8. FAO, Rome.
- Rihoy, E, 1998. *Natural Resource Tenure in Africa: Exploring Options and Opportunities*, Africa Resources Trust, Harare.
- Rogers, K. and Bestbier, R. 1997. *Development of a protocol for the definition of the desired state of riverine systems in South Africa*. Department of Environmental Affairs and Tourism, Pretoria.
- Runge, C. F. 1981. Common property externalities: isolation, assurance and resource depletion in a traditional grazing context. *American Journal of Agricultural Economics* 63 November: 595-606.
- Saluda, S.I. 1997. *Strategy for improving utilisation of shrimp by catch: a case study on Sofala Bank Shrimp Fishery, Mozambique*. MSc. Thesis.
- Saunders, M. N. K., Lewis, P., and Thornhill, A. 1997. *Research Methods for Business Studies*. Pitman, London.

- Senge, P. 1994. *The fifth discipline fieldbook: strategies and tools for building a learning organisation*. Nichols Brealey, London.
- Schlager, E. C. 1990. *Model specification and policy analysis: the governance of coastal fisheries*. PhD thesis, Department of Political Science, Indiana University. Bell & Howell, Michigan.
- Scoones, I. and Wilson, K. 1989. Households, lineage groups and ecological dynamics: issues for livestock development in Zimbabwe's communal lands. In: *Cousins, B. ed. People Land and Livestock: Proceedings of a Workshop on Socio-economic Dimensions of Livestock Production in the Communal Lands of Zimbabwe, 12-14th September 1988*. pp. 17-122. Centre for Applied Sciences, University of Zimbabwe, Harare.
- Shackleton, S. and Tapson, A. 1998. *Proceedings of the Mini-symposium on Common Property Resource Management, 4-5th August 1998, Nylsley Nature Reserve, South Africa*. CSIR, Pretoria.
- Steiner, A. and Rihoy, E. eds. 1995. *The Commons without the Tragedy: Strategies for Community Based Natural Resources Management in Southern Africa: proceedings of the Regional Natural Resources Management Programme Annual conference, Kasane, April 3-4, 1995*. USAID.
- Swanepoel, H. 1989. *Community development - putting plans into action*. Juta, Cape Town.
- Taylor, J. 1998. *Some thoughts on participatory development*. Review prepared for the EE Mail based on a presentation given to the School of Environmental and Development, University of Natal, June 10, 1998.
- Tello, J. and Dutton, P. 1997. *Ecological survey - Lugenda*. Niassa, Mozambique. DNFFB/IUCN, Unpublished Report.
- Tietenberg, T. 1996. *Environmental and natural resources economics*. 4<sup>th</sup> ed. 614p. Harpers Collins College Publishers, New York.
- Tilley, P. and Abacar, A. 1996. *Socio-economic Survey in Niassa Game Reserve*. Niassa,



Mozambique. DNFFB/IUCN, Unpublished research project paper.

Timberlake, J. 1997. *Biodiversity of the Zambezi Basin Wetlands: a review of available information: Phase I. Zambezi Society & Biodiversity Foundation for Africa*. Report for IUCN-ROSA.

Vaalbooi, P. 1998. The role of language and traditional knowledge in the future development of the Khomani Community. In: Dladla, Y. (ed). 1998. *Voices, Values and Identities Symposium: Record of the proceedings 25-27 August, 1998, Kruger National Park, South Africa*. pp. 55-56. South African National Parks, Pretoria.

Western, D.; Wright, R. M. and Strum, S. C. 1994 *Natural Connections: Perspectives in Community-Based Conservation*. Washington, D. C., Island Press.

## Personal Communication

### Professionals:

|                     |  |
|---------------------|--|
| Akissa, Hilario     | 1999 (SPFFB - DPAP/Niassa)   |
| Anstey, Simon       | 1999 (IUCN-Mozambique, Chipange Tchetu Projectt Coordinator)         |
| Breen, C.           | 1999 (INR, University of Natal, Research Project Coordinator)        |
| Falcao, Rui         | 1999 (IDPPE, Project Coordinator/Acting Director)                    |
| Gopole, Omar        | 1999 (Department of Fisheries - DPAP, Niassa)                        |
| Hilario, Gervasio   | 1999 (IDPPE - Maputo)  |
| Jacob, Benson       | 1999 (Head of Game scouts, SPFFB/Chipange Chetu Project, Translator) |
| Lidia               | 1999 (National Co-Director for Fisheries administration)             |
| Lopes, Simeao       | 1999 (IDPPE - Maputo)  |
| Magane, Samiro      | 1999 (DNFFB, Community Natural Resource Management Unit)             |
| Mansur, E.          | 1999 (DNFFB, CNRM Unit, Coordinator)                                 |
| Mota, Helena        | 1999 (UGC/MICOA - Maputo)  |
| Mucherema, David S. | 1999 (Administrative Post of Unango/Sanga District, Niassa)          |
| Rachide, Abdallah   | 1999 (District Director for Agriculture and Fisheries)               |
| Robert, Paulo       | 1999 (Department of Fisheries, Niassa Province)                      |
| Sotomane, Elias     | 1999 (Provincial Director for Agriculture and Fisheries)             |
| Tulo, Caetano       | 1999 (Head of Community Guards, translator)                          |

### Members of the Community:

|                     |   |
|---------------------|---|
| Aide, Jafar         | 1999 (Secretary of the Ward - Madeira Village/Sanga, Niassa)    |
| Assane, Selemane    | 1999 (Madeira Village - Sanga/Niassa)                           |
| Kadawele, Chaibo    | 1999 (Traditional Chief/Madeira Village - Sanga, Niassa)        |
| Malingalile         | 1999 (Traditional Head Chief - Sanga/Niassa)                    |
| Mazogo,             | 1999 (Traditional Chief/Matchedge - Sanga/Niassa)               |
| Momade, Joao        | 1999 (Madeira Village - Sanga/Niassa )                          |
| N'tabalika, Bwana   | 1999 (Traditional Chief/Madeira Village - Sanga/Niassa)         |
| Pauila,             | 1999 (Traditional Chief/Madeira Village - Sanga/Niassa)         |
| Rajabo, Pauila      | 1999 (Traditional Chief/Tulieke Village Madeira - Sanga/Niassa) |
| Saide, Assane       | 1999 (Lilumba Village - Macaloge/Sanga/ Niassa)                 |
| Wassia, M'tomone    | 1999 (Tulieke Village, Madeira - Sanga/ Niassa)                 |
| Zolea, Ahiziniulila | 1999 (A fisherwoman in Madeira Village - Sanga/Niassa)          |

## APPENDIX 1 Questionnaire addressed to key informants

### Preamble:

I'm a student from the Centre for Environment and Development at UNP, South Africa, studying about the situation of inland fisheries in this part of Niassa Province, northern Mozambique. Concerning to your own experience and with particular reference to your own fishing areas, please would you respond to the following questions? Comments are welcome, wherever appropriate.

Name of the village/fishing area-----

Location-----

Date: -----/-----/1999

Number of Interviewees, n = 10; Responses are presented in figures according to respondents;

### Q.1 How long have you been living here?

|              |                          |      |
|--------------|--------------------------|------|
| < 5 years    | <input type="checkbox"/> | 0    |
| 5 - 10 years | <input type="checkbox"/> | 3/10 |
| > 10 years   | <input type="checkbox"/> | 7/10 |

### Q.2 According to your experience, what do you think that has changed in relation to fisheries over time?

|                   |                          |       |
|-------------------|--------------------------|-------|
| Declined          | <input type="checkbox"/> | 10/10 |
| increased         | <input type="checkbox"/> | 0     |
| remained the same | <input type="checkbox"/> | 0     |

### Q.3 According to your experience, what do you think it has influenced change in relation to people over time?

|          |                          |       |
|----------|--------------------------|-------|
| Attitude | <input type="checkbox"/> | 10/10 |
| culture  | <input type="checkbox"/> | 7/10  |
| religion | <input type="checkbox"/> | 4/10  |

### Q.4 When did these changes occur?

|                    |                          |      |
|--------------------|--------------------------|------|
| pre-colonial time  | <input type="checkbox"/> | 0    |
| colonial time      | <input type="checkbox"/> | 4/10 |
| after independence | <input type="checkbox"/> | 6/10 |

Q.5 In your experience, how was in the past, fishing performed?

|                   |                          |       |
|-------------------|--------------------------|-------|
| Done individually | <input type="checkbox"/> | 36320 |
| done in group     | <input type="checkbox"/> | 4/10  |

Q.6 Did foreign fishermen had to report to the chief when they went fishing?

|     |                          |       |
|-----|--------------------------|-------|
| yes | <input type="checkbox"/> | 10/10 |
| no  | <input type="checkbox"/> | 0     |

Q.7 Do the foreign fishermen buy fishing license from the Department of Agriculture and Fisheries?

|     |                          |       |
|-----|--------------------------|-------|
| yes | <input type="checkbox"/> | 0     |
| no  | <input type="checkbox"/> | 10/10 |

Q.8 Do the local fishermen buy fishing licenses from the Department of Agriculture and Fisheries?

|     |                          |       |
|-----|--------------------------|-------|
| yes | <input type="checkbox"/> | 0     |
| no  | <input type="checkbox"/> | 10/10 |

Q.9 Please, give your opinion on the following? Access to fishing sites in Mozambique.

|   | agree                         | disagree                   |
|---|-------------------------------|----------------------------|
| most fish caught is from the rivers     | <input type="checkbox"/> 6/10 | <input type="checkbox"/> 0 |
| most fish caught is from the lakes      | <input type="checkbox"/> 4/10 | <input type="checkbox"/> 0 |
| fish caught in rivers and lakes is same | <input type="checkbox"/> 0    | <input type="checkbox"/> 0 |

Q.10 Where are the people involved in fishing from?

|                    | many                          | few                           |
|--------------------|-------------------------------|-------------------------------|
| from the community | <input type="checkbox"/>      | <input type="checkbox"/> 4/10 |
| from outside       | <input type="checkbox"/> 6/10 | <input type="checkbox"/>      |

Q.11. What role do the chiefs play in the community, in relation to the use of fisheries in their areas?

|                                |                          |       |
|--------------------------------|--------------------------|-------|
| have nothing to do with it     | <input type="checkbox"/> | 10/10 |
| control people from outside    | <input type="checkbox"/> | 0     |
| authorize fishing to outsiders | <input type="checkbox"/> | 0     |

Q.12 What role did the chiefs play in the community (in the past), in relation to the use of fisheries in their areas?

|                                |                          |      |
|--------------------------------|--------------------------|------|
| Had nothing to do with it      | <input type="checkbox"/> | 0    |
| control people from outside    | <input type="checkbox"/> | 3/10 |
| authorize fishing to outsiders | <input type="checkbox"/> | 7/10 |

Q.13 Is the role of chief (Mwenye) more or less difficult during the following periods?

Grade: A= much more difficult ; B= much more difficult; C= not difficult

|                    | A                             | B                             | C                             |
|--------------------|-------------------------------|-------------------------------|-------------------------------|
| pre-colonial       | <input type="checkbox"/> 0    | <input type="checkbox"/> 0    | <input type="checkbox"/> 5/10 |
| colonial           | <input type="checkbox"/> 0    | <input type="checkbox"/> 3/10 | <input type="checkbox"/> 0    |
| after independence | <input type="checkbox"/> 2/10 | <input type="checkbox"/> 0    | <input type="checkbox"/> 0    |

Q.14 Explain the reasons and major causes of the change in any of the cases?

|              |                          |      |
|--------------|--------------------------|------|
| no authority | <input type="checkbox"/> | 7/10 |
| I don' know  | <input type="checkbox"/> | 3/10 |

Q.15 Are there ways in which the current systems could be improved?

|     |                          |       |
|-----|--------------------------|-------|
| yes | <input type="checkbox"/> | 10/10 |
| no  | <input type="checkbox"/> | 0     |

Q.16 If yes, please give your opinion on the following?

|  |                          |      |
|--|--------------------------|------|
| with Law enforcement by government                 | <input type="checkbox"/> | 0    |
| with creation of local committees (co-management)  | <input type="checkbox"/> | 4/10 |
| go back to the older system ( traditional control) | <input type="checkbox"/> | 6/10 |

Q.17 According to your experience, what is the role of women in fishing?

|                            |                          |      |
|----------------------------|--------------------------|------|
| have nothing to do with it | <input type="checkbox"/> | 0    |
| collecting fire wood       | <input type="checkbox"/> | 6/10 |
| fish processing            | <input type="checkbox"/> | 4/10 |
| fish selling               | <input type="checkbox"/> | 0    |

Q.18 Have you attended school?

|     |                          |      |
|-----|--------------------------|------|
| yes | <input type="checkbox"/> | 1/10 |
| no  | <input type="checkbox"/> | 9/10 |

Q.19 If yes, What is your level of education?

Grade: A=Primary school only;

B=Secondary school;

|                  | A                             | B                          |
|------------------|-------------------------------|----------------------------|
| Completed        | <input type="checkbox"/> 0    | <input type="checkbox"/> 0 |
| Did not complete | <input type="checkbox"/> 1/10 | <input type="checkbox"/> 0 |

Thank you very much for your time and cooperation.

**APPENDIX 2** Questionnaire addressed to the fishermen.

## Preamble:

I'm a student from the Centre for Environment and Development at UNP, South Africa, studying about the situation of inland fisheries in this part of Niassa Province, northern Mozambique. Concerning to your own experience and with particular reference to your own fishing areas, please would you respond to the following questions? Comments are welcome, wherever appropriate.

Name of the village/fishing area:-----

Location:-----

Date:-----/-----/1999

Number of Interviewees, n = 46; Responses are presented in figures according to respondents;

## Q.1 How old are you?

|           |                                |
|-----------|--------------------------------|
| <10 years | <input type="checkbox"/> 0     |
| 11 - 15   | <input type="checkbox"/> 0     |
| 16 - 20   | <input type="checkbox"/> 3/46  |
| 21 - 25   | <input type="checkbox"/> 6/46  |
| 26 - 30   | <input type="checkbox"/> 9/46  |
| 31 - 35   | <input type="checkbox"/> 13/46 |
| >40       | <input type="checkbox"/> 5/46  |

## Q.2 According to your experience, what do you think has changed in relation to the over time?

|                   |   |
|-------------------|---|
| declined          | <input type="checkbox"/> (please, give reasons) 20/46 |
| increased         | <input type="checkbox"/> (please, give reasons) 9/46  |
| remained the same | <input type="checkbox"/> (please, give reasons) 15/46 |

## Q.3 According to your experience, what do you think that has influenced change in relation to the people?

|          |  |
|----------|--|
| attitude | <input type="checkbox"/> (please, specify) 23/46 |
| culture  | <input type="checkbox"/> (please, specify) 16/46 |
| religion | <input type="checkbox"/> (please specify) 7/46   |

Q.4 In your experience, where are the people involved in fishing from?

|                             |                          |       |
|-----------------------------|--------------------------|-------|
| outside the area/Tanzania   | <input type="checkbox"/> | 26/46 |
| outside the area/Mozambique | <input type="checkbox"/> | 9/46  |
| from the area/locally       | <input type="checkbox"/> | 11/46 |

Q.5 Do foreign fishermen have to report to the chief when they go fishing?

|     |                          |       |
|-----|--------------------------|-------|
| yes | <input type="checkbox"/> | 0     |
| no  | <input type="checkbox"/> | 46/46 |

Q.6 Do the local fishermen buy fishing licenses from the Department of Agriculture and Fisheries?

|     |                          |       |
|-----|--------------------------|-------|
| yes | <input type="checkbox"/> | 2/46  |
| no  | <input type="checkbox"/> | 44/46 |

Q.7 Do the foreign fishermen buy fishing license from the Department of Agriculture and Fisheries?

|     |                          |       |
|-----|--------------------------|-------|
| yes | <input type="checkbox"/> | 0     |
| no  | <input type="checkbox"/> | 46/46 |

Q.8 Do you consider your occupation in fishing as?

|            |                          |       |
|------------|--------------------------|-------|
| continuous | <input type="checkbox"/> | 8/46  |
| occasional | <input type="checkbox"/> | 27/46 |
| sporadic   | <input type="checkbox"/> | 11/46 |

Q.9 Do you usually migrate from one area to another?

|     |                          |       |
|-----|--------------------------|-------|
| yes | <input type="checkbox"/> | 38/46 |
| no  | <input type="checkbox"/> | 8/46  |

Q.10 Why do you migrate?

|                        |                          |                        |
|------------------------|--------------------------|------------------------|
| follow the fish season | <input type="checkbox"/> | 38/46                  |
| look better sale price | <input type="checkbox"/> | 0                      |
| other reasons          | <input type="checkbox"/> | (Please, specify) 8/46 |



Q.11 What type of fishing craft do you usually use, for different fishing areas?

|                  | in rivers                      | on the lakes                   |
|------------------|--------------------------------|--------------------------------|
| bark of the tree | <input type="checkbox"/> 0     | <input type="checkbox"/> 24/46 |
| dugout canoe     | <input type="checkbox"/> 12/46 | <input type="checkbox"/> 0     |

Q.12 What type of fishing gear do you use, according to the following?

|                       |  |
|-----------------------|--|
| fishing traps         | <input type="checkbox"/> 18/46               |
| gill nets             | <input type="checkbox"/> 11/46               |
| plant parts (poisons) | <input type="checkbox"/> 9/46                |
| hook and line         | <input type="checkbox"/> 7/46                |
| others                | <input type="checkbox"/> (Please, specify) 0 |

Q.13 Does fishing activity include collecting plant parts for poisoning?

|     |   |
|-----|---|
| yes | <input type="checkbox"/> (if yes, go to Q.13) 46/46 |
| No  | <input type="checkbox"/> 0                          |

Q.14 For how long have you collecting plant parts for fish poisoning?

|              |                                |
|--------------|--------------------------------|
| 1 - 3 years  | <input type="checkbox"/> 0     |
| 3 - 7 years  | <input type="checkbox"/> 7/46  |
| 7 - 10 years | <input type="checkbox"/> 11/46 |
| >10 years    | <input type="checkbox"/> 28/46 |

Q.15 Do you collect plant parts for fish poisoning as?

|                        |                                |
|------------------------|--------------------------------|
| Exclusive activity     | <input type="checkbox"/> 0     |
| supplementary activity | <input type="checkbox"/> 46/46 |

Q.16 What are the reasons that makes you engage in the fish poisoning methods? (Please specify).

|                             |                                |
|-----------------------------|--------------------------------|
| catch more fish (effective) | <input type="checkbox"/> 26/46 |
| do not have to spend money  | <input type="checkbox"/> 8/46  |
| many outsiders using it     | <input type="checkbox"/> 12/46 |

Q.17 How often do you mostly use plant parts for fish poisoning, according to the following?

Grade: A=more frequently B=frequently C=Very unusual

|            | A                              | B                              | C                              |
|------------|--------------------------------|--------------------------------|--------------------------------|
| dry season | <input type="checkbox"/> 46/46 | <input type="checkbox"/> 0     | <input type="checkbox"/> 0     |
| wet season | <input type="checkbox"/> 0     | <input type="checkbox"/> 0     | <input type="checkbox"/> 46/46 |
| rivers     | <input type="checkbox"/> 0     | <input type="checkbox"/> 0     | <input type="checkbox"/> 0     |
| lakes      | <input type="checkbox"/> 0     | <input type="checkbox"/> 46/46 | <input type="checkbox"/> 0     |

Q.18 What arrangements do you have to make in order to get these plant parts for poisoning?

|   |                                |
|---|--------------------------------|
| no arrangements                         | <input type="checkbox"/> 0     |
| personally, collect from the forest     | <input type="checkbox"/> 46/46 |
| contract somebody from outside the area | <input type="checkbox"/> 0     |

Q.19 What are the main sources of plant parts for poisoning?

|   |                                |
|---|--------------------------------|
| Outside the area                              | <input type="checkbox"/> 0     |
| locally from the area (mountains and forests) | <input type="checkbox"/> 46/46 |

Q.20 What are other forms of fish poisoning do you experience in the fishing areas and their sources?

|                       | locally                    | outside the area               | abroad                         |
|-----------------------|----------------------------|--------------------------------|--------------------------------|
| chemicals             | <input type="checkbox"/> 0 | <input type="checkbox"/> 0     | <input type="checkbox"/> 31/46 |
| acid from car battery | <input type="checkbox"/> 0 | <input type="checkbox"/> 15/46 | <input type="checkbox"/> 0     |

Q.21 How many days do you spend in a fishing trip?

| <10                            | 11 - 15                        | >15                           |
|--------------------------------|--------------------------------|-------------------------------|
| <input type="checkbox"/> 18/46 | <input type="checkbox"/> 23/46 | <input type="checkbox"/> 5/46 |

Q.22 What is your average catch per month?

Quantity of fish (kg): Grade: A=<50 kg B=51 - 100 C=101 - 150 D=>150

| A                             | B                              | C                              | D                             |
|-------------------------------|--------------------------------|--------------------------------|-------------------------------|
| <input type="checkbox"/> 7/46 | <input type="checkbox"/> 11/46 | <input type="checkbox"/> 23/46 | <input type="checkbox"/> 5/46 |

Q.23 Where do you get more money in relation to location of fish sell?

Grade: A=fish sell at market (Tanzania); B=fish sell at the village; C=fish sell at fishing area;

|                   | A                              | B                          | C                          |
|-------------------|--------------------------------|----------------------------|----------------------------|
| smoked/dried fish | <input type="checkbox"/> 46/46 | <input type="checkbox"/> 0 | <input type="checkbox"/> 0 |
| fresh fish        | <input type="checkbox"/> 0     | <input type="checkbox"/> 0 | <input type="checkbox"/> 0 |

Q.24 What problems do experience in fishing?

|                                  |                                |
|----------------------------------|--------------------------------|
| competition with other fishermen | <input type="checkbox"/> 31/46 |
| access without permission        | <input type="checkbox"/> 0     |
| attitude of users from outside   | <input type="checkbox"/> 15/46 |

Q.25 Are there ways in which the current situation could be improved?

|   |                                |
|---|--------------------------------|
| Law enforcement by government                 | <input type="checkbox"/> 0     |
| creation of local committees (co-management)  | <input type="checkbox"/> 33/46 |
| go back to older system (traditional control) | <input type="checkbox"/> 13/46 |

Q.26 Have you attended school?

|     |                                 |
|-----|---------------------------------|
| yes | <input type="checkbox"/> 19/46  |
| no  | <input type="checkbox"/> 279/46 |

Q.27 If yes, What your level of education?

Grade: A=Primary school only; B=Secondary school;

|                  | A                              | B                          |
|------------------|--------------------------------|----------------------------|
| Completed        | <input type="checkbox"/> 0     | <input type="checkbox"/> 0 |
| Did not complete | <input type="checkbox"/> 19/46 | <input type="checkbox"/> 0 |

Thank you very much for your time and cooperation.

**APPENDIX 3** Questionnaire addressed to the fish processors

Preamble:

I'm a student from the Centre for Environment and Development at UNP, South Africa, studying about the situation of inland fisheries in this part of Niassa Province, northern Mozambique. Concerning to your own experience and with particular reference to your own fishing areas, please would you respond to the following questions? Comments are welcome, wherever appropriate.

Name of the village/fishing area:-----

Location:-----

Date:-----/-----/1999

Number of Interviewees, n = 4; Responses are presented in figures according to respondents;

Q.1 How old are you?

|           |                          |     |
|-----------|--------------------------|-----|
| <10 years | <input type="checkbox"/> | 0   |
| 11 - 15   | <input type="checkbox"/> | 0   |
| 16 - 20   | <input type="checkbox"/> | 0   |
| 21 - 25   | <input type="checkbox"/> | 1/4 |
| 26 - 30   | <input type="checkbox"/> | 2/4 |
| 31 - 35   | <input type="checkbox"/> | 1/4 |
| >40       | <input type="checkbox"/> | 0   |

Q.2 How long have you been working in fish processing?

|              |                          |     |
|--------------|--------------------------|-----|
| <5years      | <input type="checkbox"/> | 1/4 |
| 5 - 10 years | <input type="checkbox"/> | 3/4 |
| >10 years    | <input type="checkbox"/> | 0   |

Q.3 Do you consider your occupation in fish processing as?

|            |                          |     |
|------------|--------------------------|-----|
| Continuous | <input type="checkbox"/> | 0   |
| occasional | <input type="checkbox"/> | 3/4 |
| sporadic   | <input type="checkbox"/> | 1/4 |

Q.4 Where do you process fish?

|                     |                          |     |
|---------------------|--------------------------|-----|
| at the fishing area | <input type="checkbox"/> | 4/4 |
| at home             | <input type="checkbox"/> | 0   |
| at the market       | <input type="checkbox"/> | 0   |

Q.5 Does fish you process include fish caught by yourself?

|     |                          |     |
|-----|--------------------------|-----|
| yes | <input type="checkbox"/> | 1/4 |
| no  | <input type="checkbox"/> | 3/4 |

Q.6 If you process the fish, how do you rate its quality?

|      |                          |     |
|------|--------------------------|-----|
| good | <input type="checkbox"/> | 4/4 |
| fare | <input type="checkbox"/> | 0   |
| poor | <input type="checkbox"/> | 0   |

Q.7 How do you process the fish?

|             |                          |                     |
|-------------|--------------------------|---------------------|
| smoking     | <input type="checkbox"/> | 4/4                 |
| sun drying  | <input type="checkbox"/> | 0                   |
| salt drying | <input type="checkbox"/> | 0                   |
| others      | <input type="checkbox"/> | (please, specify) 0 |

Q.8 How is fish cured?

|            |                          |     |
|------------|--------------------------|-----|
| smoking    | <input type="checkbox"/> | 3/4 |
| sun drying | <input type="checkbox"/> | 1/4 |

Q.9 How do yo dry the fish?

|               |                          |     |
|---------------|--------------------------|-----|
| On the racks  | <input type="checkbox"/> | 4/4 |
| on the ground | <input type="checkbox"/> | 0   |

Q.10 What is the time spend in drying the fish?

|           |                          |              |
|-----------|--------------------------|--------------|
|           |                          | on the racks |
| <1 day    | <input type="checkbox"/> | 0            |
| 1 day     | <input type="checkbox"/> | 1/4          |
| 1 -2 days | <input type="checkbox"/> | 3/4          |

Q.11 Does the season affect processing methods? Please, mention which season?

|                 |                          |     |
|-----------------|--------------------------|-----|
| wet/rain season | <input type="checkbox"/> | 4/4 |
| dry season      | <input type="checkbox"/> | 0   |

Q.12 What are the major problems you experience with storing fish?

|               |                          |     |
|---------------|--------------------------|-----|
| insect attack | <input type="checkbox"/> | 3/4 |
| fragmentation | <input type="checkbox"/> | 1/4 |
| pinking       | <input type="checkbox"/> | 0   |
| no problems   | <input type="checkbox"/> | 0   |
| others        | <input type="checkbox"/> | 0   |

Q.13 What has to be done to solve these situations?

|                                     |                          |     |
|-------------------------------------|--------------------------|-----|
| take fish to the market soon        | <input type="checkbox"/> | 1/4 |
| cure fish until taken to the market | <input type="checkbox"/> | 3/4 |

Q.14 Who normally buys the processed fish?

|                                   |                          |     |
|-----------------------------------|--------------------------|-----|
| Local fish traders                | <input type="checkbox"/> | 0   |
| foreign fish traders              | <input type="checkbox"/> | 3/4 |
| local people for home consumption | <input type="checkbox"/> | 0   |
| sale myself                       | <input type="checkbox"/> | 1/4 |

Q.15 What are other roles do you play in fishing activity, rather than fish processing?

|                                   |                          |                       |
|-----------------------------------|--------------------------|-----------------------|
| collecting/transporting fire wood | <input type="checkbox"/> | 2/4                   |
| selling fish                      | <input type="checkbox"/> | 1/4                   |
| others                            | <input type="checkbox"/> | (please, specify) 1/4 |

Q.16 Have you attended school?

|     |                          |     |
|-----|--------------------------|-----|
| yes | <input type="checkbox"/> | 3/4 |
| no  | <input type="checkbox"/> | 1/4 |

Q.17 If yes, What your level of education?

Grade: A=Primary school only;

B=Secondary school;

|                  | A                            | B                          |
|------------------|------------------------------|----------------------------|
| Completed        | <input type="checkbox"/> 1/4 | <input type="checkbox"/> 0 |
| Did not complete | <input type="checkbox"/> 3/4 | <input type="checkbox"/> 0 |

Thank you very much for your time and cooperation.