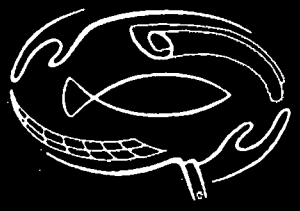
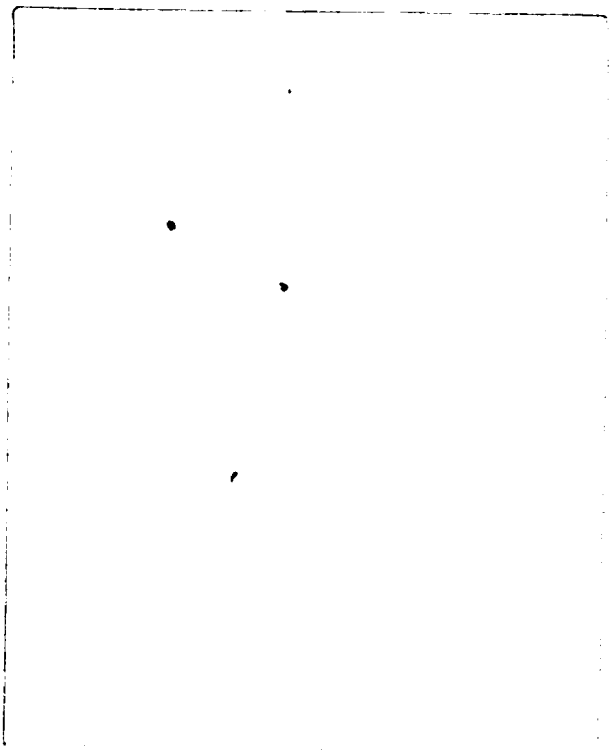


WORKING PAPER

Fisheries Co-management Research Project



With funding from the Danish International Development Agency (DANIDA), a five-year collaborative research project was initiated in 1994 involving the International Center for Living Aquatic Resources Management (ICLARM), North Sea Centre (NSC), Hirtshals, Denmark, and National Aquatic Research Systems (NARS). The collaboration is based on a mutual interest to gain practical experience in research in fisheries co-management, to demonstrate its applicability as a sustainable, equitable and efficient management strategy, and develop models for use and adoption by governments, fisheries communities, NGOs and others.

The Fisheries Co-management Research Project conducts research in coastal, coral reef, lake and river/floodplain aquatic resource systems in Asia and Africa. The overall purpose of the project is to determine the prospects for successful implementation of fisheries co-management strategies. General principles and propositions which facilitate successful implementation of fisheries co-management strategies are being identified.

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Fisheries Co-management Research Project publications include Research Reports, Working Papers, Project Documents and Reprints.

Research Initiatives on Fisheries Co-management in Central and Southern Africa.

Report of the Regional Workshop 20-22 November 1995 Kariba, Zimbabwe

J.C. Jackson (ed.)

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Research Initiatives on Fisheries Co-management in Central and Southern Africa

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Edited By J. C. Jackson

This worshop was jointly sponsored by IFM &CCD Denmark, ICLARM Philippines, and CASS UZ. Zimbabwe.

Acknowledgements

This report represents the efforts and inputs of several individuals and institutions who promoted the workshop. We are grateful for the interesting and informative presentations and discussion given by the participants from the region. The editorial approach to the documentation of the proceedings has been quite minimal. It is hoped that the continuing dialogue among the participants to this workshop might form the nucleus of a regional research network interested in fisheries co-management.

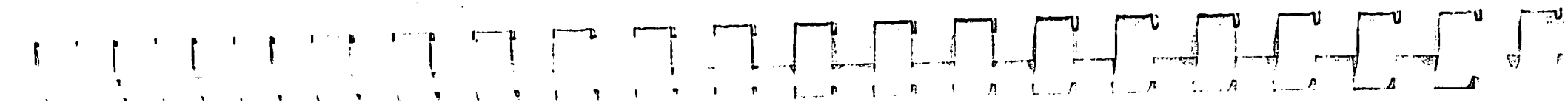
As part of their collaboration on a world wide research project on fisheries co-management (1995-1999), the Institute of Fisheries Management and Coastal Community Development (IFM-CCD) at the North Sea Centre (NSC) Denmark and the International Centre for the Living Aquatic Resources Management (ICLARM) in the Philippines have entered into a memorandum of understanding with the Centre for Applied Social Sciences (CASS) as a research partner in the region. This agreement represents part of a much bigger collaborative research approach that aims to link National Aquatic Research Systems (NARS) and other research partners from Africa and Asia with the North Sea Centre and ICLARM. This collaboration is based on mutual interest to gain practical experience in research in fisheries co-management, to demonstrate its applicability as a sustainable, equitable and efficient management strategy, and to develop models for use and adoption by governments, fisher communities NGO and others. The initial list of partners in Asia includes actors from Bangladesh, Vietnam, Philippines, Malaysia, Indonesia and Thailand and in Africa Malawi, Mozambique and Zimbabwe.

In May 1995, and as a follow-up to the exchange of ideas and information between the IFM - ICLARM project and existing and potential research partners in Asia and Africa held in Denmark at the NSC, CASS agreed to act as the initial focal point for the establishment of a possible network of social and natural scientists involved in fisheries co-management in the Central and Southern African Region. As part of this initiative a workshop for existing research partners and other actors and potential partners was planned for November 1995.

Based on initial networking and some understanding of who are relevant actors, the workshop brought together over 30 people from the region and five representatives from IFM and ICLARM. The IFM - ICLARM Research Project was able to financially sponsor a fair number of the participants while several organizations and individuals were self sponsored.

We thank all donors and orgainzations for their support. We thank the participants for the breadth and depth of their informative and critical contributions.

Any designations of the geographic entries in these proceedings and materials do not imply the expression of any opinion whatsoever on the part of the participants or their organisations concerning the legal status of any country, territory or area, or of its authorities, or concerning the delimitation of its frontiers or boundaries. The opinions expressed by the authors and editor do not necessarily represent the views of IFM&CCD North Sea Centre, ICLARM or CASS.



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WHAT IS FISHERIES CO-MANAGEMENT ALL ABOUT?

INTRODUCTION TO CO-MANAGEMENT PLUS THE ICLARM\NSC RESEARCH PROJECT
(Refer to Appendix III Paper 1)

By Robert S. Pomeroy

Conclusions of an International Workshop on Community Management and Common Property of Coastal Fisheries Organised by ICLARM in June 1983 observed that:-

- Traditional community-based management systems have an important role to play in the management of coastal fisheries.

- Recent research on community-based fisheries management systems have shown that when left to their own devices, communities of fisheries, under certain conditions, may use fisheries resources sustainably.

- A new management philosophy is warranted in which the fisher can once again become part of the resource management team, balancing rights and responsibilities and working in a cooperative (rather than antagonistic) mode with the government managers.

- Co-management is a rational extension of evolutionary trends in fisheries management over the past decades.

WORKING HYPOTHESES ABOUT CONDITIONS FOR EFFECTIVE COMMUNITY-BASED FISHERIES MANAGEMENT

Reliance purely on the government to manage the fishery, based on the conventional wisdom derived from Hardin, Gordon and Scott that all resources held in common will inevitably suffer over exploitation and degradation, has blinded fishery managers to the broad range of possibility offered by systems that involve various degrees of self-management. But integrating communities of fishers into the management process requires, in the first place, the creation of incentive structures for users to fish sustainably. The exclusion problem would almost always require government management to help enforce rights. The subtractability problem requires the building of institutional arrangements for self-management. Thus, the policy implication for a reassessment of fisheries management include the abandonment of the conventional wisdom that fisheries resources which are held as communal property are subject to eventual over exploitation and degradation and that a centralised management authority is needed to manage resources. It also requires institution building in fishery communities to establish co-management strategies towards sustainable use of resources. Ostrom (1990 has made a useful synthesis of the existing knowledge about what is needed for emergence of viable self-managed, community-based management institutions. The working hypotheses below are adopted from her synthesis.

1. Whether the resource boundaries and the rights to use the resource are clearly defined.

2. Whether there is a proportional relationship between the rules specifying the amount of harvest a fisher is allocated and rules requiring user inputs.

3. Whether benefits of investing in fisheries management institution exceed competing opportunity cost.

4. Whether there is a practical system of monitoring and regulating behaviour which is accountable to the users or are the users themselves.

5. Whether the group which specified the rules is largely constituted by the fishers who are effected by them.

6. Whether those who break the rules are likely to receive graduated sanctions as authorised by the rule-making body.

7. Whether fishers and their officials have ready access to conflict resolution arrangements.

8. Whether fishers have the legal right to organise and make institutional changes commensurate with their perceived management needs.

9. Whether performance results are in accordance with expectations of fishers, are visible to them and have no serious negative side effects.

Fisheries Co-Management

- Current management strategies have, for the most part, not been successful in reversing the trend of resource degradation and over exploitation.

- Need for substantial and rapid evolution of existing resource management systems to support sustainable resource use.

- Local communities cannot accomplish this change on their own.

- National government cannot accomplish it entirely through bureaucratic instruments.

- Must evolve a more dynamic partnership arrangement between community and national government.

- Co-management is the sharing of responsibility and authority between the government and community to manage the fishery.

- There is a continuum of co-management arrangements.

- Co-management is a formal recognition of a system of fisheries management which already exists = informal local systems existing side-by-side with formal government system.

- Modification or restructuring of government policies and laws for joint decision-making and active sharing of responsibility and authority and participation in fishery management.

- The amount of responsibility and authority that the national government and local community have will depend on country and site conditions.

Determining what kind and how much responsibility and activity should be allocated to the local level is a political decision

Co-management is a middle course between state-level concerns in fisheries management for efficiency and equity, and local-level concerns for self-governance, self-regulation and active participation.

The ultimate authority for co-management is held by the government.

The role of the national government in co-management is to provide enabling legislation to facilitate and support the right to organise and make fisheries management arrangements at the local level, address problems beyond the scope of local arrangements, and provide assistance and services to support the maintenance of local arrangements.

Why should the community be involved in coastal fishery resource management?

1. can be more economical in terms of management and enforcement that national centralised programs. It involves self-management where fishers take responsibility for surveillance and enforcement;
2. provides a sense of ownership over the resource which makes the fishers more responsible for long-term sustainability of resources;
3. allows each community to develop a management strategy which meets its own particular needs;
4. provides for greater participation by fishers in fishery management;
5. a higher degree of acceptability and compliance with management measures can be expected;
6. makes use of indigenous knowledge and local expertise.

Potential Problems with Implementing CBM

1. Community may not be willing or capable of taking on the responsibility of CBM.
2. Not all elements of management can, or should, be allocated to the community.
3. Incentives (economic, social, cultural, environmental) may not be present to engage in CBM.
4. Risk involved in changing fisheries management strategies may be too high.

Threats to Sustainable Community Governed Commons

- blueprint thinking
- rapid changes in technology, population, factor availability, heterogeneity of participants
- transmission failure between generations
- turning to external sources of help too frequently
- lack of large scale institutions exercising presumptive dominance
- international aid which does not take account of indigenous knowledge and institutions
- corruption

Coping Mechanisms related to threats:

- creating associations of community governance
- education
- improved information and knowledge base

Key Conditions for Successful Fisheries Co-management

1. **Clearly defined boundaries:** The physical boundaries of the area to be managed should be distinct so that the fishers group can have accurate knowledge of them. The boundaries of the area to be managed should be based on an ecosystem that fishers can easily observe and understand. It should also be of a size that allows for management with available technology i.e. transportation and communication.

2. **Membership is clearly defined:** The individual fishers or households with rights to fish in the bounded fishing area and participate in area management should be clearly defined. The number of fishers or households should not be too large so as to restrict effective communication and decision-making.

3. **Group cohesion:** The fisher group or organisation permanently resides near the area to be managed. There is a high degree of homogeneity, in terms of kinship, ethnicity, religion or fishing gear type, among the group. Local ideology, customs and belief systems create a willingness to deal with collective problems. There is a common understanding of the problem and of alternative strategies and outcomes.

4. **Existing organisation:** The fishers have some prior experience with traditional community-based systems and with organisations. Where the organisation is representative of all resource users and stake holders interested in fisheries management.

5. **Benefits exceed costs:** Individuals have an expectation that the benefits to be derived from participation in and compliance with community-based management will exceed the costs of investments in such activities.

6. **Participation by those affected:** Most individuals affected by the management arrangements are included in the group that makes and can change the arrangements. Decisions about management arrangements are made by the same people that collect information on the fisheries.

7. **Management rules enforced:** The management rules are simple and monitoring and enforcement is able to be effected and shared by all fishers.

8. **Legal rights to organise:** The fisher group or organisation has the legal right to organise and make arrangements related to their needs. There is enabling legislation from the government defining and clarifying local responsibility and authority.

9. **Cooperation and leadership at community level:** There is an incentive and willingness on the part of fishers to actively participate, with time, effort and money, in fisheries management. There is an individual or core group who takes leadership responsibility for the management process.

10. **Decentralisation and delegation of authority:** The government has established formal policy and/or laws for decentralisation of administrative functions and delegation of management responsibility and/or authority to local government and local group organisation levels.

11. **Coordination between government and community:** A coordinating body is established,

external to the local group or organisation and with representation from the fisher group or organisation and government, to monitor the local management arrangements, resolve conflicts, and reinforce local rule enforcement.

community

Some Lessons

- Identify the "community"
- Development of community organisation
- Community facilitator/NGO
- Community education and research
- Leadership development
- Formation of core management groups
- Definition of development and management objectives and strategies
- Fisheries/coastal resource management and community development
- Clear and achievable objectives
- Start simple and show results early
- Identify indicators of success at the beginning and monitor
- Collect baseline data
- Include all stake holders in order to ensure a politically neutral process
- Integrate traditional and scientific knowledge
- Legitimisation of organisation, rights and rules
- Co-management of fisheries management functions
- Continuous dialogue with and participation of community
- Have plans and time to discontinue assistance to

Sen and Raakjaer-Nielsen

WHAT ARE INSTITUTIONS?

- They are the rules of the game in a society
- They are affected by the following factors:
  - Economic
  - Social
  - Political
- They can be informal or formal
- They can be created or evolved

WHAT ARE ORGANISATIONS?

- Groups of individuals bound by some common factors to achieve particular objectives
- They can be political eg. Local Council
- They can be social eg. Church
- They can be economic eg. Cooperative or Company
- They can be educational eg. School

Why is it important?

Examines how institutional arrangements affect user behaviour and incentives to coordinate, cooperate and contribute to fisheries management.

What is the Aim of Institutional Analysis?

- Separates the underlying rules (institutions) from the strategy of the players (organisations)
- Origins and evolution of organisations are affected by the institutional framework
  and
  Organisations can influence the institutional framework

TYPES OF RULES

Operational:	When, Where and how
Collective Choice:	Who can make operational rules
Constitutional:	Who can make collective choice rules

and to get even more complicated

There are multiple levels of analysis!

All levels of rules operate at different levels such as community, district, province, regional, international.

What are Rules?

- They determine what actions are required, prohibited or permitted as well as the sanctions if they are not followed
- They form the basis of institutional analysis
- They give substance to rights as they structure how rights can be exercised and by whom.

1.2 Background Key Concepts and Definitions.

Common property Resources are subject to 4 types of property regimes:

- State property
- Open access
- Private property
- Communal property

State Property

- Rights vested exclusively with government
- Rights on access decided by state
- Rights on level and use decided by state

Private Property

- Rights to exclude others
- Rights to regulate resource use vested in individual or group
- Rights usually enforced by state
- Rights usually exclusive and transferable
  eg Private Dam

Communal Property

- Resource held by identifiable community
- Outsiders excluded
- Often equal access and use
- Rights unlikely to be transferable
- Unlikely to be exclusive
- May be *de jure* i.e. legally recognised OR.
  May be *de facto* i.e. benign neglect of the state

eg. Lagoon Fishery in Cote D'ivore

Open Access

- Access unregulated
- Free and open to anyone
  eg. Inshore fishery in Mozambique

1. The identification of the existing property rights system in order to determine who defines rights to exploit the resource, who has access to the resource and whether any of these rights are transferable.

2. The scale and level of user group involvement in order to determine the ways in which user groups do or can participate in co-management. Scale refers to the types of tasks which can be carried out by user groups, whilst level refers to the political level at which user groups are involved such as local, regional or national. Scale is related to level in the sense that different tasks can be carried out at different levels.

3. The nature of the representation of user groups in the decision-making process in order to determine the participants in the co-management arrangement, which user groups are legitimate participants in the decision-making process and who can claim rights to participate. (eg. fishermen, fish processors, consumers, environmentalists).

4. The type of management organisation (existing or possible) in order to determine the type of co-management arrangement most appropriate for a particular fishery.

Sten Severdrup-Jensen

FISHERIES CO-MANAGEMENT PROJECT

Development Objective

Sustainable and equitable management of fisheries in developing countries to meet the nutritive and economic needs of poor people.

Immediate Objective:

A set of globally or regionally applicable fisheries co-management models developed and applied in selected aquatic resource systems in selected countries and pilot sites in Asia, Africa and the South Pacific.

OUTCOMES RELEVANT FOR EVALUATION OF FISHERIES CO-MANAGEMENT ARRANGEMENTS:

1. Sustainability
   - Stewardship
   - Resilience
2. Equity
   - Representation
   - Process clarity
   - Homogenous expectations
   - Distributive effects
3. Efficiency
   - Management system design costs
   - Monitoring and enforcement costs

1.4 Methods to collect and analyse information on key attributes

Robert S. Pomeroy

Drawing on the experiences of Rapid Rural Appraisal (RRA) methods and techniques as developed in other sectors, this presentation described the principal features of Rapid Assessment of Fisheries Management Systems (RAFMS). In particular the RAMFS handbook focusses on the information and analytical requirements of the research framework for co-management.

Draft copies of the Handbook for Rapid Appraisal of Fisheries Management Systems by M.D. Pido, R.S. Pomeroy, M.B. Carlos and L.R. Garces were copied and made available to core agencies represented at the workshop.

2. Orientation to Concepts, Research Framework and Infromation Requirements
2.1-3 Introduction to Working Group Tasks and Group Presentations and Plenary

WORKING GROUPS

Refering to Research framework detailed in Session 1.2 and in Paper 2 participants were given opportunity to break to discuss/present the following task:-

1. REVIEW KEY ATTRIBUTES AND INDICATORS ON DECISION-MAKING

- add
- subtract
- comment

2. IDENTIFY METHODS TO COLLECT THIS INFORMATION, INCLUDING THE ADVANTAGES AND DISDVANTAGES OF THE METHODS SELECTED

3. REPORT TO THE PLENARY

4. SUBMIT WORKING GROUP REPORT BY 0830 ON TUESDAY

These tasks focus on

WORKING GROUP 1

DECISION MAKING ARRANGEMENTS/INDICATORS

1. Indicators should be quite clear - maybe in the form of questions.

2. Each decision making arrangements should have a historical background.

3. Add - International level

1A Add ownership- how responsibilities are shared jurisdiction

1B Democratic/Autocratic etc is too simplistic

2A Add Adherence - to what extent are the rules followed

4B Add level of participation

5B Add perceptions
Add type of representation and needs

4. Describe the goals of co-management system eg. Resource Management and Fisheries Development Project

5. How is the co-management system funded?

List of Methods

1. Rapid rural appraisal

2. Secondary data (Literature Review)

3. Discussion Groups

4. Key Informants

5. Detailed (comprehensive study)

2. Orientation to Concepts, Research Framework and Infromation Requirements
2.1-3 Introduction to Working Group Tasks and Group Presentations and Plenary

Comments

1. Fishermen and other levels should be informed about research results.

2. Some resources may not be sustainable in nature

RRA

- Quick Cheap

- Limited data, No feedback, People not open to strangers.

Sec. Data

- Data better utilised when visualised and annotated

- Difficult to digest
- Div. countries have poor libraries
- Data hidden in books

Discussion Group

- Participatory discussions made easier especially when local authorities or higher levels are approached first.

- Limited Community participation
- Biase in selecting groups

Informants

- Get lots of information before approaching a gathering

- Informants fell you what you want to hear

Detailed Study

- Likely to come out with the right conclusions and recommendations

- Expensive and time consuming

WORKING GROUP 2

REVIEW KEY ATTRIBUTES

GENERAL COMMENTS

- Include historical perspective
- Include political economic analysis
- multi-sectoral analysis and how they impinge on fisheries management
- land tenure and how it impinges on fisheries management

Leadership/Power Structures

Indicators

1. Models should look at specific power structures in a society at that particular time.

2. There is need to choose the specific level to address.

3. Articulation of power at different levels.

2. Orientation to Concepts, Research Framework and Infromation Requirements
2.1-3 Introduction to Working Group Tasks and Group Presentations and Plenary

Main types of Rules

1. Rules are a reflection of particular social systems and context.
2. Boundaries under "level of Applicability" exclude social boundaries

Decision Making Process for Operational and Collective choice rules

- Analysis of the rules must include broader intervening factors.

Indicators

Use of Case Studies

Level of Presentation in the Decision Making Process at Different Levels

- No comments

Methods of Getting Information

- "Information can not be collected by a single method"

1. Literature review
2. Longterm observation of communities and factors that influence activities and attitudes.
3. Rapid Rural Appraisal
4. Workshops
5. Questionnaires
6. Interviews

NB: **Informants** - important to get better representation of reality

Relevance of Rules Indicators:

Addi)Compliance to Rules
ii) On Indicators use values as well

General Comments

Seen links among A, B and F

A -Leadership/Power structures

B -Type of Rules

F -Enforcemen

WORKING GROUP 3

DECISION MAKING ARRANGEMENTS AND INDICATORS

LEADERSHIP AND POWER STRUCTURE

- Elected - Democratic? - (may not be)

- Add State imposed on indicators also "VETO" "Censorship"

- Subtract "Credibility/Respectability" and move to "Relevance of Rules" Indicators

- The two are not measurable

- Add customary as indicator for hereditary leadership

MAIN TYPES OR RULES

- Add "Optimal Exploitation"

DECISION MAKING FOR OPERATIONAL AND COLLECTIVE CHOICE RULES ADD "CASE STUDIES"

- Add Flexibility of rules, frequency of change and duration of application, compliance and non-compliance.

LEVELS OF REPRESENTATION

- No additions/subtraction

RELEVANCE OF RULES - ADD "CREDIBILITY AND RESPECTABILITY"

Comment: Attitudes difficult to measure

ENFORCEMENT - NO COMMENT

METHODS

1. Desk studies and RRA, PRA
2. Desk Studies/CAse Studies
3. Case/Desk Studies
4. PRA
5. PRA and Case Studies
6. Reports, recordsand PRA

DISADVANTAGES/ADVANTAGES

- PRA - Comprehensive

Costly
Time consuming
People may not give accurate information
Likelihood of miscontruing information

WORKING GROUP 4

GENERAL POINTS

- Lack of clarity on the theoretical framework underpinning research - eg theory of decision making.

- Is the concept of COM a western construct

- At implementation level - build on local structures - Local structures may not be conducive to COM

2. Orientation to Concepts, Research Framework and Infromation Requirements
2.1-3 Introduction to Working Group Tasks and Group Presentations and Plenary

METHODS

- Different methods for different stages in the research process plus each situation unique

DECISION MAKING ARRANGEMENTS

- A hierarchy of decision making structures may be relevant to part. COM regime.
- There (are) range of power structures in place at local level - not consistent with National systems.
- Need to understand factors which influence decision making systems
- Decision Making systems need to be understood within policy context
- Need more guidance on indicators eg what are indicators' relevant to different decision making regimes.
- Some are not indicators
- Add legitimacy to indicator (Row 1)
- Add international (Row 2)
- Decision making systems/operating procedures for enforcement of Rules etc (Row 5 and 6). Relevance of Rules - an indicator.

METHODS

Refer General Comments RRA - Suite of PRA methods have limitation. When working at commercial level must know for what purpose collecting data, to what end, for whom. Document not enough must be leading somewhere. Problem of expectations

1. What is in it for us
2. Review of lit. plus case studies
3. Participatory (Action) Research - emphasis on close involvement of communal aspects

Problems

(A) Researcher becomes associated with particular group.

(B) Can't be involved in research and implementation

4. Participant observation

FISHERMEN'S TRAINING TOWARDS FISHERIES CO-MANAGEMENT ON LAKE KARIBA, ZIMBABWE

Songore N, Mupetsi & Vengayi A**

INTRODUCTION

The need for training and extension in the artisanal fishery on Lake Kariba was identified during a participatory workshop on the management of the inshore fisheries of Lake Kariba that was carried out in 1993. It was realised that Lake Kariba Fisheries Research Institute lacked the capacity and manpower to run an efficient extension service for the fishermen thus the lack of information flow between the managers and the fishermen. Agritex, a government agricultural extension agency was given the mandate to carry out extension services for the artisanal fishermen working in close collaboration with the Research Institute.

The actual training needs of the fishermen were identified through brainstorming sessions and case study analysis which involved the fishermen, Lake Kariba Fisheries Research Institute, Campfire Coordination Unit and Agritex. These sessions were carried out in the fishing villages. Information obtained from these sessions was used to develop the training programme.

Training courses were run at centrally located fishing villages and arrangements were made with local schools for accommodation and training facilities. At most each component of the training programme covered a period of one week. Lake Kariba Fisheries Research Institute was responsible for all the logistics while Agritex provided resource persons and other training materials. The Campfire Coordination Unit was very useful with its experience in working with the community based wildlife management programme. Course participants were drawn from all four sub-area units of the Lake Kariba Gill net Fishermen's Associations of the Eastern basin of Lake Kariba. The idea was to form core groups of trained fishermen in fishing villages that would assists local extension workers in training the rest of the fishermen within their fishing villages.

OBJECTIVES OF THE TRAINING

- to develop fishermen's management capacities and institutional structures that will promote decision making in the fishing communities.
- to develop fishermen's capacities and skills in repairing and maintenance of their fishing gear and crafts.
- to develop fishermen's capacities and skills in fish processing and preservation
- to equip fishermen with basic financial management skills and record keeping that will enable them to plan and manage their activities efficiently.

- to enable fishermen to understand the need for conservation and wise utilisation of the fishery resources.

- to empower fishermen to take increased responsibilities in running their own affairs.

Institutional Building Course

The objective of this course was to train fishermen in basic principles of leadership and group dynamics with particular emphasise on fishing groups. This would enhance their management capacities and improve decision making at local levels. This would also help improve team spirit and cohesiveness within the fishing communities.

Participants for this particular component of the training programme were leaders drawn from the sub-area committees of the Fisherman's Association. The content of the course included the following:

- types of leaders
- leadership styles
- qualities and duties of office bearers
- organisation and running of meetings
- formulation of by-laws
- team building
- programme planning
- basic fisheries legislation and policy
- legal rights of access
- the role of local authorities

Fishing Gear Repair and Maintenance

This course was designed to equip gill net fishermen with the following skills:

- gear rigging of standard gill nets used on Lake Kariba
- setting and hauling of nets
- repair and general maintenance of fishing gear
- safety on water

Fish Processing and Preservation

Like in any other tropical artisanal fishery, post harvest losses on Lake Kariba are very high. This accounts for the low earnings the fishermen get from their fishing activities. This course was designed to help in the reduction of such losses through training fishermen in fish processing and preservation.

The following areas were covered:

- evisceration and cleaning
- fish filleting
- sun-drying
- various ways of smoking including drum-smoking, pit-smoking, open fire smoking, kiln smoking, etc (advantages and disadvantages of

each method were spelt out, particularly on fuel conversation)
- fish chilling methods

Nature of delivery

Lecturers accompanied with the use of flip charts and chalk boards as well as videos were used. In the leadership course, question and answer sessions were sandwiched in the programme and role play was used to increase group participation. Two games in which everyone participated were played to help participants internalise some of the theoretical aspects delivered.

The other two courses were more practically orientated. Efforts were made to ensure that everyone participated during the practical sessions

Participants' general reaction

Participants expressed satisfaction with the course content which they though had met their expectations. It was generally felt that other group members should have attended the course as this should have facilitated ready acceptance of good group management principles. Fishermen were particularly pleased with the supply of a vernacular brochure on updated fisheries regulations governing their fishing activities.

A course in basic financial management skills is scheduled for December 1995. Effort is being made to ensure women's involvement in every training course. This is reflected in the attendance figures listed below.

Attendances

Institutional Building Course
Total Attendance 37 (27 men and 11 women)

Gear Repair and Maintenance
Total Attendance 54 (46 men and 8 women)

Fish Processing and Preservation
Total Attendance 6 (50 men and 14 women)

* Agritex Personnel who are members of the Fisheries Extension Team.

Preliminary Observations on the Current Artisanal Fishery Management Regulations and the Prevailing Fishing Practices in the Eastern Basin of Lake Kariba

Wellington Muriritirwa

1. INTRODUCTION

Vandana Shiva (1991) suggests that the reorganization of a fishery should of necessity take into account the 'initial conditions prevailing in (the) fish (political) economy' which among other things, she suggests, relate to the following broad categories of analysis :

a. the fishermen's eco-sense;
b. prevailing fishing techniques;
c. processing and preservation techniques;
d. established trade links; and
e. forms of traditional (or/and current) organisation and resource management. (Shiva:1991)

At a micro *'immediate project environment'* level the above conditions can shed some light on the resource dynamics which are a *'pivotal element in the development process'* (ibid). But there seems to be more to it than that. It seems these factors have to be located within the *'broad'* socio-economic, ecological and political environment in which they prevail. This also includes the institutional, ie. administrative, legal/judicial, organisational and managerial etc., arrangements governing the fishery.

This of necessity entails that the five factors actually reflect responses towards this broader environment which involves many other non-fishing actors. Normally responses tend to be different and multi-levelled in temporal and spatial as well as in relation to people's socio-economic and *'livelihood'* position or *'entitlement mapping'*. This can be in relation to individuals, groups of individuals, households, groups of households, villages, wards, districts, and so on as analytical categories.

Moreover, artisanal fisheries *'... are more than a profession, they are a consuming occupation, a way of life, integrated into village structures and family traditions in very complex ways. Traditional structures are not easily analyzed by outside observers. The latter tend to see the anatomy of the structure, rather than the physiology.'* (Bacle & Cecil: 7)

It is precisely because of this that Ruijter,1994 emphasizes that analysis has to focus towards a full *'...understanding of the relations between economic, political, social, cultural, administrative, ecological and other aspects of transformation processes if we are to go beyond the fragmented and limited approach(es) of the past'* in the evolution of the fishery or any other resource exploitation regime (Ruijter,1994: 13). Participant observation and extended field visits can enable one to see both the physiology and the anatomy of the structure being studied.
Such an understanding of the principles and processes underlying the individual, household and local, regional, national, and international communities's interest in a particular resource can show how these entities perceive the resource's relative abundance, its value to different stake holders as well as the fairness of resource control and management mechanisms and the equitability of accessibility or of the prevailing property regimes. It can be argued that these factors, together with the distribution of the costs and benefits of maintaining and managing a natural resource, have a bearing on resource use patterns and therefore can be suggestive to efficacious ways of alternatively and/or sustainably managing the resource.

The analysis is equally important in relation to other analytical categories such as age, gender, ethnicity, race, caste, class, etcetera. Illustrations and examples abound from the fishing practices of the artisanal fishermen of Lake Kariba. It should also be noted that these factors should not be taken into account in the process of project or programme formulation and planning only but at every stage in the project/programme cycle, especially at the monitoring and control stage.

Well formulated and meant projects in various fields of developmental endeavors are known to be usurped from the intended beneficiaries through lack of proper monitoring and control which leads to a general dearth of transparency, accountability and responsibility on the part of some actors.

A better appreciation of the problems can be made against the background of the institutional environment in which the artisanal fishery is located as well as the rules and regulations which governed the fishermen prior to the changes currently being proposed. This paper seeks to analyse the fishermen of Lake Kariba's fishing practices in relation to some of the other factors suggested above. Most of the discussion will, however, focus on the five fishing villages in the Eastern Basin; namely Nematombo, Dandawa, Nyamhunga, Musampakaruma and Mudzimu. Where field observations suggest the generalizability of some of these influences, examples will be cited from where such observations were made.

2. LAKE KARIBA FISHING RULES AND REGULATIONS

Fishing in Lake Kariba is regulated through a number of controls and rules governing the conduct of fishermen. First and foremost, control over fishing is exercised through the control of effort. This can be achieved by limiting the number of fishermen through the licensing system which prohibits any person from fishing in any part of the lake without a permit. In addition, the very possession of nets without a fishing permit is illegal except for manufacturers, fishermen, distributors and/or dealers.

Effort is also controlled through gear restrictions. Gear restrictions are meant *'..to ensure equitable access and distribution of fish stocks among fishermen and to discourage the destruction of fingerlings.'* (Olomola:3). Fishing gear is categorized by the physical elements of the equipment used to catch fish. Relevant gear restrictions on the Zimbabwean side of Lake Kariba relate to net mesh-size. It is an offence for a fisherman to use a net below the four-inch mesh size. This measure is intended to protect young fish from being caught before they have bred.

In addition to the above, a limit is put on the number of fishing nets each fisherman is allowed to use. In the past each fisherman was allowed to use only three nets but this limit has been raised to five nets per fisherman thus raising total effort even if there was no increase in the total number of fishermen.

Furthermore. it is an offence to kill fish by means of explosives, chemicals, poisons or intoxicating substances, jigging, or scoop-nets. Spear guns, basket traps (zviduwo), and rods and lines with more than three hooks each is also prohibited.

Another control measure is the designation and policing of *'closed areas'* eg. river mouths. Apart from some of the prohibited or closed areas being on National Parks and Wild Life land, three more reasons are given to justify closing some sections of the Lake from fishermen by the authorities. These are:

a. to conserve fish stocks which could act as a reservoir from which to replenish neighboring areas where intensive fishing has depleted fish populations;

b. to protect fish breeding or maternity areas; and

c. to protect crocodile populations.

In the context of the Eastern Basin artisanal fishery the main contentious locations associated with this regulation, and therefore the most relevant to our discussion, are the Sanyati and Nyawodza River systems - especially the Sanyati Gorge and the Nyawodza River mouth area. These are considered to be prime fish breeding areas which are very important for replenishing the fish stocks of the Eastern Basin.

Fish driving is also prohibited and anyone who is seen beating the water whilst he/she is in the lake can be arrested. In addition, fishermen have to fish within designated fishing boundaries and every fisherman knows the limits of his official fishing ground; although they may neither agree with the boundaries nor respect

them in practice. When caught, however, fishermen either pretend that they have got lost or they have been forced off-course by the waves.

The possession of fish automatically leads to the assumption of guilt if a person fails to explain how he or she got hold of the fish. Carrying of fish from the fishing camps to the adjacent communal areas or to any other place removed from the fishing camps can also land one in trouble. The argument is that the carrying of fish to the villages is problematic in the sense that it is difficult to approximate how much an individual can justifiably and reasonably carry to his or her communal area for domestic or household consumption. As such mere suspicion can lead to a person's arrest, this measure is also meant to curtail illegal trade in fish.

It is the Management Section of the Department of National Parks and Wild Life Management (DNPWLM) which is responsible for policing and enforcing these regulations. The game scouts from this department also get the support of the Zimbabwe Republic Police (ZRP) in its anti-poaching operations.

As part of the institutional changes which seek to involve the local communities in the management of 'their' natural resources, the Gache Gache Fishermen Association has appointed a Fish Guard who is now responsible for investigating violations of these regulations within the designated fishing grounds. The guard reports to the association, the Research Department of DNPWLM, and the Zimbabwe Republic Police (ZRP). The fish guard's powers are limited to the official fishing grounds and has nothing to do with the closed areas.

3. FISHERMEN'S OBSERVATION OF RULES AND REGULATIONS

A Participatory Rural Appraisal (PRA) conducted along the Kariba shoreline in all fishing camps in June and July, 1994, and subsequent in-depth individual and group interviews, revealed that nearly every fisherman is aware of all the relevant fishing rules, regulations, restrictions and controls, as well as the rationale behind them.

In addition, observations show that whilst a few fishermen consider the possibility of the fish stocks collapsing as preposterous and absurd, the majority are also aware of the negative ramifications of disregarding these controls on the resource base.

Furthermore, it seems as if all fishermen are well aware of what will happen to them as individuals (being arrested and incarcerated, confiscation of gear, payment of a fine etc,) and to their families (loss of income for household sustenance) when they are caught doing what is prohibited within the fishery.

It is therefore interesting, and potentially puzzling to an outsider, to notice this paradoxical juxtaposition between the fishermen's pronounced awareness and appreciation of the value of various fisheries management principles and their seemingly persistent conflict with such principles in practice. This is an issue which needs to be thoroughly investigated and analysed.

The question is: why do fishermen continue to employ fishing practices which they know are illegal, are capable of causing the collapse of the resource base and are, therefore, not sustainable resource use practices?

Alternatively, is it that fishermen have been forced to learn - through the experience of perpetual *'harassment'* - to memorize all the authorities' management regulations and what the authorities believe those regulations can achieve, without them - as fishermen - necessarily being convinced about the value and efficacy of such management principles? It is also possible to take it further and suggest that the prevailing situation could be a combination of both, plus a number of other factors that ultimately influence the resultant fishing practices.

Direct field observations suggest a complex interplay of factors and considerations that influence this and other behavioral patterns of independent fishermen operating from within the five fishing villages in the Eastern Basin. Some of these factors may have more or

less influence on the operations and fishing practices of fishermen operating in some or all the other basins on the Zimbabwean side of Lake Kariba.

It should also be noted that the Eastern Basin has its own special qualities and characteristics which tend to place it in a special category far different from the other fishing camps in Binga, for example, for a variety of reasons.

Fishing practices within the Eastern Basin are influenced from both within and without the Lake Kariba artisanal fishery. An attempt, albeit not an exhaustive one, will be made to try and isolate some of the observable factors, patterns and processes which seem to be influencing fishermen's attitudes as well as their resource use patterns within those five fishing villages.

It is suggested that the performance of the national economy eg. in terms of employment creation within the formal sector, the operation of labour markets, the catch sharing arrangements and the market structure of the fish caught by the artisanal fishermen are some of the proximate issues to this problematic.

To the above must be added the spatial location of the Eastern Basin in relation to Kariba; relative levels of infrastructural development and communication possibilities along the entire shoreline; the possibilities and potential feasibility and viability of non-fishing and non-farm employment opportunities in the fishing camps and in the adjacent communal areas respectively; as well as the potential and relative profitability of agriculture vis-a-vis fishing.

3.1 Control of Gear

There is no evidence from direct field observations or personal interviews that chemicals, explosives, toxicants, spear guns and three or more hooked lines are being used by fishermen in catching fish. However, every other regulation seems to be violated on a daily basis. The examples below suffice to demonstrate this point:

Nets of all sizes and descriptions are being used. This can be seen from the landings at the designated landing sites where the fish sizes suggest that even two inch mesh nets are being used to catch fish. Fishermen can also be visited whilst they are repairing their nets and one can see for him/herself the mesh sizes which different fishermen are using. Some fishermen are using nets with mesh sizes ranging from as small as $1^{1/2}$ inches to 7 inches. Sanyanga,1994 observed that fishermen are using illegal meshes and suggests that this could be attributable to the barter trade between fish traders and fishermen. Fish traders exchange nets for fish. Home-making of nets also compounds the problem.

There is evidence that other types of prohibited nets are being used by some fishermen to catch fish. For example on 7 June, 1994 four people were arrested using a large scoop net which could not even be ferried using a standard wheelbarrow. We happened to be within the camp and had the opportunity to talk to the arrested parties!

3.2 Closed Areas

Most people fish in the closed fish breeding areas of Sanyati Gorge and Nyawodza River. During confidential discussions and interviews most fishermen reveal, even without being questioned, that it is one way in which they manage to increase the size of their catch. In addition, most patrols and arrests are confined to those areas. It is also noticeable that very few fishermen are still using their designated harbors as exit points. Most fishermen are now far from their designated fishing grounds.

There is a lot of movement across camps and between camps, day and night. This is partly due to the current land-use planning exercises going on in that part of the valley. It also has to do with individual choice as to where and when to go fishing to be able to get a decent catch. Many fishermen now operate from Tsetse Island (KuTsuwa) and have constructed temporary shacks at Hungwe. Efforts to make them move to the planned fishing villages have failed. The two

camping sites are closer to the Nyawodza River which makes it easier for the fishermen to reach than when they have to use their own harbors for landing. In addition most buyers have followed the fishermen to those temporary camping sites to ensure that they get fish quickly.
Fishermen realize that fish 'poaching' is risky business but they say there is no alternative these days if one is to survive. The law abiding fishermen who use the designated exit points sometimes land on the shoreline without a single kilogram of fish. Some may even come out with a single fish which they reserve for the day's lunch and supper.

For others who are in the cooperatives of Nyawodza and Gache Gache and those who go to closed areas, the situation is very different. Those in the cooperatives complain that the independent fishermen are encroaching onto their fishing grounds; not only poaching fish but also stealing canoes, nets and their fish. Despite that disadvantage, their catches are very much higher and their levels of income, compared to the independent fishermen, far better.

Independent fishermen who are brave and enterprising, on the other hand, get a lot of fish from their own nets and from the nets of cooperators and, therefore, are assured of a decent income everyday. They also go to the closed areas in order to increase their incomes so that they can earn as much as cooperative members, or even surpass them.

There is a lot of activity in such busy fishing camps as the five mentioned above. Commoditized as fish is in the Eastern basin, as is the case in the other large and busy fishing camps of the Kariba Lakeshore like Mujele further down the shoreline, there is a lot of trade in fish and a variety of other goods. Despite the poor communication infrastructure, the eastern basin remains the most easily accessible fishing zone on the Kariba shoreline from Kariba by the District Development Fund (DDF) ferry or by Anchorage Marine.

Because of this, many independent fish traders prefer to buy their fish from there than from any other areas. In addition, I & J prefers to trade with the eastern basin fishermen because of the short distance the company boats have to travel to buy fish which cuts fuel costs as well as travelling and subsistence allowances for the crew members. Thus, there are market induced pressures to maximise income by increasing catch size and this can be done by illegal fishing.

There is nothing for free in the fishing camps and the price of basic commodities has soared. For the past ten or more years prices of basic groceries have always been almost double the prices asked for in Kariba just across the lake, mainly due to transport bottlenecks and poor road infrastructure linking the fishing camps to the town of Kariba across the lake to the north. Fishermen argue that they can only meet the high cost of living in the fishing camps by going to the prohibited areas where they are assured of a lot of fish to sell to traders who do not want to spend too much of their time in the fishing camps.

The traders can also make special arrangements with fishermen so that they get as much fish as they can in the shortest period possible. When offered hard cash in advance, or when promised instant cash for fulfilling a bulk order, some fishermen are prepared to take the risk and go and fish in the closed areas.

Within such a commodity oriented environment in which the individual's primary aim is to maximise *'commercial exploitation'* and not meet subsistence needs, conflicts over the natural resource in question can arise:

> *'At a superficial level the diversion of resources from subsistence needs to the demands of the market generates conflict between commercial interests and people's survival. At a deeper level, the diversion of resources from nature's economy of essential economic processes to the market economy of commodity transactions generates ecological conflicts.'* (Shiva:330)

Shiva continues to note that it is generally the *'market mechanism and the invisible hand that drives it that underlies the choice of new fishing technologies and the harvesting patterns which they involve.'* (ibid:313)

3.3 Fishing Boundaries

Most of what has been said in relation to the independent fishermen's disregard of closed areas also applies in their violation of fishing boundaries which they share with their neighbors. But, in addition to that, fishermen also complain that cooperatives are favored by the authorities. They see no reason why cooperators who are numerically inferior should be given a larger fishing ground with more fish resources than theirs.

The eastern basin fishermen in the five camps also want to get the same material and financial assistance which the cooperatives received from the government and non-governmental organisations during their formative stages. Some fishermen argue that they go fishing in the prohibited areas because before the war those prohibited areas were part of their official fishing grounds and they were only prohibited from going to those fishing grounds for security purposes during the war.

The fishermen claim that they were surprised when the DNPWLM refused them the right to fish in those old fishing grounds. A Kenyan delegation member on a working field visit asked the fishermen what they were doing for their livelihoods before the construction of the Kariba Dam. The fishermen responded by saying that they used to fish in the Zambezi River but when the Lake was inundated they started fishing in the Lake from the Sanyati Gorge up to the Nyawodza River mouth together with Irvine and Johnson (I & J).

Irvine and Johnson are a major player in the Kariba fish industry as the largest buyer of fish from the artisanal fishermen, the largest Kapenta operator on the lake, the largest concessionaire involved in gillnet fishing and also one of the largest players in the frozen foods industries in both Zimbabwe and South Africa. During those years, the fishermen recall, they were fishing without any boundary and they were surprised when the boundary system was put in place.

They also say that before the cooperatives were created they used to share the fishing grounds, which have since been allocated to the cooperatives, together with Irvine and Johnson. It was only after the creation of the cooperatives that they were told to stop fishing from those fishing grounds. To them it is very disturbing that they can be refused entry into their traditional fishing grounds by foreigners whom they had agreed to accommodate. As far as they are concerned most cooperators are of Malawian origin and they should not benefit at the expense of indigens.

As such, some fishermen consider their use of these disputed fishing grounds as legitimate. They vow that they will continue to illegally use the area for fishing at night until a fair settlement of the issue is reached. They have discussed the matter with the authorities, but nothing has been done about that.

3.4 Fishing Licenses

Over the years the human population within the fishing camps, and that of fishermen, has been increasing markedly. Sanyanga, 1994, attributes this incremental trend in the number of fishermen over time to the relaxed controls in the issuing of permits; with the District Council issuing permits on the basis of demand, without consultation with the DNPWLM to get expert and technical advise. That can explain the increase in the number of legal fishermen.

The increase in the number of licensed fishermen naturally implies an increase in gear and, therefore, effort with each boat having approximately two crew members. This, and the resultant congestion, could be responsible for the decline in catches in the designated fishing grounds which in turn is forcing fishermen to go to prohibited areas and fish beyond their allotted boundaries clandestinely.

The increase in the absolute numbers of people in the fishing camps, especially those without licenses, needs an alternative explanation. It seems this has been caused by the changes in the rules and regulations governing settlement, residence or 'citizenship' within the fishing camps. Settlement in the fishing camps before independence was strictly controlled. Only licensed fishermen were allowed to stay in the villages. Wives and children were supposed to stay in the communal areas and just pay occasional visits to the

husband.
Relatives and friends were to seek permission before they were allowed to put up in the camp, and had to stick to a code of conduct of the local kraal head (sabuku) who was, and still is, the traditional representative of some chief in the adjacent communal areas of Hurungwe, Binga and Nyaminyami and Omay. A fishing permit and a residential permit could only be got through the recommendation of the sabuku and could be withdrawn in case of misconduct or violations of the regulations.

The names of the five fishing camps are actually names of these communal chieftains and the camps were created as part and parcel of a compensatory package for the people who were displaced by the inundation of Lake Kariba. The chiefs were supposed to control immigration and to make sure that fishing regulations were adhered to. This was done by the sabuku on behalf of the chief.

After independence, movement of people was allowed and some people started to stay together as families; although some still go to the communal areas to visit their families there because they have agricultural interests there since agriculture (ie. livestock rearing and crop cultivation) is still illegal within the fishing villages. With the problem of high unemployment within the adjacent communal areas, and the country in general, there has been a lot of immigration from both these communal areas and the country as a whole. You get people from all the country's provinces, near and far. Most people confess that they came to the fishing camps because they failed to find employment elsewhere, especially in the major urban centres.

With the easing of controls family members, relatives and friends can come to the fishing camps and stay for as long as they want with the fishermen. Most of the immigrants are young, literate and adventurous school leavers who have joined their kin. Agriculture is prohibited except for the small irrigation scheme -(kuMagadheni) and economic and income generation opportunities are limited. This forces some of these young men to be employed by the licensed fishermen thus bringing in a relatively new phenomenon, that of 'proletarianization'.

Some licensed 'fishermen' are now fishermen in name only or insofar as they possess boats, nets, and licenses which are written 'fishing permit'. They do not go fishing themselves, instead the actual fishing is done by these employees. It is from this group of non-license holders employed by others that you get the majority cases of illegal fishing and violation of stipulated regulations and controls.

This seems to be associated with the 'sharing arrangements' within the fishery whereby the workers get a share of the catch whilst the owner gets the bulk of the fish. The unlicensed fishermen can throw their own nets without the risk of being arrested as they are now recognised by the authorities since each permit holder is now allowed to have two workers.

In addition, the workers can take the risk of going to the prohibited areas because they have nothing to lose when arrested. The gear which is confiscated or sunk belongs to the licensed employer and it is generally accepted that it is the owner who is responsible for the release of the worker through the payment of a fine. It is not very clear as to whether all the employers sanction the illegal activities of their workers, but it has been observed that three employers actively assist their workers with logistics of fishing in the prohibited areas.

There are no banking facilities within the fishing villages although there is always a lot of money circulating within the villages which makes it extremely difficult for the fishing communities to save, especially given that they have to buy everything they require on a daily basis at highly inflated prices except for fish.

In any case, they pay $100 per year (some consider the amount 'peanuts', given their incomes) to be able to get the fish legally, and they have to labour to catch the fish and they take great risks. Not only are they exposed to hippopotamus, the elements (waves and storms), and sinking on the lake, they are also exposed to elephants, buffaloes and game scouts on land.

As for fish-driving one just needs to go to the landing sites after 1100 am., or towards sunset, and observe on his or her own. One can observe

that the practice is rife. The practice is mainly done by those who fish on the officially designated fishing grounds in desperate efforts to increase their fish catches. Those who go to prohibited areas also practice fish driving in order to cut the time they spend in the areas, thus minimizing the risk of getting arrested.

Lastly, a lot of illegal traders have been arrested within the fishing camps or when they have already gone as far as Hurungwe with their fish. Fishermen carrying fish considered to be too much for domestic consumption have also been arrested whilst on their way to their communal homes or to town on the suspicion that the fish would be meant for sale.Confiscations of such fish have been made quite often.

Records from the fish-guard currently employed by the Gache Gache Fishermen Association as well as his oral revelations are very informative. They indicate the names of individuals who have been arrested for various offenses in the past; as well as the dates, times of the day, and the locations at which those arrests were made. In addition, the problems confronted by the guard and course of action taken for each offence is also recorded.

4. OFFICIAL RESPONSE

Evidence shows that since the 1960s up to date there hasn't been much change in relation to the official response to the continued abrogation of laid down rules and regulations governing the fishery. A person caught flouting regulations today is invariably arrested by members of the management section of the Department of National Parks and Wild Life Management (DPWLM) or the Zimbabwe Republic Police (ZRP) who confiscate or sink the culprit's fishing gear and take him or her to the police. The person is then prosecuted, and depending on the gravity of the matter fined or jailed.

Success in the management and regulation has always been measured in terms of the number of arrests, the amount of money paid in the form of fines per annum, the amount of gear sunk or confiscated eg. the number of boats confiscated or the total length of nets seized. It seems this is not very different from the colonial practice as illustrated by the Director of the DNPWM's 1968 report on Binga:

> *'Poaching, particularly in the Tribal Trust Lands continued to be rife. Staff were successful in apprehending 24 Africans, who were prosecuted under the Wildlife Conservation Act, with sentences totalling 342 pounds, or alternatively, 43 months imprisonment with hard labour being inflicted. In a further case the accused was sentenced to a fine of 15 pounds or three months suspended for three years, and one accused was discharged. The closest liaison with the British South African Police (BSAP) has been maintained and members of staff have participated in various exercises which have been undertaken from time to time.'* [p.22]

In the same report, but in reference to a different area altogether in which only 11 convictions were made out of 34 arrests for a variety of fishing offenses, the same Director, suspectedly out of fear of being castigated for not having done enough continues to assure his audience :

> *'Illegal fishermen have, however, not got off as lightly as these figures might suggest. Some 8 000 yards of net, three metal boats, four dugouts and twenty five bark canoes, as well as large amounts of dried and fresh fish have been confiscated.'* [p.24]

After independence the authorities continued to respond to the management problems of the artisanal fishery in the same way. People found violating fishing regulations are arrested, their gear is either sunk or confiscated so that it can be used as an exhibit during the individual's trial. Game scouts are armed and they are authorized to shoot, and sometimes fishermen report about their mysterious escapades after having been fired at and chased by the game scouts in the closed areas.

In their paper entitled 'The Creation of Property Rights in Lake Kariba' Machena and Kwaramba, 1994 make it clear that there are

serious problems with the management approaches which have been used in the past. Not only are the mechanisms employed by the resource managers failing to cope with the persistent abrogation of laid rules and regulations, they are also failing to answer questions of fisherman's security and the equitability of the mechanisms of sharing the fish resource base which we noted as being very important in terms of shaping the people's attitudes towards the resource base and therefore their resource exploitation patterns.

In addition to that, it has become apparent that the management regime which was in operation is costly in terms of manpower as well as the logistics of enforcement and financing operations, especially in this age of economic structural adjustment programmes. It is out of this realization that the need for institutional change in the management of the fish resources in the lake is now being called for.

Machena and Kwaramba isolate two main problems within the fishery and these are the *'lack of effective state control in the inshore fishery (which) has put management of this fishery into crisis. The fishery is now 'effectively' in an open access state with attendant problems of competition amongst resource users, overexploitation and lack of accountability.'*

A number of reasons are given for this state of affairs:

a. fishermen's control over the fish. This is considered to be the primary reason;

b. the break down of pre-independence system which gave the traditional chiefs control over the waters fished by their subjects;

c. the worsening economic climate eg. the Economic Structural Adjustment Programme (ESAP), unemployment, the low input costs required for one to enter into the fishery, the problem of accessing some of the areas which enables people to fish without being detected, and the occasional droughts which make fishing an activity of last resort; and

d. the Department of National Parks and Wild Life Management (DNP&WLM)'s lack of sufficient resources to monitor and control the fishing activities.

Implicit in the above is a failure of a top-down, centralised, bureaucratic, paternalistic, regulatory/control system of natural resource management ie. a resource management regime characteristic of virtually all land/resource use systems meant for the 'native' of colonial Zimbabwe. As such, institutional arrangements being proposed are a response to a problematic and not an altruistic measure to improve the livelihoods of the fishing communities or a reflection of a genuine desire to empower these communities and to enhance their meaningful participation in the development process.

The changes are more instrumental and/or manipulative in the following senses:

a. they are meant to reduce the transaction costs of the state, used mainly in the field of policing and enforcing regulations; and

b. they seek to motivate the local communities through so-called 'security of tenure' and 'empowerment' to assume the above responsibilities.

Current trends in natural resource management do not necessarily conflict with the proposed changes in terms of the modus operandi, but in terms of the motivation and the spirit behind the changes. The concepts of proprietorship, empowerment, participation and involvement seem to be coincidental rather than playing the role of motive force in the whole game.

The deliberate need to empower people and to enhance their participation and involvement in the determination of the courses of their lives as part of a democratization process - devolution, decentralization, deconcentration etc as variants of this process - is silent on the deliberations of the proposed changes and is invisible in the actual implementation of the changes on the ground. Key participants also seem to be very ignorant of the concepts or they do

not believe in their efficacy and desirability in development.

5. THE FISHERMEN'S RESPONSE

It seems fishermen are more worried about the fate of their gear than the actual arrest or having to pay a fine. As far as they are concerned, the arrests are legitimate since they will have knowingly violated the law. Getting arrested is part and parcel of the game. To them, getting arrested is just one out of a multitude of risks that they face in the process of executing their duties. It is put in the same category as having one's nets being torn or dragged by crocodiles, being stolen or having one's canoe being destroyed by a hippopotamus.

Whilst some of the above represent loss of valuable assets, they do not think it is humane for a human being - especially a law enforcement agent - to be responsible for the loss of assets. Fishermen are unanimous that the sinking of gear or its confiscation represents insensitivity and cruelty on the part of the authorities. For them such practices deprive them and their families of their livelihoods after paying the fines. Several fishermen complain using what have now come to be standard expressions of their common predicament as fishermen:

> *'Zvino ukanyudza dingi rangu, wotora ndangara dzangu unofunga kuti ndinoitasei? Unenge watondiurayaka? Nyangwe ndikaenda kujeri handiti pandinobuda ini nemhuri yangu tinofanirwawo kurarama? Saka zvinotorevaka kutanga patsva. Ndavakutofanira kutenga dingi rimwe nendangara dzimwe. Zvino nekudhura kwavakuita zvinhu ndinoiwana kupi $3 500 yokutenga dingi rimwe? Uye nekushayika kwendangara kutoreva kuti ndinotopedzisira ndava kutoshandira vamwe. Utsinye wemagemu chete uhu. Handifungi kuti zvavanoita ndizvo zvavanotumwa nevakuru vavo.'*

The protest can be translated to the following:

> *'So if you sink my canoe and confiscate my nets what do you think I will do? It means you will have killed me. Is'nt it? Even if I have to go to jail is it not that my family and I have to survive as well? So it means starting afresh all over again. I am automatically forced to buy another canoe and some more nets. But then with the expensiveness of things these days, where do you expect me to raise $3500 to buy another boat? Furthermore, with the prevailing shortage of nets it means I will end up having to work for someone else.'*

Fishermen also feel they are not treated fairly through these measures. Thus they also use an analogue throughout the fishing camps:

> *'Say you happen to be driving your car within this village and you run over a person, is your car confiscated or it is only you who is arrested.'*

The other issue which causes fishermen's resentment towards resource managers, and authorities in general, relates to what fishermen consider to be disciminatory treatment which they contend favors other resource users. For example, they wonder why Kapenta operators who are found poaching in some areas are allowed to pay a fine and go without their gear being confiscated or sunk. To them that explains why kapenta operators continue poaching in the very same areas they are regularly caught. As far as the fishermen are concerned the explanatory variable is that the other resource users are treated differently simply because they are rich.

A key informant is convinced that despite the risks associated with fish poaching, the fishermen will continue to go to the prohibited areas of Nyawodza River and Sanyati Gorge. For him fishermen are risk takers and are not very much concerned about what happens when they go out fishing. They are not scared:

> *'Not with fishermen! There are greater risks than those associated with the game scouts and beside that we need to*

survive. We need to feed our families. We do not have jobs and our designated fishing grounds are no longer capable of giving us anything. On a bad day you can come out of the lake with nothing. But not when one goes to the Nyawodza River. There is plenty of fish there.'

'Moreover fishermen are now very experienced. Now they know how to evade capture. They no longer camp in the bush for some days poaching until they have reached the quantities of fish they will have promised fish traders who used to stay behind in the camps while the fishermen went out poaching for some days. They leave the camp around this time (1500 Hrs) for the targeted poaching area, hang around for some time until around 2000 hours. After that they throw their net and drive the fish. It does not take a lot of time. By 0500 Hours they will be at the Tsuwa (Island) selling their fish. That's over!'

Artisanal fisheries in certain areas of the Kariba Lake shore are feeling the territorial pressures of other developmental activities, notably tourism on the land side. J. Bacle and R. Cecil note that this is a generalizable phenomena which has the potential of *'forcing the artisanal fisheries communities to yield ground, and also..(has)..a negative impact on both the environment and resources. If the artisans are not protected,the problem grow more acute.'* (Bacle and Cecil, 1989: 7).

Three safari operation have sprung up on the west and eastern side of the fishing camps and the fishermen are convinced that the authorities are being *'bought by the safari operators'* so that they cede land to the operators at the expense of the fishermen. One of the safari operators operating from the Sanyati Gorge is reported to be dragging fishermen's nets claiming that the nets are in his front yard. According to the fishermen, this is contrary to an understanding they had reached with the operators when he came seeking for permission to establish his safari operation. Then, the fishermen were told that the safari operation would not interfere with their fishing operations but would actually help them since the operator would open a supermarket which would enable the fishermen to buy their groceries at reasonable prices.

After establishing the safari operation, the owner now calls the fishermen poachers and accuse them for interfering with his operations. The operator does not tolerate black visitors at the safari and any black person who dares go there is likely to be shot at. Fishermen also allege that the game scouts are now closely collaborating with the safari operators because they are given free beer and food and when they get drunk they become trigger happy shooting at the fishermen and generally harassing them in the process of trying to appease the safari operators.

An operator is also accused by the fishermen for taking photographs of their womenfolk while they are naked and for also shooting their dogs.

Bacle & Cecil, 1989 have observed that the combination of gear concentration and catch sharing arrangements disadvantage the crew members (the workers) vis-a vis the owners (license holders). On the Zimbabwean side of Lake Kariba these observed bottlenecks are compounded by a general sense of insecurity and a complete lack of convenient local banking facilities which, coupled with the artisanal fishermen's own spending habits, the high costs of consumables (a direct result of the communication and infrastructural deficiencies), and the resultant chronic indebtedness make it very difficult to save. All of these factors seem to be proximate to the resource use patterns prevailing on the Zimbabwean side of Lake Kariba.

Schepens, quoted by the two above notes that there is a general prejudice against artisanal fishermen:

'Society often considers the fishermen as marginal. They work, live and die, literally on the margins of society. They live between the (lake), and its dangers and infertile lands. They are often considered to be dirty, ignorant, drunkards, and the like. Many

government agencies do not visit fishing villages other than for political reasons and they do so with the greatest reticence.'

On the Zimbabwean side of Lake Kariba, such prejudices also exist and these tend to make the relationship between resource managers and the artisanal fishermen problematic. Every fisherman is considered inherently criminal. Fishermen are suspected of being poachers or of collaborating with poachers. Communication between fisheries researchers and the resource users is also very poor. During our stay in the fishing camps we never met a single officer in the fishing camps and most officers seem to be sceptical about the appropriateness of the proposed institutional changes given the *'criminal nature of fishermen'*.

There are also a number of problems that confront artisanal fishermen which have more to do with processing and marketing of fish. These seem to affect artisanal fishermen the world over (Bucle & Cecil, 1989). Thus the Kariba fishermen are not an exception in this regard. These are related to infrastructure ie. roads, transport, ice, storage, etc which normally result in the deterioration of fish, the impact of physical geography eg. heat, rain and humidity accelerate the deterioration of fish and impede the desirable processing of catches. Another problem is that of the cost of the actual processing itself eg. the cost of processing material such as salt and firewood.

6. CONCLUSION

'Economic development must take into consideration the human nature of the people who live in fishing communities. The fate of a project may rest solely on individual or collective socio-cultural norms and expectations of the people that are involved' (Bucle & Cecil: 47). Moreover there a variety of other factors whch influence the individual and collective attitudes of resource users towards the resource base, as well as towards the institutional mechanisms put in place to manage the resource. Such attitudes influence the resource use patterns and, therefore, to a large extent determine the sustainability of user practices.

In the context of the Lake Kariba Eastern Basin fishery, it seems that macro economic performance in terms of employment, migration patterns, sharing arrangements as well as the weakening of both traditional and state regulatory mechanisms have tended to have a very negative impact on the resource base. Spatial factors are also at play which makes the eastern basin markedly different from the other fishing camps which are confronted with infrastructural and communication problems. Such camps seem not to experience as acute resource conflicts as those in the eastern basin. In addition, there is less violation of fishing rules and regulations in those camps when compared to the eastern basin.

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3.1.3 Towards a New Management Regime in Zimbabwe's In-shore Fishery Lake Kariba

LAKE KARIBA
INSHORE FISHERY MANAGEMENT:
Experiences, problems, and opportunities

Kefasi Nyikahadzoi

INTRODUCTION

The management of the inshore fishery resource in Lake shore communities is crucial to the continued existence of the communities occupying these areas. If their exploitation is kept within the limits defined by the surplus growth capacity of the fish stock, they are capable of providing sustainable benefits to the Zambezi valley communities. Unfortunately, there are a number of social, political, cultural, and economic factors that have prevented these marginalised communities from fully realizing the potential of the fishery resources.

Under the colonial rule in Zimbabwe, the state through its Department of National Parks And Wild Life Management assumed control and management of the lake fisheries in order to prevent over exploitation of the fisheries. Despite strict management regulations adopted in the gill net fishery, there " continued to be a slight long term downward trend in the total catch" (Jackson, 1991). There are so many possible causes for these failures of management regulations, such as human population increase with consequent increased demand on the fishery, lack of money and manpower within the Department of National Parks to police the resource, and the imposition of western models of management which are inappropriate to the Zimbabwean context. It is likely that total fishing effort available will increase due to population increase and the threat of over fishing will become greater unless an appropriate management can be implemented.

People of the Zambezi Valley are marginalised as result of the colonial land tenure act. They were therefore forced to move into ecologically fragile areas, and their first priority was survival and could not afford to plan for the future (Sida, 1992). It is said that only after the poor have raised enough income can they turn their attention to long term sustainability of the resource. Arguably, this situation conditioned the attitudes of state-based resource managers towards the fishers. Their assumption was that the fishers have little concern for the resource or the future of the fishery. This attitude influenced their approach to fishers. When designing regulatory measures, the fishers' interests was not identified or represented. This resulted in confrontation between the government and the fishers. Consequently the confrontation has degenerated into a conflict between what is good for the fish and what is good for the poor.

Traditional consensual arrangements and informal systems of social sanctions used in maintenance of common property resources have been replaced by modern legal and centralized administrative measures. This marginalised people's local initiatives in Natural Resource Management (NRM.) It alienated the traditional custodians from the resource. (Jodha, 1992). Fishers are adept at getting around effort regulation as long the social cohesion is slackened by public interventions (Panayotou, 1982). As long as the income they generate is below the minimum acceptable income, there would be no incentive for fishers to comply with the fishery management regulations (Johnston, 1990).

Regulation to restrict fishing effort often causes unexpected distortions. Fishers attempt to avoid the intended impact of the regulations (Spulber, 1982). This paper identifies and explores the existing socio economic responses of the fishers to various management instruments as currently maintained by the Zimbabwean authorities. The paper will then review the possibility of using community management approaches in lake Kariba.

RESEARCH METHODS

Evidence presented in this paper is based on the field work conducted during the months of May to November 1994. Additional data have come available through the work of other researchers and they are referred to and discussed. Relevant literature, particularly archival material on use, and regulations was reviewed. The baseline study undertaken in June and July 1993 also provided essential data on

fishers' perceptions regarding current management regulations. Map 1 indicates the location of districts and villages under study.

The study involved a number of sensitive issues which could not have been covered through structured surveys. Therefore, participant observations was combined with participation in fishing activities to see for example, to what extent illegal fishing methods such as small mesh size nets were used.

Group interviews and focussed group discussions are appropriate for certain sensitive types of social information that otherwise were likely to arouse suspicion and generate poor quality information and analysis. Discussions were initiated as and when opportunities arose. For example, where small groups of fishers were at work at the harbour, mending nets or at their homes. Group dynamics exhibit self-correcting mechanisms. While one fisher put across an overly favourable picture a peer would give a more realistic and balanced observation. These discussions were guided by a check list of questions designed to elicit fishers' attitudes towards specific state regulatory policies. Included were:- mesh size control; area closures; and licensing.

The following questions were asked:

1) Is the control of fishing working today?
2) Should there be other regulations?
3) Could you manage the fishery resource, and how would you organize it?
4) What help would you need from the authorities?
5) Do you think government know what your needs and problems are?
6) What is the present status of the resource?

The observations and reactions of key informants were used to triangulate across methods to cross-checking responses and validate convergence of opinions and evidences. Key informants included school teachers, nurses, fish guards, and local leaders.

TENURE SYSTEMS

In terms of section 72(1) 83 of the Parks And Wild Life Act, the Department of National Parks And Wild Life Management (DNPWLM.) is the ultimate authority which controls and manages the gill-net fishery. At the Rural District Council (RDC.) access to gill net fishery is administers by the Binga and Nyaminyami RDCs. These councils are responsible for issuing an annual licence to fishers. Under this arrangement the headman recommends the renewal of licenses and supports or rejects the applications of new entrants to the fishery. The District Council receipts the application and then advises the Department of National Parks to issue a license. Fishers then hold a copy of the application form (case of fishing camps in Nyaminyami) or a receipt (case of fishing camps in Binga) as a temporary permit. The permit from the DNPWLM is issued sometimes much later. Lake Kariba Fisheries Research Institute (LKFRI) has advised the two RDCs on delineation of fishing grounds and concessions and their allocation among fishing camps. The RDCs employ fish guards, who police the resource. Some of their duties are to check on the mesh size, the total number of nets per licensed fisher, to ensure that unlicensed fishers do not access to the resource, and that fishers and their workers fish within the defined concessions. The fish guards report to the District Councils or LKFRI.

ORGANISATIONAL STRUCTURE OF THE INSHORE FISHERY

Gill net inshore fishery was established on Lake Kariba soon after its construction. Historically, two types of fisher organizations were established on the Zimbabwe side, these were a) the local fishers operating from council lands and b) the European concessionaires operations adjacent to State lands.

The inshore fishery along the council area, is being exploited by fishers resettled from the communities displaced the impoundment of the lake. They are currently located in over forty camps along the lake. Historically, each displaced chief was allocated a fishing village which he controlled and was occupied by his subjects. Each village had an appointed Headman (the SaBhuku) who reported directly to the chief. Besides recommending on the allocation of fishing licenses, the headman was also supposed to enforce the

3.1.3 Towards a New Management Regime in Zimbabwe's In-shore Fishery Lake Kariba

exclusion of other fishers from their camp. This system therefore gave the headman authority over and responsibilities for fishery management. In addition, the headman had the traditional role of presiding over disputes.

The European concessionaires fished exclusive concessions and were mandated to buy from the local fishermen. European fishing was established in several concessions along the Lake utilizing contract workers. Besides exploiting the resource, it was expected that theses concessionaires would provide local employment. They were also expected to provide reliable data for estimating the potential of the Lake. At independence, many of the contract workers attached to former European concession areas formed cooperatives with the backing of the state. The are currently being exploited by cooperatives, made up of retired migrant workers and other Zimbabweans (Machena, 1993).

THE STRUCTURE OF THE INSHORE FISHERY

Small scale fisheries are labour intensive using little capital and hardly any modern technology. It is therefore easy to increase fishing effort beyond ecological limits of sustainable use. There are 1229 fishers operating 586 boats and 4899 nets, producing 2.4 tonnes per fishers per year (Murphree *et al*, 1989). Their boats are propelled by paddles.

FISH CATCHING TECHNIQUES IN THE INSHORE FISHERY

One boat is operated by at least two people, one for setting or checking nets while the other will be paddling the boat. Cooperative boats are used by cooperative members also involving joint operation by two fishers at any given time. Independent fishers are allowed to have two workers and as an employer, he/she is expected to provide the working capital for the team. He/she usually collect rent from his/her workers in the form of labour or portion of catch.

Nets are hung on polystyrene floats and weighted with metal and/clay sinkers. They are left in water for two to four weeks unless they have been severely damaged by hippos or crocodiles or fishers decides to change sites. Nets are usually inspected early in the morning, unless this exercise is disturbed by heavy rains or high winds (Bourdillion, *et al*, 1985). During the day, or even at night especially when there is moon light, some fishers spend hours beating the water to frighten and drive fish into their nets. Women and children use hook and line and to fish either for subsistence or to supplement fish for sale.

ECONOMIC IMPORTANCE OF GILL NET FISHERY

Small scale fishery of the lake play a significant role in the poorest parts of the Zambezi Valley. It is important to Zimbabwe, especially to the Valley communities, as a source of protein. The artisanal fishery is an important source of employment and income in Lake shore communities, especially during the periods when other opportunities are almost non existent (for example during droughts). Over 1,200 people are employed in fishing alone (LKFRI Statistical Report, 1994). The artisanal fishery also generates considerable ancillary employment and over 550 traders make a living from the fishery. Employment is also provided by Irvin and Johnson who provides employment for over 100 people who work as fish buyers, processors and marketers of fish from inshore catches (Murphree *et al*, 1989). The small scale fishing communities are in areas where land based activities are limited and transport and communication linkages with the rest of the country is poor. This is worsened by a legislation which forbid fishers to practice any form of agriculture along the shoreline. Lake Kariba is the main source of fish production in the Zambezi Valley producing over 2,000 tonnes per year (Machena,1993). Fishing is carried out both for subsistence and commercial purposes. The fishery is earning over $10 millions to the fishers (using a price of $5.00 per kilogram) and $30 million on retail market (using a price of $15.00 per kilogram), and with the protein equivalent of 6,000[1] dressed cattle (Bourdillion *et al*, 1985).

THE RATIONAL OF CONTROLLING FISHING EFFORT

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Before the construction of the Lake local demand for the riverine fish was low such that there was no danger of over exploitation, because people had a lot substitutes for fish, for example some wild animals and small creatures and plants were used as relish (Scudder, 1965). Following the construction of the lake, the inshore was initially developed without reliable stock assessment as early yields predictions were made without much empirical evidence (Bourdillion *et al*, 1985). Soon after the formation of the lake, there was need to accommodate as many as possible, people displace because the government was concerned with curbing the influx of rural people into towns (Machena, 1993). The number of fishers was allowed to expand, until 1978 when it was realized that although the number of fishers was increasing, the total yield was not and individual catches were becoming poorer (Marshall *et al*, 1982). Size structure of the fish population was also changing. Changes in size structure also brought about a change in the net mesh sizes employed by the fishers. As the fish caught became smaller, small mesh sizes were correspondingly becoming important. Fishing intensity increased as fish caught became smaller. Cash flows were good during the pre 1978 periods, with each village in Sanyati basin averaging $10,000 (at 1978 prices) annually. This situation has changed since 1979 and there is now larger population in the villages. Despite the increased fishing effort, yields have not changed and the catch per fisher has been declining (Marshall *et al*, 1982). This problem is accentuated by the poor agriculture potential and lack of alternative employment opportunities in the vicinity of the village. There was need therefore for the government to intervene to conserve the resource base and mitigate the inevitable effects of overcrowding. The problem is accentuated by the restricted productive potential of Lake.

Fish production in Lake Kariba is very low when compared to Zimbabwe's other lakes and dams. Lake MacLlwane produces at least ten times more fish than Lake Kariba per unit habitant (Kenmuir, 1989). A number of factors help to explain this phenomenon. First and foremost Lake kariba has limited areas with shallow waters thus making it less conducive as far as fish production is concerned. Secondly, the Chobe swamps above the Victoria Falls trap nutrients leading to decreased nutrients status of the Zambezi river which provides 78% of the Lake's water. Thirdly, catchment areas are not rich in nutrients. Most of the catchment area is in natural region V with sand and infertile soil as result both nitrogen and phosphorus are limited. Overall Lake Kariba is slightly alkaline and oligotrophic lake with low potential for production (Machena, 1993). It is fear of over fishing and destroying this limited resource which has been the chief motive behind the various regulatory measures imposed on the inshore fishery.

OBJECTIVES OF MANAGING THE FISH RESOURCE

Objectives of managing the resource have been classified under various headings by different authors. In this section Lawson's (1984 page 61) classification will be followed, and additional objectives will be listed last. Following is a list of objectives:

1. Biological: namely to achieve conservation of the stocks by
   - a) preventing fishing pressure which could impair the reproductive capacity of any valuable species.
   - b) avoiding the capture of fish at the age and sizes such that the growth rate exceeds the natural mortality rate.
2. Economical: namely
   - a) to earn a reasonable income for the fishers.
   - b) to achieve economic optimum utilisation of the resource.
3. Socio-economical: namely
   - a) to increase fisheries employment.
   - b) to achieve a regional or rural-urban balance in development of the economy.
4. Redistributional: namely
   - a) redistribute income in a way which enables state to

receive some of the economic rent.

b) redistribute income between fishers equitably in a manner different from the existing system.

5. To reduce overcapacity in the inshore fishery.

6. To increase the availability of large fish for sport fishing.
7. To conserve the marine habitats and marine life for tourists.

Management regulations in Lake Kariba gill net fishery address objectives 1, 5, 6 and 7. These objectives, while well intentioned leave an important actor in the resource conservation scheme, the human beings involved. This is because, the resource managers, being fisheries biologists tend to regulate fishing in the interest of fish. They do not look at the system of fishery resource management and its achievement from the fishers' perspectives. Objectives 2, 3, and 4 have a human concern and unfortunately they were not seriously considered in planning management strategies that are in place.

MANAGEMENT TECHNIQUES THAT ARE IN PLACE

In Kariba's gill net fishery, managers use a diversified portfolio of management instruments to control fishing effort. These include restriction on net mesh size, limits on the number of nets, licensing and area closure, and prohibition of fish driving. Mesh size control aims at achieving the most productive age structure of the stock by allowing immature fish to grow larger so as to be more valuable and possibly reproduce before they are caught. Limiting the number of nets and licenses aims at improving the yield and economic performance of the fishery through direct removal of excessive fishing effort. Area closure aims at improving the productivity of the resource by ensuring uninterrupted spawning. Fish driving is forbidden because it disturbs spawning of some species such as breams. Under favourable circumstances, all these measures can increase yield by increasing recruitment or reducing mortality. They compel the industry to make investment in the stock by cutting down immediate catches to obtain larger catches later on.

EVALUATION OF MANAGEMENT INSTRUMENTS

Unfortunately, there is no strict relationship between catch rate and each of these controllable factors when taken individually. In each relationship several other aspects intervene, some of them depending on the fishers, and others on nature. If such aspects are not fully understood, these factors, which are complementary to those being controlled, will cause enough distortions in the management schemes to bring about failures (Troadec, 1983).

The purpose of this section is to review the main causes of the specific distortions characterizing the main relations used to control effort using lake Kariba's inshore as a case study. In this way, an endeavor is made to identify certain aspects of contemporary fisheries management that have undesired, and largely unforeseen, consequences for fisheries development.

The modern means of resource management that are enforced through an external administration agent have failed in many cases mainly because they are imposed from outside and are not in accord with the community (Wilson, 1982). In the European mode of fisheries management fishing effort is set after evaluating and monitoring production statistics. Although the monitoring and management of fish stock are important as such they alone may not be sufficient for successful long term management of the fishery resource (Gulland, 1983), because of the following:

1. Management by stock assessment excludes the fishers and their society, all of which affect the outcome and performance of the fishery (Molsa and Lindqvist, 1992)

2. Managers of the resource are not well versed in social and economic matters and as results such matters are not considered when designing a management plan.

3. Rules alter behaviour patterns of fishers, by changing the individual's expectation regarding cost and benefit likely to result from his (and others) alternative courses of action. He therefore develops undesirable strategic behaviour that

destroys the possibilities for collective gain.

Licensing

Effort is directly limited to a desired level by requiring that fishers be licensed in order to fish and by controlling the number of licenses which are issued. Access to gill net fishery is administered by the district councils. License are issued to people with historic and traditional fishing rights, that is, those displaced by the creation of Lake Kariba. Licenses are renewed annually, irrespective of whether the terms and conditions of the license are fringed upon.

Advantages of licensing

a) Licensing is providing an important source of data regarding the number of fishers and the total number of nets they have at low cost.

b) Charging a license fee, is providing revenue to cover some of the administrative costs.

c) Licensing can help remove open access and problems related to it.

Shortfalls of licensing

a) Licensing does not in any fundamental way resolve the conflict between collective and private interest; it merely limits and identifies the population in which conflicts exists (Rettig, 1983). That is, the opportunistic behaviour that destroys the possibility for collective gain is not addressed by licensing.

b) License limitation has been made difficult especially in areas consisting of many islands which provide shelter for unlicensed fishers. Most area around the Lake are remote and provide good hiding sites for poachers, making strict monitoring of fishers very difficult.

c) License limitation does not provide future livelihood for sons and daughters of the fishers totally dependant on fishing especially those who characteristically do not have educational, mobility to enable them to move to urban centres in search for work in other industries (Rettig, 1983).

d) Licensing does not specify who would be prevented from fishing if a history of consecutive fishing over a number of years was required to qualify for a license (Scott, 1979).

e) Decisions about the numbers to employ in the fishery is not made on strict economic criteria. Government, for reason of employment, is prepared to accept a measure of inefficiency in order to keep some level of employment for reasons of social and political stability, to which only low income accrues (Mackenzie, 1983). Moreover, Local authorities with the responsibility of controlling access have lost concern for controlling the number of fishers in order to raise as much money as possible through license fees (Machena, 1993).

f) Licensing has created inequalities in income distribution. Only a few who are licensed become relatively well off. Many " people will accept unequal wealth based on differences in skills or information gained through experience and willingness to accept greater risks" (Rettig, 1983). Those denied access are finding it difficult to accept these same inequalities that are conferred by an act of law.

Closed Area

River estuary and other parts of the shoreline (for example, shoreline near Kariba town, parts of Matusadona National Parks, Chete National Parks and a small area near Binga township) are closed to fishing. Justification for closing river mouth is that many indigenous fish migrate up streams to breed. Fishing is not, therefore allowed in breeding grounds, like in rivers and in river mouths to enhance reproduction. Area closure aim at improving the

productivity of the resource and protection of juvenile fish(Panayotou, 1982)

A total of 60 kilometres of the shoreline off the national parks lands on the Zimbabwean side is closed to gill net fishing (Machena, 1993). Justification for the policy of prohibiting fishing off National Parks shorelines are as follows: (See Bourdillion *et al*, 1984)

a) This shoreline provides a breeding reservoir for species such as breams which should remain undisturbed.

b) This shoreline contains valuable sites for research in respect to a variety of aquatic and terrestrial species, and such sites should be undisturbed by fishing activities.

c) Commercial fishing in this shoreline would jeopardize the marine habitat and marine life for tourists.

d) Permanent settlement in fishing villages on this shoreline would create administrative difficulties related to the containment of poaching and environment deterioration.

As a means of controlling total catch or effort, area closures are said to be ineffective, encouraging wasteful expansion of effort as fishers attempt to make the best of the open areas (Panayotou, 1982). The imposition of area closure especially river estuaries forbids gill net fishers from harvesting spawning stock. However the restrictions prescribe behaviour that is contrary to the private economics of individual fishers. It therefore induces undesirable strategic behaviour such that fishers after exhausting the open area, tend to fish in closed areas that harbour a lot of fish.

Mesh Regulation

Regulation stipulate that only gill nets of mesh sizes 100 millimetres and above be used on the lake. The large mesh net permits young fish to escape and hence to grow and contribute to the biomass of the fish stock in subsequent years. It is possible to improve the yield of the stock for a given level of effort to some extent and, consequently, to proportionately increase its yield in weight, and economic profitability of the fishery. In theory, size limits allow for the harvest of all individuals above the size. They typically assume that there will be a significant number of individuals above the size. Small mesh size nets in the long run lead to a reduction in the catches of large mesh sizes affecting household consumption and income.

Problems of Mesh Size Regulation

In the immediate period following the introduction of mesh size regulation, catch rates fall. Fishers are expected to make a sacrifice now for future benefits. This is not economically optimal for fishers who are concerned with maximizing present income. This regulation therefore is attracting disfavour because of its discounting effect to the individual. Fishers tend to bypass such regulation by using as small as one inch nets, making enforcement difficult and expensive given that nets are kept in water.

Another problem with mesh regulation is that, although the expected benefits are easy to calculate using biomathematics, such benefits in terms of changes in stock size or increased yields to the fishers are extremely difficult to detect. The reason is that natural fluctuations in recruitment far exceed the expected changes in yield and stock size and hence mask any benefits. Accordingly, it is almost a matter of faith that such benefits occurs. The problem of communication such faith to a fishing community can be difficult given that fishers have a better knowledge of the stock, their movements, and of fish behaviour that they have gained through experience and exchange of information (Troadec, 1983). This is particularly important as fishers have at their disposal a number of ways of circumventing these regulations.

In Gache Gache, most of the area now fished by independent fishers was originally an Irvin and Johnson concession area who used to fish with smaller mesh size nets (Marshall *et al*, 1982). In 1972, the fishing ground was redesignated. Using smaller nets, the fishers argue that I & J over fished the area and was moved to new grounds, and independent fishers were moved to exhausted grounds

(Bourdillion, 1985). They therefore do not see the rational of using big mesh size nets where there are few large fish to exploit.

The effectiveness of the regulations pertaining to mesh size is difficult to assess or evaluate. This is because, the gill nets are priced out of reach of most fishers, thus leaving them to use home made nets. In such a situation minimum mesh size can be difficult to maintain. On the other hand, even if they could afford the gill nets enforcing, the regulations on mesh size and number still remains a mammoth task since the nets are kept in water and only taken out for repairs.

Restrictions on the Number of Nets per Fisher

Licensed fishers are each allowed to have five nets (in Nyaminyami) and two nets (in Binga). Each fisher is given tags equal in number to the number of nets he has. It is hoped that the use of tags will limit the number of nets used for fishing as any net without a tag will be confiscated. Restrictions on the number of nets owned by one person serve as a means of spreading employment among a larger number of fishers per given fishing effort.

Fishing nets are supposed to be bought from a registered dealer or manufacturer who should keep records of his transactions. This is to allow the DNPWLM to check on the mesh size, and make sure that only licensed fishers get nets (Statutory Instrument 362 of 1990). However, nets are being brought into the country from Mozambique, Malawi, Tanzania in large quantities through hawkers trading and this is difficult to monitor and control. It means people without permits have access to the nets and are in position to fish illegally.

The above discussion does not suggest that gear restrictions, area closures and licensing must not be used under any circumstances. Quite the contrary, the intention here is to emphasis that these type of regulations should be kept to any absolute minimum and used as part of a larger management scheme.

EVIDENCE OF OVERFISHING

Groups of fishers were asked how their current catch compared to that of 1989 five years previous. The time frame of the question was deliberately limited because of the increased likelihood of error in memory for a more distant point in time.

Most groups contented that there is over fishing especially in their fishing grounds. Fishers were then asked to suggest the indicators on the status of the resource. For each indicators mentioned, supporting evidence was gather from either literature or key informants.

1. A drastic decline in the fish caught, following the disappearance of a number of species which fishers used to catch in the past is an important indicator that the resource is over fished. According to Kenmuir 1983, nchilla were common in the Zambezi before the dam was built, and in the early years of the Lake the species comprised a large part of the inshore catch at the Sanyati basin. Like other species in this group (*labeo, labeo altivelis* and *L. congoro*), with the exception of tigerfish, they have declined in importance in the total commercial catch although they remain significant in basin 1 and 2 which have riverine ecologies (Bourdillion *et al*, 1985).

2. The difference in the number of species found in the protected and unprotected shorelines is an important indicator of fishery degradation and associated resource depletion. There is a notable differences between fished and unfished areas. Fished areas have reduced mean length compared to unfished areas. There differences between fished and unfished is attributed to fishing pressure (Machena, 1993).

3. An important indicator of reduced productivity of the fishery is that fishers have to spend greater time to harvest the same or lesser quantity of fish today as compared to the past. Some elderly respondents spoke of days during their youth when it was possible to use a hook and line to catch a plentiful supply of fish. Also despite a major shift from part time to full time fishing by the majority of fishermen in the recent past, there has not been any significant increase in

catch, implying a decline in catch per unit of effort. Fishers, in the past were using only two (90 by 20) five inch nets and catching over twelve kilogrammes per night but now can hardly catch a kilogramme of fish per nights using five nets. Women used to use lines and caught ten to fifteen kilogrammes of large breams a day but now they can hardly catch more than two kilogrammes of small breams.

FACTORS THAT REDUCED FISHERS' COMMITMENT

a) Changes in the set of regulations and designation of prohibited fishing areas. This has instilled a sense of impermanence among the fishers. Communications between the authorities and the fishers regarding such issues as the actual boundary of the fishing ground, is poor, and frequent and genuine confusion is compounded by the fact that the fishery fall under two administrative offices, the LKFRI and the DNPWLM with divergent regulations. For instance, near the Gatche Gatche estuary a number of fishermen were apprehended by officers from the DNPWLM, but they insist that the LKFRI gave them the right to fish in that same area.

b) The changes in boundaries of fishing grounds allocated to independent fishers, the seizure of fishing grounds for example the fishing area near Chete, and the relocation of established fishers in Gatche Gatche means that fishers now regard their present fishing grounds as temporary fishing sites which they must fish before any further change is initiated.

c) The inability of many established fishers to renew their licenses in the Binga District resulted in lack of confidence on the part of the fishers that they will be allowed to fish. The result is a tendency to see fishing as a tenuous and uncertain enterprise because there is no guarantee that a licensee will get the license in successive years. This has introduced an element of insecurity among the fishers, hence inducing fishers to adopt short run strategies that result in the over exploitation of the fishery.

CAUSES OF RESOURCE DECLINE

Those groups of fishers who reported a decline in catch were asked for their opinion on the cause of the decline. The following answers were given;

1. Use of indiscriminate fishing techniques, particularly scooping which they described as sweeping even the bottom of the Lake so that no fish can escape the area of its operation. They pointed out that scooping was indiscriminate such that even the smallest fish were captured. Fishers who use large mesh to capture large fish now claim they cannot compete with such poachers because many of the species they exploit are captured as juvenile.

2. High population growth within the fishing community and movement of people into the community. The present rate of increase in the number of fishers is estimated to be 5.8% per annum. The fishers said as long as alternative employment opportunities are limited, the sons of fishers will follow the careers of their fathers.

3. The breakdown of traditional fishery management and barriers to entry. In the past each village was headed by a headman who reported directly to the chief. Beside presiding over disputes some of his duties were to see to it that no one from another village fish in their fishing ground. The scrapping of traditional powers from the chiefs also meant that the Sabhuku of the camp does not have the management function that he used to have. Therefore, there is poor control of entry such that many people now fish without a permit. The District Councils and the Department of National Parks into which such powers were vested are remote, understaffed and under funded for the to effectively manage the resource.

4. Low monopolistic prices charged for fish by middlemen,

especially in remote areas where there is monopsony in fish market, which lower the incomes of fishers. This then forces fishers to work long hours or more intensively thereby increasing their catches to maintain an acceptable minimum income. In more accessible areas, the demand for fish is high, but the price of fish are determined by the buyer. Fishers cannot increase the price of fish in order to meet demand since it is the buyer's market. Henceforth, to meet the demand the fishers just have to increase their working hours, the only variable that they can manipulate.

5. The cost of living in fishing camps is very high with prices of basic commodities almost double those of retail shops in cities and towns. So for fishers at least to meet the high costs of living engage in illegal fishing. By so doing they are assured of good catch and hence better income

FISHERS' CONDUCT

Fishers operating under the influence of the statutory management regulations and pressure generated internally, (through population growth) have contributed to the decline of their catches. In the process, they have also evolved their own strategies to cope with the declining resource productivity, whose focus is the maximization of private gains from the worsening status of the fishery resource (Jodha, 1992). The following observations were made;

1. There is continuous premature harvesting of the resource. Some people are resorting to scooping which is an indiscriminate way of catching fish of all sizes. Fishers ring net and scoop the whole bay, coves or part of the shoreline. Normally this operation is done at night. Such people are now not worried about the future status of the resource. They catch a lot of fish such that at times they hire a scotch cart to carry the fish. Fingerlings are left on the ground to die, their weight is difficult to estimate, but fish birds normally fail to eat them all, and they go bad. Scooping is difficult to police, because it is done at night between 9 pm and 4 am for fear of arrest. Nets used for scooping are hidden in water. Scoop nets are brought in the valley by fish traders who buy them from Mozambique to barter them for fish. They are two inch in mesh size, strong nets made of thirty six ply threads.

2. Some people are now fishing in closed areas catching fish that would have gone spawning upstream, destroying the resource base. People who fish in protected areas get good catches so it senseless to use small mesh size nets. People who normally fish in protected areas are in most cases workers and former workers of licensed fishers. Nets are set and checked at night. They are removed during the early hours of the morning and both the nets and the boat are sunk before the National Parks starts its patrols. Fish is dipped in salt solution and sun dried. This is done over a number of days, before fish is transported to towns for sale. Women, especially in summer, spend hours cutting off fish that are found in coves from the main water body. They then remove water from the cut off cove. They catch fish of all sizes. Relatively big fish are collected leaving small fish and fingerlings to die. Usually they catch over 40 kgs of fish a day. This practice is said to have started recently following the exhaustion of fish in their present fishing ground. Women who used to dominate the marketing sector now also use hand and line to supplement domestic's income.

3. Fishing is done over night. As of late, there has been a major shift from part time to full time fishing. Each fisher is allowed to have only two workers. The increase in people employed in fishing is certainly leading to lower fishing incomes, less economic stability among the fishers and their workers and this further dissipate the resource. The general trend is that each worker is a fisher with his own nets. The risk involved in this operation encourage workers to have their own nets and become independent fishers. Worker and former workers of licensed fishers interviewed preferred that they rather be arrested fishing for themselves, rather than for their employers. They steal nets from other fishers or buy their own and share boats with friends. The idea of licensed fishers having workers has encouraged many people to poach

fish, and when caught, they always claim to be workers.

4. Skilled fishers are now using their ability to 'see' the invisible prey to catch hitherto trash and inferior species such as the squeakers, the barbels, and silver fish that are of low market value but are still relatively abundant.

5. As of late, there is increased frequency of checking nets, and working overtime. Fishers now resort to fish driving especially at night when there is full moon. This is a desperate measure showing that fish is now depleted. Fish that are currently caught are breams that are found in shallows spawning. Fishers contend that fish have been frightened into deep waters or other areas that are closed to fishing by fish driving. Fish driving was mostly done in the afternoon after checking their net, but fishers are now driving fish even during the night.

6. Fishers move from fishing grounds closer to their villages to other areas, because they argue that their allocated fishing grounds are over fished.

Notes:

1. The figure is arrived at by simple proportion see Bourdillion *et al*, 1985, page 16.

CONCLUSION

Management techniques applied in lake Kariba inshore fishery have shown limited success. Government's conservative motive conflicts with the fishermen's profit motive. Thus fishers feeling that they are placed at a comparative disadvantage tend to evade these management measures. This is particularly easy because effective enforcement of regulation is difficult given prohibitively high costs involved.

Lack of understanding of socio economic variables that are essential in determining the productivity of the resource on the part of managers, leads to misunderstanding and misinterpretation of causes and effect. The focus has been on the fish without studying the mobility of the fishers, their demography, and returns from the fishery and its adequacy to the fishing community.

There is need therefore for the fishery to be used sustainably if continued benefits are to be realised without compromising the interest of the future generations. Given the increased demand for fish as a result of population and economic growth, there is need for new management systems that ensure that exploitation is kept within limits defined by the resource's capacity to yield.

DISCUSSION

The scattered nature and remoteness of the fishing communities exacerbate the problem of managing the inshore fishery making conventional methods of enforcement costly and easily evaded. Thus vesting management in the hands of the community that exploits the resource may probably solve the problem.

Community Based Management Approach

This can be achieved by allowing fishing activity in a geographically and physically delineated territory to be monitored, controlled and supervised by the fishing community itself or by its elected or traditional leaders. However, for community based management (CBM) to be successful:

1. it should take advantage of existing institutional arrangements that are already strengthened through years of dealing with people and natural resources that surrounds them (for example the CAMPFIRE Committees).

2. revenue generated through licensing, fines paid by apprehended poachers or from tourists wishing to use the fishing ground for other purposes should be reinvested into the fishing community. Such an incentive will encourage the fishers to be vigilant when controlling effort. This approach will also resolve conflict between tourists and gill net fishers.

3. intensive campaigning must be done for community based management to gain credence and majority support from fishers. Therefore for the principle to be successful it demands that the fishers must be educated to the purpose, pros and cons of CBM approach. Fishers must be consulted as management plans are being developed.and they must be kept informed of any progress in the implementation phase of any approved management plans. This emphasizes the critical role of extension in inshore fishery management which is largely absent. LKFRI has never had a fisheries development unit\wing.

4. it demands the creation of meaningful and effective communication between managers and the fishers. Extension must bridge between research and fishers and it must carry research results to the fishermen and fishers problems to the research institute.

5. control must be undertaken by the community with full understanding of the finiteness of the resource. Also the user community must have the desire to ensure its survival for future use.

6. it is important to understand how traditional systems can be used to deal with management functions and how outside interventions can strengthen existing management potential.

However, in the short run there may be some perceived problems, that might limit the user community to become owners and managers of the resource. These need to be addressed if the community based management approach is to be successful. Some of the limitations are listed below:

1. Some of the fishers reluctant to play roles in apprehending poachers because they are threatened by witchcraft. bewitched. This is limiting the ability of some fishers to act as managers of the resource.

2. The fish guards being fishers themselves know the problems and need of fellow fishers, hence they tend to sympathize with poacher and those found on the wrong side of the law.

3. Poaching is done at night, it is therefore dangerous for fish guards and other fishers to make patrols in an area where there so many wild animals. In most cases fishers are armed with spears clubs and axes they use when attacked by wild animals, they are therefore dangerous to apprehend at night.

4. Some fishers are not prepared to apprehend their relatives and friends if they see them poaching or using illegal fishing techniques.

5. The historical inheritance of oppressive and top down inshore fishery resource management regulations have alienated the fishers' initiatives.

However, in the long run, when the community fully realise that its to their benefit to guard against ill practices, the is great chance for community based management to succeed.

Effective control and management of the fishery leads to additional profit for those who remain in the fishery. Since the effect of control is to reduce competition for the resource and thus eliminate a certain amount of inefficiency and waste that comes from excessive effort.

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DEVELOPMENT OF A COMMUNITY BASED FISHERIES MANAGEMENT PLAN FOR THE ZAMBIAN INSHORE FISHERY ON LAKE KARIBA

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1. INTRODUCTION

Devising the Inshore Fisheries Management Plan for Lake Kariba is a sub-output of the Zambia/Zimbabwe SADC Fisheries Project. This was actually achieved when a Management Proposal was produced in February, 1994 which was later approved by the Department of Fisheries in April, 1994.

2. CHARACTERISTICS OF THE INSHORE FISHERY PRIOR TO DEVELOPMENT OF THE MANAGEMENT PLAN.

Prior to the formulation of the Management Plan, the artisanal fishery on the Zambian side of Lake Kariba was operated by more than 2.280 fisherman distributed in 278 villages (1993 Joint Fisheries Statistics Report).

These villages were spotted randomly along the lakeshore with some of them comprising only single families. The fishermen and their households were highly mobile in search of better fish catches. See Table 1 showing Basic statistics for 1993.

In the same year the Zambian shoreline harvested 1,196 tonnes with a catch per boat/night of 3.52kg while Zimbabwe harvested 1,280 with a catch per 100m net of 6.13kg.

The Department of Fisheries with its limited personnel, financial and material resources, located at Sinazongwe and Siavonga about 200 km apart, admittedly failed to closely monitor fishing activities on the lake with a total shore-line (Zambian side) of about 1,000 km including 103 islands. This resulted in rampant use of illegal fishing methods including use of small mesh-size gill-nets and Kutumpula (driving fish into nets by hitting water).

Table 1: Basic statistics for the Inshore Fishery of Lake as per Frame survey of 1993.

Basin/Strata	Fisherman	Fishing Villages	Boats	Nets
1	455	55	863	4,131
2	803	91	448	5,721
3	418	44	138	2,911
4	613	88	412	3,069
5				
Totals	2,283	278	1,861	15,832
Totals(Zim)	1,229	41	586	4,899

Extracted from: 1993 Joint Fisheries Statistics Lake Kariba (Project Report No. 36)

The large number of temporary fishing villages and the high mobility of fisherman over-stretched resources of the Department of Fisheries during:

- licensing;
- data collection; and
- Patrolling.

such that the Department of Fisheries could not satisfactorily enforce the fisheries law.

Provision of credit to fisherman, credit recovery and provision of community development facilities like schools and clinics also became unfeasible.

It became apparent therefore that a new Management strategy was necessary that would hopefully;

(i) have a greater impact in the fishery

(ii) have the presence of its implementors felt on a daily basis in all parts of the fishery.

(iii) require reduced inputs in terms of fuels and allowances for law-enforcement efforts.

(iv) increase community awareness and participation in fisheries management issues.

(v) be formulated and enforced with the participation of the fishing communities themselves.

This type of Management is possible when technocrafts in the Department of Fisheries work closely together with the fishing communities at all stages of formulating and enforcing the fisheries law.

2.1 Local Administrative Structures

Traditionally the shoreline can be divided into four chiefdoms; Senior Chief Mweemba from Mulibizi to Ngoma: Chief Sinazongwe from Ngoma to Jongola; Chief Chipepo from Jongola to Siamatuba and Chief Simamba from Siamatuba to Kariba dam wall. Each Chief is assisted by a number of village headmen - one for each village.

Politically the shoreline is divided into three (3) districts with district councils located at Sinazongwe, Gwembe and Siavonga. The district is headed by a Council Secretary. Each district is divided into Wards which are headed by Ward Councillors who sit in the Council Chamber. The fishermen have formed Artisanal and Kapenta Fishermen's Associations.

Non-Governmental Organisations operating in the area include Harvest Help (Zambia), Gossiner Mission of Berlin and World Vision International.

3. DEVELOPMENT OF THE PLAN

The Inshore Fishery Management Plan (the Management Plan) was developed with the participation of all known interest groups along the Zambian shoreline of Lake Kariba. This included artisanal fisherman, kapenta commercial fisherman, fishermen's associations, traditional local leadership, political local leadership, district councils, Non-governmental Organisations and Department of Fisheries.

3.1 Identification of key issues for Management

Key issues for Management were identified at three levels through;

- a Department of Fisheries internal workshop.
- a short term external consultancy.
- a management formulation workshop with all interest groups.

3.2 Review of the Inshore Fishery: Department of Fisheries Internal Workshop.

In order to prepare for the review and ultimate formulation of a management plan of the inshore fishery the ZAM/ZIM SADC Fisheries Project organised an internal workshop for the Department of Fisheries, which was held at Buchi Farm Guest House 13-15th July, 1993.

The main aim of this workshop was to give an opportunity to the Department of Fisheries to have a clear stand on a number of management issues affecting the inshore fishery of Lake Kariba before initiating consultations with outside interest groups. The second aim of the workshop was to give an opportunity to the consultant (Dr. P. Chipungu), who was later to review the inshore fishery, to have an inside perception of the views of past and present members of the Department of Fisheries on management of the Lake.

The workshop was attended by all key senior officers in the Department of Fisheries from Chilanga, Sinazongwe, Choma and Siavonga. Also three former members of the Department participated to give vivid descriptions of how the fishery used to be in the past.

The workshop started with presentations of papers and from discusssions which followed issues to consider in designing a fisheries

management plan were identified as follows;

- community based management
- distribution of fishermen
- enforcement of fisheries regulations
- financial constraints
- political intervention
- institutional aspects
- fish marketing and quality control
- fisheries research inputs

Through working groups problems were identified and solutions suggested for the major issues above. The results of one group working on distribution of fishermen is included in Table 2 as an example.

The workshop concluded with the following recommendations;

(i) that community based management be promoted

(ii) the closed fishing season be introduced for Lake Kariba

(iii) ways be found to utilize under-exploited fish species

(iv) a village regrouping programme be undertaken

(v) there must be incentives to encourage the fishing communities to participate in training programmes.

(vi) preliminary standards for control of fish quality must be set

(vii) centralized fish markets must be promoted

3.3 Review of the inshore fishery

A consultancy to review the inshore fishery of Lake Kariba was concluded by Dr. Patrick Chipungu in November, 1993.

This study included;

(i) a review of literature to trace the history and development of the artisanal fishery

(ii) a review of literature to gather biological, socio-economic and anthropological facts from studies and surveys so far conducted on the inshore fishery

(iii) interviews with representatives of institutions and administrative bodies involved with the management of the inshore fishery and

(iv) interviews and discussions with fishermen and local leaders in order to determine current fishing practices and to identify fishery management concepts as viewed by the fishermen and local communities. Altogether 84 persons were interviewed and 30 references cited. The information gathered was synthesized into recommendations for management.

The study concluded that there was imminent danger of damaging the fishery through unregulated entry, settlement and fishing effort levels.

The study further proposed among other things that;

(a) the Government reviews the role of chiefs and local communities in the management of natural resources (including fish) in their chiefdom

(b) the Government should adopt a community centred management approach for inshore fisheries management.

Table 2. Example of Working Group Results at the internal Department of Fisheries Buchi Workshop.

Group four: Distribution of Fishermen

Identified Problems	Suggested Solution	Strategy
1. Uncontrolled movements		

3.1.4 Development of a Community-Based Fisheries Management Plan Zambian In-shore Fishery on Lake Kariba

Regroup the fishermen to create bigger & more Permanent fishing villages
- Define fishing grounds
- Indicate Fishing grounds on Licence
- Registration of fishermen according to villages
- Hold meetings with local Authorities
- Providing facilities to established villages

2. Small Scattered numerous villages
"

3. Difficulties in provisions of facilities and services
"

4. Difficulties in dissemination of information
"

5. Difficulties in Law Enforcement
"

6. Difficulties in data collection
"

7. Interference with development of other Lake based sectors e.g. tourism, Wildlife etc
"

8. Influx from other fishermen
- control transfers
entry to be through an approved transfer

3.4 Proposed structure for a community centered management approach.

The consultant proposed an inshore fishery management structure that had a Valley Development Committee (VDC) at its apex. This committee would be composed of Department of Fisheries, District Councils, Chiefs, fishermen (50%), local leaders and NGO's.

3.5 Formulation of the Inshore Fishery Management Plan

The Community based Inshore Fisheries Management Plan for Lake Kariba was finally formulated through a workshop that was held in Siavonga in February 1994.

The Plan was a result of contributions through participation of traditional Chiefs of the lakeshore area, representatives from selected fishing camps and the Kapenta Fishermen's Association, District Chairmen and Secretaries of Siavonga, Gwembe and Sinazongwe Districts, Department of Fisheries and representatives from development NGO's and donor funded projects involved in fisheries development.

The workshop started with identification of problems and their solutions. Prioritization of problems; identification and agreement on realistic's practical solutions all in working groups.

Discussions that followed group presentations, finalized agreements on solutions of prioritized problems and the concept of the insitutional frame work of the management plan.

The workshop ended with a Proposal for the Management of the Inshore Fisheries of Lake Kariba. In this Proposal the roles of Chiefs, Management Committees and District Councils were clarified.

4. THE INSHORE FISHERY MANAGEMENT PLAN.

The organisational structure of the Management Plan is as shown below.

Annual
Coordination
by Dof

ZONE 1 TO 4

Zonal Fisheries Management Committee

Fishing Camp Management Committee
Fishing Camp Management Committee
Fishing Camp Management Committee
Fishing Camp Management Committee

The shoreline is divided into four zones according to the Chiefdoms.

4.1 Compositions and functions of the Fisheries Management Committees

Each zone has a Zonal Fisheries Management Committee which is composed of:

- The Chief
- District Council representatives
- Fisheries Development Officer
- 4 Fishing Management Committee representatives
- 2 Kapenta Fishermen's Association representatives
- 1 NGO or development agency representative
- 2businessmen

The Zonal Fisheries Management Committee has the following functions;

- monitor fishing practices
- monitor implementation of fisheries regulations
- draw up development action plans
- sourcefunds
- identify projects/development activities for funding
- examine and approve requests for funding
- manage a revolving Fund

This Committee meets once every quarter.

The fishermen in permanent fishing villages are assisted to form Fishing Camp Management Committees composed of:

- 1 Chairman elected from the fishermen
- 3 elected fishermen
- 1 village headman
- 1 Fisheries Assistant
- 1 Village scout, a fisherman appointed to be an honorary fisheries officer

The Fishing Camp Management Committee;

- recommends fishermen for issue of licences
- facilities and assists in enforcement of fisheries regulations
- assists in selection and desighation of centrally placed landing points for fish for each village

4. Administrative Arrangements and Regulations in the Management Plan.

Part of the cost of Managing the fishery is to come from the resource itself by establishing a Revolving fund that would draw its finances from retaining 60% of the licence fees and 60% of the council fish levies.

The fishermen are to be re-settled in designated and gazetted larger permanent villages.

Each designated fishing village shall have a clearly demarcated exclusive fishing Zone over which their collective management responsibility is granted through their management committee.

Breeding areas shall be identified and protected as non-fishing areas.

The results of initiating implementation of this plan have shown a drastic reduction in the number of fishermen and fishing villages, Table 2.

Table 2. Basic statistics for the Inshore area as per Frame Survey of 1995, Zambia

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

Extracted from: 1994 Joint Fisheries Statistics Lake Kariba (Project Report No. 43)

5. Conclusion

The difference between the Zambian Management Plan and the Zimbabwean Plan (Machena and Kwaramba, 1995) is that whereas the Zimbabwean Plan aims to devolve power and management responsibility to the fishing communities (fishermen), the Zambian plan aims to devolve Management authority only up to the local leadership in the fishing communities. We believe that the fishermen still need to be directed and controlled but at a local level. It is anticipated that full implementation of these community inshore fishery management plans will improve the status of the inshore fishery resources on Lake Kariba.

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IMPLEMENTATIONS OF THE LAKE KARIBA INSHORE FISHERIES MANAGEMENT PLAN ZAMBIA

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1. INTRODUCTION

Implementation of the management of the Lake Kariba Inshore Fisheries proposal (Chipungu and Moinuddin 1994) developed at a workshop held at Siavonga on 31st January - 6th February 1994), did not start immediately in February 1994 as required by the proposal action plan. This was so because the Department of Fisheries needed some time to study the plan before approving it and there was no budget for the programme.

The plan is viewed as a way out to solving some problems in the management of the Kariba Inshore Fisheries which have continued to cause great concern among fisheries authorities, fish consumers, marketeers, traders and fishermen. There is an increase in the use of illegal fishing methods like small meshed gill nets, Kutumpula (fishing driving method) and seine nets.

Two (2) conflicting statements from Biologists who worked on Lake Kariba are of special concern i.e. (Balon 1971 - 1974) reported that the "Inshore fish stocks of Lake Kariba were under exploited." results from his fish stock assessment studies, siting the marketing structure as a major constraint to development and expansion of the inshore fishery of Lake Kariba. On the contrary Marshall and Longerman (1988) biomass of the fish stocks is very low and concluded that, the size of the resource itself was a major constraint to the expansion of the fishery.

One is however, tempted to accept both conclusions as reflecting the true status of the fishery at that time the assessment of the fish stock was done and that the same should have a co-relation to the level of fishing pressure and the kind of fishery management that was in force at each particular time i.e. the fishery was well managed in 60's to early 70's while open access to the fishery since 1980 seems to have reversed the situation, hence the low fish stock sustainable utilisation of the fish stocks of Lake Kariba to the ultimate goal the plan is set to achieve.

2. APPROVAL OF THE MANAGEMENT PLAN PROPOSAL

Department of Fisheries approved the Inshore Fisheries Management Plan without any amendments in April 1994.

3. IMPLEMENTATION OF THE PLAN

Appendix I to this paper is an action plan for the implementation of the Lake Kariba Inshore Fisheries Management plan, which was being rescheduled.

4. IDENTIFICATION OF BREEDING GROUNDS

Lake Kariba Fishery has approximately 49 species of fish. In order to adequately identify breeding grounds, breeding habits of 13 fish species of economic importance were considered "A proposal to close river and other areas of Lake Kariba for protection of breeding fish." DoF report July 1994.
Thirteen (13) species of economic importance are:-

O. mortimeri, T. rendalli, S. codrington, S. macrocephalis, M. deliciosus, M. longirostris, H. longifis, L. altivelis, L. congoro, Disticodus Schenga, O. mossambicus, S. depresirostris and *synodontis Zambezensis.*

(This is in fulfilment of activity 4 of the Action Plan). Different aspects of the Lake Kariba Fishery were considered i.e, the

a) Breeding Habits of thirteen Lake Kariba Fish species

These fish species can be sub divided into 4 groups ie. i) lake breeders, ii) short stay river breeders, iii) long stay river breeders and iv) esturine breeders.

i) Lake breeders

Fish species from chiclidae family are generally lake breeders. These are fish commonly known as (breams). They are one single family that make the bulk of the catch in tropical Africa's lakes and rivers. These species in respect to Kariba fishery are *Tilapia rendalli, Oreochromis mortimeri, Oreochromis mossambicus, Seranochromis codrington.* These breed in water of about 1 metre deep and their fry shelter in shallow vegetated waters. These breed up to four times in a year but have a peak period around August to April.

ii) Short stay river breeders

Species from the family characidae are short stay river breeders i.e. *Hydrocynus vittatus* (Tiger fish), *Brycynus imberi, Brycinus lateralis* and a *mormyrid, Mormyrus longirostris.* The breeding period is normally signalled by flooding rivers, spawning takes place in 2 to 3 days only and will breed nearly in any stream or river that remains flooded more than three (3) days.

Two (2) fish species from different families are well known for long stay breeding in rivers. These fish fry will remain in the river until they are mature. They spawn in permanent rivers that have water throughout the year like Lufua and the Zambezi river. The mature fish only come into the lake for food.

iii) Esturine breeders

Fish species from mixed families. Their movement into estuaries is also signalled by flooding rivers during rainy season. They lay their eggs in sheltered flooded shallows especially *S. zambezensis,* and *M. deliciosus* are primary examples. *H. longifilis and C. gariepinus* maybe in this group also though the latter also enters rivers and streams to breed.

Table 1. Summary of known breeding behaviour of important species from Lake Kariba

Species	Breeding	Breeding area	Nursery
H. forkshalli	Jan - Mar	Rivers	Estuaries
T. rendalli	Cont. (Oct - Mar)	Lakeshore	Shallows
S. codringtoni	Cont. (Oct - Mar)	Lakeshore	Shallows
O. mortimeri	Cont. (Oct - Mar)	Lakeshore	Shallows
C. gariepinus	Oct - Apr.	Rivers	Rivers
S. zambezensis	Oct - Jun	Esturaries	Estuaries
M. longirostris	Oct - Mr	Rivers	Rivers
M. delicisus	Oct - Apr	Estuaries	Estuaries and lake margins
B. imberi	Oct - Mar?	Rivers	Estuaries Lake margins
B. lateralis	Oct - Mar?	Rivers streams	Estuaries
H. Longifilis	Oct - Mar?	Rivers, Estuaries	Rivers
L. altivelis	Nov - Mar?	Rivers	Rivers
D. schenga	Oct - Mar?	River	Rivers

1. From Kenmuir D. (1989).

b) breeding grounds

Arising from the information on the breeding habits of 13 species above the following rivers were identified as major importance to breeding fish as follows:

Major rivers to be considered for closure as important fish breeding grounds

i. ZONE 1 - Senior Chief Mweemba's area

1. Namazambwe river position S17_50.576', E27_05.398'
2. Mwenda river S17_41.794', E10.387'
3. Chinene river S17_37.000'E13.917' and
4. Maaze river S17_26000', E27_20.000'

ii ZONE 2 Chief Sinazongwe's Area

1. Zongwe River S17_.18.400'E27_.27_ 27.2'
2. Sikalamba river S17_11.83'E27_ 32.32'
3. Nang'ombe river position given and
4. Jongola river S16_57.728'E27_41.391'

iii ZONE 3 Chief Chipepo's Area

1. Chezya river S16_48.7' E27_54.5'
2. Chipepo harbour - several small rivers S16_48.7' E27_54.5'

iv ZONE 4 Chief Simamba's Area

1. Nang'andwe river S16_38.38'E27_08/81'
2. Lufua river S16_32.83' E28_31.81' and
3. Nanhunwe river S16_36.00' E28_.27.87'

There are numerous small seasonal rivers and streams that become important fish breeding grounds when they flood during the rainy season. These too may be considered for closure as they also provide shelter to fish fry.

It should also be noted that over 90% of present fishing activities are concentrated in the estuaries rivers and very shallow inshore areas of the fishery which indeed are the nursery of the fishery.

3. The following recommendations were made as a way of protection of breeding fish:-

i. all rivers less than 50 metres width be closed if shoreline is not close

ii. all major estuaries be closed up t 250 metres into the lake

iii. fishing villages and there fishing grounds be separated by buffer zones

iv. irrigation dams on streams and rivers which are tributaries should be constructed with fish passes

v. No fishing within 200 metres of shoreline, but special consideration be made to licensed sport anglers

vi. size limit on fish for sale be imposed, subject to further studies

5. SELECTION OF PERMANENT FISHING VILLAGES

Prior to the commencement of field trips to explain the plan to fishermen and initiate its implementation; a meeting, was held at Sinazongwe from 21st to 22nd July, 1994 to "DETERMINE THE NUMBER AND LOCATION OF PERMANENT FISHING VILLAGES AND THEIR

ASSOCIATED FISHING GROUNDS IN LAKE KARIBA" DoF Report 1994. Considerations were made to the contents of the report of 13th July 1994 on closure of rivers and some areas of Lake Kariba for protection of breeding fish and adopted the recommendations there of. The meeting further reduced the closure of the shoreline area to only 100 metres.

(a) Selected villages

A number of selected villages were grouped together and in Senior Chief Mwemba's area zone 1, twelve villages were selected and fishermen in nearby villages that were not selected, were told to shift into selected villages.

(b) in Chief Zinazongwe's area Zone 2, seven villages were selected. Please see table 2 below:-

Table 2: Grouped Villages zones 1 and 2 only bigger camps reflected

Name of Village	No of F/men	No of boats	Fishing Camps grouped
Zone 1			
Names, Makunka Bashichanda			
1.Makunka	44	43	
2.Twabane	74	25+	Twabane
3.Chibumba	57	64	Chibumba
4.Namazambwe	46	33+	Gate, Mulenga, Machomedi, Chitinti, Syambolola.
5.Lubwelubwe	54	33+	Syapongo, Mailosi, Chibuma, Baschichanda, Syapaka Njewa and Lubwelubwe.
6.Dengeza	33	27+	Chiseki, Chipepo, Makwani, Dengeza and Siamuswi
7.Chimini	39	45	Muuka Chimini
8.Namafulu	35	30+	Namafulu, Chilubi and Namayube Island.
9.Simunyika	37	28	Simunyika
10.Kawama	62	35	Kawama Mashapi Island
11.Siansowa	67	29+	Maze Island Bolden, Siabadenda, Malovale, Kabuya, Siansowa and Welensky Island
12Siatwinda	73	47+	Kabanana, Siatwinda, Kamanga, Chongola
Zone 2			
Muchekusa, Ngoma, Lunchenze and Chikonka Island			
1.Ngoma	57	37+	
2.Simuzila	85	66+	Samara Island, Simuzila and Golila
3.Sinantandabale	89	86+	Mwene, Nzenga, Laka, Boma, Zebra Island, Mukuku, Syambololo, Govembi Island, Trainee Island, Sinantandabale
4.Nang'ombe	70	56+	Sikalamba, Dundumpongo Island, Nang'ombe
5.Mambova	78	70+	Mambova, Chilele, Chimpalaba sland and Syachibatabata Island
6.Sinalilongwe	50	54	Sinalilongwe, Bunda, Chibwe and Muuze.
7.Chiyabi	60	46	Chande, Katondo, Chiyabi and Jongola

In Chiefs Mwemba and Sinazongwe's Areas - Zones 1 and 2 The criteria used to select these villages was the availability of any of the following facilities:- The school road, hospital/clinic fish market and where these facilities are not available, the reasonable number of fishermen resident in the vilage i.e. above 20 fishermen.

(a) Regulation proposed for fishing village are as follows:-

i) The maximum size of village to be about 60 fishermen or 500 people when you consider fishermen and their families.

ii) The fishing grounds to be stretching about 7km from village of fishable waters.

iii) Each fishing ground to have only one central fishing village no temporal camps.

iv) Demarcation of grounds to allow for Kapenta fishermen to fish in offshore deep waters though some deep waters are important to artisanal fishermen.

v) Difference in size of village may vary depending on the number of people the village management committee allows to leave or join the village.

vi) The buffer zone to be one kilometre wide and policing to be the duty of the village management committee.

vii) The fishing village will be independent but affiliated with established agricultural villages under a single village headman. In rare cases an independent headman will be appointed.

viii) The fishing village management committee shall be responsible for all fishing activities.

ix) Each village shall have only one harbour where all fishing boats shall land their catches and park.

x) Each village shall have only one fish market and is required to construct a shelter for visiting fish traders.

xi) Fishermen required to build permanent brick houses preferably of burnt bricks.

xii) Transfers from or to the village to be considered and recommended by village management committees.

** The Chiefs committed themselves to identify persons in villages who would be recommended for appointed as honorary fisheries officers and lists would be submitted to fisheries for action.

* It will be noted that villages in Zone 1 don't have all the facilities especially those in the Mulibizi area. i.e. Makunka, Twabane and Chibumba. These became trading entry points with Zimbabwe and are well populated. Lubwelubwe is totally new also but the community want the village here. Namazambwe and Siatwinda are original fishing camps developed in late sixties, while Siansowa is relatively new but has developed quite rapidly because of a Kapenta Company.

* In Zone 2 all villages are well developed since they had been fishing camps since late sixties except for Simuzila which is new but well populated.

Fishing grounds

Each fishing village has been allocated fishing grounds which are separated from the neighbouring villages by buffer zones. The boundaries of these fishing grounds will have permanent markers. The policing of these fishing grounds remains the responsibility of each village Management Committee.

6. REPORT TO FISHERMEN ON MANAGEMENT STRATEGY

A tour to explain the management plan was made in zones 1 and 2 in August, 1994 this covers all the villages including all that were selected the team comprised of Chiefs, Council, Department of Fisheries staff and fishermen representatives.

Fishermen were told of the plan and that they were to move to respective selected fishing villages by 30th September, 1994. Islands were also visited and residents were told to go to fishing villages of their own choice on the main land as there would be no fishermen allowed to reside on the Islands.

Interim Village Management Committees were formed and their rolls were given. The immediate responsibilities was that of demarcating and allocating plots in villages. Fishermen were to build permanent burnt brick houses.

Several follow up trips were made by Department of Fisheries staff, Chiefs and Council Staff. By 30th September, 1994 about 98% of fishermen had vacated the Islands and also those who were to shift on the main land a good number of them did so.

The fishermen on the islands were essentially going there on patrol. They actually had their homes and families at some village on the main land. These fishermen therefore went back to their village of residence on the main land.

Those that didn't move were mainly those people who came to the Islands as fish traders, poachers, smuggler or Kapenta dealer. These got stranded and this included one member who attended both the Siavonga and the Sianazongwe Management Meetings. Only Samaria Island was still inhabited by October, 1994. In December 1994. Police went on the Island and cleared these people who since then have gone either to Lusuka, Copper belt or else where they were residents. Most of them didn't have their families in the fishery area.

A Social Economic Input into the Plan

As the programme implementation did not have a social economic a consultant was contracted to look into the social economic aspects of the implementation of the plan. Eyolf Jul-Larsen 1995 in his report "The Politics of Resources Management made following recommends:-

1. The involvement of all actors participating in exploitation of the lake and its near shore resources in a political, economical management regime with a careful thought given to rigidity on geographical mobility of artisanal fishermen.

2. That the success of the plan was dependent on the co-operation of fishermen and that dialogue must be maintained between fishermen and the fishermen in order to create more understanding.

3. The Department of Fisheries should be the custodian of fishermen's interests in order to defend them against suppression by other more power lake resources users.

*The Zambian plan is already involving all actors and is more than a Management Plan but a Development Plan which stands a good chance of succeeding.

7. REACTION OF FISHERMEN

A recent visit to the fishery in Zones 1 and 2 and in an effort to maintain dialogue with fishermen as advised by the consultant, two (2) villages have been added to the list of permanent villages in zone 1 namely Muuka and Makwani. Mukunka being an Island has been substituted for Nameso.

In Zone 2 three (3) villages have been added to list of number of selected villages at a request of fishermen and these are, Nzenga, Sikalamba and Chilele village.

8. MONITORING IMPACT AND REACTIONS OF FISHERMEN

A survey of zone two (2) villages shows that a number of fishermen have settled and some are constructing brick houses. See table 4.

Village name
No. of F/Men
No. of Permanent houses
Remarks
1. Ngoma
28
-

Village Management Committee in place, F/men roofing their school using funds from illegal fishing joins old road to market opened

2. Simuzila

60

?

Constructing Health Centre Village Management Committee in place illegal fishing by Kutumpula is presented. Largest village.

3. Nzenga

19

?

Village developing.
Illegal fishing in Zongwe estuary prevalent. 4 Village Management Committee absentee members including chairman.

4. Sinantandabale

21

?

New houses under construction no funds raising yet.

5. Sikalamba

29

?

No development most fishermen still at so illegal site in Sikalamba estuary.

6. Nang'ombe

22

22

All have constructed brick house nearing completion. Village Management Committee in place but one member absent needs replacement no fund raising.

7. Mambova

20

?

Allocated plots not occupied and yet by absentees. Village Management Committee members not resident. Many houses are brick walled.

8. Chilele

25

?

A village shop built, rapid development traders's shelter under consideration. Women's club in place. Village Management Committee raising funds from F/men donors.

9. Sinalilongwe

24

?

Conflicts with farmers over firewood village split. Village has on e uncompleted Market from 1969. Requiring re-roofing Kutumpula prevalent.

10. Chiyabi

35

?

Two breakaway camps i.e. Chibwe and Jongola. Village progressing well houses under construction Village Management Committee want Police to destroy breakaway camps causing problems.

* Illegal camps Jongola, Chibwe, Nagasanga intake Siambololo and Lundinze to be closed. Law enforcement required. Village Management Committee Treasurers to be trained. Second Social work be employed to help Mr. Haamwinde.

Utilisation of Island

Six Islands have been leased to investors for five (5) years which includes Kapenta fishermen. As mentioned in Eyolf Jul-Larsen's report this has brought about mistrust among artisanal fishermen. Department of Fisheries, Council Fishermen, Kapenta operators and the Chiefs have resolved the artisanal fishermen to fish from unoccupied Islands by getting fishing permits from the Council at the rate of K200.00 per day.

Only fishermen in whose fishing (Zone) grounds the Island falls will fish from the Island. Village Management Committee in respective villages to recommend fishermen to get permits.

Issues Requiring Attention

1. Fisheries legislation still unamended see (Appendix.2)
2. Licence fees and fish levy fees still to be made available to fishing villages.
3. Permanent villages to be gazetted.
4. New village registers to be printed.
5. Fishing grounds to be demarcated.
6. Appointment of Honorary Fisheries Officers.

9. FORMATION OF ZONAL AND VILLAGE MANAGEMENT COMMITTEE

** Zonal Committees have been formed and have been meeting regularly using donated funds. Chiefs have ably chaired the meetings and one joint Zonal Committee Meeting has been held.

** Village management committee have been formed in all villages but are facing problems because most fishermen have not moved into the village.

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APPENDIX 1

PROPOSED FISHERIES REGULATIONS FOR LAKE KARIBA
GOVERNMENT OF ZAMBIA

STATUTORY INSTRUMENT NO. OF 1995

The Fisheries Act
(Laws, Volume VI, Cap. 314)

The Fisheries (L. Kariba) regulations, 1995

In exercise of the powers contained in section twenty one of the Fisheries Act, the following regulations for Lake Kariba are hereby made.

1. These regulations may be cited as the Fisheries (Lake Kariba) regulations, 1995 and shall read as one with the Fisheries (Integrated Fisheries Management) regulations, 1995 hereinafter referred to as the principal regulations.
Title S.I. No. of 1995

2. (1) In exercise of the powers contained in section two of the principal regulations, names of designated fishing Villages and Zones on Lake Kariba are set out in Column two, of the First Schedule, Appendix (b) hereto.
Designated fishing villages and Zones on L. Kariba

(2(The Zones described in sub-section (1) shall apply to the extent described in Column Two of the Second Schedule, Appendix (b)

(3)In exercise of the powers contained in section twenty four of the Fisheries Act, traditional Chiefs named in Column three of the Second Schedule, Appendix (b) shall be appointed Honorary Fisheries Officers and shall play a leading role in the management of fish resources and development of the fishing industry in their respective areas.

Role of traditional chiefs

3. In exercise of the powers contained in section ten of the principal regulations, no person shall fish in any major estuary up to 100 metres into the Lake. Affected Estuaries are Namazambwe, Mweenda, Chimini, Zaaze, Sikalamba, Nang'ombe, Jongola, Chezy, Chipepo Harbour, Nang'andwe, Lufua and Nanhunwe.
Prohibited estuaries on Lake Kariba

4. No person shall, without written permission from the Director, fishing within 50 metres of shoreline.
No Fishing within 50 metres Zone

5. Any person who, without written permission from the Director, builds a house or settles for the purpose of fishing any where along the shore other than in villages set out in Column two of the First Schedule, Appendix (a), shall be guilty of an offence.
Offences and penalties

6. (1) Any person who, without written permission shall apply to the extent indicated by land marks put in place by the Director.

7. The Director shall put or cause to be put in place Land marks which shall indicate the extent of boundaries of fishing grounds and Buffer Zones.

8. Any person who without written permission from the Director, fishes in any fishing ground which belongs to another fishing village shall be guilty of an offence.

9. Any person who without written permission from the Director, fishes in Buffer Zones, shall be guilty of an offence.

10. Each village committee shall elect a village Appointment scout

who shall be appointed a Honorary Fisheries Village scout Officer.

11. The Officer named in section 11 of these regulations shall be responsible for, among other Functions of duties as demanded by the Fisheries Act, Keeping records of fish landings and marketing data.

First Schedule

DESIGNATED FISHING VILLAGES ON LAKE KARIBA

Fisheries (Lake Kariba) regulations, 1995

Village name Name of the Chief	Zone number
	I
Nameso	
Chibumba	
Twabane	
Namazambwe	
Lubwelubwe	
Makwani	
Dengeza	
Muka	
Chimini	
Namafulu	
Simunyika	
Kawama	
Siatwinda	
Senior Chief Mweemba	
	II
Ngoma	
Simuzila	
Nzenga	
Sinantandabale	
Sikalamba	
Nang'ombe	
Mambova	
Chilele	
Sinalilongwe	
Chiyabi	
Chief Sinazongwe	III
Simulilika	
Kayuni	
Namazuma	
Kansumba	
Hamatuba	
Chief Chipepo	IV
Kole	
Kalelezi	
Henga	
Manchamvwa	
Munyama	
Chilongo	
Mpango	
Matinangala	
Chief Simamba	

APPENDIX (B)

Second Schedule

ZONES ON LAKE KARIBA

Fisheries (Lake Kariba) regulations, 1995

Zone	Extent of Boundaries Chief's name
I	The area from the junction of Lake Kariba with the Zambezi river at Devil's Gorge to and including Siatwinda village in basin 3 Senior Chief Mweemba
II	The area from Ngoma through Nang'ombe to Jongola river at Chiyabi Chief Sinazongwe
III	The area from Jongola river to a small peninsula to the East of Hamatuba Chief Chipepo
III	The area from East of Hamatuba Island to the Dam Wall Chief Simamba

A GENDER ANALYSIS OF PARTICIPATION IN PLANNING AND THE EFFECT OF THE VILLAGE REGROUPING ON LAKE KARIBA SHORELINE (ZAMBIA)

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Introduction

The village regrouping exercise on the Zambian side of lake Kariba falls within the broader context of the Lake Kariba Inshore Fishery Management Plan. The management objective is to maximise fish production while ensuring minimum damage to the resource (SADC Report NO.32, 1994). The village regrouping is seen as a step towards establishing a community based approach to management of Lake Kariba Inshore Fishery on the Zambian side. Well defined communities with discrete boundaries has been identified as one of the factors contributing to the success of community based resource management in the framework of co - management. The paper gives an overview of the objectives of the village regrouping as a starting point. The main objective is to make a gender analysis of participation in the pre and post village regrouping activities related to the new lake Kariba fishery management plan, the hardships and problems faced during village regrouping and the effects of village regrouping.

Gender concerns have been incorporated in sectors such as agriculture. Incorporation of the same in the fisheries sector is fairly recent despite women's active involvement in the sector (FAO.1988; Bacle J. and Cecil R.1989; Kos C.W.1991).

A note on Gender Analysis

Gender has been defined as a social construct of expected behavioural roles. For Lerner G. (1986), gender is a cultural definition of behaviour as appropriate to the sexes in a given society at a given time. As social constructs, gender roles are dynamic and differ according to time, society and culture.

Gender considerations have been gaining significant attention in policy research. Development policy makers and project planners need to take into consideration the gender differences in the division of labour, roles performed and responsibilities , access to and control of the resources and decision making powers. It has been argued that lack of this consideration has led to gender-biased policies and projects. Most policies and projects treat men and women as a homogeneous group who would equally benefit from developmental interventions.

Work done by Boserup E. (1970) challenged the notion that developmental initiative improves women's position in the same way as it does to the men's position. Her work proved that the women's position could actually worsen as a result of a development intervention.

The Women in Development (W.I.D) perspective made famous by

Boserup's work, argued that women are an untapped resource that can provide an economic contribution to development. The followers of the W.I.D perspective advocated legal and administrative changes to ensure that women would be better integrated into economic systems. Women's income-generating activities have been typical of W.I.D projects. Gender analysis differs from the W.I.D perspective in that while W.I.D focuses on women in isolation, gender analysis focuses on both men and women.

Current literature in development points to gender-biased development (Hanraham D. 1991). According to him, gender bias is taken to reflect unequal status or treatment of women resulting in their physical or economic deprivation relative to counterpart males. Gender is one of the criteria that determine access and control over resources, others include economic and social status and age. Emphasis on gender rather than in women issues reflects a broader concern with women's roles and responsibilities in relation to those of men.

Why gender analysis?

Research and project analysis over the last two decades shows that failure to incorporate gender consideration in project design and implementation often results in failure of projects (FAO/ALCOM 1991; FAO 1988). Experience has also shown that recognition of the different actions traditionally and culturally assigned to men and women, their gender roles, can assist in the achievement of project outputs (Robinson L. 1993). It is widely believed that those projects that include a careful analysis of the sexual division of labour and responsibilities and are designed in such a way as to realistically reflect the contexts within which men and women work are likely to be more efficient in meeting developmental goals. There is also ample evidence to show that disruption of the traditional patterns of division of labour and responsibilities between men and women have detrimental effects on the household economy and that negligence of specific functions of women will certainly have a negative impact on efficiency, effectiveness and viability of interventions. It is this observed relation between gender considerations and project successes that justifies gender analysis.

Data Collection

The data used in this paper was collected from various sources using various methods. Most of the data was collected during field visits to the fishing villages between May and August 1995.

Discussions were held with the Department of Fisheries staff, Council representative, chiefs, village headmen and chairmen and kapenta operators to solicit for their views on village regrouping.

Focused group interviews were conducted with men and women in the fishing villages. This was aimed at getting their perceptions on the new fishery management plan and the village regrouping exercise in particular, their experiences and expectations.

Zonal and village management committee meetings were attended. Discussions were also held with committee members. This provided more insights on the functions and composition of these committees.

Relevant Zambia/Zimbabwe SADC Fisheries Project (Lake Kariba) reports were reviewed. Other literature was also reviewed including the historical literature on the Zambezi valley people before the construction of Lake Kariba and the resettlement exercise that preceded the construction of the lake.

Background Information

The Zambezi River People

Lake Kariba, which borders Zambia and Zimbabwe was formed by damming the Zambezi river in 1960. The primary objective of forming the lake was to generate power to meet the Zambian and Zimbabwean requirements. The people who lived on both sides of the Zambezi river were predominantly Tonga. Their subsistence was based upon the cultivation of crops supplemented by fishing, gathering of wild produce, hunting and raising domestic stock. This farming was practiced despite the fact that farming in the valley was difficult due to high summer temperatures, unpredictable rainfall and sandy soils. Since people lived so close to the Zambezi river and its tributaries, they were able to practice flood plain agriculture (Raynolds P, 1989).

As the valley Tonga lived so near the river, fishing in the Zambezi river was an important respected part-time activity in which a wide range of techniques were used to catch fish throughout the year (Scudder T. 1960). These techniques enabled the valley Tonga to fish the banks and flood plains of the Zambezi river and the flood plains of the tributary system. Some of the fishing devices include the following: barriers, pocket sieves, fish baskets, spearing and tangle nets. Women used fishing baskets.

Characteristics of Lake Kariba Inshore Fishery

Administratively, the shoreline is shared by three district councils namely Sinazongwe, Gwembe and Siavonga. Traditionally the shoreline is shared by Senior Chief Mweemba, Chief Sinazongwe, Chief Chipepo and Chief Simamba. Recently the shoreline has been divided into four fishing zones for management purposes. A Zone being defined as an area of the lake and hinterland falling under the jurisdiction of a particular chief (SADC Project Report Number 32). In 1992, the shoreline was stratified for statistical purposes into four strata. These do not necessarily correspond with the Zones. While the Zones are based on traditional chiefdoms, the strata were based on geographical convenience (see Map 1).

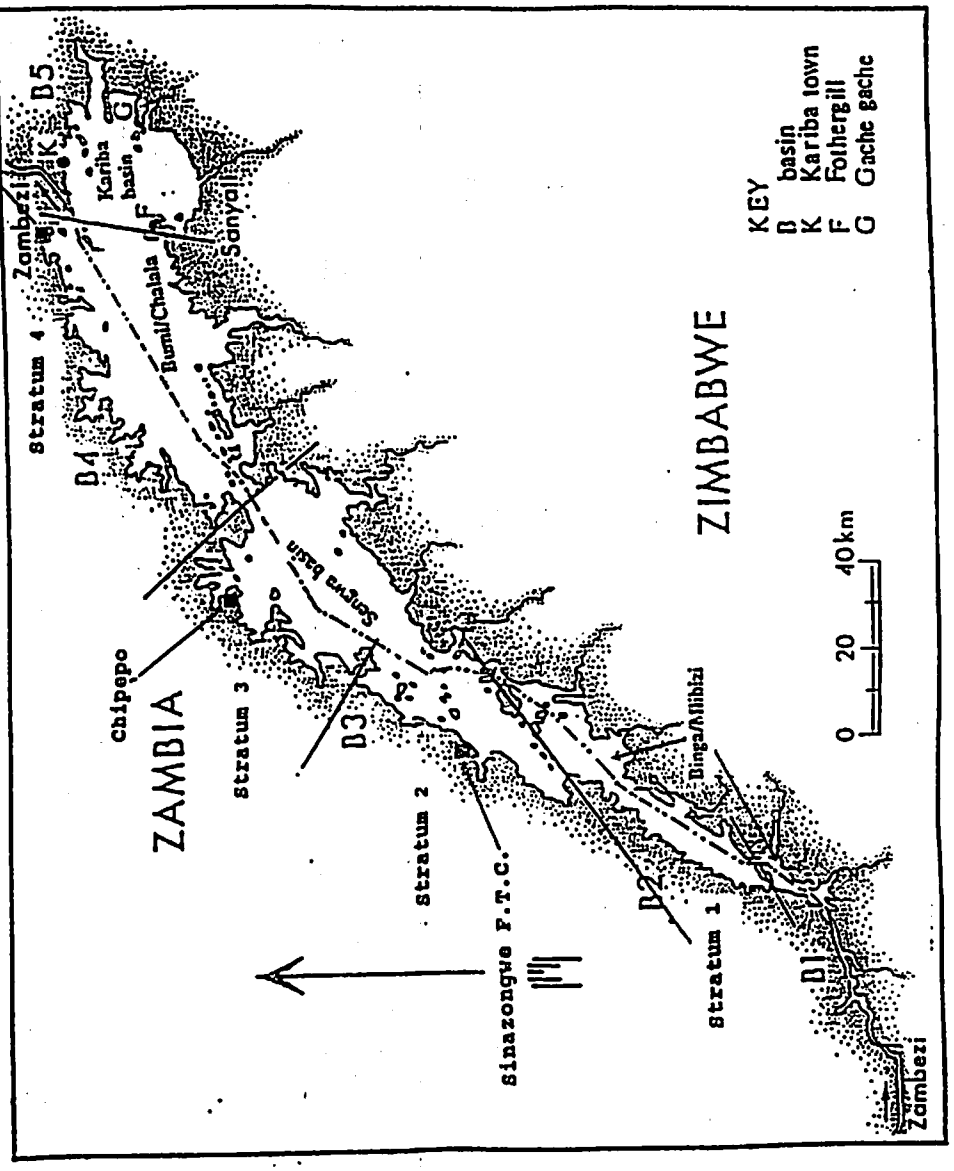
The artisanal fishery till recently has been characterized by numerous small scattered fisher settlements as a consequence of the open access. Fishing is regarded as a fast money making business with minimal capital requirements. Consequently Zambia has had fisher numbers increasing at a faster rate than Zimbabwe. The numbers of fishers on the Zambian side were 1 939; 2 155 and 2 283 in 1988, 1990 and 1993 respectively (Lupikisha J, 1993; Murphree M.W, 1989; and Chipungu P, and Moinuddin H, 1994). Table 1 gives a village count by stratum.

Table 1: Number of villages by type and stratum

Village Status	Number of Villages by Stratum				Totals	%
	1	2	3	4		
Permanent	54	90	44	88	276	99
Temporary	1	1	-	-	2	1
Totals	55	91	44	88	278	100
%	20	33	16	31	100	

Source: Lupikisha J.M.C, 1993, Report on the 1993 Frame Survey of Lake Kariba (Part II,Zambia) Zambia/Zimbabwe SADC Fisheries Project (Lake Kariba), Chilanga, Project Report No. 31 page 7.

The most common boat in use among fishers is a dug out canoe. These are either made or purchased locally. Other boat types are fibreglass, plank and metal.



Map . 1: Map of Lake Kariba showing adjusted strata.

While all fishers own nets, there are some who do not own boats and depend on various local arrangements for access to boats. They can rent, borrow or share boats and make payments in kind or cash depending on the arrangement. Table 2 shows the boat distribution.

Table 2: Boat ownership by stratum

Village Status	No. of fishermen by Stratum				Totals	%
	1	2	3	4		
With boats	396 98.09%	783 99.77%	317 75.84%	555 90.54%	2051	90
Renting or Sharing boats	50 1.01%	20 0.23%	101 24.16%	58 9.46%	232	10
Totals	446	803	418	613	2283	100
%	19	35	18	28	100	

Source: Lupikisha J.M.C, 1993, Report on the 1993 Frame Survey of Lake Kariba (Part II,Zambia) Zambia/Zimbabwe SADC Fisheries Project (Lake Kariba), Chilanga, Project Report No. 31 page 3.

Note: The percentages which are not in the original table give boat ownership by stratum.

Stratum 3 has the highest number of fishers who do not own boats with stratum 2 with the least number fishers without boats. This could partially be an indication of the different economic positions of fishers with the richest and poorest fishers being concentrated in stratum 2 and 3 respectively. It could also be a reflection of differences in the availability of boats for purchase and / or the availability of the suitable trees for making boats.

Discussions with fisheries officers indicated that the fisherfolk is ethnically diverse. Among the majority are the Tonga from Southern province (the province in which the lake is situated), Bemba from Northern and Luapula provinces and Lozi from Western province. Most of the indigenous Tonga people engage in crop production and livestock keeping.

Rationale for Village Regrouping as Perceived by the Department of Fisheries and other Interested Parties

There have been various arguments put across to justify village regrouping along the lake Kariba shoreline on the Zambian side. Some of the arguments are presented below.

1. To control access to the fishery and regain traditional authority. The open access to lake Kariba inshore fishery that was adopted by the post independence Zambian government encouraged fishers' movement to lake Kariba. Since the shoreline is communally owned with fish being regarded as common property, anyone could settle anywhere, even on islands and fish anywhere. As a result there was a danger of depleting the fish stocks. As a consequence of open access the fishery became inhabited by various foreign ethnic groups who felt they had no allegiance to pay to the traditional chiefs. This led to the traditional chiefs losing their control over people and land. Another factor which led to the disruption of the village system was the Zimbabwe liberation war from the mid Seventies till independence in 1980. Village regrouping would revive the old village system that existed among the Zambezi valley people. Consequently chiefs would regain effective control over people and land and entry to the fishery would be controlled.

2. To enable the Department of Fisheries (DOF) collect accurate fishery statistics and enhance law enforcement.DOF has the mandate to collect fisheries statistics (stock assessment, numbers of fishers, boats and gear.), monitor violations of fisheries regulations and enforce law. The scattered nature of the fisher settlements has made it difficult and expensive for DOF to perform the above mentioned functions in terms of staff, transport and finances. With fishers settled in permanent villages data collection would be enhanced. The communities will take over law enforcement responsibilities.

3. To enable District Councils provide services to the fishing communities. It is the duty of the District Councils to provide services such as health, education, water wells or boreholes and roads for their respective communities. In addition to provision of services, the councils are to collect the due levy. The scattered nature of the fisher settlements made it difficult for the councils to effectively fulfil any of the above. There are however other factors contributing to council's failure to provide services to the fishing communities. One such factor is the financial situation in the councils and the nation at large.

4. To reduce crime and conflicts. It is alleged that there has been rampant crime such as poaching of fish and wildlife mostly on islands. Kapenta operators have been concerned over kapenta losses through thefts by artisanal fishers. On the other hand artisanal fishers have been complaining of harassment and marginalisation by the kapenta operators. In the villages fishers will form committees to monitor illegal activities and provide for a forum for artisanal and kapenta fishers to discuss and resolve their conflicts or misunderstandings.

5. To improve the declining catches. According to artisanal fishers individual catches have been declining. Their observations show that currently one needs more nets to catch what could be caught in one net some years back. One of the kapenta fisher confessed experiencing a decline in catches in the case of tiger fish. Some of the reasons given by the fishers for the declining catches include the following:
a) Low water level
b) Use of illegal fishing methods
c) Lack of closed season
d) Increased numbers of fishers

However fishers argued that the water level was the most important factor in determining fish stocks. It is however difficult to understand that the catches would improve when fishers would continuously fish from the same waters. As fishers rightly point out there are other factors that contribute to declining catches which may still persist beyond village regrouping.

6.To promote community-based resource management. As pointed out by Pomeroy R.S. (1994), there has been great realisation that it is not sustainable on a long term basis to have government departments in this case DOF, to solely manage the fishery without the involvement of the resource users. This has proved to be costly and inefficient. Given the situation, the reasonable option would be to involve the fishers and other resource users in a co-management framework. Community-based management is a central element of co-management. The fishing communities should take over the responsibility of managing and controlling the fishery. The fishers will have to determine who may use the resource and who is excluded from the resource use. They will also have the responsibility to improve observance and acceptance of regulatory measures necessary for sustainable resource utilisation. The fishing communities will then benefit from managing resource sustainably. It is assumed that the more benefits the communities receive the more they will be interested in sustaining the resource. Since co-management is about sharing powers, rights, and responsibilities the

state will still have some commitments towards fishery management.

7. To promote tourism and other investments. The councils supported village regrouping as they saw the opportunities to promote tourism and other investments from which they would gain financially. With the abolishment of fisher settlements on the islands and fishing around islands, the islands could be leased out for tourism and other investments.The vacation of fishers from certain sites also created land for alternative investments.

Participation in the Pre village Regrouping Activities (Planning Phase)

The main reason for regrouping the fishers along lake Kariba shoreline in permanent villages was to create a framework for the communities' active participation in managing the fish resource. Active participation in the planning and implementation of fisheries management by those affected is a crucial element of community-based management (Pomeroy R.S. 1994). This may increase the communities' commitment to the success of the plan. The importance of community participation in the whole project cycle in relation to project success need not be overemphasized.

A series of activities preceded the village regrouping. In the first stage a review of lake Kariba Inshore Fishery was carried out with the focus on development and management of the artisanal fishery. Information for this review was collected through reviewing the relevant documents. Part of the information was collected through discussions with representatives from the relevant organisations closely involved with the management of the inshore fishery to identify current constraints and problems on the fishery. The list of interviewees included traditional chiefs and headmen, councillors, artisanal fishers, kapenta operators, project representatives and others (SADC Project Report NO. 32, Annex 1). While there was representation from the men fisherfolk, there were no women interviewed from the fishing village. Table 3 shows the categories of people interviewed.

TABLE 3 : Categorization of People Interviewed

Interviewee Category	Number Interviewed	Percentage
From within fishing communities (men)	50	60.20
From within fishing communities (women)	0	0.00
From outside fishing communities (men)	32	38.60
From outside fishing communities (women)	1	1.20
Total	83	100.02*

Note: * The percentage is more than 100 due to rounding up.

The table has been made using the list of people interviewed (SADC Project Report Number 32, Annex 1: 40 - 42)

From the composition of the people interviewed it becomes clear that the constraints and problems presented were not gender balanced. These were presented as perceived and experienced by men. While it is widely believed and accepted that it is only the women who can adequately represent themselves, they were denied the opportunity to give their views and share their experiences. Despite the unequal opportunities for participation between men and women, the review report partly formed the agenda for the management workshop which was the main activity in the second stage.

The review was followed by a Fisheries Management Workshop which was attended by council staff, project staff, kapenta and artisanal fishers, traditional chiefs and headmen and others (SADC Report NO.32, Annex II). While there were male artisanal fishers in attendance, there were no women from the fishing villages. Table 4 shows the categorization of the workshop

participants.

TABLE 4: Categorization of workshop participants

Participant Category	Number of Participants	Percentage
Artisanal Fishers (men)	10	17.86
Non-Fishers (men and women)	46	82.14
Women from fishing communities	0	0.00
Total	56	100.00

The table has been made using the list of people who attended the workshop (SADC Project Report Number 32, Annex II: 4 - 5)

This forum was to identify needs and problems of inshore fishers and of fishing communities. The same forum was also to come up with solutions to be turned into planned activities to address the identified needs and problems. It was at the same forum where it was decided that fishers have to be regrouped in permanent bigger but fewer villages for them to participate in fishery management.

There is reason to believe that the identified activities will not reflect gender differences as they were from a male perspective. For example, "Train women in net mending for income generation" (SADC Project Report NO.33, Annex 1, Output 2.1 :Management Plan) was identified as an activity to address women's concerns. While it would be good to enhance women's skills in net mending, it may not be feasible for them to earn an income from net mending due to the existing social arrangements. Overtime fishers gain experience in net mending and have continued to mend their own nets during their spare time. Women are already involved in net mending at a household level though it is done occasionally. This is done as part of the household activities which are not paid for. This makes the idea of net mending services being on high demand for a reasonable fee highly

questionable. If anything, this project is more likely to increase women's workload without a corresponding economic gain while reducing the workload for men.

The workshop resolutions which were the,"Management of Lake Kariba Inshore Fisheries (Zambia) Plan" were to be disseminated to the rest of the fishing communities through meetings during which the rationale for village regrouping and other management proposed measures were explained. For various reasons these meetings were dominated by men who raised their concerns. The few women who attended these meetings did not find the situation conducive for their active participation. The various reasons that may contribute to this situation include the following:

1. Although women play an important role in most of the fishing related activities, they are not directly involved in fish production. Therefore women's participation in fisheries meetings is not considered necessary.

2. Since fishing is regarded as a man's activity, all fishery management related meetings are targeted at men.

3. According to tradition, the man as a head of the house hold represents the household. This implies that the man should attend all meetings on behalf of the household and relay messages to the women and other household members.This implies that women may attend meetings if the men (heads of households) are not available or if they are heads of households.

4. Management measures are on fish production which is a man's domain. Fish processing and marketing which are dominated by women are not part of fishery management.

Participation in the Post village Regrouping Activities (Implementation of the Fishery Management)

Community's participation in project implementation is one of the factors that contribute to project success. Soon after the regrouping, fisheries management committees were established at zonal and village level. Figure 1 shows the fishery management plan implementation structure.

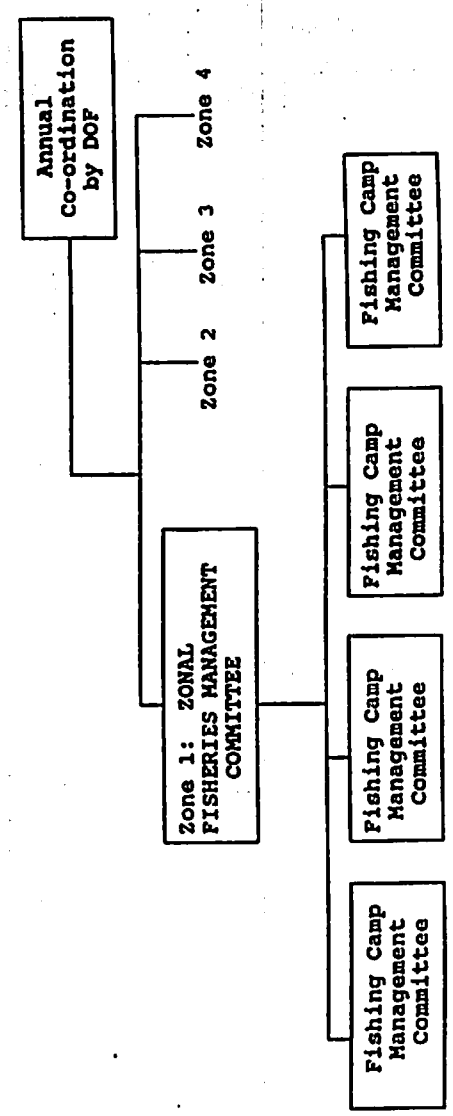


Figure 1: Organisational Structure for Lake Kariba Fisheries Management Plan.

Source: Chipungu P. and Moinuddin H., 1994 Management of Lake Kariba Inshore Fisheries (Zambia) A proposal. Zambia/Zimbabwe SADC Fisheries Project (Lake Kariba) Chilanga, Project Report Number 32 page 5.

The composition and roles of these committees were defined (SADC Report NO. 32). The zonal committees were to oversee fishery management related activities, developmental plans and finances at zonal level. The village management committees were to oversee the village activities in relation to the fishery management requirements. Membership in these committees was not gender balanced. Very few village committees had female members while most of them were male only. Zonal committees were male only. Various reasons could be cited for this situation. Firstly, women were less knowledgeable about fisheries management for the reasons discussed above. Secondly women were not confident enough to contest for any position especially given the fact that the committee roles were not clearly understood. Thirdly, women were not voted for. Nabane N. (1994) discusses other reasons contributing to male only village based committees.

The Village Regrouping

As pointed out by some fishers, it may be too early to give a full fledged assessment of village regrouping and how it has affected both men and women. This information was collected less than a year after the exercise had began. At the time people were still moving to their new villages. However it would be worthwhile to look at the hardships and problems faced by those involved. Some hardships could be short lived while others could have long term effects.

As indicated earlier, women were not attending meetings or workshops where the village regrouping issue was discussed and yet they had different roles to play during the movement. Colson E. (1971) discusses a similar situation during the resettlement in the Zambezi valley in preparation for construction of Lake Kariba where it was assumed that only men need be mobilized .

1. Given limited time in which to prepare to move, packing of household items which is normally a woman's duty had to be done in a hurry. This was more true for the 500 households who had to be removed from the islands by the Zambia Paramilitary Police (Times of Zambia : 23/02/95) who patrolled the islands daily to ensure no fisher had access. Most of those affected were women as most men could paddle away in canoes. Colson (1971) describes a similar situation where police were involved to move those who were resisting the resettlement prior to the construction Lake Kariba.

2. Women had to look for thatching grass for the new structures. This was a big problem given the fact that the Zambezi valley and the country as a whole never received enough rains the previous year. Secondly, the grass was being looked for at the wrong time of the year, towards the rain season, with some fishers moving even in the middle of the rain season (Times of Zambia :

23/02/95). In some of the new villages, there was no thatching grass nearby. Arrangements had to be made to import grass from elsewhere. This led to delays in thatching the structures causing a lot of inconvenience to the households.

3. It is the women's responsibility to collect firewood for cooking purposes and fetch water for household use. In some new villages, women complained of the scarcity of firewood and that they have to walk long distances to look for firewood. The same applies for drinking water. Women have to walk long distances or puddle to get clean drinking water.

4. Agricultural activities especially on lowland gardens were disrupted since women who are the main actors had to divide their time and labour between agricultural and village regrouping activities. Agriculture is both a source of livelihood and income. Through sales of fresh maize and vegetables from gardens women raise income to buy some household essentials. It is however difficult to assess the effect of the disruption on the household food security.

5. The village regrouping created loss of land and landlessnoss among both men and women especially those who had to change villages. Women who usually get user rights from their husbands lost and would continue to lose their rights as land becomes more and more scarco.If land became available, the men as heads of households would receive first priority in land allocation. Women would consequently become more dependant on men for land and this may have along term effect on the economic position of women.

6. Social arrangements and ties were disrupted since neighbours and kin had to in some cases resettle in different villages. Some fishers even moved to other fisheries. These social ties are appreciated by both women and men for security in times of need.

7. For men as well, the village regrouping time was a period of high labour demand as everything had to be done at a faster pace. It was the men's duty to select the new village sites and demarcate residential plots. Men had to clear individual plots, cut poles, dig up foundations and put up the required houses and other structures.

8. The men as heads of households and owners of boats had to arrange transport for their family members and property. Various local arrangements had to be made to facilitate movement people and property. Those who moved to other fisheries had to hire trucks.

9. Fishing activities were disrupted due to the movement and labour requirements at the new sites. The seriousness of the disruption is difficult to measure in terms of the hardships faced by those households that depend on fishing for their

livelihood and income.

Despite all the above discussed problems and hardships that were faced as a result of the village regrouping, both men and women were hopeful that they would derive some in the near future. The following are some of the identified expected benefits by gender.

Women:

Increased cooperation amongst themselves
Increased business opportunities

Men:

Improved communication between Department of Fisheries and the fisherfolk
Access to credit facilities
Increased individual catches
Minimized use of illegal methods
Increased business opportunities
Increased cooperation among fishers

Conclusions

The great realization of the need for community participation in planning and implementation for them to meaningfully and effectively participate in a community-based management arrangement was not reflected in practice especially in terms of gender. In the planning stage, the participation was not gender balanced as women from the fishing villages were not given the opportunity to participate. This lack of women's participation in the planning process is an indication of the strong cultural belief held by the government and the project staff that fishing is a man's activity and the under representation of women's contribution to the fishing industry. The continued lack of women's participation may in turn re-enforce the belief.

Since the survey team which significantly contributed to the plan never interviewed and invited any women to the management workshop, they do not know the women's role in the fishing industry. This is evident from the type of projects proposed for women. The women felt left out in the deliberations that led to village regrouping. "Ngankutobala mulawo waamba balaacisi", (we have to follow our leader's orders) was one of the statements made by one woman to summarize their participation in pre village regrouping activities.

The limited involvement of women in the fishery management committees may have serious implications for project initiatives. Even in some committees where women have been elected, their contributions are generally not taken serious. It is more likely that the project initiatives would only be targeted at men's

needs.

The village regrouping caused some hardships to both men and women with some fishers even opting to move to other fisheries. The magnitude of hardships or problems differed among households and according to gender. The period of moving was a labour demanding time and the normal activities of men and women were disrupted. Most of the hardships were short-term while others could be long-term and have long-term effects, for example the land issue.

Village regrouping has been accepted partly due to the anticipated benefits which were promised during fisheries management meetings conducted to inform the communities about the management plan. In the event of these promises not being fulfilled, the implementation of the management plan may be affected negatively. With fishers having done their part, they felt that new management plan campaign promises should be fulfilled as one fisher commented, "we have moved so we are waiting for government to start fulfilling its promises". From the arguments given to justify the village regrouping, it becomes clear that the management plan is not only a fishery management plan but a lakeshore development plan as well.

Special efforts should be made to ensure women's participation in the management committees. Since these committees have some decision making powers, lack of women's participation may lead to decisions being biased towards male related issues which may not be satisfactorily to women as members of the communities. As actors and beneficiaries of the fishing industry, women must also be involved in the decision making process regarding the fishing industry in general and fish as a resource in particular.

There are some issues that need long-term solutions in view of the village regrouping. These include the following:

1. Scarcity of firewood
2. Tenure Issues
3. Water and Sanitation
4. Disposal of fish processing waste.

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3.1.7 CO-MANAGEMENT ON NORTHERN SHORES OF LAKE KARIBA - CONFLICTS ARISING

CO-MANAGEMENT ON NORTHERN SHORES OF LAKE KARIBA CONFLICTS ARISING

Isaac Malasha

CONFLICTS AND PROBLEMS:

With the introduction of co-management on the lake a number or problems and conflicts between different users have started to emerge. Although not threatening the whole process the conflicts need to be addressed for the process to be a success. Some of these problems and conflicts are:

A) Tonga vs Non-Tonga fishers:

In some of the fishing villages in zones 3 and 4, most of those who have moved into the new camps at the time of the data-collection were non-Tonga fishers. Some of the Tonga interviewed claimed that they were not fishermen and as such saw no reason to leave their permanent homes to go and live in fishing camps. However, the fishing village residents felt that the Tonga are fishermen as evidenced by their possession of fishing craft and gear. They contend that the Tonga do not want to move into the villages because they do not want to be bound by the new fishing regulations. This is resented by some of the `outsiders.'

The current debate aimed at resolving the difference should be encouraged. It should be appreciated that the Tonga engage in more than one source of income as a guarantee against drought and famine which are prevalent in the area. Most of the non-Tonga fishermen have a hedge against such vagaries of nature as they invest most of their earnings in ventures located in urban or their home areas. The Tonga should maintain their permanent homes where they can continue to engage in agriculture and livestock-keeping. At the same time they should be allowed to set up structures in the new fishing villages from where they can be conducting their part-time fishing activities and observing the regulations related to the practice. Trying to create a `perfect fisher' is neither possible nor a true reflection of the realities of the Gwembe Valley.

B) Island Owners vs Artisanal Fishermen:

Councils have now engaged in the leasing of islands on the lake as one way of earning additional funds for development. However, the leasing of islands comes in the wake of artisanal fishers leaving these same islands. In some instances, ranchers have introduced game and opened up tourist ventures. However, there does not seem to be a well thought-out policy on the boundaries of the ranches and the areas where artisanal sector can conduct their activities. Incidence of artisanal fishermen being shot by`owners' of these islands have been reported. Artisanal sector feel betrayed that soon after moving from islands restrictions have been made on fishing. Commercial fishers on the other hand contend that fishers steal their property and connive with traders and their (commercial operators) workers to steal Kapenta from the rigs.

There is consequently need to ban traders from buying their Kapenta from islands as one way of reducing tension. The new markets being created in the fishing camps should be sued by traders to conduct their business. Additionally, the Fishing Village Management Committees should be able to monitor traders who come to their camp to buy fish or Kapenta. Artisanal fishermen found with Kapenta should be in possession of a licence to reduce suspicions that they steal it from operators.

As not all islands have been leased and given the claims of good catches by fishers, it should be possible to design a mechanism that would allow fishers to operate from there. This can be done by mandating the FVMC to keep a mutually agreed upon rotating roster of which fishermen can be allowed to go to the island and the period they are to operate from there. Those who overstay can be sanctioned by using several methods such as forfeiting their next turn or paying a certain amount of money to the FVMC.

The use of water encircling islands should also be clearly defined. While artisanal fishermen are not allowed to operate about 50 meters from the leased islands, tour operators are fee to take their

clients anywhere on the lake. This tends to go give an impression among the artisanal sector that the whole exercise is weighed heavily against them. The view is made more plausible by the fact that commercial fishers have assisted DOF in the form of fuel and to her resources to resettle the artisanal fishers.

C) Artisanal vs Commercial

While commercial fishers maintain that they lose a lot of their property to artisanal sector, the converse is also true. Fishers lose their nets to rigs that drag them away. These nets are either torn apart, completely removed and in certain incidences sold by crews of Kapenta rigs. Loss of nets is usually not compensated. A mechanism should be put in place to allow for speedy compensation where this is proved. Commercial fishers have also been accused of fishing in areas where the artisanal sector have been prohibited.

D) Department of Fisheries vs Artisanal Sector:

One of the reasons for introducing co-management is to curb the rampant use of illegal methods of fishing. Artisanal fishers are not allowed to fish near the river estuaries and have also got to set their nets about 100 metres from the shore-line. Gill-nets of mesh size less than 76mm and mono-filament nets of a mesh size of less than 120mm are banned. These regulations do not, however, address some of the problems faced by fishers and instead encourage non-compliance;

Firstly, during data collection most of the fishers said that fish go down rivers to breed in the rain season only. Using this knowledge they question the wisdom of banning them from fishing from estuaries all year round. The DOF should carry-out research to exactly determine when fish breeds so that the rest of the period fishers can be allowed to fish.

Secondly, more than seventy percent of the craft on the lake are dug-out canoes. Those mounted with engines are largely used for transport and not fishing. Given that lake Kariba is characterised by uncertain weather conditions, with storms starting suddenly and wind direction changing abruptly, it is risky to do one's fishing further from the shore. A number of fishers have lost their lives on the lake through the use of such crafts. It is therefore prudent to relax this regulation until investments have been made into sea-worthy crafts.

Thirdly, the issue of mesh size needs to be addressed as well. Although it is recognised that the piece of legislation is aimed at protecting breeding and juvenile fish it, nevertheless, allows mature breeds of certain species to go unharvested. Small fish species such as Brown squeaker *(Synodontis zambezensis)* and *Alestes Laterallis* attract a good price on the market but under current legislation, they can go unharvested. The research department needs to come up with a mechanism that will allow for these species to be caught. Failure to do so can only lead to non-compliance and increased conflicts between fishers and policing agents.

E) Use of Fuel Wood:

With the establishment of permanent of villages, pressure on fuel-wood and agricultural land ins bound to increase. The pressure will be increased by in-migration and births. Although a reforestation programme was initiated under a GTZ project, under the regrouping exercise fishers moved to new villages. Those who had planted trees for fuel-wood and fruits left their plantations in the abandoned villages. Given the fragile nature of the soils in the valley, the zonal committees should give priority to another afforestation programme. As it is not likely that another donor agency will undertake the programme, part of the licence fees can be used for the purpose as it will be the fishers who will eventually benefit.

F) Broken Promises:

The process of informing fishers to move was done by conducting meetings in all the villages along the shore-line. These meetings were addressed by chiefs, DOF staff and representatives from councils, health and education. Fishers were told that it would be easier for services to be provided once they have moved into permanent villages. However, there is a feeling of disillusionment among the fishers as most of these promises have not been forthcoming. Given the financial standing of the

government and councils in particular it would be far-fetched to suggest that schools and health care facilities would be provided in the near future. This frustration for broken promises is usually directed at the DOF as it is seen as the 'engine' behind the resettlement programme. It is recommended that institutions make clear there capability to provide the promised services otherwise the whole programme will be seen in negative light by the fishing communities.

Towards a sustainable fishery

the need for joint action on Mweru-Luapula

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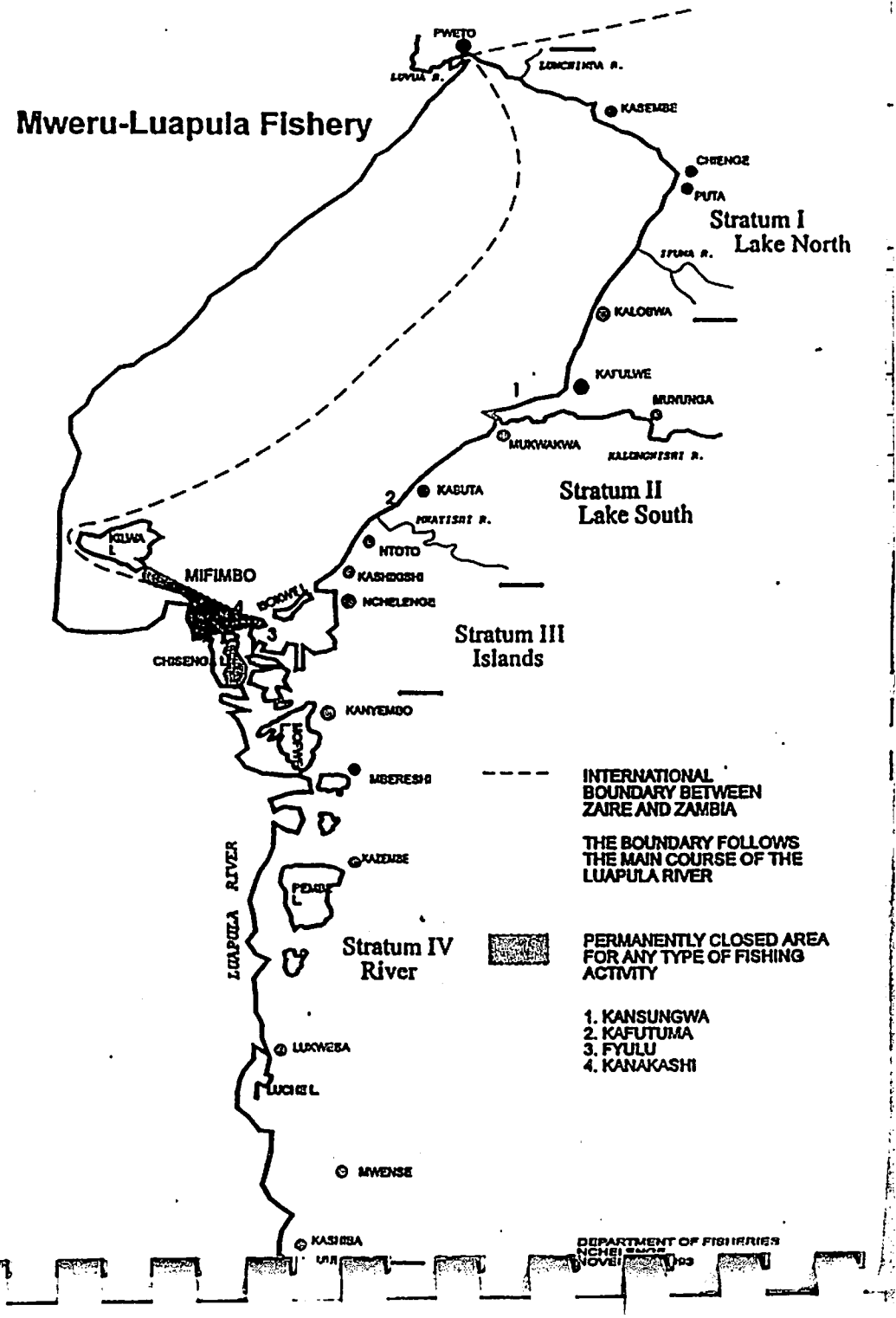
October 1995



Introduction

Lake Mweru-Luapula provides food, income and employment for many people. About 25,000 people are directly involved in fishing, either as owners of boats and gear or as workers. In total around 160,000 people along the lake and the river shore depend on fish: fishers, processors, and traders. But also shopkeepers, boatbuilders, pitsawyers and marine mechanics who can do business because of fish, and all those people who barter food for fish..... and eat it.
The past two years the fish trade around Mweru boomed. Two new fish freezing companies have provided a steady income for many people, both through employment and by providing a secure market for fish. Many traders also have found their way to Kashikishi. Clearly, there are high benefits for many people and instutions if the fishing industry remains healthy.

Right now the situation seems promising.Yet we should raise some questions on the sustainability of the fishery:

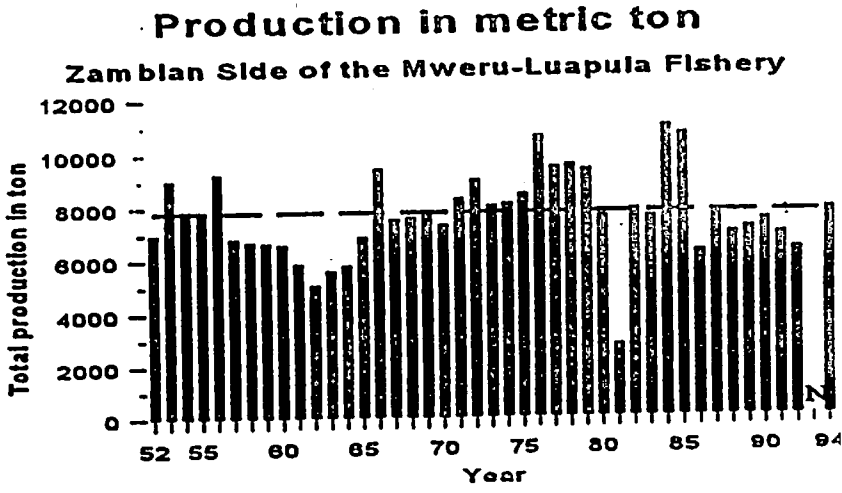
- How is the present status of the fish stocks? Is the fishery as healthy as it may seem? Fishers regularly complain about the declining catches. They complain that among themselves many fishers now resort to destructive methods to catch just a little bit more fish.
- What is necessary to make and keep the Mweru-Luapula fishery going so that many people will benefit a good income for many years to come?

People coming from different sides - fishers, fish traders, politicians and many others alike - have asked these questions to the Department of Fisheries. Through our research we could come up with an analysis of the situation which we will present here.

We will first talk about the fishery on large species like *pale, makobo, tembwa, imonde, misebele* etcetera - usually caught with gillnets - before we say something about the *chisense* fishery. We will do that through posing some questions. We will answer those questions with figures showing trends of the fish catches and the interpretation of those trends. Finally we will propose some solutions for the management of the fishery. We think that the Department of Fisheries needs to manage the fishery jointly with all those who benefit from its wealth.

How much fish comes out of the lake?

The next figure shows the fish production of Mweru in tons (1 ton=1000kg



The production of the fishery is the total amount of fish that all fishers cat per year. The Department of Fisheries knows such figures since the ea fifties for the large fish species. *Chisense* is not included. The production all other types of fish fluctuates from year to year. Yet the remarkable thi is that since the start of data collection fishers landed around 8000 to fish/year, not much more not much less. (The closure of trade during cholera epidemic has caused the low yield of 1981, there is no figure 1994).
To be more precise: the average fish production over a fifty years perio 7800 tons with a yearly variation falling between 6600 and 9000 to important is that this amount has not changed over the years, despite tremendous increase in numbers of fishers, nets and boats.

How many fishers, boats and nets are there now? How has this changed over the years?

In a survey held in 1992 we counted 9,301 fishers, 7,707 boats and 46,000 nets. Apart from with nets - including nets used for beach seining, *kutumpula*, *sichide* and other active fishing methods - fishers also fish with traps, baskets, hook and lines, longlines. However, these are not as important as the gillnet fishery and the *chisense* fishery.

The following table shows the change in effort over the years on the Zambian side of the fishery:

Year	Number of Fishers	Number of Workers	Number of Boats	Number of Gillnets
1955	-		-	± 8750
1965	±2000		-	-
1971	5963		4155	-
1980	7210		4004	-
1986	7723		6640	-
1992	8440 (9301)	16000	7707	46000

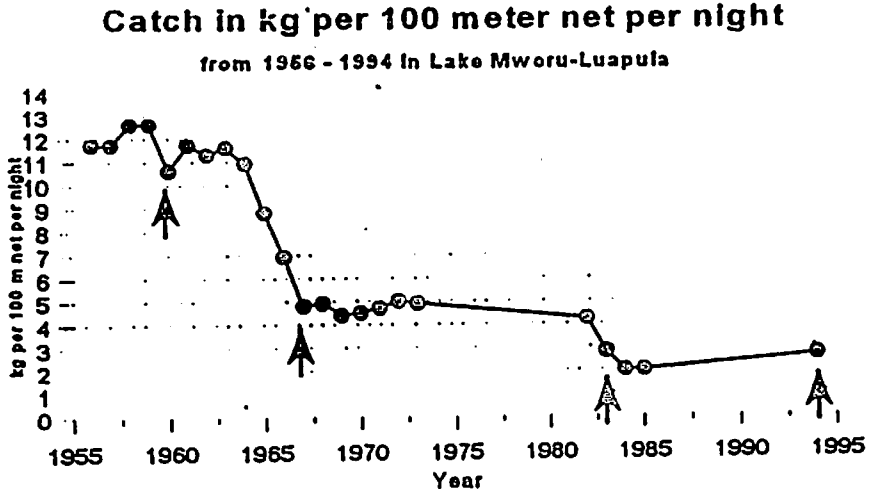
The figure in brackets in 1992 is including the female fishers. In all other years the Department of Fisheries counted men only.

The numbers of fishers, nets and boats have increased four- to fivefold since the sixties. However, the total amount of fish that all these fishers catch has not changed, as we showed in the previous graph. In other words the total amount of work - or total effort - has increased tremendously, only to catch the same amount of fish. The next paragraph will show what this means for the average catch of one net in one night.

How has the catch per fisher changed over the years? Why?

On the one hand the total amount of fish coming out of the lake has not changed. On the other hand the total effort has increased four to five times in forty years. This means that the average amount of fish caught per fisher - or better per net - must have gone down. The Department of Fisheries also does its own research on catches with gillnets independent of fishers. In Mweru-Luapula we do this through controlled fishing: nets of a specific size and specific mesh size are set for a given number of hours each time at the same parts of the lake. We record the catch of fish in these nets. This gives us an indication of the catch in number of kg's fish per net per night. We can compare the figures between years.

The following figure shows the change in catch per 100 m of net per night over the years 1956 to 1994



The trend of catches per net is clear: while in the fifties the catch of fish per net per night was around 10-12 kg, it is now around 2 kg.
We can give a number of reasons for this decline, which are connected with each other:

- First, the lake has a kind of maximum natural production of fish: it cannot produce more fish than it does.
- Droughts cause low water levels in the lake. We found that after each year the lake had a low water level - usually after several rainy seasons with low rainfall - the catch per net declines rapidly. In the above figure we have indicated these years with extremely low water levels with an arrow. In the fifties the natural fish production of Lake Mweru could still recover after a drought. However, since then such recovery does not take place any more.
- The reason for this lack of recovery is clear. The number of fishers and their effort has increased so much, that the recovering ability of the lake is not sufficient anymore to keep up with this effort. Because of the present drought and extremely low water levels - almost the lowest in fifty years of recording - we expect that the catch per net per night will go down even more.

The following table summarises our findings up to now. In the next paragraphs we will discuss the consequences of the observed trends for the fishers and the fishery as a whole.

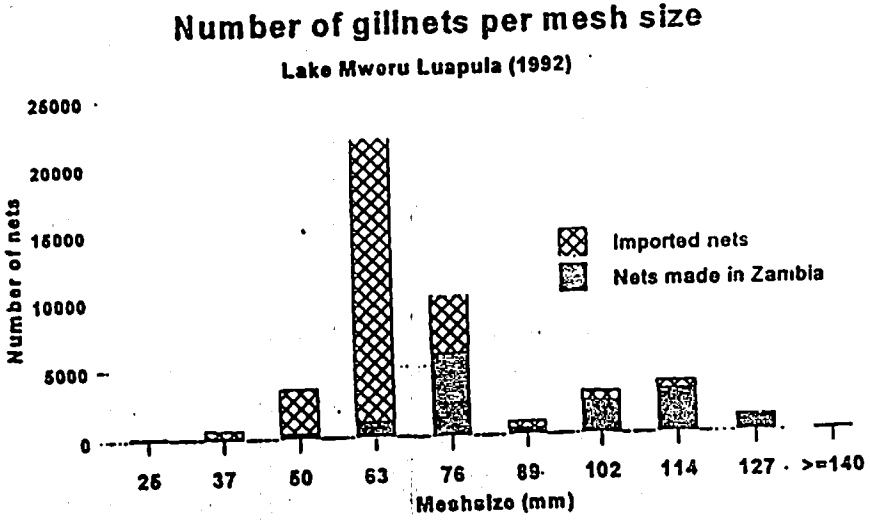
Year	Total fish production	Number of fishers	Catch per fisher	Catch per net per night
In 1965	6900 tons was shared by	2000 fishers	gives 3450 kg/fisher/year.	9 kg
1971	8350	5983	1400	6 kg
1980	7700	7210	1006	4 kg
1986	6300	7723	816	3 kg
1992	6400	8440	760	2 kg
2000	?	?	?	?

How do fishers still manage to make a living through fishing?

We have found that:
1. the total fish production from the lake remains the same
2. while ever more fishers chase the remaining fish

While this is the case, how is it possible that fishers still manage to catch all that fish and provide a livelihood for themselves and their families?

The following figure shows the different mesh sizes presently used in the fishery.



The most used mesh size in the whole fishery is 63mm (2.5 inches). Areas of the fishery differ in this respect: in the overfished lagoons Mofwe and Pembe, 50mm (2 inches) and 63mm (2.5 inches) are the most common mesh sizes. In the high production areas in the south and middle of the lake the most common nets are 63 mm (2.5 inches) and 76mm (3 inches).

In the past this was different: in the 1950-ies and sixties the most used mesh size was 102mm to 145mm (4 to 5 inches). In the seventies the most used mesh sizes were 76mm and 102mm (3 and 4 inches). Now it is 63mm (2.5 inches).

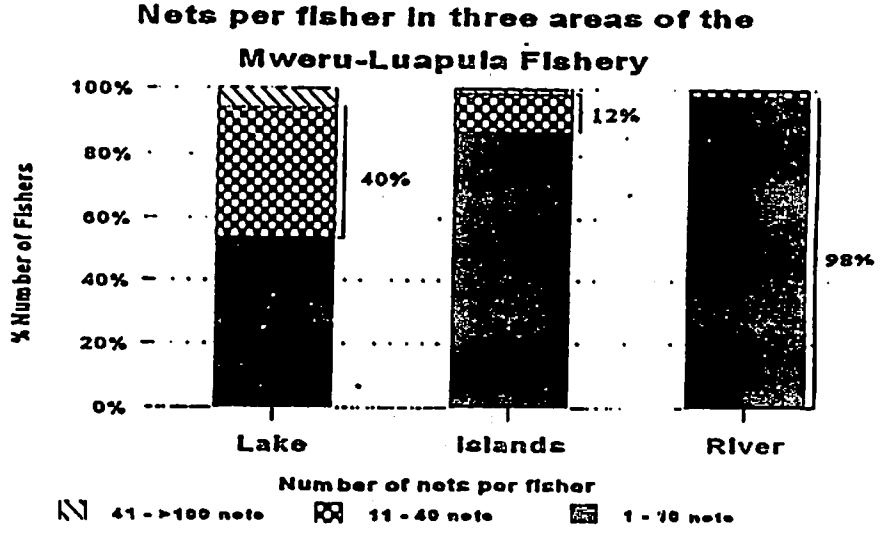
Bigger mesh sizes catch bigger fish. Small meshes catch small fish. If no more or not enough big fish is available, fishers start using smaller mesh sizes. Thus, not only the amount of fish per net has declined. The need for fishers to use smaller mesh sizes means that the size of the fish that fishers catch today has become smaller as well..

In other words over the years ever more fishers are chasing smaller and smaller fish. This can have severe consequences: it means that the fish that fishers catch today is younger than they used to catch. We think that with the major use of 2.5 inches (63mm) nets we are entering a danger zone. If the mesh size decreases more, some varieties of fish will be caught too young: they will not have had time to reproduce when they are caught. If that happens the gillnet fishery may collapse, like it has happened in Mweru-Wantipa and Bangweulu.

We can give yet another answer to the question to why fishers are still able to catch so much fish. Because it has become difficult to catch fish with stationary gillnets, fishers increasingly resort to active methods of fishing: beach seining, *kutumpula*, *sichide* etc. To catch the same amount of fish, fishers do not require as many nets for such active methods as they would when just setting a net overnight. In other words: to catch the same amount of fish, fishers have to actively put in more labour then they used to when setting a net or trap was enough. They either have to put in more labour or use smaller mesh sizes or do both because otherwise they cannot make a living.

What will be the consequence of the declining catches per net? Who will be most affected?

Most fishers in the Mweru-Luapula fishery fish on a subsistence level, by which we mean: they fish for food and a bit of cash. Many fishers have one to ten nets. In the Luapula River area from Kanyembo to Mulundu 98% of the fishers have one to ten nets, as we can see in the following graph. 50% of the fishers in that area even have only one net.



On the other hand many fishers fish with more nets than would be needed for subsistence only. They are fishing for their livelihood. In the Lake area from Lupiya in the North to Kashikishi in the South 40% of the fishers have between eleven and forty nets. We may call these medium sized fishers. Big fishers with more than forty nets are uncommon in the whole fishery. In the lake area 6% of the fishers have more than forty nets, in the Islands area only 2% of the fishers are big. Most of these medium and big fishers set their gillnets overnight as stationary - or passive - gear.

The income from fishing of all fishers will decrease with the declining catches. However, we think that the declining catches will hit the medium sized fishers hardest. As it concerns so many fishers, with that group the Mweru-Luapula fishing economy will be hit hard as well.

Usually a net lasts for about two years. Those fishers with stationary gillnets who presently are just able to earn enough money to replace or repair their nets will soon not be able to do so anymore. If that happens, they will fall back to subsistence level fishing, and become small scale fishers. Or they will start using active fishing methods. Like we said earlier, fishers do not need many nets for such fishing methods. The Islands area - this is Isokwe, Kanakashi, Kilwa, Chisenga and the mainland south of Nchelenge - has reached this stage: only 12% of the fishers have between eleven and forty nets and use these as stationary gear. However, much fish comes from this area, despite that most fishers (85%) have less than ten nets. This is because these fishers have to resort to active fishing methods like beach seining. Active methods are indeed prevailing around the Islands.

The declining catches concern all fishers. However, it will affect all other business in the area and institutions like the District Council as well. To know what may happen to Kashikishi and Kafulwe if catches remain declining, one just has to look at places like Kazembe, Kanyembo or the area around Kaputa: once thriving shops have closed because of the declining income of their customers, and much other economic activity has disappeared.

We describe the situation in lake Mweru as economic overfishing: catches are not high enough to enable all fishers to make a decent living. If the trends continue as we have described here, only a few big fishers - those who earn enough to be able to reinvest their profit into new nets - can go on as they do now.

If all this is true, how long will the business continue at the present level?

We want to signal trends: right now in some areas of the fishery the fish catches of big types of fish are still reasonable. However, in other areas of the lake and the river not at all! A very important reason why the fishing business as a whole still seems good is the *chisense*. *Chisense* fishing has a cushioning effect on the local economy. Without it Kashikishi and other places along the lakeshore would not be as busy as they are today. The area north of the lake would probably be economically dead.

Chisense fishing started in the mid eighties. It is an enormous blessing for the fishery. Some fishers even call it 'manna from heaven'. Presently the total fishery production of *chisense* may be even two to 2.5 times as big as the gillnet fishery. It has given a push to the local economy, especially in the poorer gillnet fishing areas of the north of the lake. Much of the local trade, before collection and transport to the urban areas, is done by women and small traders. Many benefit from the way the fishery is organised. However, if we want the *chisense* fishery to remain as prosperous as it is now, we need to give it proper management attention. We have to be careful with further expansion of this fishery.

As for the fishery on big species of fish, the answer to our question posed at the beginning of this paragraph is clear: this fishery is in danger and all business and income from levies associated with it! Highly contentious management measures of the fishery like closed seasons and closed areas, have slowed the process of decline in catches. Especially the closed season, if stuck to properly, will give fish some chance to recover from the high fishing pressure during the rest of the year. Still, it takes more to make the fishery healthy again. It needs the concerted effort of everyone involved in the fishery.

What do we need to do to make the fishing industry healthy again?

Keeping up the relative prosperity of the Mweru-Luapula fishery for a long time to come is possible if we can stop the trends we described. These are:

- declining catches per net
- increase in use of smaller meshsizes
- increase in active fishing methods
- increase in numbers of fishers and fishing gear

A. What can be done now?

Some management measures are already in place:

- a three month closed season from 1 December to 1 March
- the closed area of Mifimbo (breeding area)
- a ban on the use of illegal methods
- a minimum allowed mesh size of 63 mm

Yet these measures are not as effective as they could be. One reason is that enforcement of these measures in the whole fishery is virtually impossible for the Department of Fisheries with the limited funds and personnel they have. The management of the breeding area Mifimbo - the 'mother of the lake' - has been made even more difficult as fishers have been allowed to settle on Kanakashi Island, right in the middle of Mifimbo. Companies are now buying fish straight from the island.

We need improvement of the effectiveness of the present measures. We can take some measures now:

- a clear direction on the settlement of fishers in or near breeding areas. The Department of Fisheries is strongly in favour that no person should be allowed to settle in these areas. This means that the present fishers living in Mifimbo should be resettled. A management policy on the breeding area around the Kalungwishi River mouth (Kansungwa) and Mwatishi River mouth (Kafutuma) is in the making.
- the government discourages industrial fishing on the lake - some fishing methods are even forbidden -; but the definition of industrial fishing is not clear. We need a clear definition on what is artisanal and industrial fishing. This is important because of new developments in the fishery. One is *Lelelke* fishing: a large vessel - or motherboat - is anchored far from the shores of the lake. A fisher operates from this vessel with several smaller 'satellite' boats and large number of nets. This needs to be regulated, as it tends to become large scale fishing in small areas. According to us, fishing done for large companies falls under the same category. Here, often fishing is still done through small fishers, but a larger company actually pays them to do the fishing for them or gives them nets. Again this is done from motherboats moving over the lake with nets of the company. The fishers are in fact workers for these companies. The Department of Fisheries in Nchelenge will come with a proposal on these matters.
- an increase in the minimum allowed legal mesh size to 76 mm (3 inches) is needed. Right now we should encourage the use of larger mesh sizes. Already the two fish freezing companies encourage it. With their demand for larger fish they push fishers from whom they buy towards using larger mesh sizes. Also, loan schemes should be encouraged to comply with this policy and give out mesh sizes of 76 mm (3 inches) and larger.
- many benefit from the fishery. Many should be responsible for its management. The Department of Fisheries cannot handle the fishery on its own. The management should be Co-management: those who have a stake in the fishery should come together regularly to discuss its future: fishers through their organisations, chiefs, fish traders, the District Council and the Department of Fisheries. A district fishery committee may be a step in this direction. In this committee we should decide on the use of levies from fish, boats and nets for the benefit of the fishers and the conservation of the fishery.

B. What more can be done in the future

- licence limitation. Licencing regulations are in place but not executed. Through licensing the number of fishers entering the fishery can be controlled. Licensing of the new types of fishing in the lake (*chisense* and *lelelke*) needs to be taken up immediately by the Department of Fisheries to limit the influx of fishers. Licencing of boats should go hand in hand with limiting fishing power per boat. An idea could be to give a community (to be defined) a number of licenses that they should manage themselves.
- the Mweru-Luapula fishery is divided between two countries: Zambia and Zaire. The most important breeding areas of the lake are in

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3.4 Co-management Activities Lake Malombe and Upper Shire Rivers Malawi

A COMPENDIUM OF CO-FISHERIES MANAGEMENT ACTIVITIES FOR LAKE MALOMBE AND UPPER SHIRE RIVER

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1.0 INTRODUCTION

The Co-Fisheries Management Programme in Lake Malombe and Upper Shire River involves 28 Beach Villages Committees (BVCs) with an approximate population of 69,000 Fisher Families. These 28 BVCs agreed to conduct some management measures like gear specifications (mesh, headline length, depth), closed-season and enforcement of regulations.

A lot of activities were conducted with the 28 BVCs during the period from March 1995 to October 1995. These activities included the following: - Workshop with BVC representatives and village heads, Setting up of artificial reefs, Formations of fisher groups for IGAs, BVC refresher courses, Formation of Lake Malombe and Upper Shire Fishers' Association, Servicing of first net loans, Launching of Usodzi Walero Programme on MBC, Distribution of T-shirts, Band meetings and Study tour to Zimbabwe.

2.0 WORKSHOP WITH BVC REPRESENTATIVES AND VILLAGE HEADS

This was conducted in March 1995 to review the Management of the closed-season and to make preparations for 1995/96 fishing season.

Reports from both the BVC representatives (including village heads) and the enforcement section indicated that the closed-season was well observed than in the previous years when it was policed by Fisheries Department alone.

The participants had pledged to ensure use of the required gear specifications during the 1995/96 fishing season.

2.1 Follow up Visits

After the workshop with BVC representatives and Village Heads, follow up visits were made to 18 BVCs to check whether they had relayed the messages to the rest of the fishermen. It was discovered that 14 BVCs had organized meetings with their fishermen.

3.0 SETTING UP OF ARTIFICIAL REEFS IN LAKE MALOMBE

The idea of setting up of artificial reefs as breeding areas for fish in Lake Malombe was accepted by all the 18 BVCs around the Lake. The number of proposed sites have been identified as follows:-

East Malombe (12), North-West Malombe (5) and South West Malombe (6).

It was generally agreed that old motor vehicles be used in these artificial reefs as opposed to use of old motor vehicle tyres which would be prone to vandalism since people are making good business out of them.

BVCs have suggested use of metal poles painted white as identification marks for such reefs but there is need for expert advise on lay out of such reefs.

4.0 FORMATION OF FISHER GROUPS FOR INCOME GENERATING ACTIVITIES (IGAS)

The period has witnessed the formation of several groups both for men and women for the purpose of income generation. The formation of such groups was initiated by the IGA Expert, National IGA Consultant and the International FAO IGA Consultant.

4.1 Men Groups

These men groups have been concentrated along the Upper Shire River where BVCs would like to be engaged in IGAs since the area is closed to fishing. So far over 10 men groups of 10 individuals per group have been formed and opened accounts with Commercial Bank.

The groups would like to be engaged in several businesses and right now they are just waiting for funding for training in business skills and running of businesses.

It is proposed that instead of centre based business training which has in the past proved to be very costly (in some cases training costs are as high as K1000 per beneficiary), the men's groups should go through village based training to avoid costly accommodation, food and allowances.

The money saved from training could then be used to increase the number of credit clubs. FD has also stressed to the clubs that its role is to train the clubs with the purpose of making them ready for linkage to the local financial institutions. FD does not intend to become a lending institution.

4.2 Women Groups

The objectives of forming the women groups were three fold:-

a) Easy contact with women as a group in order to provide direction and technical advice on IGAs.

b) Fostering linkage between women groups and the money lending institutions.

c) Enable women to share experiences in the IGAs which are already being undertaken.

There are 17 women groups with a total of 176 women formed so far and 10 groups are already engaged in some form of businesses using the capital which they contributed. These groups have been formed as follows:- East Malombe (3), North West Malombe (4) and South West Malombe (10).

The major problem is funding of these groups to boost up their activities and that as at now no particular IGA has been recommended to such groups.

5.0 BVC REFRESHER COURSES

Several refresher courses were conducted to BVCs between 18th August 1995 to 4th September, 1995 to cover the following subjects:-

a) Principles of lending and borrowing
b) Procedure for the second round net loans
c) Duties of BVCs
d) Formulating BVC constitution
e) Writing a BVC Monthly Report.

5.1 Attendance

A total of 231 BVC Members (219 men, 12 women) were trained in all the 28 BVCs compared to a target of 286. The 231 participants came from the following areas:- Upper Shire River 64 (55 men, 9 women), East Malombe 54 (54 men, 0 women), North West Malombe 58 (56 men, 2 women) and South West Malombe 55 (54 men, 1 woman).

5.2 Issues Raised

During the refresher courses, several critical issues were raised by BVC Members. These issues need considerable thought by Fisheries Department Staff inorder to come up with relevant answers and the issues were as follows:-

a) Finding of markets for bunts

b) Provision of BVC loans for IGAs

c) "Kauni" fishing being highly considered as detrimental to the efforts being done by BVCs in Management of the Fisheries.

d) Trawling by MALDECO is considered by BVCs as a system responsible for sweeping all the fish from the Lake, hence, antagonizing the work done by BVCs. The BVCs suggest that the "No trawling area" should start from Boadzulu Island up to Mpima.

e) Generally, BVCs are advised to preserve "Kasawala" but they claim that to MALDECO the same "kasawala" is regarded as "small chambo".

f) BVCs were claiming that there is no "closed-season" for MALDECO.

g) Legislation of BVC Rules and Regulations. The BVCs are finding it difficult to police the rules and regulations which were agreed upon by them because they are not covered by Law.

h) The question of sitting allowances for BVC members constantly comes up during meetings with them.

6.0 FORMATION OF LAKE MALOMBE AND UPPER SHIRE FISHERS' ASSOCIATION

The subject was discussed thoroughly at various BVC fora and most fishers are in favour of such a grouping. However, an assistance is required on the selection of members to sit in the committee.

7.0 FISHING NET LOANS

7.1 Loan Repayment

AREA LOAN	AMOUNTPAID	(MK)	% PAID
S.W.LMB	65,673.44	52,937.22	80.60
N.S.LMB	98,800.00	87,599.00	88.57
E.LMB	6,964.26	6,964.26	100.00
U.S.R.	42,595.85	30,242.00	70.99
TOTALS	214,035.55	177,652.48	83.00

7.2 Participation in Credit

AREA	NO. LOANEES	NO. LOANEES PAID OFF
S.W.LMB	9	4
N.W.LMB	14	10
E.LMB	1	1
U.S.R.	7	3
TOTALS	31	18

There are 18 loanees who have paid off out of 31. The majority of loanees (20) representing 65% were BVC committee members while (11) representing 35% were ordinary fishermen.

8.0 LAUNCHING OF USODZI WALERO PROGRAMME ON MBC

Usodzi Walero Programme was formally launched on 18th March 1995 with members from all the sections involved in propaganda work such as Women's World, Tadzuka, Drama, Extension Aids etc.

The main objective was to solicit assistance from MBC as there were a lot of messages to be passed on to the target group especially through the Radio.

The programme is aired on Thursdays and repeated on Fridays for 15 minutes and will run for 52 weeks at a cost of K97,000. Several meetings were conducted with 27 BVCs where 279 BVC members (including 5 women) attended. The aim was to familiarise Usodzi Walero producers with the BVCs and allow them to gather necessary information for the programme.
The meeting showed that BVC members including ordinary fishers were able to express themselves freely. The majority talked about the dwindling stocks of fish over the years due to wrong fish gears (small mesh nets), wrong type of fishing (kauni, trawling), two many gears and too many fishermen (as a result of migration and increased population).

The fisher folk proposed that licensing should be regulated by Fisheries Department and that BVCs be given legal backing in limiting the member of fishermen or gears into the lake.

An assessment format has been designed to monitor the progress of the programme on a monthly basis.

9.0 DISTRIBUTION OF T-SHIRTS

The T-Shirts were distributed to all the 28 BVCs with 301 members. These T-Shirts were given to the members as a token of appreciation as well as campaign

materials on Co-Fisheries Management.

An overview of the fisheries regulations in Upper Shire and Lake Malombe was also given during the ceremony.

10.0 BAND MESSAGES

Use of the Zomba band was done and several messages such a mesh sizes, protection of kasawala, use of modern kilns, roles of BVCs, conservation f trees, the Aids epidemic were relayed to the fisherfolk.

The band messages covered over 2000 fisherfolks.

It is proposed that use of Chimwala (health) and Kamwana (fisheries) bands be intensified since the one from Zomba is prone to transport problems.

11.0 STUDY TOUR TO ZIMBABWE

A study tour to Zimbabwe was conducted between 17th to 27th September, 1995 for 10 members of staff who are involved in Co-Fisheries Management Programme.

The Study Tour was set to meet the following objectives:-

a) to enable Fisheries staff examine Co-Fisheries Management Programme;

b) to enable Fisheries staff share experiences with the Mangers (Government staff and the Community) in the selected organization.

c) to enable Fisheries staff study specific Co-Fisheries Management issues in the selected organization and relate their findings to their practical work with Co-Fisheries Management Programme.

It was very interesting to see how fisherfolks manager their own fish resources there by enforcing, on their own, such regulations as illegal fishing in riverlines, river mouths, trawling, fish driving, fishing in resorts, use of seines and use of less than 4" mesh nets.

One of the most important issues learnt from the tour was the protection of Community Action by the Government through the "Appropriate Authority Act". It enable the fisherfolk to take law breakers to court without using the enforcement staff.

In Malawi, almost all BVCs are ready to enforce BVC rules and regulations but are caught in a dilemma because they are not covered by law. It was not uncommon to see even enforcement staff shying away from enforcing such BVC rules and regulations because they were not yet made into law.

12.0 CONCLUDING REMARKS

"For an efficient Co-Fisheries Management Programme there must be some legal provision made to sanction those two deliberately deviate from the agreed norm".

It should be borne in mind that peer pressure alone without legal backing, in a World of transparency, may not serve any meaningful purpose.

There is need to develop an effective and efficient information link with the BVCs and fisherfolks inorder to minimize their fears as expressed under 5.2

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3.4 Co-management Activities Lake Malombe and Upper Shire Rivers Malawi

CO-MANAGEMENT ACTIVITIES LAKE MALOMBE AND UPPER SHIRE RIVER

Steve Donda

- 28 beach village committees 69,000 fisher families
- agreed to conduct some management measures like:
  a) gear specification (mesh, headline length, depth)
  b) closed season
  c) enforcement of regulations

A lot of activities conducted with the 28 BVCs as follows:-

1. **Workshop with BVCs and Village Heads**

   Aim: To review the management of closed-season (January - March 1995) and make preparations for 1995/6 fishing season.

   Reports revealed that the closed season was well observed than in previous years.

2. **Follow up Visits**

   To check whether messages were relayed to the whole fishermen folk.

3. **Setting up of Artificial Reefs in Lake Malombe**

   As breeding areas of fish.
   - idea accepted by 18 BVCs
   - so far 23 areas identified

4. **Formation of fisher groups for IGAs**

   Especially during closed-season and USR closed through out

18 men group	(10 members each)
17 women group	(176)

5. **BVC Refresher Courses**

   Objectives
   a) Principles of lending and borrowing
   b) Duties of BVCs
   c) Formulating BVC constitution

6. **Fishing Net Loans**

Amount of Loan	Amount Paid	%	No. of Loans
214,000	178,000	83	31

7. **Formation of LMB and USR Fishers' Association**

   - Subject discussed at various BVC Fora and most fishers favour such a grouping
   - Process of facilitating the selection of members to sit in the committee

8. **Radio Programme**

   The Fisheries Management Programme was launched on the radio.

9. **Study Tour to Zimbabwe**

   10 members of staff in September 1995.

10. **Major Problems**

    - Some of Fisheries regulations agreed by BVCs not yet enacted by law.
    - Hence making the BVCs difficult to police.

The Lake Malombe Community Participation Programme, a new approach in management of small-scale fisheries in Malawi.

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A paper to be presented at the regional workshop on fisheries co-management, Kariba, Zimbabwe, 20-22 November 1995

Abstract

A new approach to manage a small-scale fishery is at present conducted at Lake Malombe and the Upper Shire River (USR), by the Malawi Fisheries Department with assistance of the GTZ (German Technical Cooperation) funded Malawi-German Fisheries and Aquaculture Development Project (MAGFAD). The Lake Malombe fishery has undergone severe changes since the last decade. Catches fluctuated in the 1980s between 7,500 t (1981) and 16,000 t (1988). They declined in the 1990s from 12.000 (1990) to 5,600 (1993). Next to low catches, the valuable Chambo (Oreochromis spp.) was replaced by less economic Kambuzi species (different Haplochromides). Chambo declined from 8,000 t in 1982 (63 % of total catch) to 300 t in 1993 (2.5 % of total catch). The development of the fishery was monitored by Fisheries Department and certain projects and can be correlated to an increase of fishing effort and change of fishing gear, were large mesh (> 3.5 inch) gill nets and Chambo beach seines were replaced by small meshed (0 .5 inch and less) Kambuzi and Nkacha seines, which comprise about 60% of all gear in 1994. Since 1994, a community participation approach is conducted in the area were no traditional fisheries management structure was so far existing. The approach involves 30 local fisheries committees (Beach Village Committees) which conduct certain management measures which were carried out by Fisheries Department in the past, e.g. mesh control. So far, the community agreed to certain gear specifications (mesh, headline length, depth), closed season and enforcement of regulations. In 1994, more than 95 % of fishermen respected the closed season (January to April), by July 1995 about 90 % changed their gear to the by fishermen accepted minimum mesh of 0.75 inch. Next to fishery regulations, the programme also involves co-ordination of activities in the extension, credit, income generating activity, enforcement and research sector and the creation of fish sanctuaries.

1 Introduction

Living aquatic resources play an important role in Malawis economy. Twenty per cent of the countries area is covered by water, with Lake Malawi being the largest and most significant water body in terms of fish production, 58% from a total of 68,000 t in 1992. The other major water bodies like Lake Chilwa, Lake Malombe, Lake Chiuta and the Shire River contribute varying amounts to the total production but are all of high local importance.

The capture fisheries sector, with more than 90% per cent of the catch being landed by small-scale fishermen, is a source of employment for approx. 45,000 fishermen and provides between 60-70% of the nation's animal protein supply and nearly 40% of the total protein supply.

The aquatic resources of Malawi are extremely diverse, with Lake Malawi being among the freshwater lakes with most endemic species in the world. This biodiversity is reflected in a high degree of specialisation amongst the fish, the genetic variability within species and a range and number of ecosystems. Such biodiversity is a part of the countries natural heritage and needs to be conserved for future generations. Hence, with the high rate of population growth, 3.7% per annum, pressure on the Malawi fisheries has increased tremendously.

2 The study area

Lake Malombe is situated south of Lake Malawi, being a natural impoundment of the Shire Riv the outflow of Lake Malawi. It covers a surface area of 390 square kilometres, with a maxim length of 29 km, a width of 17 km and a mean depth of four metres. It is highly productive a achieved a maximum yield of 15,500 t in 1988. Fishing supports a small-scale fishing industry approx. 400 gear owners, 2,300 crew and approx. 1,200 traders, having a high significance the livelihood in an area which is entirely focused on fishing.

Compared to Lake Malawi, species diversity of Lake Malombe is quite poor, with 40 spec appearing in catches. Most abundant are Cichlid species, in particular about 20 benth haplochromine species ("Kambuzi") of which three comprise 75 % of the total catch (FAO 199 The taxonomic status of most Kambuzi species is not yet clear. They are quite small (max. cm) maturing at about 5 to 6 cm (Tab. 1) and have a low fecundity. Recruitment is stron related to the size of the adult stock, thus being capable to high fishing pressure (Tweddle et 1994).

The Cichlid with most economic value, the Chambo, comprises three species (*Oreochro spp.*), which are difficult to be distinguished (FAO 1993). All are maternal mouthbrooders wh mature at a size of about 30 cm. Other species appearing in commercial catches are mai "catfishes" like *Clarias gariepinus* (Mlamba) and *Bagrus meridionalis* (Kampango) and cert Cyprinids like *Engraulicypris sardella* (Usipa), (Tab. 1).

3 Development of the fishing industry

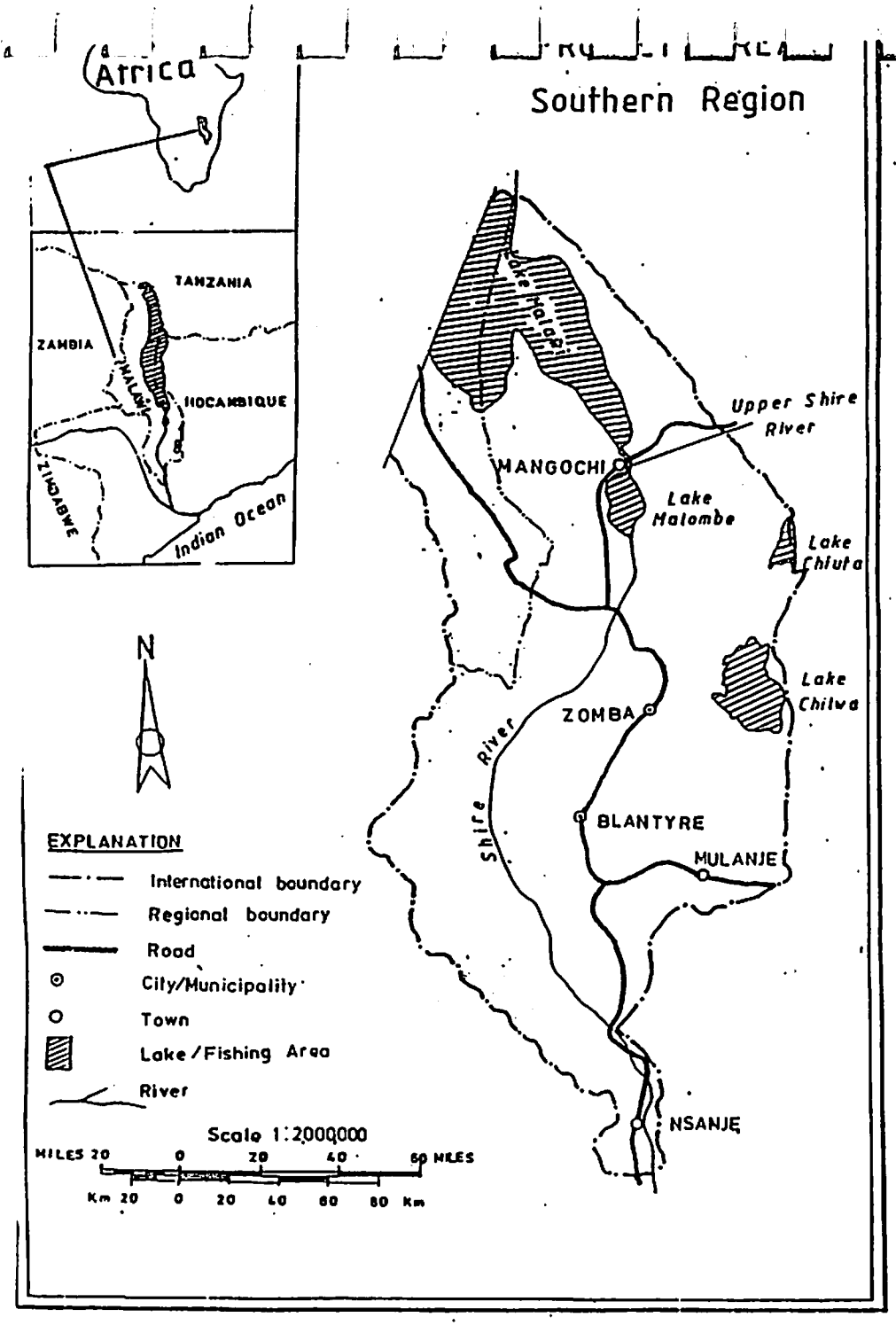
Lake Malombe was target of different research projects, with the most comprehensive stu being conducted by the Chambo Research Project (FAO 1993). Additional information available through Tweddle et al. 1994 and Allmoso et al. 1990. At present, an ODA fund research project continues with sampling and monitoring, accompanied by regular cat assessment surveys by Fisheries Department.

The fishery was until the early 1970s solemnly based on gillnets, traps and handlines (Banda a Hara 1994). Chambo beach seines with a headline length of up to 1,800 m, a depth of 3 to 10 and 3 inch mesh were the first seine nets introduced. In the early 1980s Kambuzi seine nets a Nkacha open water seine nets invaded the area, both up to 800 m long and 2-10 m deep w meshes between 0.25 and 0.75 inch. A special gear introduced were so called Mosquito (Chil nets, Kambuzi beach seines with mosquito gauze at the bunt, which are often operated behi ordinary seine nets. The number of small meshed nets has increased since the mid 1980s (Te 2) and comprises about 60% of all gear in 1993 (Tab. 3).

Catches have fluctuated in the 1980's between 7,500 t (1981) and 15,500t (1988) and sho downward trend in the 90's with only 5,600 t landed in 1993 (Tab. 2). Species composition h changed significantly with the replacement of Chambo, (comprising 80% of the catch in 1981) other, mainly Kambuzi species (Fig. 1). In 1993, Chambo catch was only 2.5% of total cat 1994 figures even seem to be lower.

4 Conclusions

Simply all authors agree, that the decline of catches and the changes in species abundance c be related to the replacement of traditional gear and to an increased fishing effort during the l years. The process of the shift of large mesh gear (< 3 inch) to fine mesh gear (0.5 inch a below), has not only depleted the Chambo stock but also endangers the remaining Kamb stock, as about 70 % of the fish caught are immature (FAO 1993).



2 DESCRIPTION OF THE STUDY AREA

Lake Chiuta is a shared Lake between Malawi and Mozambique. It is located at an altitude of 620m in the Southern part of Malawi. The mean depth of the lake is 5m, it has a total surface area of about 200 km2, of which 40 km2 lie in Mozambique. The main influent rivers are Lifune, Chitundu, and Mpili rivers. Lujenda river is the major outlet and links Chiuta to Lake Amaramba in Mozambique (FAO, 1994)..

The average annual fish production comprised about 1400 tonnes in the 1970s. In 1977 some 200 fishermen were reported to be active on the lake. In the 90s, catches fluctuated between 1,300 t (1991) and 3,600 t (1992), but a decline is evident with 2,500 t in 1994. In this year, the frame survey conducted showed 652 fishermen and 819 workers were operating on the Lake by using 62 planked canoes and 507 dug out canoes (Fisheries Department, 1994), Tab 1.

In terms of gear, fishermen traditionally use traps, gill nets, and long lines. The main fish species dominating catches include Oreochromis shiranus (Makumba), Barbus paludinosus (Matemba), Clarias gariepinus (Mlamba) and Tilapia rendalli (Chilunguni), Tab. 1. The management of fish stocks in Lake Chiuta was previously based on a centralised mechanism without participation of the fishing community. However, more recently fish stock management committees were set up to be involved in planning and decision making for management of the resources to a sustainable level.

This paper, reviews the community based fish stock management approach for Lake Chiuta and its effects on the exploitation of the fish stocks in the lake.

3 MANAGEMENT OF THE LAKE CHIUTA FISHERY

Since 1975 the Department of Fisheries is involved in management of Lake Chiuta fishery, but due to lack of fisheries regulation governing the fishery, enforcement was not conducted. Since beginning of the 1990s, migratory fishermen from other distant places started to operate seine nets, in particular "Nkacha" open water seines, with a length of up to 500 m and mesh seizes of 0.25 inch and below at the bunt. The gear is non selective and has been observed to be catching all sizes of species of fish.

The Fisheries Department and some resident fishermen started to express concern over the use of Nkacha seine nets from 1990 onwards. They could not, however, stop the

THE DEVELOPMENT OF A COMMUNITY BASED FISH STOCK MANAGEMENT APPROACH A CASE STUDY FROM LAKE CHIUTA/MALAWI

BY

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20-22 NOVEMBER, 1995

ABSTRACT

Fish resource management in Malawi has until recently been based on efforts by the Department of Fisheries, a centralised mechanism without participation of the resource users. With rising financial problems, it becomes difficult for Government Institutions to meet all costs of certain activities to regulate fishing pressure like extension, monitoring and enforcement. Further, there has been a weak relationship between the Fisheries Department and the fishing community. However, more recently there has been an emerging interest in the concept of community participation in fish resource management. The development of fish stock management committees (FSMC) on Lake Chiuta from 1993 onwards with support of the GTZ funded Malawi Germany Fisheries and Aquaculture Development Project (MAGFAD) has been regarded as a suitable approach to the concept. Remarkable progress has so far achieved by banning of certain gear and setting of regulations concerning a minimum mesh of 2.5 inch for all type of gear. The new regulations resulted in the eviction of approx. 300 non-resident fishermen and their gear (Nkacha seine net with meshes of 0.25 inch and below at the bunt) which invaded the area since the beginning of the 1990s.

1 INTRODUCTION

Malawi is a land locked county in Eastern Central Africa with a total surface area of 118,500 km2. Approximately 25% of the countries area is covered by water, with Lake Malawi being the superior water body. Riparian countries are the United Republic of Tanzania; the Republic of Mozambique and the Republic of Zambia (see map).

The population of Malawi is estimated at 10 million growing at a rate of 3.7% per annum. Consequently, there has been a growing pressure on natural resources such as land and water for subsistence agriculture, fisheries and forests. Therefore, it is becoming necessary for these different sectors of the economy to manage their resources to a self-sufficient and sustainable level to meet the growing population demand.

The fisheries sector in Malawi is of vital importance to the national economy in several respects. The sector secures employment for approx. 45,000 fishermen and gear owners and provides some 60-70% of the nations animal protein supply and is thus of great importance in domestic food security, nutrition and import substitution. Most of the fish is consumed in the rural areas and thus contributes to the nutritional needs of the poorest people in the country (Fisheries Department, 1995).

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Tab. 1: Data on Lake Chiuta fisheries based on annual frame survey records by Malawi Fisheries Department. 1995 data from January to July only.

Year	Gear owners +crew	Gill net	Long lines	Beach seines	Fish traps	O. shiranus (t)	Barbus spec. (t)	Clarias gariepinus	Others (t)	TOTAL CATCH
1990	1457	1905	143	89	535	1536.9	492.9	78.1	189.6	22975
1991	1772	1863	39	113	2411	707.4	235.5	118.7	281.7	1343.3
1992	334	1353	37	48	1852	1410.8	502.3	279.3	1397.0	3589.4
1993	587	588	70	35	2286	1144.3	566.6	365.4	1397.0	3473.4
1994	1472	1166	337	305	8637	1241.7	166.7	362.9	753.4	2524.7
1995 * 01-06	No Frame	Survey yet	cond uc	ted		131.11	11.0	88.0	281.2	511.1

persistent drought. In 1994, more than 300 non-resident fishermen were counted.

An early attempt to manage the fishery were so called fishermen's clubs, but their objective was mainly to settle disputes at the beach as both non-resident fishermen and residents were members. With assistance of MAGFAD, Fisheries Department held numerous meetings with fishermen who started to form Fish Stock Management Committees (FSMC) with the intention to regulate the fishery by

- adoption of new regulations
- enforcement
- stopping of all Nkacha operations.

The committees complained in particular about the way these Nkacha fishermen were permitted to operate their prohibited gear in the Lake. They started blaming some of the local traditional leaders for being involved in bribery. The other area of concern was the quality of drinking water. The committees complained that there was no clean water in the Lake due to the Nkacha fishing operation. The fishing operation course the mixture of bottom soil and water and hence rendering the water dirty. It was also disclosed further that some wastes were disposed into the lake during fishing operations , making the water unsafe for drinking.

Then new 9 committees were formed to represent all the villages around Lake Chiuta. Each committee comprises fourteen members, additionally one person is selected to join the so called Lake Chiuta Fishermen Association (LCFA) The association is the one which settles all problems that are presented to it from the nine clubs.

All traditional leaders and fishermen of Lake Chiuta agreed in July 1995 to the following regulations:

- Nkacha should be a prohibited gear in Lake Chiuta.
- The Minimum mesh size restriction for beach seine nets should be not less than 2.5".
- Beach seine nets should be operated from the shore and not in open water.
- The minimum takeable size of Oreochromis species should be not less than 4".

By August 1995, all Nkacha fishermen left the lake . In future, the Association is also to impose some fines if any fisherman is caught violating regulations. For example, two fishermen were using Nkacha nets and were found crossing to the Mozambique side. They were caught and brought before the Association. They were fined K 200.00 each and were told to go. The fine will be used to pay allowances and say those who were selected to act as local enforcement officers.

4 CONCLUSION

The new approach to regulate the fishery has so far profane to be successful, as catches and quality of catch has improved. The resident fishermen and traditional authorities support the work of the committees and the Lake Chiuta Fisheries Organisation which should guarantee sustainability. However, the work of Fisheries Department is still demanded in future regarding monitoring and research ad access to credit facilities which do not exist so far.

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Njaya F. J. (pers. Comm.) Department of Fisheries, P.O. Box 206, Zomba.

loss for the area, as beach prices for Kambuzi comprise only 25% of Chambo prices. While the tonnage of fish caught in 1982 was similar to 1990, the value of the 1990 catch was only approx. 8.4 million Kwacha compared to 36 million Kwacha in 1982 (Banda and Hara 1994).

The introduction of seine nets has additionally shown a detrimental effect on the Lake Malombe ecosystem. Parts of the shore line and the central lake bottom were once covered with dense weed beds which even hampered trawling attempts (Tarbit 1972). Those areas were important habitats for invertebrates which serve as food for most of the Lake Malombe species, provided refugee for fry and adults and helped to maintain benthic production by trapping of silt (Banda and Hara 1994). To facilitate operation, fishermen cleared beaches, while weeds in other areas were removed during operation. As a result, Lake Malombe is today free of weed beds, except a protected national park area of 12.5 square kilometres located in the South Eastern part (Jambo pers. comm.)

As a response to the situation of the Lake Malombe fishery, the Malawi Fisheries Department initiated in 1993 a programme on the management of the fishery, implemented though the GTZ (German Technical Cooperation) funded Malawi-German Fisheries and Aquaculture Development Project (MAGFAD).

The strategy of fisheries management in Malawi was so far based on enforcement of fisheries regulations regarding gear design and closed season (Tab. 4) or minimum takeable sizes of fish (Tab. 5). These regulations were in theory sufficient to manage the Lake Malombe fishery as

- most of the undermeshed gear exceeds the permitted 100 m,
- nobody respected the closed season,
- Chambo of less than 152.5 mm (Tab. 5) occur in almost every catch of small meshed nets.

However, lack of funds etc. hampered Fisheries Department to enforce the regulations on a regular basis. To overcome the problem, an approach to community participation was chosen, a new more parametric, decentralized approach as it is found in certain traditional fishery management systems (Wilson et al. 1994).

The programme comprises certain components (Tab. 6) which are co-ordinated by MAGFAD and Mangochi Fisheries Office. Basis are 30 Beach Village Committees which were elected by the community of each respective fishing area. They act as intermediaries between the fishing community and Fisheries Department to enforce proposed fisheries regulations through peer pressure and traditional authorities. After numerous meetings and discussions, the community agreed to the following revised regulations

- a minimum mesh of 0.75 inch for Nkacha and Kambuzi seines,
- a minimum mesh of 3 inch for Chambo seines and gill nets,
- a maximum head line length of 250 m for Nkacha, 500 m for Kambuzi and 1,000 m for Chambo nets,
- to follow the recommendations of the closed season,
- limited access to the fishery.

The proposed gear regulations have entered the new Fisheries Act which was handed over to Ministry of Justice for processing and further discussion in parliament. This new act will provide an improved basis for the departmental enforcement wing, which is still seen as necessary by the fishing community and project management. The results achieved so far are quite satisfactory. More than 95 % of the fishermen respected the closed season in 1995. By July 1995, more than 90 % of the fishermen changed their gear to 0.75 inch, partly supported by credits through a commercial bank scheme, with interest at current bank rates.

discussed in vernacular languages. The distribution of extension messages was so far hampered by the fact that each fisheries extensionists in Mangochi District had to cover a coastline o approx. 70 km, a distance which necessitated the purchase of motorcycles. The radi programme, however, reaches a much larger community, as the amount of radios in Malawi estimated to be 1 million. The annual costs for "usodzi walero", are similar to the costs for on set of tires for each motorcycle of the fleet.

Hence, a lot of activities are still pending. These comprise of:

- Creation of fish sanctuaries including submerged obstacles to act as fish aggregating devic and to prevent seine netting.
- A revised government licensing system, where parts of the fees flow back to the Committee (BVC's) to support their work.
- The foundation of a Lake Malombe Fisheries Association to be elected by BVC members.
- A re-appraisal of the closed season, which was also critical reviewed by FAO (1993).
- The identification of alternative income generating activities (IGA).

As the programme is still new, information on sustainability, success and weaknesses will only b available in the near future. However, fisheries management has to find other ways next to leav it entirely to enforcement of regulations by government institutions. If proven to be successful th approach should be applied to other areas of Malawi.

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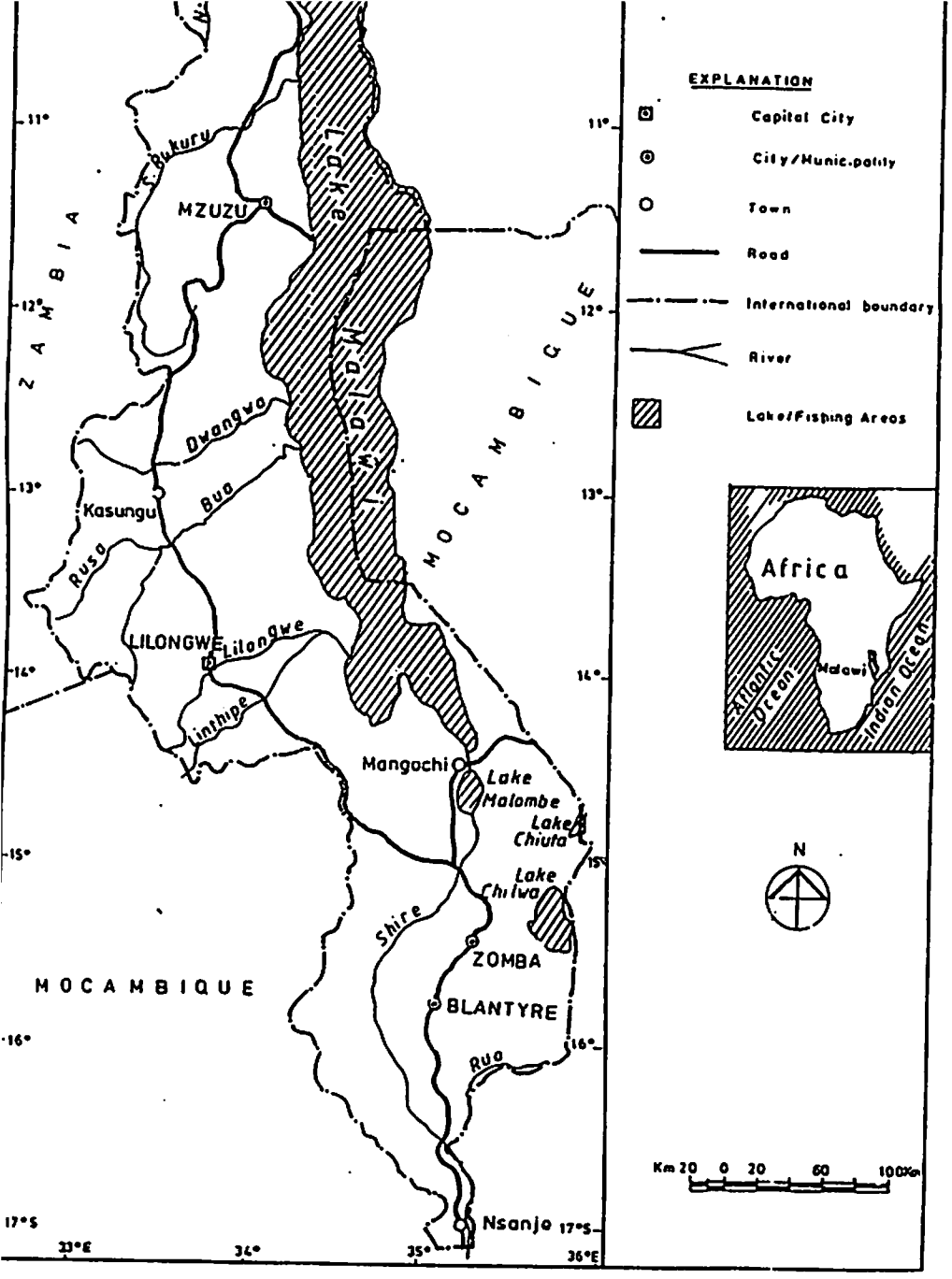

Family	Scientific name	Vernacular name
Tilapiine Cichlidae	Oreochromis lidole O. squamipinnis O. karongae O. shiranus Tilapia rendalli	Chambo Chambo Chambo Makumba Chilunguni
Haplochromine Cichlidae	Lethrinops "pink head" Copadichromis viginalis Othopharynx spec.	Kambuzi, Mbaba Kambuzi, Mbaba Kambuzi, Mbaba
Cyprinidae	Engraulicypris sardella	Usipa
Clariidae	Clarias gariepinus	Mlamba
Bagridae	Bagrus meridionalis	Kampango

Tab. 2: Key data on Lake Malombe Fisheries based on data from Malawi Fisheries Department.

Year	Gear Owner/ Crew	Gill nets	Chambo Seine	Kambuzi Seine	Nkacha Seine	Total catch (t)	Chambo catch (t)
1981	648	1036	27	72		7500	5960
1982						12800	8320
1983	2851	811	20	35		7600	4460
1984	2508	745	20	145		10200	6560
1985	2417	677	15	202		8400	5250
1986	1958	547	18	224		13600	5900
1987						12400	1900
1988	2454	474	11	77	157	15500	1780
1989	2768	453	15	101	144	6800	1480
1990	2077	440	6	56	186	12200	1280
1991						9500	260
1992						8000	300
1993	2206	358	3	49	227	5600	140
1994	2698	201	3	50	247		

(LM) and Upper Shire River (USR), Malawi. All figures except gill net relate to smallest mesh size recorded at the bunt. Data from May 1994.

STRETCHED MESH SIZE (Inch)									
GEAR	0.25	0.5	0.75	1	1.5	2	2.5	3 +	SUM
Nkacha seine LM	26	162	39	1					228
Nkacha seine USR	17	11							28
Kambuzi seine LM		16	19	6					41
Kambuzi seine USR	7	24	1	4					36
Chambo seine LM								2	2
Chambo seine USR					2	20	9	8	39
Gill net LM								4	4
Gill net USR						2	2		4
Mosquito net USR									19
TOTAL	50	213	59	11	2	22	11	16	401

Tab. 4: Fisheries regulations (Laws of Malawi) for Lake Malombe (LM). Upper Shire River (USR).

Fishing gear	Max. headline length	Minimum mesh size	Prohibited period
Shore seine net, LM	100 m	No restriction	1 Jan. to 31 March
Shore seine net, LM	1,500 m	3 inch (76 mm)	1 Nov. to 31 Dec.
Shore seine net, USR	100 m	No restriction	1 Nov. to 31 Dec.
Shore seine net, USR	250 m	3.5 inch (90 mm)	1 Nov. to 31 Dec.
Gill net, LM	No restriction	3 inch (76 mm)	
Gill net, USR	No restriction	3,5 inch (90 mm)	

Tab. 5: Minimum takeable length of fish according to the Laws of Malawi.

Species	Where taken	Minimum length
All species of Chambo	All waters	152.5 mm
Osphronemum microlepis	All waters	300 mm
All other species of the genra *Tilapia* and *Saratherodon*	All waters	102.5 mm
All other species	All waters	No restriction

Malawi. Organisational set up.

Organisation/Group	Tasks
Department of Fisheries • District Fisheries Office, Mangochi • Regional HQ, Zomba	• Co-ordination, monitoring and evaluation • Personnel: Extension, Research, Enforcement, Administration. • Licensing • Fisheries regulations
Malawi-German Fisheries and Aquaculture Development Project, MAGFAD (GTZ)	• Co-ordination, monitoring and evaluation • Training of Fisheries staff and beach village committees • Personnel and funds
Malawi Broadcasting Cooperation (MBC)	• Production of the radio programme "usodzi walero"
Commercial Bank of Malawi (CBM)	• Lake Malombe Fisheries Fund
Fishing community • 2700 fishermen • Traditional leaders • Religious leaders • 30 Beach Village committees (BVC) • approx. 1200 traders	• Discussion and adoption of regulations • "Enforcement" • Extension
UNDP	• Funds and personnel (IGA and extension expert)
IDA	• Funds for enforcement and extension

Pending:

- Fish sanctuaries
- New Fisheries Act with revised regulations
- Revised licence system
- Foundation of the Lake Malombe Fisheries Organisation
- Closed season ?
- Introduction of the approach to other water bodies

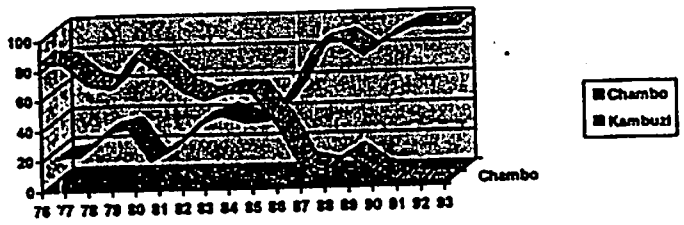

Fig.: 1: Percentage catch composition by weight of Chambo (*Oreochromis spp.*) and Kambuzi (different haplochrimid Cichlids), Lake Malombe, Malawi.

PARTICIPATING SECTORS

* REGIONAL FISHING FORUMS

* COASTAL PROVINCIAL GOVERNMENTS

* NATIONAL GOVERNMENT

* CONSERVATION & ENVIRONMENTAL

* INDUSTRIAL BUSINESS

* SMALL BUSINESS

* INFORMAL FISHERFOLK

* LABOUR UNIONS

* RECREATIONAL

* TOURISM

POLICY OBJECTIVES/PRINCIPLES

* OPTIMISE LENG-TERM SOCIAL AND ECONOMIC BENEFITS TO THE NATION

* PROMOTE SUSTAINABLE UTILISATION OF LIVING MARINE RESOURCES

* CONTRIBUTE TO THE OBJECTIVES OF THE RDP

* TRANSPARENCY AND ACCOUNTABILITY

* EQUITABLE ACCESS

* RESEARCH BASIS FOR MANAGEMENT

* DEVELOPMENT OF MARINE RESOURCES PART OF HOLISTIC APPROACH TO COASTAL DEVELOPMENT

* PARTICIPATION OF LOCAL COMMUNITIES /PARTICIPANTS IN RESOURCE MANAGEMENT

* IMPROVE CONDITIONS OF EMPLOYMENT

REGIONAL WORKSHOP ON FISHERIES CO-MANAGEMENT 20-22 NOV'95
KARIBA - ZIMBABWE

THE CONTEXT - RDP DOCUMENT

"THE PRIMARY OBJECTIVE OF OUR FISHERIES POLICY IS THE UPLIFTMENT OF IMPOVERISHED COASTAL COMMUNITIES THROUGH IMPROVED ACCESS TO MARINE RESOURCES AND THE SUSTAINABLE MANAGEMENT OF THOSE RESOURCES THROUGH APPROPRIATE STRATEGIES"

INTEGRATED POLICY DOCUMENT - OUTLINE

1. POLICY OBJECTIVES/PRINCIPLES

2. ACCESS RIGHTS - TECHNICAL TEAM

3. INSTITUTIONAL STRUCTURES

4. RESEARCH AND DEVELOPMENT

5. STOCK MANAGEMENT

6. LABOUR ISSUES

7. OTHER ISSUES

REGIONAL WORKSHOP ON FISHERIES CO-MANAGEMENT 20-22 NOV'95
KARIBA - ZIMBABWE

FOSTERING SUSTAINABLE COMMUNITY MANAGEMENT OF COASTAL AND MARINE RESOURCES

Rick Hasler

OBJECTIVES

1. Assess ways in which communities can benefit from and co-manage coastal and marine resources.

2. Identify competing rights to these resources at various levels.

3. Identify institutional arrangements which could be harnessed to enable local communities to benefit from and co-manage local resources.

4. Profile resources for revenue generation.

5. Identify opportunities and constraints for resource use.

6. Develop a resource development and management program building productive linkages between state, private sector and local people.

AIMS

1. Policy relevant research.

2. Identify income generating activities that will involve and benefit local communities.

Testing assumptions about equity and environmental sustainability

- desirability of devolving benefits and responsibility for local resources

- quality of life might be enhanced by granting access rights to communities

- environmental management is improved through benefits reaching the local level.

POTENTIALS AND PROBLEMS ON THE WEST COAST OF SOUTH AFRICA

Working Assumptions about environmental sustainability

There are two central assumptions that community based natural resource management programs explicitly or implicitly deal with. Internationally, the primary assumption and motivation behind such programs is that the devolution of aspects of management to local levels will enhance the environmental sustainability of these resources (Brundtlandt Report). This assumption is informed by the human perception, validated through scientific measurement, of global environmental crises concerning the earth's natural resource base. The idea is that if local people benefit from the resources where they live this will encourage them to become proprietors and managers of these resources, instead of being exploiters of resources that are managed by the remote state or allowing interests at national or other levels to exploit local resources. International experience in natural resource management tells us that this is simply a working assumption which may be a small part in a much broader solution. For example, the issue of alleged climate change or depletion of the zone layer can not be solved at the local level alone. International national, district, local and household levels need to be involved. Community based solutions have most relevance when collective action at the local level impacts on the way resources are

managed. This is in a way true for all resources but it is also obvious that, for instance, the impacts of nuclear leakage or oils spills cannot simply be an issue for local management. The impact of oil spills on local marine ecology and on local tourism industry is not simply an issue for local people. It concerns the various national and international interests in the oil trade or in nuclear power respectively. Costs are used for many competing and conflicting activities that emanate from different levels of scale. Thus International, National, Regional, Municipal and local levels are all involved in the management of the coastal strip. Certain activities and certain levels of influence or control therefore tend to dominate the coastal strip.

ACTIVITY	LEVELS OF MANAGEMENT INVOLVED	PROPERTY
Farming	Regional	Private
Steel industry	National and International	State
Nuclear Power	National and Regional	State
Mining	National and Regional	State & Private
Fishing	Global (eg Whales) to Local (eq Muscles)	State
Tourism	All levels	State and Private
Luxury Housing	Regional and National	Private

In this sense, coastlines are effectively common property resources, and are subject to the problems of management which all such regimes are subject to. Coasts are simultaneously international, national, regional, district and local resources. Coasts are the conduits for national and international trade, the source of mining, heavy industrial, tourism and many other competing and conflicting activities. The most dominant or environmentally significant activities taking place along the Natural Resource Management has been the relative merits of state or private property regimes. Advocates of privatized natural resources management have argued that market dynamics and long term security of tenure are the best ingredients for sustainable utilisation and management. Advocates of state management emphasise that equity and collective interest are the key to successful management of the resource (Murphree 1993).

Both perspectives have strengths and weaknesses particularly when one considers specific resources in identified contexts. A criticism of thee regimes is that frequently in both the state and the privatized managements regimes, the actual management of the resource may be in the hands of a third party: the people living with he resources concerned. Murphree argues that the tragedy in Southern African land and Natural resource Management is that policy has assumed the two options of privatize or nationalise instead of investigating the further option of communal property regime (Murphree 1993). Lawry however has questioned the effectiveness of polices which rely solely on local level common property arrangements. He explains that there are political and economic constraints on the emergence of local collective action (Lawry 1990). Along with other critiques (Bromley and Cernea 1989, Hasler 1995) he claims that "obtrusive state action" is responsible for the breakdown of local common property management systems. Lawry argues that while there has been a breakdown of local level communal property systems, state management systems have not worked because states ignore local inputs and initiatives and policing activities are arbitrary. Lawry therefore proposed a system of co-management of resources which addresses the weaknesses of state, private and community control (Lawry 1990). Co-management, another term for creative

problem solving between and within different vested interest groups at different sociopolitical levels, is actively put forward as a model that is appropriate for a wide range of resources including wildlife (Hasler 1995) Tourism (Hasler 1994), Coastal management (Sowman 1994) and Fisheries management. Institutional, legal and socio-cultural arrangements applicable to these various property regimes and the various resources to be managed therefore provides the basis for a comparative analysis.

The Historical Context

The trajectory of history and pre-history has important lessons to teach us about the sustainable utilisation of resources by "communities" on the West Coast of South Africa dating back to more that 10,000 years ago. From evidence in prehistoric cave sites and a string of near shore shell middens Parkington hypothesised the possibility that seasonal movement between mountainous and coastal areas according to the fluctuating availability of key resources (Parkington (including tortoises, black muscles, limpets rock rabbit, as well as other marine foods. Later Parkington suggested that the Olifants River Valley and other sources of fresh water provided the source for aggregation behaviour including communal rituals, exchange of information and interchange of personnel (Parkington 1977b). Because of an observed lack of occupation of the Elands Bay Cave between 7,800 and 3,800 years ago it was hypothesised that during this period there was minimal coastal settlement along the Atlantic shores of the Cape because of harsher climatic conditions (this was supported by Deacons 1974 work in the interior. In the millennium before pastoralists arrived people exclusively visited isolated rocky points and left massive volumes of shell. After pastoralists appeared in the archaeological record the residual foragers and fishers left much smaller volumes of shell refuse. Higher quantities of limpets were used during this time at these rocky points and an integration of coastal and inland food gathering strategies was hypothesised including crayfish, sea birds, seals and fish which are rarely found in the mega middens (Parkington). Yates indicates that the relative sea level in Elands Bay was 2 metres above that of the present (Yates *et al* 1986) indicating a strong collation between climate change and utilisation. Another hypothesis was that the rock paintings reflecting ritual activity painted into he last two millennia by stressed foragers (Soaqua) who saw their subsistence base and culture being eroded by the arrival of pastoralists and by the intrusion of colonists.

The introduction of pastoralism took place some 1,800 years ago thereby transforming and complicating the pattern of resource management on the West Coast and posing the problem of access rights to grazing and foraging. This nomadic pastoralism involved trans humane. The lush pastures of the Cape were used in the spring when the country further north and East, which has rain in summer was dry (Wilson and Thompson 1975). Despite the alleged dominance of this management regime, DaGama recorded encounters with "hunters" in St Helena Bay in 1487 (Da Gama) and Portuguese records talk of herders in Saldanha Bay. Van Riebeeck recorded "a camp of Saldanhamen" describing them as "two-hundred and fifty men, women and children, with fifteen sixteen hundred cattle and sheep besides". According to Wilson these herders were reluctant to slaughter their cattle and depended on hunting, fishing and collecting of veldkos (edible fruits tubers and berries) (Wilson 1975). Van der Stel in his journey to Namaqualand in 168 describes how the Soqua were employed by the Nama as hunters or herders in exchange for food. (Kolb).

The arrival of the Dutch in the Cape immediately led to conflict over land rights and competing coastal use strategies. In 1659 the "Capemen" attempted to expel the Dutch who they saw cultivating their best grazing land (Wilson p65). The emphasis on Agriculture again transformed the coastal management regime and added

increasing dimensions of complexity as increased trading took place between the perpetrators of different land and coastal use strategies (Foraging, Fishing, Hunting Grazing and Agriculture). In 1673 to 1677 there was a war over land rights between the Dutch and the Gonnema of Saldanha Bay. Pastoralists who lost their land became clients or farm servants. Hunters and foragers, who formerly relied on wild game now plundered domestic stock and were in turn systematically hunted by both agriculturalists and pastoralists. Thus the nomadic stock farmers, foragers and fishers originally lived on the West Coast of South Africa were gradually forced to become wage labourers on the expanding white farming. The first farms in the area were set up in the early 1700s, thereby privatizing rights to many natural resources in the area which formerly were held under some mechanisms of communal access or common property. Farms centred on an institutionalised form of feudal indentured labour. Settlements seem to have coalesced or centred themselves around resource use patterns. The advent of industrial activities into the current century (including commercial fishing, the building of international harbours, the building of the steel industry at Saldanha bay), added increasing complexity to the coastal management regime. This century has seen the competing activities and natural resource management regimes co-exist or modify and the personnel have all changed. Thus we still have foraging taking place of the intertidal resources, we still have pastoralism, but for the most part it is not nomadic. We still have agriculture and in addition we have a growing industrial economic activities which are highly dependent on labour. Historically the resource management regime has become increasingly complex. Social organisation has also become increasingly complex:-

Competing Vested interests in Natural Resources
The institutional framework
The legal framework
The Political mechanisms
Implications and second order problems.

Secondly the activities taking place along the coast constitute a range of overlapping property rights regimes, but the bulk of these are in fact State management regimes or privatized management regimes. Communal property rights regimes are restricted. Community management of the coastline required a definition of community which can respond to the various different levels of scale (Local to International). Secondly, patently it is not desirable nor necessary that all marine resources and coastal resources can or even should be managed by the community.

Equity

The second working assumption, which internationally is rationalised as being intertwined with the assumptions concerning environmental sustainability is that concerning equitable use of resources. That is that if local people benefit from local resources they will have an incentive to manage the resources well instead of exploiting these resources. Poverty is seen as a primary cause of environmental degradation. Internationally the primary motivation behind community based natural resource management programmes is environmental. Such programs have often been perceived by planners as a means to solve common property problems of open access in regard to trees, fisheries and wildlife. In the South African context the discourse and motivation about community based natural resource management has been inverted. At this point in the historical process in South Africa, the facade if not the reality of working towards equity is becoming an important aspect of the political process but private and state interests ....

Seeking equity into he South African resource management situation is worthwhile pursuit but it does not necessarily equate with the pursuit of environmental sustainability.

Another question about equity is the tendency to define communities as only referring to the historically disadvantaged groups in any

area. An analysis of the political and economic systems impinging on these areas quickly dispels this assumption. Coastal communities are usually articulated around specific economic activities (Luxury housing, fishing, heavy industry, tourism). Sustainable utilisation often involved joint ventures between private and public sectors and linkages between and within various groups into he area. For an economic activity to thrive it can not be restricted to any one group.

The Theoretical Context

Comparable common property institutions have been documented by several scholars (McCay and Acheson 1987). Berkes and Farvar have typologized property rights regimes as they apply to common property resources (Berkes 1989). These regimes are open access, state property, communal property and private property. Like any typology this is a simplification of social reality: natural resources are rarely managed only within one of these types. Instead considerable overlap exists within and between management regimes.

DEVELOPING A CO-MANAGEMENT SYSTEM FOR THE HARDER FISHERY IN THE OLIFANTS RIVER ESTUARY

Paper presented at the 5th Regional Workshop of the Network for Environmen and Sustainable Development in Africa, University of Cape Town, South Africa 25 - 28 October 1995

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1. INTRODUCTION

The Olifants River harder fishery provides a source of food and income to peop of the Ebenhaeser community. A decline in catches in 1991 catalysed a projec aimed at facilitating the development of a management system for the harder fishery that integrally involves, and is supported by the fishers of Ebenhaeser. This paper provides an overview of progress towards the development of a co-management system, with particular emphasis on national and provincial policy considerations, the development of a harvesting strategy for the fishery, and th formation of a partnership between the fishing community and the relevant conservation authority, for implementing the co-management system.

2. BACKGROUND

2.1 A BRIEF HISTORY OF A COMMUNITY DISPOSSESSED OF THEIR LAND

The realities of the community of Ebenhaeser, located on the southern bank of the Olifants River, 10 km upstream from the river mouth, are rooted in the history of a land exchange in 1925 (see figure 1). This took the form of an agreement between the Governor General of the Cape and certain residents of the community, then located on fertile soil approximately 20 km further upstream of Ebenhaeser today.

11000 morgen (9460 ha) of fertile land with access to fresh water from the Olifants River, for 11 000 morgen located on the lower reaches of the river, where the water is saline due to tidal exchange. Only a small portion of this land had access to water for irrigation. The rationale for the transaction originated at the turn of the century when the full agricultural potential of the land at the site of old Ebenhaeser was recognised. This land was surveyed for the development of an irrigation scheme, and designated for white farmers, who, in the view of the Governor General, would be better able to fully exploit the potential of the area (Surplus People Project (SPP), 1995).

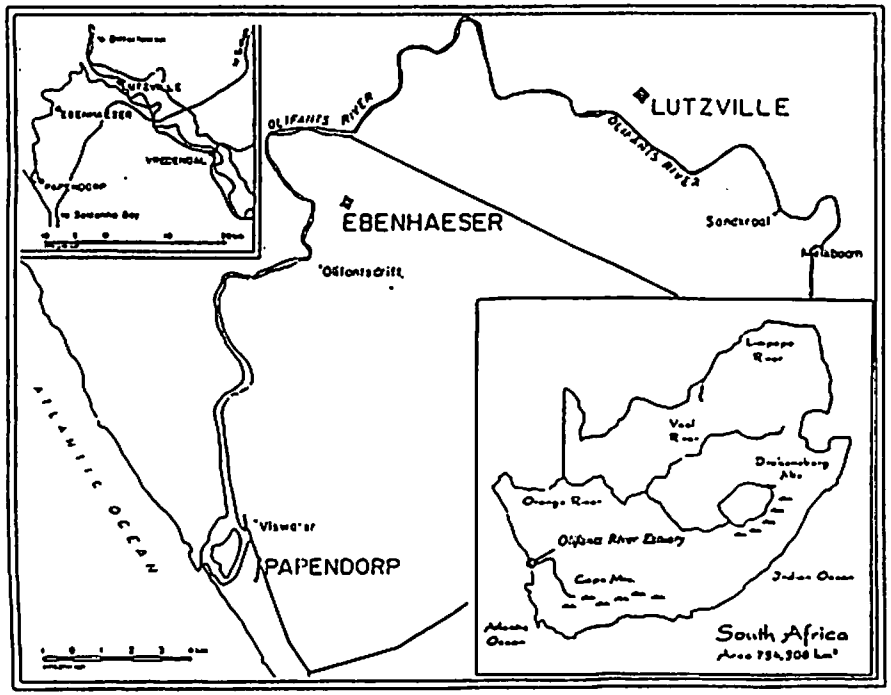

Figure 1: The location of the Olifants River estuary.

2.2 EBENHAESER TODAY

Today, the community of Ebenhaeser comprises a number of settlements with a total of approximately 2500 people. About 20% of the community is able to make a living from farming in Ebenhaeser, cultivating lucerne, beans, and potatoes or farming sheep. The majority of people seek seasonal work on neighbouring commercial farms, or are employed in other sectors such construction or mining.

Fishing provides a supplementary source of income and food to approximately 20% of households, the majority of whom do not have access to land for cultivation or grazing. Fishers use small wooden rowing boats and gillnets, an fish mainly in the summer months, between November and April. High winter rains in the Olifants River catchment make conditions unsuitable for fishing during the winter months. Time spent on the river could be anything between hours or 4 days, and may yield 2000 fish (for a lucky catch), 200 or nothing. portion of the fish is kept for household consumption. The rest are salted, dri and sold as "bokkoms" for around R10 per bunch of 30, or sold fresh to farmers in the surrounding area, for between 30 and 35 cents per fish.

A democratically elected Transitional Local Council was established early in 1995, to deal with local government issues and to replace the ineffective and corrupt management board system, set up by the apartheid regime in the so-called Coloured Rural Areas. A Development Forum has been established to initiate community development projects, and a Land Committee has been set up to co-ordinate the preparation of a land claim for land lost in 1925.

2.3 RATIONALE FOR THE PROJECT

In 1992, fishers claimed that their catches were declining causing considerabl hardship in the community. They requested an investigation into the effects o diamond recovery vessels anchored in the vicinity of the river mouth, on harde catches. A fisheries biologist was consequently appointed to undertake an initi assessment of the situation.

Preliminary findings suggested that there are various factors which may have affected fish catches; the most likely explanation being overexploitation of the resource when additional net permits were granted in 1991. However, records of catch amounts and other catch statistics such as the size of harders caught are so incomplete and unreliable that it is very difficult to make any statement on the status of the resource, and to assess whether the present catch levels are leading to resource overexploitation.

Despite these preliminary findings, fishermen were of the opinion that the mai reason for reduced catches was the presence and activities of the diamond recovery vessels. This conviction was fuelled by their general dissatisfaction c the manner in which mining companies operated in the area. There was no consideration of the impacts and implications of mining activities on the fishin communities resource base and lifestyles, nor any attempt to consult with them.

Consequently, a workshop was facilitated with all relevant stakeholders including the mining company, Ebenhaeser community representatives, and relevant government departments. What emerged from these discussions was that whilst the activities of the diamond boats and overfishing may be

contributing to reduced fish catches and required further investigation, other factors, namely the obstruction of a canal in the river mouth and the legal minimum gillnet mesh size could be affecting fish catches, and should be addressed. The following steps were thus taken in 1993:

i) The portion of the river mouth blocked by boulders was opened. This increased the quantities of harders entering the estuary, thereby improving the catches.

ii) The gillnet mesh size was reduced from 54mm to 51mm, and has improved catches by giving access to smaller harder size classes.

However, without a reliable means of monitoring catches, it is very difficult to confirm whether either of these steps have improved catches. What is urgently required in the area is the establishment of a reliable catch monitoring system, allowing clear identification of the trends in catch tonnages from month to month, and of the size and sex structure of the catch. This will make it possible to determine trends in the resource, to estimate realistic and bioeconomically sustainable catch levels, and to assess the benefits of different measures to enhance the number of harders entering the estuary from the sea.

In addition to the above, there is a need to revise the existing strategies for the management of the harder resource and to implement a system which is supported by the fishing community and conservation authorities.

Within this context, a project was designed in consultation with the fishers, with the following objectives:

1. To determine the social and economic importance of the fishery; this would provide information on the contribution that the harder fishery is making to the gross economic activity of the community;

2. To develop a community-based catch monitoring system to make it possible to obtain reliable monthly values for the total tonnage of fish caught and the variability of catches, and to enable the community to play a role in resource management;

3. To ascertain whether harder catches in the estuary are limited by an overcapacity of fishing effort, or by other factors;

4. To build the capacity of the local fishing organisation, to enable the fishing community to play a greater role in the management of the resource; and

5. To develop a community supported management system consisting of
   - a harvesting strategy, on which there is agreement among the fishers on the total number of fishing permits that should be allocated, and the allowable mesh size for fishing nets;

   - an agreed system for allocating access rights;
   - a partnership arrangement, in which the fishing community and the conservation authority take joint responsibility for resource management decisions.

3. PROGRESS TOWARDS IMPLEMENTATION OF A CO-MANAGEMENT SYSTEM

This section contains a summary of progress made towards the development a fisheries management system that would be jointly implemented by a community organisation representing the users of the resource, and the responsible conservation authority. The project is mid-stream, and there is sti significant amount of work to be undertaken in forming the partnership. Progress has however been made in (i) establishing a community-driven monitoring system; (ii) determining a harvesting strategy that would be economically and biologically sustainable; and (iii) building the capacity of the local fishing organisation.

In addition, the project team has facilitated discussion among groups with an interest in the management of the estuary, including the relevant government authorities, the mining company and representatives of the fishing communit While at this stage the project's aim is to develop a co-management system f the Olifants River harder fishery, there should ideally be a similar system for t management of the entire Olifants River estuary, involving all estuary users a interest groups. It is envisaged that the above-mentioned discussions will ser as a foundation for later negotiation among role-players on a broader estuary management plan.

3.1 POLICY CONSIDERATIONS

The management of natural resources in South Africa is fragmented amongst variety of departments at different levels of government. In addition the roles and responsibilities of these different government departments with respect t resource management is unclear. New policies are being formulated and the merits of national, provincial and local level management measures are being debated.

3.1.1 National level

The principle of local level management of natural resources is emerging in policy documents such as the Reconstruction and Development Programme (1994), the Environmental Policy Mission Report (International Development Research Centre, 1995) and in policy research papers emanating from the La and Agriculture Policy Centre (Meintjies, 1995; Singh,1995). However, the institutional and legal arrangements necessary for the implementation of loca management of natural resources have not been clarified. The national fisheri policy, currently being formulated, is of particular relevance to this project. A

management of certain inshore and intertidal resources, and the necessary institutional changes required to effect this.

3.1.2 Provincial level

While the responsibility for determining harvesting and management strategies for South Africa's commercial fisheries rests with the Department of Sea Fisheries (a national department), the management of estuarine resources has been delegated to the provincial governments. This responsibility rests with the departments responsible for nature and environmental conservation in the Northern, Western and Eastern Cape, and with Natal Parks Board (a statutory body) in the case of KwaZulu-Natal.

In the Western Cape, the Department of Cape Nature Conservation (CNC) has promulgated a number of regulations in terms of the Nature Conservation Ordinance No 19 of 1974, for the management of various estuaries. Regulations relating to the Olifants River are enforced by officials of a district office of the department. While the ordinance does not make formal provision for local-level participation in resource management, in certain areas CNC has facilitated the establishment of a number of local resource management forums consisting of representatives of resource users and relevant authorities. The forums do not have any legal status, and primarily provide the conservation authority with an opportunity to consult with users on management decisions. For example, a forum established for the management of the Bot River estuary is used as a platform for consulting user-groups on issues such as the timing of opening the mouth of the estuary.

3.1.3 Local level

The forthcoming local government elections will set in place democratically elected local authorities throughout the country. These structures are expected to play a central role in the delivery of infrastructure and development, as promised in the Reconstruction and Development Program. Minimal consideration has, however, been given to their role in the management of natural resources. In the past, many local authorities, particularly in rural areas, have lacked both expertise and a responsible attitude towards environmental management.

With respect to the management of marine resources, a draft document emanating from discussions on a new national fisheries policy, suggests that interest groups, including representatives of local authorities, should participate in fisheries management decisions through Provincial Fishing Forums. These forums presently provide an opportunity for fishers and other interest groups to contribute to fisheries policy development, and will in future be an ongoing link with government (Fisheries Policy Development Committee, 1995).

This section contains information on problems associated with the present system for managing the Olifants River harder fishery. Progress on the implementation of a community-supported system is outlined, including the implementation of a catch monitoring system, experimental work and the formation of a partnership between the local Fishing Committee and the conservation authority.

3.2.1 Problems associated with the current management system for the Olifants River harder fishery

Management of the harder fishery in the Olifants River is effected through controls on: (i) fishing effort; (ii) legal mesh size; and (iii) restricted fishing zones. At present, 65 permits for the use of gillnets with a mesh size of 51mm, and length of either 30m or 10m, are re-allocated on an annual basis at a meeting between representatives of CNC and the local Fishing Committee. Permit allocation is based on the Fishing Committee's local knowledge of which of the applicants have the greatest economic need. Successful applicants are those that have no other source of income, and have not been prosecuted for illegal fishing in the preceding year.

There have been a number of problems associated with this management system. Firstly, decisions regarding management of the resource are based on limited scientific information since a catch monitoring system administered by CNC was not supported by the fishers. Secondly, there has been minimal consultation with the fishers regarding changes to the controls on fishing. Thirdly, the criteria for access to the fishery are ill-defined, and are a source of conflict among the fishers. They also provide minimal opportunity for new entrants to the fishery. A number of the older members of the community, who are no longer physically able to engage in active fishing, and whose monthly pension allowance provides an alternative source of income, are able to retain their licence simply because the Fishing Committee does not want to challenge the status quo.

CNC is also responsible for enforcing regulations pertaining to the broader management of the estuary. For example, boating activities are restricted in a zone that stretches 1 km upstream from the river mouth. The rationale for this regulation is the creation of a fish sanctuary in this area which contains the highest concentration of fish. The regulation is vigorously enforced by CNC officials who arrest people that are illegally fishing in the area and confiscate their fishing gear. CNC has, however, been allowing between 5 and 8 diamond recovery vessels to use this same area as a harbour. A recent decision by CNC to grant permits to the diamond-mining company to formalise this arrangement has had the effect of intensifying the existing conflict between the fishers and the company.

3.2.2 Progress with respect to the development of a community-supported resource management system

(a) Collecting data and designing a harvesting strategy

A catch monitoring system: In fisheries management, reliable catch data is an important tool for designing a management strategy. World wide, especially in the commercial sector, fishers are required to submit catch records, which form the basis of analyses that enable predictions to be made on the implications of different management actions. It follows that catch records, collected and owned by the fishers, are an important means of enabling their direct involvement in decisions on managing the fishery. At Ebenhaeser, this data is now being obtained by means of a catch monitoring system that has been designed and implemented with the direct involvement of the fishers. A series of workshops were held to discuss the need for, and value of a monitoring system. Once there was broad support for the monitoring system, further discussions were held to design the monitoring card. The system was phased in over a three month period in which selected community members from each district assisted fishers to record their catches on the cards. Criteria for the selection of these "Walskippers" (meaning "skipper on the shore") as well as a monthly wage were agreed by community representatives. It was further agreed that following the initial three month period, fishers themselves would take on the responsibility for completing and submitting the cards to those currently providing technical advice.

Experimental work: From the initial investigation on the harder resource, it emerged that there was limited understanding of the impact of mesh-size on catch rates and resource sustainability. As part of the project, a small experiment was thus designed to assess the sensitivity of harder catches to the use of different mesh sizes. The experiment is conducted in collaboration with Ebenhaeser fishers, who assist with data collection.

Preliminary results have confirmed that the catch rates are extremely sensitive to mesh size, showing a three to fivefold increase in catch rates with a 3mm reduction in mesh size (from 54mm-51mm and from 51mm-48mm). This has far-reaching implications for management and also has a bearing on how we interpret the historic situation. It suggests that one has to conduct a more careful analysis of how mesh size has changed in the fishery over the last 5-10 years to understand the changes in fishing performance.

Use of the data: Data from both the monitoring system and experimental work will be used to develop a range of harvesting options which show the implications of using different mesh sizes, as well as the implications of reducing or increasing the total number of permits, thereby changing the fishing effort. The fishery management structure, referred to in paragraph 3.3, would then be able to choose the preferred harvesting option which, ideally, should address the needs of the fishers and ensure the ecologically sustainable use of the resource. The following is a hypothetical example of different options:

20 fish per hour;

(ii) 120 licence-holders, using a net with a m mesh, may catch an average of 10 to 15 fish per hour;

There could be a number of variations, in which the implications of manipulating mesh size, total net length, fishing seasons and fishing areas are predicted.

(b) A new system for allocating access rights

The Fishing Committee, conservation authority and project team members have been engaged in a number of workshops aimed at defining objective criteria for determining access to the fishery. This is a contentious issue because a new system is likely to result in the removal of fishing permits from those that obtain income from pension allowances, and those that are not actively using the permits. The new system has not been finalised and is the subject of ongoing discussion.

3.2.3 Problems and prospects

There are a number of lessons that have been learned from this aspect of the project, and a number of questions that still need to be answered.

Firstly, the importance of involving the entire fishing community in the design and implementation of the monitoring system cannot be over-emphasised, both to ensure that people understand the reason for the work, and to ensure the long term sustainability of the system. At Ebenhaeser, workshop discussions have focused on the fishers' concern that the information gathered would be used as a rationale for reducing the number of available fishing licences. This issue relates to the question of ownership of data and how it will be used. At present, the project team is responsible for processing and interpreting the data In the long term however, a member of the community should be trained to do this work, perhaps or a computer situated at Ebenhaeser. It is likely that the Fishing Committee would still require technical assistance for the formulation o appropriate management strategies, based on the catch trends. There is no clarity on who would provide this assistance. One suggestion is that the Department of Sea Fisheries should offer this kind of advice as part of its extension services to the emerging fisheries co-management structures.

Secondly, as mentioned in paragraph 3.2.2 above, a "Walskipper" system was sanctioned at community workshops as a means of implementing the system for a trial period of 3 months. This was seen as a way of providing short term employment opportunities for a small number of community members, whilst a the same time, providing monitoring data and training fishers to complete the cards. There were advantages and disadvantages to this approach. It was successful in that catch cards were completed on a regular basis. However, it has set a precedent in that people now expect that all activities relating to fisheries management should be remunerated. Members of the Fishing

not possible, and methods of fund-raising are being considered by the Committee.

Thirdly, the project team has found it difficult to motivate a monitoring system to people whose reality is one of poverty, and whose interest is in improving the economic efficiency of fishing activities, rather than ensuring the sustainability of the resource. It has become apparent that the Committee's role in monitoring and management could be enhanced by its role in facilitating the development of initiatives to improve the economic efficiency of fishing activities. In cases where the resource is unable to sustain the existing fishing effort, the management structure should investigate alternative income generation activities as part of a broader community development strategy. It is important to show how the monitoring system is used as the basis for designing the fisheries development projects.

Finally, there is the question of how to demystify fisheries management concepts, and communicate the results of the monitoring system and experimental work, to the community. At Ebenhaeser, a number of popular pamphlets have been written and distributed to the fishers. While these have stimulated active discussion at workshops, the project team is concerned that written documents are not understood by all members of the fishing community. Consideration is now being given to innovative means of conveying this information through the use of video, posters, school workbooks and games.

3.3 DEVELOPING A PARTNERSHIP TO IMPLEMENT THE CO-MANAGEMENT SYSTEM

Co-management has been described by Pinkerton (1994) as ranging from "consultation" on the one end of a "co-management spectrum" to "community-based management" on the other. Consultation implies that the community organisation has no authority, and plays a minimal role in decision-making. In a community-based management system, the legal and moral authority is vested in the community, with the government playing little or no role in decision-making. At the centre of the spectrum, the management structure would consist of partners of equal status sharing the responsibility for resource management decisions. The latter arrangement is the objective for the management of the Olifants River harder fishery.

Although support for a partnership has been expressed by the Fishing Committee and conservation authority, there are presently a number of pre-requisites for its formation. These are outlined below.

the Olifants River harder fishery

(a) Creating an environment that is conducive to negotiation

The conflict around the presence of the diamond boats in the Olifants River estuary is hindering the creation of a negotiating environment. This conflict has dominated the project, and there have been numerous attempts to facilitate its resolution. Initially, consideration was given to addressing the issue through scientific research aimed at assessing whether the activities of the boats are indeed disturbing the movement of shoals of harders from the sea into the estuary. However, the cost of a research project that would provide conclusive results was prohibitive. It was also apparent that fishers would outrightly reject any research result, unless it showed that the fishery is being significantly affected by the diamond boat activities. It has become evident that, for the fishers, the diamond boat issue is a symbol of inadequate recognition by the conservation authority and diamond-mining company of the fishers reliance on the resource, and their consequent right to be directly involved in making decisions on use and management of the resource.

With this insight, a different approach was taken, and discussions were held with the role-players, aimed at identifying options for resolving the conflict. A meeting in August 1995, involving representatives of the diamond-mining company, the Fishing Committee and relevant government departments, resulted in: (i) an agreement among all parties that outside intervention was necessary in order to resolve the conflict; and (ii) a decision by the Fishing Committee to submit a request to the conservation authority for an independent assessment of the environmental impacts of, and alternatives to, the use of the estuary by the mining company. Further action on this matter will depend on the nature of the response to this request. The Fishing Committee is now considering obtaining legal advice on the matter, a step that may serve to shift the balance of power and create the necessary conditions for negotiation.

(b) Building organisational capacity

A second pre-requisite for the formation of a partnership is a local fishing organisation with the necessary administrative, organisational and financial capacity to take on functions associated with co-management of the harder resource. The Fishing Committee at Ebenhaeser is presently under-resourced and unclear of its role. The Committee has operated without any sources of funding, and organisational costs, have been borne by the members themselves. Members have had minimal previous involvement in local decision-making processes, and have few organisational and leadership skills.

To facilitate the development of a viable local fishing organisation, capacity building workshops are taking place, aimed at defining the objectives of the Fishing Committee, improving the organisational skills of members, formulating a programme of action and exploring sources of funding, such as income from

There is also a need to build the capacity of the conservation authority. Organisational constraints to implementing co-management systems for natural resource management need to be identified and addressed. In addition, CNC needs assistance in changing its role from that of protector of the resource to that of partner in managing the resource. This requires a change in mindset, that may be a challenge for government officials who are currently primarily involved in enforcing the regulations.

(c) The need for political and legal support for a co-management entity

Finally, for a fisheries management partnership to work, it must be recognised as the legitimate management entity, with political support from national and provincial government. While at national level there is indeed the political will for this form of management structure, there is a lack of clarity on how these structures will be legally empowered.

3.3.2 Roleplayers and their tasks

The envisaged tasks of the partnering organisations that will be involved in the system for the co-management of the harder fishery include the following:

The fishers would monitor their catches, and assist with the enforcement of certain regulations regarding the management of the estuary (the latter point has not been discussed in any depth).

The Fishing Committee would be responsible for:
- processing catch statistics;
- co-ordinating discussions on the criteria for licence allocation, and re-allocate licences on an annual basis;
- obtaining technical advice for interpreting information from the catch monitoring system;
- coordinating annual discussions with the fishing community, and participating in discussions with the conservation authority on an appropriate harvesting strategy;
- formulating project proposals aimed at enhancing fishing activities.

The conservation authority would be responsible for:
- implementing government policy;
- liaising closely with the Fishing Committee on monitoring of catches;
- providing support, where necessary in the processing of catch records;
- participating in discussions with the Fishing Committee on an appropriate harvesting strategy;
- providing extension services aimed at improving the efficiency of fishing

that would determine regulations for estuary management;
- facilitating the resolution of conflict among estuary users.

The non-government organisations and scientific advisors engaged in this project would be a resource for both the Fishing Committee and the conservation authority, providing assistance in the analysis of catch data, and making recommendations on catch rates and mesh sizes to ensure the sustainability of the resource.

The partnering organisations, the Fishing Committee and conservation authority, would have joint decision-making responsibility and would meet on a regular basis to identify problem areas, assess progress on the monitoring of catches, discuss and select a harvesting strategy, and identify and implement fisheries development projects.

4. CONCLUSION

This paper has attempted to provide an overview of progress towards the establishment of a management system for the Olifants River harder fishery, that would be jointly implemented by the conservation authority and local fishing organisation. The conditions that motivated a change in approach to management of the harder resource were sketched, and actions taken to address the problems facing the Ebenhaeser fishers and to set up a community-supported management system, were outlined.

In summary, a co-management system for the harder fishery is evolving from a combination of national and local conditions. At national level, the process of democratisation in South Africa has been a catalyst for an overhaul in national policy on access, use and management of natural resources. One outcome of this process is that local resource management initiatives are being encouraged. At local level, as a consequence of these changing political circumstances, there is increased awareness of peoples' rights to participate in decision-making processes.

Regarding implementation of the new management system, there are a number of critical factors that are necessary to ensure its sustainability. These include the following:

- recognition by all stakeholders, of the fishers' reliance on the harder resource, and their right to play a central role in decisions on the management of the fishery and estuary;

resource;

- development of organisational capacity, within the local fishing organisation and the conservation authority, to enable their participation in a partnership;

- ongoing re-assessment of the respective roles of the partnering organisations;

- reliable data on the fishery, collected by the fishers, and processed and analysed with the assistance of an independent technical advisor;

- an innovative means of de-mystifying and communicating fisheries management concepts, as well as catch trends and their implications for harvesting strategies, to fishers that may have had minimal access to formal education; as part of this process, it is essential to combine local knowledge on resource management with scientific concepts; and

- a clearly defined linkage between the resource management functions of the local fishing committee, and its role in facilitating development initiatives to enhance or support fishing activities.

In conclusion, there are numerous challenges to the process of establishing and sustaining this fisheries co-management system. A significant investment of time and resources is required to reach a stage in which the system is self supporting. A reading of international literature reveals that it can take several years, and requires ongoing evaluation. The concept of resource co-management is relatively new in South Africa, and it is hoped that the experience gained at the Olifants River can be applied in other parts of the country, to assist in the formation of similar emerging resource management partnerships.

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Aquaculture for Local Community Development Programme

Activities are spread among four action programmes:

- **Aquaculture** for small-scale farmers. Four aquaculture pilot projects are ongoing in Zambia, Tanzania and Mozambique. The pilot projects aim to improve the integration of fish farming into the existing agriculture systems and improve fish production.
- Utilization of small water bodies for aquaculture and fisheries; Small reservoir fisheries management and production pilot projects are underway in Zambia, Malawi, Tanzania and Zimbabwe.
- The information service disseminates information and aims to stimulate debate and discussions of development issues by the periodic publication of reports on technical, social and economic aspects of aquaculture development.
- Administration and management of the whole programme ensures increased awareness about aquaculture and fisheries issues in the member countries and the region: organisation of conferences, workshops,...

Funding and execution

- Funding: FAO, Sweden and Belgium (Norway, Japan)
- Execution: FAO

Regional programme: SADC

Small Water Body Programme

Assessment of regional small water body fisheries potential

Establishment of a regional database of information on small reservoirs for use in fisheries management and enhancement

Participating countries:

- SADC region

Research & development

Biological, physico-chemical and socio-economic follow-up of selected reservoirs and development of fisheries capacity by awareness training and management improvement.

Participating countries:

- Malawi
- Tanzania
- Zambia
- Zimbabwe

Physico-chemical and biological data collection

General information about reservoir and catchment

Reservoir name, Coordeast, Coordsouth, Elevation (m), Catchment (km2), Avg Yearly Rainfall (mm), Avg Yearly Air temp (degC), Avg (Y) Min air temp (degC), Avg (Y) Max air temp (degC), Dominant Soil type in Catchment (FAO class.), Owner Type (Community, Government, Private), Fluctuation (Minimal, Strong, Drying up yearly, Functions(Human drinking water, Cattle drinking, Washing, Irrigation, Fishing, Brick molding,...) in order of importance e.g.: H,W,C.

Physico-chemical information on water (bi-monthly except for surface)

Name, Surface (ha), Shoreline (m), Avg depth (m), Max depth (m), Avg pH, Avg Alk (mg CO3), Avg Total Hardn.(dH), Avg Cond (microS), Avg Secchi Disk depth (cm).

Oxygen and temperature profiles (bi-monthly)

Experimental fishing (bi-monthly):

preferably with seine nets, all fish put back in the reservoir.
measurement of : species importance (weight, number), lenght frequency distribution, GSI evolution, comparative experimental CPUE

Creel survey

data on total fishing effort, CPUE, total catch, fishing methods,..

Important socio-economic indicators in SWB fisheries assessment:

Economic

Costs for entry into the fishing activity, opportunity costs of labour
Comparative costs and returns of principal fishing gear
Income generation in local economy, direct and indirect value of production
Income distribution of the natural resource
- social equity
- household equity

Catch trends, price trends

Market Attributes

Distribution patterns (seasonal and spatial)
Processing
Markets
Consumer preferences
Consumer prices and price fluctuations

Social:

Livelihood and occupational structure
economic status of fishers
Size, composition of household
contribution of other fisheries activities individual/household
Importance of fisheries in local survival strategy:
Gender sensitivity analysis

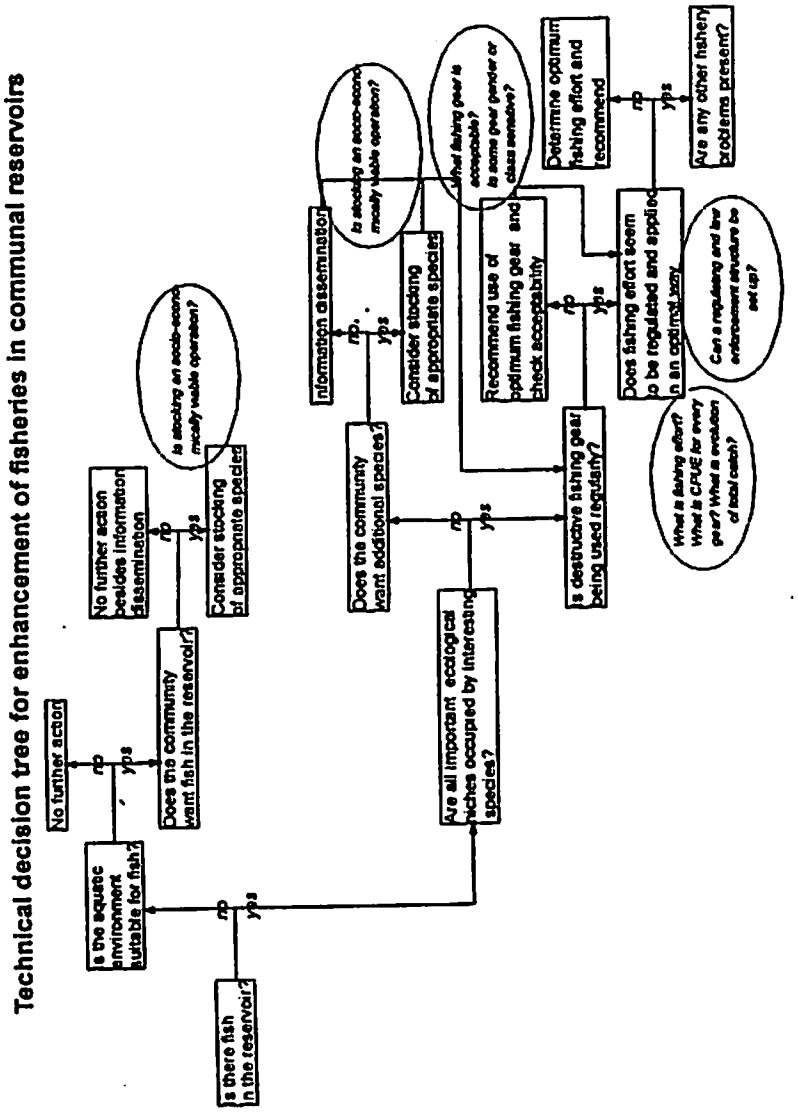
Nutritional importance of Fish:

Quantitative importance of fish consumption in local economy.
Comparative cost of fish in relation toother protein options

Institutional arrangements:

Local village level organisations (fisheries, other)
Rights and rules systems at local level (fisheries, other)

Analysis of fisheries management system



Options for Co-management or Community Based Management

Probable legal framework of Pilot project reservoirs:

- Tanzania: Co-M (already existing)
- Malawi: option for CBM
- Zambia: Co-M or CBM
- Zimbabwe: Co-M

Chances for succes based on key conditions for Co-M (Ostrom,1990; Pinkerton, 1989):

Clearly defined boundaries:	ALWAYS
Membership is clearly defined	MOSTLY
Group cohesion	MOSTLY
Existing organisation	RARELY
Benefits exceed costs	DON'T KNOW
Participation by those affected	MOSTLY
Management rules enforced	POSSIBLY
Legal rights to organise	UNCLEAR, COUNTRY SP.
Cooperation & leadership at comm.lev.	MOSTLY
Decentralisation & delegation of auth.	UNCLEAR, COUNTRY SP.
Coordination between gov. & comm.	UNCLEAR, COUNTRY SP.

FISHERIES COMMITTEES, NOKUE LAKE, BENIN

NOKUE LAKE: 12,000 ha lagoon lake. 33 fishing villages all dependent on fisheries. Multi-species, multi-gear all year fishery for cichlids, clupeids, crabs and pink shrimp. Fish marketed fresh or smoked for local consumption by women; shrimp for export by men.

TRADITIONAL MANAGEMENT: Unwritten code (gear restrictions, sacred zones, effort regulation) implemented by a group of elders or chiefs with recognized authority. Elders embody the powers of water divinities, which are feared and adored.

COLONIAL TIME: Chief deprived of their powers and rights to coerce their (former) subjects. Monotheistic religions erode belief in water divinities. Non-adherence to traditional code of conduct facilitated.

INDEPENDENCE: Centralized DFO authorized to manage resources and enforce regulations. Fisheries police and extension service grossly ineffective. Widespread bad fishing practices leeds to depletion of resources. Involving fishermen in resource management in response to reduced yields suggested first time in 1989.

SINCE 1993 (legal basis in process): Creation of **Fishing Committees** in each village. The five Committee members represents users of different gear. Tasks: (a) contribute to rational resource exploitation, (b) awareness creation among lakeside residents on legal provisions and regulations, (c) ensure that traditional rules for protecting the environment are followed, and (d) conflict resolution among different gear uses

Assessment: Some Committees functioning; others not. Stewardship demonstrated, conflicts solved. High expectations with user groups.

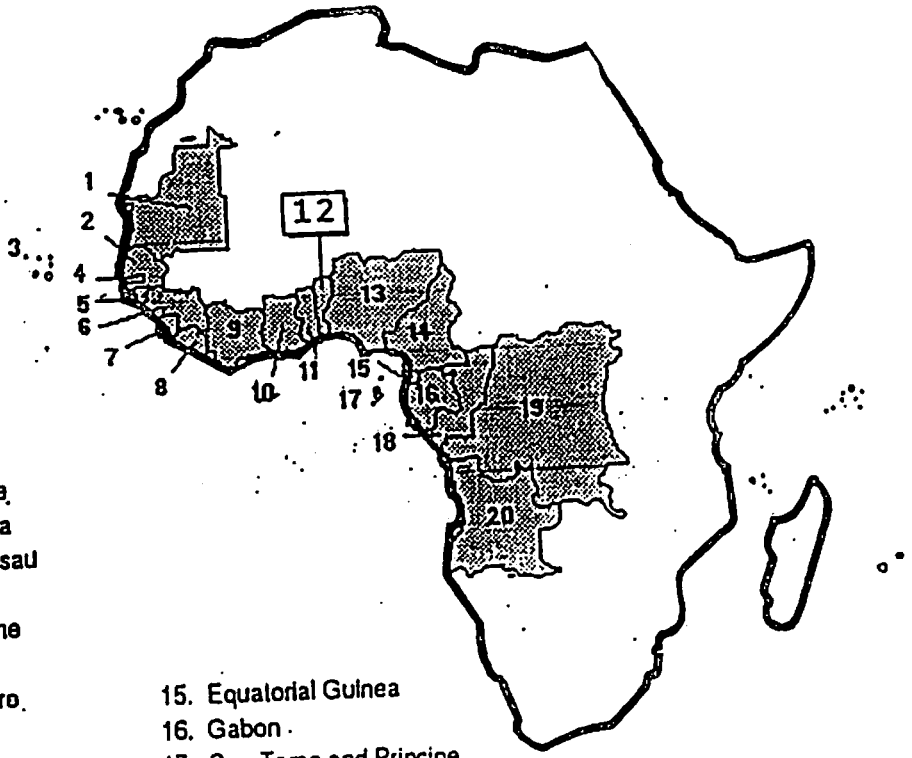
PARTICIPATORY MANAGEMENT APPROACH: ABY LAGOON, COTE D'IVOIRE

ABY LAGOON SYSTEM: 425 sq km. Many fishing villages within four districts/kingdoms. Strong social hierarchy. 3,000 fishermen (indigenous/foreigners; independant/laborers) targetting estuarine fish species, crabs and shrimp. Multi-gear, all year fishery.

TRADITIONAL MANAGEMENT: Resources ensured and controlled by customary management of a subsistence fishery where collective, passive gear were predominant.

COLONIAL TIME: From 1930 introduction of new gear and technologies causes the disappearance of collective gears. Single ownership with fish laborers introduced. Influx of foreign fishermen (Ghana, Benin, Mali). Power of local authorities seriously undermined.

"The success of the experiment which constitutes the Fisheries Committees may be facilitated by legal documents that clearly defin their roles and function, a strengthening of the committees through regular training in management and organization and field oriente activities to improve awareness on the part of fishermen as to their responsibility. To these, one must add that a change of the present mentatlity of some fishermen, might motivate memebers of the committee".
(Toussaint A. Adegbite, National Coordinator the Promotion of Lagoon Fisheries Project, Benin).



1. Mauritania
2. Senegal
3. Cape Verde
4. The Gambia
5. Guinea Bissau
6. Guinea
7. Sierra Leone
8. Liberia
9. Côte d'Ivoire
10. Ghana
11. Togo
12. Benin
13. Nigeria
14. Cameroon
15. Equatorial Guinea
16. Gabon
17. Sao Tome and Principe
18. Congo
19. Zaire
20. Angola

INDEPENDENCE: Indigenous fishermen replaced by foreigners (urban drift). Centralized management structure; decentralized control largely ineffective. Licence system for foreigners. Serious crisis in 1982 and 1987 caused by overfishing. Government seen as last resort to save a deficient system.

1990 serious clashes between young locals and foreigners over management issues: foreigners excluded from access (only allowed as laborers), gerontocratic management of "common heritage" challenged, village heads redundant, resource protective regulation enforced by new generation. New participatory management structure underway, involving all stakeholders, men and women.

the Aby Fishing Project intends to use in the years to come not because it is fashion but because it permits the transfer of responsibility to thye communities which the latter is supposed to assume if they want to rely on the support of the public authorities in the strict sense of one and others interest"

(Konan Angaman, Head of the Lagoon Fisheries Project of Aby Adiake, Cote d'Ivoire)

Managing the Commons

The "commons" include natural resources, such as fisheries, wildlife, forests, irrigation waters and pasture lands, which by their physical nature are not owned by individuals but are shared by a community of producers (e.g., fishers) and consumers. "Common property resources" share two important characteristics. The first is excludability or the control of access. The physical nature of the resource is such that controlling access by potential users is a problem and may be costly. For example, migratory fish species present problems for regulating access to fishing. The second characteristic is subtractability; that is, the fish harvesting activities of one fisher subtracts from or lowers the catch per unit of fishing effort of other fishers. The term "common property regime" is used to describe the system of property rights and rules under which the common property resources may be managed. Common property regimes aim to provide assurance that the resources on which all persons collectively depend will be available sustainably. In many parts of the world, rights to common property resources are all that separate the poor from destitution. Thus, development planners must eventually deal with the issue of institutional arrangements for property rights and rules over natural resources.

The "commons" has come to connote inevitable resource degradation. Many accepted that fishery resources which are held in common are often subject to overexploitation and degradation. They incorrectly identified all common property situations as being those in which entry into the fishery is uncontrolled, with no effective boundaries

around the resource, and no restrictions on how the resource is to be exploited. This situation is more correctly classed as an open access fishery. This popular notion of the nature of common property resources is misleading and has led to inappropriate policy recommendations and project implementation in the fisheries sector. Policy recommendations have often focused on how to create individual property rights rather than on how to limit access. Common property management where joint rights exist is a legitimate form of management and can be successful if access is controlled. Many government management arrangements failed to conceive of or recognize the existence of local community-based fisheries management (CBFM) institutions which could effectively manage common property fisheries resources.

Common property regimes are forms of management grounded in a set of individually accepted rights and rules for the sustainable and interdependent use of collective goods, that is, a resource that is managed and controlled by a group. Such a regime is composed of a recognized group of users, a well-defined resource boundary that the group uses and manages, and a set of institutional arrangements (rights and rules) for the use of the resource. Common property represents private property for the group of co-users. These regimes have been shown to develop when a group is highly dependent on a resource and when availability of the resource is uncertain or limited. If resource availability problems are repeatedly experienced, such as low or no catches, and if it is controlled by a single community of users, the fishers are likely to develop collective arrangements to deal with the problem.

The principal problem faced by group members of a common property regime is how to organize themselves. That is, how to change from a situation of independent action to one of collective action and coordinated strategies to obtain greater joint benefits and reduce joint harm. A sense of commonality , commitment and compliance must be established for the collective good. Problems on the allocation of catch and assigning duties for resource use must be overcome.

Common property regimes can be very effective at controlling access to the resource. Most common property regimes are based upon the exclusion of certain potential users. The entire community, sensing security of tenure and enjoying some of the benefits from access control, will actively take responsibility for monitoring and enforcement.

The establishment of common property regimes is a complex process that cannot be done solely by administrative decree. It must take into account general factors and their local context such as the nature of

Fisheries Co-Management Research Project

Partner Country Workplans
- 1995-1998

MALAYSIA

Ongoing:

1. Enforcement and Compliance with Fisheries Regulations in Malaysia, Philippines and Indonesia. Universiti Pertanian Malaysia.

Planned:

1. Transaction Costs and Institutional Arrangements in Coastal Fisheries Management. Universiti Pertanian Malaysia.

VIETNAM

Ongoing:

1. A Baseline Socio-economic Survey of Small-Scale Fishing Households and Communities in Vietnam and a Review of Coastal Fisheries Management Strategies. IFEP-MOF.

2. Training Course on Principles and Practices of Fisheries Co-Management. VCOP; IFEP-MOF.

Planned:

1. Documentation and Evaluation of Community Management and Property Rights Systems: A Historical and Case Study Analysis. IFEP-MOF; NCSS-Institute of Southeast Asian Studies

2. Pilot Site Community-Based Coastal Resource Management. IFEP-MOF.

3. Review and Evaluation of Experiences with Community-Based Resource Management in Vietnam: Lessons Learned.

4. Coastal Fisheries Co-Management and National Laws and Policies.

INDONESIA

Ongoing:

1. Community-Based Fisheries Management in Bali Island. RIMF.

Planned:

1. National Workshop on Community-Based Coastal Resource Management in Indonesia. RIMF; IDRC; Ford Foundation; Asia Foundation.

2. Documentation and Evaluation of "Sasi" in North and Southeast Maluku Province. RIMF.

3. Review and Evaluation of Literature on Community-Based Coastal Resource Management in Eastern Indonesia (West Nusa Tenggara, East Nusa Tenggara, Timor, Sulawesi, Irian Jaya, Maluku).

4. Documentation and Evaluation of Community-Based Coastal Resource Management Systems in Eastern Indonesia.

5. Documentation and Evaluation of Community-Based Inland Fresh Water Resource Management Systems in Kalimantan and Sumatra.

6. Community-Based Resource Management and National Laws and Policies.

7. National Policy Workshop on Community-Based Aquatic Resource Management and Co-Management.

THAILAND

Planned:

1. Documentation and Evaluation of Traditional and Modern Community-Based Coastal Resource Management Systems: Lessons to be Learned in Support of Thailand's Fisheries Rights Program.

2. Evaluating the Potential for Implementing the Fisheries Rights Program in Thailand.

PHILIPPINES

Ongoing:

1. Study on the Management of Fisheries/Aquatic Resources at the Local Level. UP-CPA.

2. Institutional Arrangements on the Fisheries Co-Management in Malalison Island, Culasi, Antique. SEAFDEC-AQD.

3. Development of a Management Plan for El Nido Marine Reser . PE; DENR.

4. Proceedings of the Forum on Co-Management of Marine Fisheries a: d Other Coastal Resources in Palawan: Concepts and Experiences. ICLARM.

5. Proceedings of the Visayas-wide Conference on Community-Based Coastal Resources Management and Fisheries Co-Management. ICLARM; WRI; TDC.

6. A Review and Evaluation of Community-Based Coastal Resources Management Projects in the Philippines, 1984-1994, Field Study. USAID-Manila funded. ICLARM.

7. A Review and Evaluation of Community-Based Coastal Resource Management Projects in the Philippines, 1984-1994, Desk Study. ICLARM (Melvin Carlos).

PHILIPPINES

Planned:

1. Impact and Performance of Community-Based Coastal Resource Management Projects in the Philippines: A Case Study Analysis. ICLARM.

2. Pilot Site Community-Based Coastal Resource Management: Palawan. ICLARM; SEARCA; SEAFDEC; TDC.

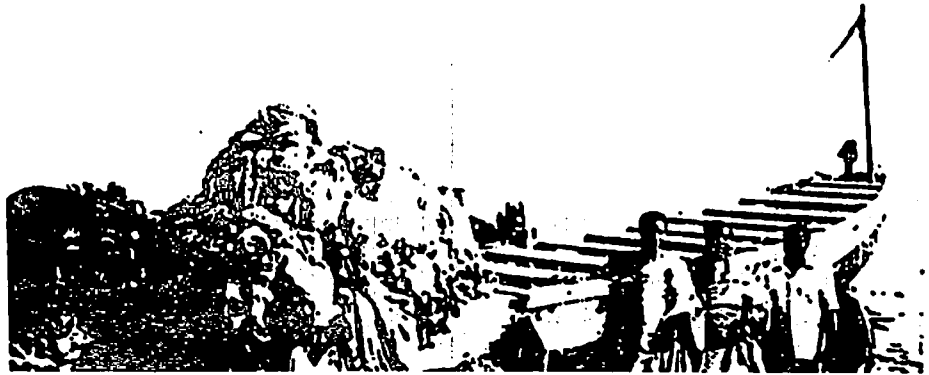
3. Mindanao Conference on Community-Based Coastal Resource Management and Fisheries Co-Management. ICLARM.

4. Follow-up Study on National Laws and Policies for Coastal Resource Co-Management.

systems. While governments may be willing to call for more community involvement, they must also establish commensurate rights and authorities and devolve some of their own powers. Fisheries administrators may be reluctant to relinquish their authority or parts of it. They may fear infringement by local fishers and their representatives upon what they consider their professional and scientific turf. In all cases of co-management, the ultimate authority is held by the government.

The issues are not easily resolved. Each policy bearing on co-management is embedded in a broader network of laws, policies and administrative procedures, at both national and local government levels, and consequently will be difficult to change. The role of the government in co-management is to provide enabling legislation to facilitate and support the right to organize and make fisheries management arrangements at the local level, address problems beyond the scope of local arrangements, and provide assistance and services to support the maintenance of local arrangements. Government administrative and fisheries laws and policies will, in most cases, require restructuring to support decentralization and co-management. The actual form of co-management will depend upon the form of government and the political will for decentralization.

Other than fishers, resource users that derive economic benefit from the resource (e.g., fish traders, business suppliers, police, politicians, consumers) will also need to be considered in the co-management arrangements. These stakeholders often hold considerable political influence in the resource management regime.



Key Conditions for Successful Fisheries Co-management

Over the last decade, research done at different locations around the world has documented many cases of co-management and community-based management in fisheries and other natural resource systems. From the results, certain conditions are emerging which appear to be central to the chances of developing and sustaining successful co-management arrangements. These conditions should not be taken as complete as research is continuing to reveal more about the systems and the factors for successful performance. Indeed, more research is required to establish evaluative criteria for such outcomes as sustainability, equity and efficiency of fisheries co-management systems. Among the emerging conditions for successful co-management are that the more of these key conditions that exist in a particular situation or system, the greater the chance for successful co-management.

The key conditions are (Ostrom 1990, 1992; Pinkerton 1989):

1. *Clearly defined boundaries:* The physical boundaries of the area to be managed should be distinct so that the fishers group can have accurate knowledge of them. The boundaries should be based on an ecosystem that fishers can easily observe and understand. It should also be of a size that allows for management with available technology, i.e., transportation and communication.
2. *Membership is clearly defined:* The individual fishers or households with rights to fish in the bounded fishing area and participate in area management should be clearly defined. The number of fishers or households should not be too large so as to restrict effective communication and decisionmaking.
3. *Group cohesion:* The fisher group or organization permanently resides near the area to be managed. There is a high degree of homogeneity, in terms of kinship, ethnicity, religion or fishing gear type, among the group. Local ideology, customs and belief systems create a willingness to deal with collective problems. There is a common understanding of the problem and of alternative

4 Proposed Research Activities in the Region

Representatives from Malawi, Zambia-Zimbabwe SADC Socioeconomic Research team, Zambia - Lake Mweru and South Africa presented verbally on their proposed and ongoing research relevant to co-management or (as proposed or planned) within the prospective collaborative links and initiatives possible with the world wide collaborative research project on fisheries co-management.

While it was a general opportunity to understand the objectives and foci of the research in the region it was generally accepted the there could be considerable benefits to researchers in the region by participating or collaborating regionally in a research network. Researchers could use the framework by attempting to "piggy-back" on to the existing research projects and policy processes. The approach would enable researchers to contextualise the framework into their local contexts, taking into account the elaboration of other theoretical and conceptual frameworks, and to produce a comparative synthesis of their research findings drawing out the development, policy issues - such as equity etc.

It was felt to be highly relevant to access information and research results as well as the lessons of different case studies. They provide insights into the development opportunities to test and introduce different management regimes. Such an initiative fits into in a wider regional policy context which emphasises community involvement in natural resource management CBNRM.

5. How might we Collaborate Regionally and Internationally?

Professor B. Hersoug introduced this session with a presentation on the lessons from the experience of co-management internationally (Norway). A reproduction of his overheads follow.

Regarding the discussion on a strategy for regional collaboration it was necessary for all the participants to caucus from the plenary session to enable separate the regional and institutional interest groups to discuss and come up with their consensus and opinions. With a few reservations the participants agreed that it would be fruitful to further collaborate directly bilaterally with the Project (in terms of small grants and project financial support) and by networking, exchanging information and by agreeing to participate and present research results at a proposed (second) Research Workshop on Fisheries Co-management in Central and Southern Africa which could take place in approximately a years time.

COMMON PROBLEMS EU, NORWAY, CANADA, US

1. The starting point: existing systems are notworking

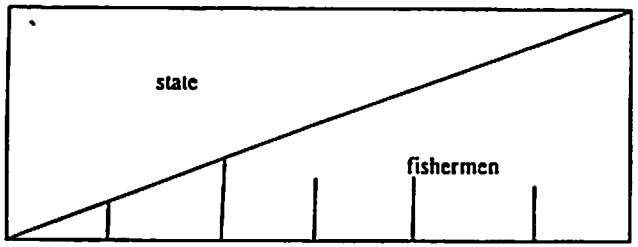
2. Overfishing
   - overcapacity
   - little or no adherence to rules and regulations
     - no proper control, monitoring and surveillance system
     - lo ligitimacy

3. Co-management as a possiblesolution?
   - better information - more informed management
   - higher legimacy - less low breaking - cheaper CMS

   (the cost of CMS - important: in Norway: min 900 mill NDK
   administration + CMS + applied reseach = 150 mill US$

4. Concepts:
   - co-management (devolved, deventralized, regional, informarl local systems)
     - Turf, Traditional Marine Tenure System (TMTs)
     - Commuity based management

5.



the starting point

What? (the scope of co-management)
How? (the institutional arrangements)
Who? (among ishermen:small scale - industrial active - passive geography

Only fishermen, women, fishworkers?
When? (in the political process)

6. What:

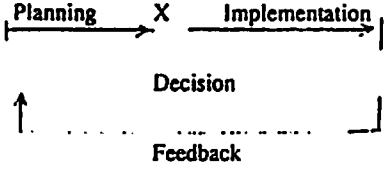
   a) The general development objectives - the sector plan
   b) Structural policies
   c) To setting of TACs
   d) To distribution of quotas
   e) Other technical regulation measures
   f) Control, monitoring and surveillance
   g) Enforcement
   h) Research and education
   i) The development of infrastructure
   j) Coastal zone management

7. How:
   - Consultation "hearing",
   - committee membership,
   - shared responsibilities (as with control)
   - delegated responsibilities (by law)

8. Who:
   - organised vs unorganized
   - full-time vs part-time
   - functional groups vs territorial groups

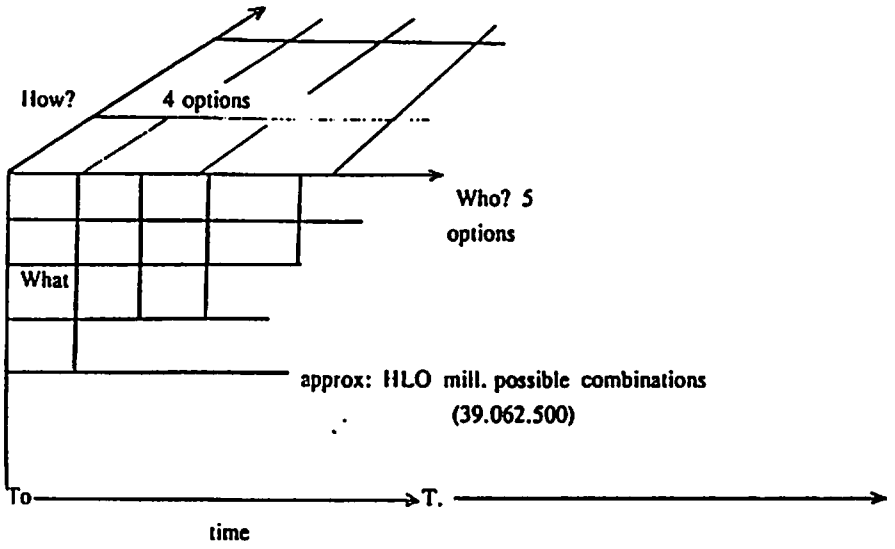
   Why only fishermen? women?
   fishworkers?
   aquaculture?

9. When?



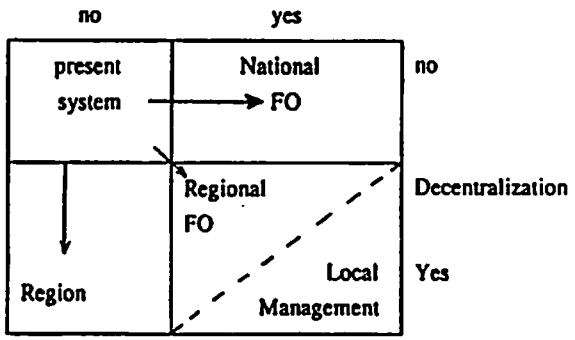
(Where you stand depends on where you sit!)

10. Co-management as part of the ordinary political struggle in society, where science do not play a neutral role (not even biology!)



Hence: there is a need for SIMPLIFICATION in order to compare!

11. The EU problem: too little influence Delegation



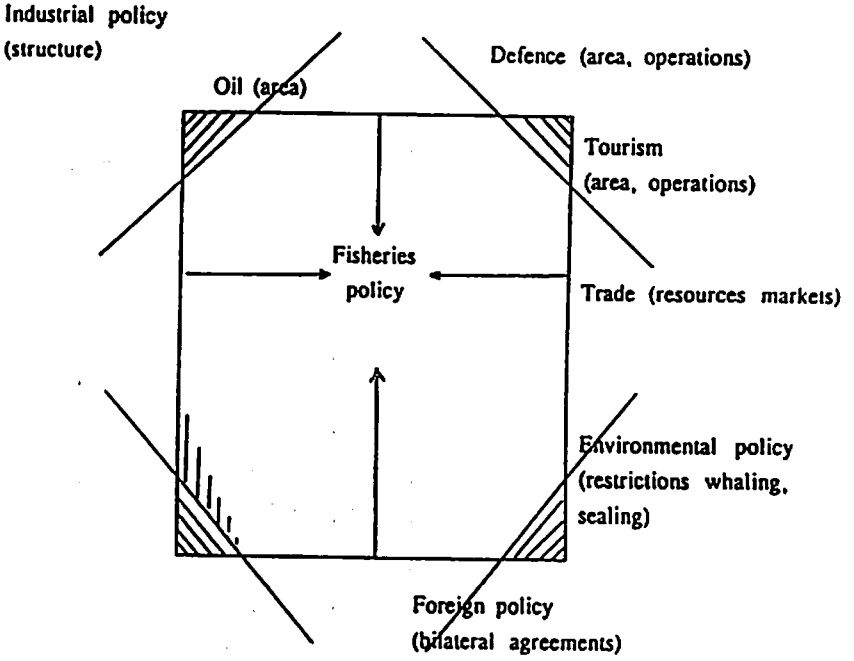
Possible options: depending on culture/history significance of fisheries, resources, power etc.

12. The Norwegian system: too much influence

Reducing the role of the National Fishermen
Assist/increasing the role of processors/exporters from corporative solutions to market solutions.

from: The state as "the solution" to all problems
to: the state as "the problem".

Why not a new system: 1. No crisis
2. Resistance in fishing industry
3. Resistance in mobile fleet
4. The researchers have not come up with a credible alternative!



Co-management in industrial fisheries: increasing influence on fisheries policy but fisheries policy is increasingly being influenced/dominated by other decision-makers.

DRAFT

ANALYSIS OF FISHERIES CO-MANAGEMENT ARRANGEMENTS: A RESEARCH FRAMEWORK

INSTITUTE FOR FISHERIES MANAGEMENT AND COASTAL COMMUNITY DEVELOPMENT (IFM)

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Robert.S Pomeroy

October 1995

1. INTRODUCTION

The Fisheries Co-management Research Project is a collaborative project between ICLARM, IFM and National Aquatic Resource Systems (NARS). It is based on a mutual interest to gain practical experience in research on fisheries co-management. There are two components to the research:

(1) Comparative case studies of fisheries co-management strategies on the basis of existing literature and country research.

(2) Co-management models based on (1) and tested at pilot sites.

This paper describes a research framework which has been developed by the project to carry out the above research. The aim is to provide a common analytical framework which will enable comparison between case studies, country research and pilot-tested co-management models. This will allow data to be analysed in a systematic way and allow generalisations to be made about conditions which facilitate successful fisheries co-management. The framework is in draft form because it is anticipated that once it has been applied in the analysis of case studies and country research, there might be a need to modify and/or expand it.

This paper is divided into two main sections. The first section briefly describes the theoretical background to the research framework, exploring the concepts of common property, fisheries co-management, institutional analysis and rights and rules. For more detailed coverage of the theoretical background, readers are encouraged to consult the bibliography. The second half of the paper describes the framework itself.

2. THEORETICAL BACKGROUND

2.1 Common property resources

For a long time, the most widely accepted explanation for overexploitation of fisheries was because it was held in common property[1] such as wildlife and forests. The main rationale for this was based on Hardin's theory on The Tragedy of the Commons (Hardin, 1968) which concluded that "freedom of the commons brings ruin to all". The assumption was that when resources are limited and publicly owned, it is rational for each individual to overexploit them, even though this behaviour ultimately results in tragedy for the group (Acheson, 1989). Hardin's solution was either to privatise the commons or keep them as public property, to which rights

[1]Common property resources such as fisheries, wildlife and forests share two important characteristics. The first is excludability which means that the physical nature of the resource means that controlling access is either impossible or very expensive. The second is subtractability, that is, each user is capable of subtracting from the welfare of others (Feeny et al, 1990). Common property resources have therefore been defined as a class of resources for which exclusion is difficult and joint use involves subtractability (Berkes et al, 1989).

of entry and use could be allocated i.e. privatisation or government control.

In more recent years, social scientists have observed that not all common property resources are subject to such a 'tragedy' and are not overexploited. This has led to considerable discourse on the subject and consequent rejection of the notion that it is the common property nature of the resource which is the problem. What is important is not the type of resource i.e. common property, but the property rights regime in combination with the resource it is subject to, namely open access, private property, communal property and state property. The following definitions are given by Feeny et al (1990) to describe these regimes:

Open access: the absence of well defined property rights. Access to the resource is unregulated and free and open to anyone.

Private property: the rights to exclude others from using the resource and to regulate the use of the resource are vested in an individual or group. They are usually recognised and enforced by the state and are usually exclusive and transferable.

Communal property: the resource is held by an identifiable community of interdependent users who exclude outsiders while regulating use amongst members. The rights are unlikely to be exclusive or transferable and are often rights of equal access and use. Some inshore fisheries and shellfish beds are managed as communal property. The rights of the group may be legally recognised or *de facto*.

State property: rights to the resource are vested exclusively in the government which makes decisions concerning access to the resource and the level and nature of exploitation.

This separation between the nature of the resource and the property regime it falls under shows that Hardin's theory was correct inasmuch it predicted a situation of a common property resource under an open access regime. However, other property regimes can and have also led to overexploitation, indicating that the provision of property rights alone is not enough. New methods of management are being investigated, in an attempt to take on the best aspects of state control, private and communal property. Largely from the management experiences gained in certain fisheries, and other common property resources such as forests and groundwater, it is recognised that what is needed is a more dynamic partnership using the capacities and interests of local fishers and communities, complemented by the ability of the state to provide enabling policies and legislation as well as monitoring and enforcement. This has been termed co-management.

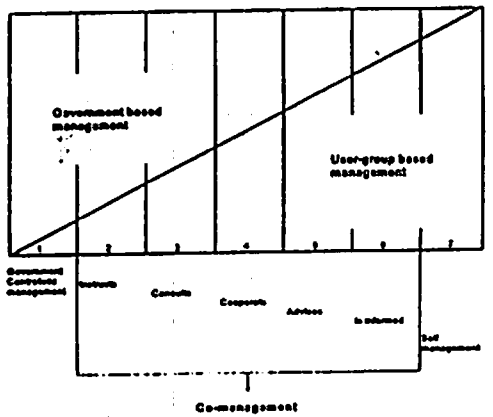
2.2 Fisheries co-management

Co-management is defined as some form of institutional arrangement between the government and user groups to effectively manage a defined resource. Lying between two policy prescriptions - centralised control and privatisation, co-management can cover a broad spectrum

of management strategies and is illustrated in Figure 1. The essence of co-management is that government and user-groups share responsibility and competence for managing the resource.

Devolution of some authority to manage fisheries away from central administrations to user groups may be one of the most difficult tasks of co-management. Fisheries administrations may be reluctant to relinquish some or all of their authority and user groups may not have the aspiration nor the capabilities to undertake some or all fisheries management responsibilities. For these reasons, co-management covers a number of possibilities ranging from government (fisheries administration) instructing user groups to user groups informing government on management regimes they have decided upon.

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



2.3 Institutional analysis

Institutions are the rules of the game in a society and are affected by economic, social and political factors. Institutions can be both formal and informal , created or evolved. Any human interaction is governed by both formal rules (i.e. those that are written down) and informal codes (i.e. those which everyone knows about but are not formalised in any way). North (1990) uses the analogy of football to describe institutions. In football there are formal rules and usually unwritten codes of conduct which underlie and supplement formal rules such as not deliberately

injuring a player from an opposing team. The effectiveness of the rules is determined by whether they are enforced, the cost of enforcement and the severity of punishment.

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

The purpose of institutional analysis is to separate the underlying rules (institutions) from the strategy of the players (organisations). Institutional analysis examines how institutional arrangements affect user behaviour and incentives to coordinate, cooperate and contribute in the formulation, implementation and enforcement of management regimes. When carrying out institutional analysis, it also important to examine some aspects of organisations because their strategies can influence, or lead to change in, institutions.

A considerable amount of theoretical and empirical work on institutional analysis for common property resources has been undertaken, mainly by the Workshop in Political Theory and Policy Analysis at Indiana University, USA. They have developed the Institutional Analysis and Development (IAD) framework which has theoretical foundations on game theory, neoclassical microeconomics, institutional economics, transaction cost economics, political economy and public choice. The framework emphasises the relationship between the contextual variables of the "action arena[2]" and the institutional setting, how these affect patterns of interaction amongst users and in turn, how this determines outcomes in terms of efficiency, equity and sustainability. The process is continuous and dynamic. The framework developed for this research project has been based on their work and is described in detail in Section 3.

2.4 Rights and rules

As rights and rules are the basis of institutional analysis it is important to describe their relationship. Rules give substance to rights as they structure how rights may be exercised and by whom. Rules also determine who has rights . The important aspect of rules in terms of institutional analysis is that they may create different incentives which affect cooperation among users. Schlager(1990) cited the example of two groups of fishers in an identical physical environment and with identical set of rights but with different rules determining how those rights can be exercised . These two groups may have different incentives to cooperate so that the result may be two totally different outcomes.

Ostrom (1990) distinguishes three level of rules:

[2] Ostrom et al (1994) states that action arenas include an action situation component and an actor component. Action situations encompass the "area" where the actions are taking place while the actor component encompasses the participants of the action situation.

(1) Operational rules are those which determine when, where and how to harvest the resource, who should monitor and enforce rules and what information must be exchanged or withheld.

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

(3) Constitutional choice rules determine who is eligible to make collective choice or operational rules and the types of rules which are permissible. Constitutional choice rules also determine who has collective choice rights.

Operational or working rules are nested within collective choice rules which are in turn nested within constitutional rules. To further complicate matters, all levels of rules operate at different levels: community, district, province, national, regional, and international. A full understanding of behaviours and outcomes in managing a resource is only possible when information is analysed on how institutional arrangements at the operational level (resource use, monitoring and enforcement) relate to institutional arrangements in collective choice (policy, management and adjudication) and constitutional choice (governance, adjudication and modification).

3. Institutional Analysis Framework for Fisheries Co-management

Based on the previous theoretical work and concepts described in Section 2, an analytical framework has been developed for use by project researchers on fisheries co-management arrangements. The framework is based on the work of Oakerson (1992), Ostrom (1990), Pinkerton(1990, 1993), Hanna (1995) and Feeny (1994).

The purpose of the framework is to describe and characterise the key factors which influence the institutional and organisational aspects of fisheries co-management arrangements. Such an analysis can then be used to make generalisations about the type of co-management arrangements appropriate for different situations. In particular, the analysis would enable:

(1) The identificaton of the *existing property rights system* in order to determine who defines rights to exploit the resource, who has access to the resource and whether any of these rights are transferable.

(2) The *scale and level of user group involvement* in order to determine the ways in which user groups do or can participate in co-management. Scale refers to the types of tasks which can be carried out by user groups, whilst level refers to the political level at which user groups are involved such as local, regional or national. Scale is related to level in the sense that different tasks can be carried out at different levels.

(3) The *nature of the representation of user groups* in the decision-making process in order to determine the participants in the co-management arrangement, which user groups are

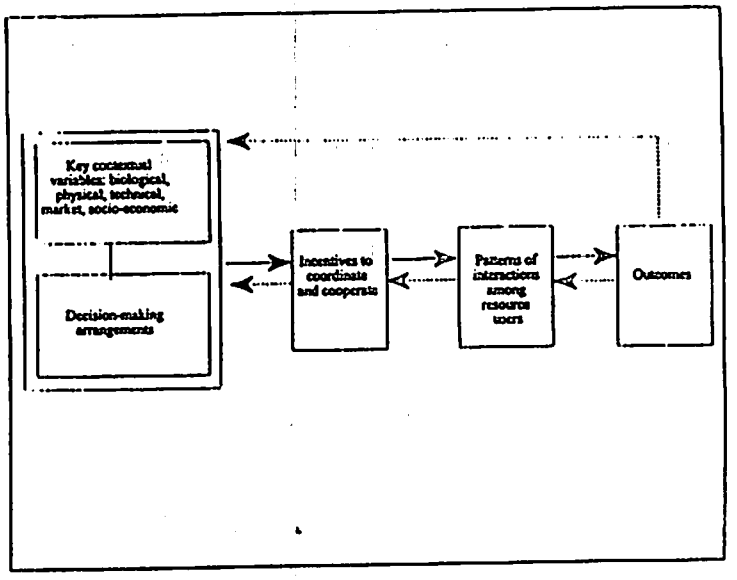
legitimate particpants in the decision-making process and who can claim rights to particpate (eg. fishermen, fish processors, consumers, environmentalists).

(4) The *type of management organisation* (existing or possible) in order to determine the type of co-management arrangement most appropriate for a particular fishery.

Using a common analytical framework will enable a systematic approach to the analysis of information collected in case studies and country research, as well as allowing for meaningful comparisons. A graphical representation of the framework is given in Figure 2. Information is collected for a set of contextual variables comprised of a number of key attributes of the resource, the technology used, the market and the resource user. This is combined with information on the decision-making arrangements which cover the rights and rules governing access to, and utilisation and management of, the resource. The contextual variables and the decision making arrangements determine the incentives for users to coordinate and cooperate, which in turn leads to patterns of interaction amongst resource users resulting in an outcome such as more(or less) efficient use of resources. The framework describes a complex and dynamic process so that outcomes, incentives and patterns of interaction can affect the contextual variables and the decision-making arrangements. In other words, the "system" is continually adjusting and reacting to changes. Looking at it from another perspective, the "system" may be altered to achieve a particular outcome.

Oakerson (1992) observed that an analyst should work backwards through the relationships, starting with outcomes. For example, an analyst would ask what is happening to the community and its users (outcome), then ask why (patterns of interaction and incentives) and then examine what contextual variables affect incentives. In this way the framework is not only a diagnostic tool but also be a prescriptive tool as ways can be identified to modify incentives and patterns of interaction by adjusting the institutional arrangements - rules- to achieve a specific outcome.

Figure 2 Draft Research Framework



The following sections, describe each of the main framework components in more detail. These sections focus on what are considered to be the key attributes which affect incentives and patterns of interaction in a fisheries co-management situation. It should be emphasised that the attributes are not definitive and might vary according to situation. As research gets underway, other key attributes might be identified and existing ones rejected. However, the purpose is to focus research on critical attributes to ensure that considerable time is not spent collecting an exhaustive amount of information which ultimately turns out to be of little use for diagnostic or prescriptive purposes for fisheries co-management.

Oakerson (1992) observed that there are three considerations when looking at these attributes: subtractability, excludability and boundaries.

(1) Subtractability is the capacity of the resource base to support multiple users at the same time without reducing the yield of the resource available to the whole group. e.g. how many fishers can fish the resource without total catches declining.

(2) Excludability (or access control) is the extent to which exclusion of users is possible and the limiting conditions which apply to excludability determined by the biological, physical or technical attributes of the resource as well as social and cultural factors.

(3) Boundaries are the extent to which the commons area is divisible and what boundary conditions apply to its regulation. Boundaries can be physical, technical, social, economic or legal.

3.1 Contextual variables: biological, physical, technical , market and socio-economic attributes

Related to these considerations, and more specifically, Table 1 shows the biological, physical and technical attributes and indicators which are considered the most critical factors affecting incentives to cooperate. Table 2 shows the characteristics of the market and Table 3 shows the socio-economic attributes and indicators which are considered critical factors in providing an incentive for users to cooperate.

Table 1 Biological, physical and technical attributes and indicators

Biological, physical and technical attributes	Indicators
Multi-species or single species fishery	*Species mix*
Migratory or sedentary fishery resources	*Types of species*
Level of stock exploitation	*Catch per unit effort/stock assessments*
Status of habitat	*Water/seabed quality (% coverage, health of fish;*
Boundaries	*Types and definitions*
Single or multiple gear fishery	*Types of gears being used*
Artisanal or industrial fishery[3]	*Gear and vessel types; range of fishing operations*
Level and mix of technology	*Gear and vessel types; technologies for preservation/processing*
Dispersed or localised fishing patterns	*Seasonality of landings and vessels*

[3] There is no standard definition of artisanal and industrial. Smith (1979) pointed out that it is more useful to talk about *ranges* of the technical and socio-economic characteristics of fishing activities. What is considered artisanal in one country may be considered industrial in another. For the purposes of the analysis presented in this paper, what is meant by the term artisanal is lower technology fishing with limited fishing ranges, often, but not always, for subsistence needs. What is meant by the term industrial is higher technology fishing with greater fishing ranges., predominantly for commercial purposes.

Table 2 Market Attributes and Indicators

Market Attributes	Indicators
Subsistence or market oriented fishery	*Proportion of the catch sold/consumed*
Market structure	*Buyer/seller concentration; power relations between buyers and sellers*
Market orientation	*Local/domestic/international*
Value of products	*High/low*

Table 3 Socio-economic Attributes and Indicators

Socio-economic attributes	Indicators
Homogeneity/heterogeneity of users	*Ethnicity, wealth, religion, gear types, residency*
Dependence on the fishery for livelihood	*Proportion of household/family income from fisheries*
Motivation of users	*Subsistence or commercial*
Attitudes towards: risk, innovation, collective action	*Strong/weak/indifferent*
Level of information and knowledge on the fishery and management	*Sources of information available (indigenous or scientific)*

3.2 Decision-making arrangements

Decision-making arrangements are concerned with how institutional arrangements, rights and rules, are made. There are three important aspects of decision-making : representation, relevance and enforceability.

(1) Representation is the extent to which users and stakeholders participate in rule making.

(2) Relevance is the extent to which the rules are considered relevant to the management problem.

(3) Enforceability is the extent to which the rules are enforced.

The issues which are considered critical and their indicators are given in Table 4.

Table 4 Decision-making arrangements and indicators

Decision-making Arrangements	Indicators
Leadership/power structure	*Type of system: Autocratic/democractic/hereditary Methods of operation: consenus, majority Credibility/respectability of leaders*
Main types of rules (operational, collective choice, constitutional choice) and at what level of applicability (local, regional, national).	*Formal and informal rights and rules concerning excludability, subtractability and boundaries;*
Decision-making process for operational and collective choice rules	*Decision-making processes followed for one or two examples of operational and collective choice rules;*
Level of representation in the decision-making processes at different levels (local, regional, national)	*Type of users/stakeholders; Type of organisations participating in decision-making on rules (operational, collective, constitutional); type of representation*
Relevance of rules	*User and stakeholder attitudes to decision-making processes and user attitudes towards rule-breaking*
Enforcement of rules and regulations/sanctions	*Mechanisms for enforcement; sanctions in use; Compliance/non-compliance e.g. number of convictions, user attitudes; obedience/obstruction;*

3.3 Incentives to coordinate and cooperate

The contextual variables and the decision-making arrangements will determine whether individuals have an incentive to cooperate, that is engage in some form of collective action, and whether groups (users, stakeholders, government) have an incentive to cooperate with each other. In some cases, the contextual variables might be similar, but the decision-making arrangements might differ to the extent that there will be significantly different outcomes. In such a situation, the focus of the analysis would be on how those rules were devised, what they contain, whether the users considered them legitimate and whether they are enforced.

3.4 Patterns of interactions among resource users

Whilst incentives to cooperate might exist, this does not guarantee that stakeholders and user will cooperate. Much will depend on the way resource users interact with each other and thei behaviour both as individuals and as a group.(Oakerson ,1992). There is some overlap betwee incentives and patterns of interaction but the purpose in separating them is to assist the analys in determine the likely reasons for a lack of cooperation when the incentives are thought to b in place. Wade (1988) described the choices of the individual in relation to the behaviour o others based on game theory. His conclusions are summarised in Figure 3.

Figure 3 Choice of an individual to cooperate in relation to behaviour of others

INDIVIDUAL BEHAVIOUR		GROUP BEHAVIOUR: *Cooperative*	GROUP BEHAVIOUR: *Non-cooperative*
	Non-Cooperative	Some users/ stakeholders affected, but do not participate (or have representation) in the decision-making processes	Stakeholders/users do not participate (or have representation) in the decision-making process
	Cooperative	All users/stakeholders participate (through representative bodies) in the decision-making processes	Only some stakeholders/users participate (or have representation in the decision-making process

3.5 Outcomes

The three main types of outcomes considered most relevant for evaluation are efficiency, equity and sustainability. These can relate to meeting management objectives and the impact on the resource and its users. To enable standardisation in the evaluation of outcomes, there has to be a consistently applied definition of these outcomes. The definitions chosen are based on those proposed by Hanna (1995) and are described below .Evaluation would not necessarily entail quantifying these outcomes, but assessing whether co-management has had a positive or negative effect on them.

3.5.1 Efficiency

As management processes are established to achieve particular objectives, the cost-effectiveness of the process compared to others has to be evaluated. One of the purported advantages of co-management compared to centralised management is that it will reduce transaction costs - the

regulation enforcement. Some of these costs remain fixed regardless of the management regime, such as information which is required by law. Other transaction costs vary with the quality of data and the process used to make decisions. Hanna (1994) points out that a centralised approach is often associated with low programme design costs but high implementation, monitoring and enforcement costs as the management regime may have little legitimacy with user groups. A co-management approach, on the other hand, is associated with high programme design costs as effective participation is time-consuming and therefore costly. However, co-management is likely to lead lower implementation, monitoring and enforcement costs as legitimacy of the regime is greater.

3.5.2 Equity

There are four main components to equity:

(a) *Representation*: a more equitable management regime should represent the range of interests in the fishery and accommodate the full diversity of those interests.

(b) *Process clarity:* the management process should have a clear purpose and a transparent operation.

(c) *Homogenous expectations:* the extent to which participants have similar expectations concerning the management process and it's objectives

(d) *Distributive effects:* the management process should address the distributional changes embedded in the options under consideration

3.5.3 Sustainability

Sustainability can be divided into stewardship and resilience. Stewardship, the tendency for resource users to maintain productivity and ecological characteristics of the resource, is divided into three components: time horizons, monitoring and enforcement. To promote resources stewardship, the management process should expand time horizons beyond the short term. A sense of stewardship will be more likely if the effects of the management regime can be monitored and where necessary, enforcement measures taken.

The other aspect of sustainability is resilience. This is the ability of the system to absorb and deal with changes and shocks. The three components of resilience are rule flexibility, structural adaption and market adaption. Rules should be flexible enough to respond quickly to changing conditions. The management regime should be able to adapt to both changes in the structure of the industry as well as changes in the market.

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1994

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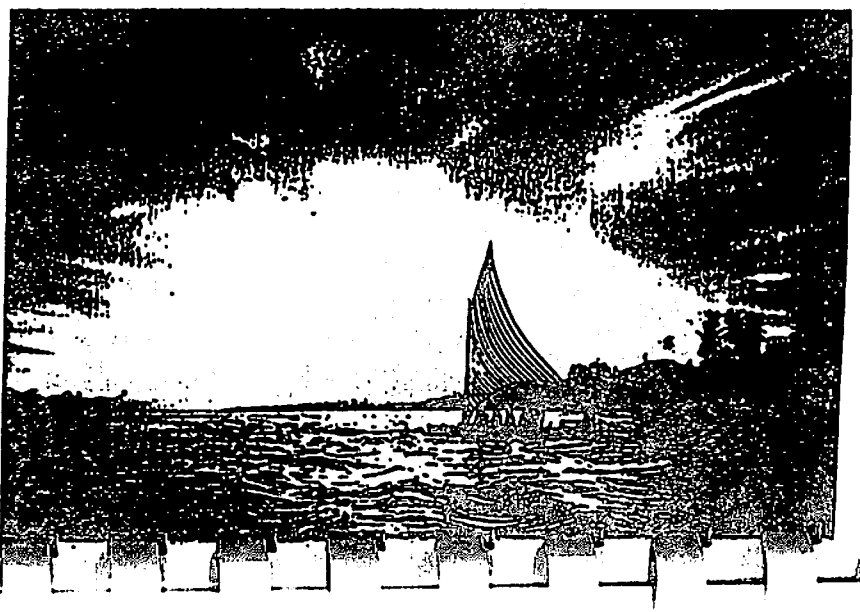
4. *Existing organization:* The fishers have some prior experience with traditional community-based systems and with organizations, where they are representative of all resource users and stakeholders interested in fisheries management.
5. *Benefits exceed costs:* Individuals have an expectation that the benefits to be derived from participation in and compliance with community-based management will exceed the costs of investments in such activities.
6. *Participation by those affected:* Most individuals affected by the management arrangements are included in the group that makes and can change the arrangements. Decisions about management arrangements are made by the same people that collect information on the fisheries.
7. *Management rules enforced:* The management rules are simple. Monitoring and enforcement are able to be effected and shared by all fishers.
8. *Legal rights to organize:* The fisher group or organization has the legal right to organize and make arrangements related to its needs. There is enabling legislation from the government defining and clarifying local responsibility and authority.
9. *Cooperation and leadership at community level:* There is an incentive and willingness on the part of fishers to actively participate, with time, effort and money, in fisheries management. There is an individual or core group who takes leadership responsibility for the management process.
10. *Decentralization and delegation of authority:* The government has established formal policy and/or laws for decentralization of administrative functions and delegation of management responsibility and/or authority to local government and local group organization levels.
11. *Coordination between government and community:* A coordinating body is established, external to the local group or organization and with representation from the fisher group or organization and government, to monitor the local management arrangements, resolve conflicts, and reinforce local rule enforcement.

Conclusion

The idea of active participation of local resource users and communities in development and management is not a new one; it has been part of the development process since the 1960s. What is different is the increasing commitment of governments to programs of decentralized co-management. Fisheries co-management aims specifically at achieving the sharing of authority and/or responsibility between government and local fishers and the community to manage the fisheries.

Co-management systems that have arisen around the world show promise for addressing many of the issues of sustainability, equity and efficiency that exist in small-scale fisheries management today. Co-management is only one alternative fisheries management strategy which has recently emerged. Others include territorial use rights and area leasing. Co-management is an alternative that requires compromise, respect and trust among all parties involved. Its potential advantages and disadvantages are well documented. The development of fisheries co-management systems is not automatic or simple, nor is its survival guaranteed.

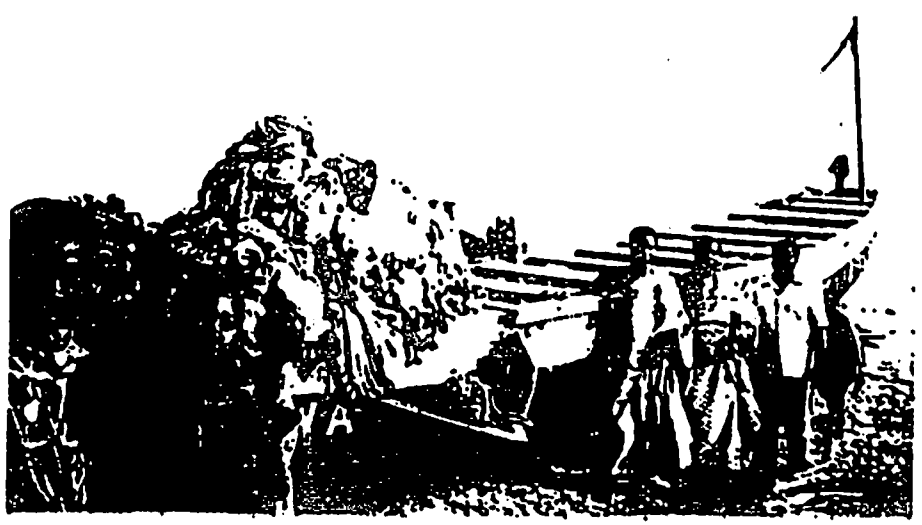
Co-management is a political issue. The local fisher and community and the government will have to be restructured. Co-management addresses the critical management issues of who controls the rights to use the fisheries and who obtains the benefits from these. More experience and information are needed to learn about the conditions leading to successful fisheries co-management.



systems. While governments may be willing to call for more community involvement, they must also establish commensurate rights and authorities and devolve some of their own powers. Fisheries administrators may be reluctant to relinquish their authority or parts of it. They may fear infringement by local fishers and their representatives upon what they consider their professional and scientific turf. In all cases of co-management, the ultimate authority is held by the government.

The issues are not easily resolved. Each policy bearing on co-management is embedded in a broader network of laws, policies and administrative procedures, at both national and local government levels, and consequently will be difficult to change. The role of the government in co-management is to provide enabling legislation to facilitate and support the right to organize and make fisheries management arrangements at the local level, address problems beyond the scope of local arrangements, and provide assistance and services to support the maintenance of local arrangements. Government administrative and fisheries laws and policies will, in most cases, require restructuring to support decentralization and co-management. The actual form of co-management will depend upon the form of government and the political will for decentralization.

Other than fishers, resource users that derive economic benefit from the resource (e.g., fish traders, business suppliers, police, politicians, consumers) will also need to be considered in the co-management arrangements. These stakeholders often hold considerable political influence in the resource management regime.



Key Conditions for Successful Fisheries Co-management

Over the last decade, research done at different locations around the world has documented many cases of co-management and community-based management in fisheries and other natural resource systems. From the results, certain conditions are emerging which appear to be central to the chances of developing and sustaining successful co-management arrangements. These conditions should not be taken as complete as research is continuing to reveal more about the systems and the factors for successful performance. Indeed, more research is required to establish evaluative criteria for such outcomes as sustainability, equity and efficiency of fisheries co-management systems. Among the emerging conditions for successful co-management are that the more of these key conditions that exist in a particular situation or system, the greater the chance for successful co-management.

The key conditions are (Ostrom 1990, 1992; Pinkerton 1989):

1. *Clearly defined boundaries:* The physical boundaries of the area to be managed should be distinct so that the fishers group can have accurate knowledge of them. The boundaries should be based on an ecosystem that fishers can easily observe and understand. It should also be of a size that allows for management with available technology, i.e., transportation and communication.
2. *Membership is clearly defined:* The individual fishers or households with rights to fish in the bounded fishing area and participate in area management should be clearly defined. The number of fishers or households should not be too large so as to restrict effective communication and decisionmaking.
3. *Group cohesion:* The fisher group or organization permanently resides near the area to be managed. There is a high degree of homogeneity, in terms of kinship, ethnicity, religion or fishing gear type, among the group. Local ideology, customs and belief systems create a willingness to deal with collective problems. There is a common understanding of the problem and of alternative strategies and outcomes.

alternate management strategies, appropriate for certain areas and situations. The establishment and successful operation of fisheries co-management can be a complex, costly and multiyear effort.

Co-management involves various degrees of delegation of management responsibility and authority between the local level (resource user/community) and the state level (national, provincial, municipal government). Co-management is a middle course between state-level concerns in fisheries management for efficiency and equity, and local-level concerns for self-governance, self-regulation and active participation. Co-management can serve as a mechanism for both fisheries management and community and economic development by promoting participation of fishers and the community in actively solving problems and addressing needs.

In some cases, co-management may be simply a formal recognition of a system of fisheries management which already exists. Informal and customary community-based management strategies already exist side-by-side with formal state-level management strategies.

Community-based resource management (CBRM) is a central element of co-management. The advantages of CBRM systems have been well documented in various parts of the world. The better known of these initiatives have been in irrigation and social forestry but similar approaches are being applied in upland agriculture and wildlife. CBFM tends to be more difficult due to the complexity of fisheries and aquatic resource systems, the social and cultural structures of fishing communities, and the independent nature of fishers. Recent research in small-scale fisheries in Asia, the South Pacific and Africa have shown, however, that communities of fishers, under certain conditions, can manage fisheries resources sustainably.

CBFM, through co-management, strives for more active fisher participation in the planning and implementation of fisheries management. The theme of CBFM is that self-involvement in the management of the resource will lead to a stronger commitment to comply with the management strategy and sustainable resource use.

The potential advantages of CBFM include effectiveness and equity. It can be more economical in terms of administration and enforcement than centralized systems. It involves self-management where the community takes responsibility for a number of managerial functions. It provides a sense of ownership over the resource which makes the community more responsible for long-term sustainability of resources. Fishers are given incentive to respect the rules because they complement cultural values and because they are seen as individually and mutually beneficial. CBFM allows the community to develop a management strategy which meets its own particular needs and conditions. Since the community is involved in the formulation and implementation of management measures, a higher degree of acceptability and compliance can be expected. CBFM makes maximum use of indigenous knowledge and expertise to provide information on the resource base and to complement scientific information for management. Its strategies can minimize social conflict and maintain or improve social cohesion in the community.

CBFM may not be suitable for every fishing community. Many communities may not be willing to take or capable of taking on the responsibility of CBFM. A long history of dependency on government may take years to reverse. Leadership may not be available within the community to initiate or sustain the CBFM efforts. For many communities, the incentive(s) - economic, social and/or political - to engage in CBFM may not be present. The risk involved in changing fisheries management strategies may be too high for some communities and fishers. The costs for individuals to participate in CBFM strategies (time, money) may outweigh the expected benefits. Sufficient political will may not exist among the local resource stakeholders or in the government to actually manage the fisheries in a responsible and sustainable manner. Actions by user groups outside the immediate community may undermine or destroy the management activities undertaken by the community. Particular resource characteristics, such as fish migratory patterns, of the area may not make it possible for the community to manage the resource.

The delegation of significant authority to manage the fisheries may be one of the most difficult tasks in establishing co-management

the resource; the characteristics of the users of and stakeholders in the resource; the characteristics of the legal, political and institutional environment in which the users reside; and external economic forces which shape resource use.

Fisheries Co-management

Common property regimes offer some insights into how fisheries might be better managed but, except in isolated cases, they cannot offer a complete solution since the theoretically ideal situation for common property management is not obtained and fishers therefore cannot manage fisheries entirely by themselves.

As fisheries were developed over the last four decades, most countries increased the role of the national government in managing fisheries; the role of local level control through traditional management and control has correspondingly diminished. National governments often failed to develop an adequate substitute for or complement to the traditional resource management regimes. Policies of nationalization or privatization have not solved the resource overexploitation and degradation problem, and in many instances, may have deprived many small-scale fishers of their livelihoods.

In many cases, what is needed now is a more dynamic partnership using the capacities and interests of the local fishers and community, complemented by the ability of the state to provide enabling legislation, enforcement and other assistance. This approach to fisheries management will require a shift away from a centralized, top-down form of management to a new strategy in which fisheries managers and the fishers jointly manage the fisheries - "co-management" (Fig. 1).

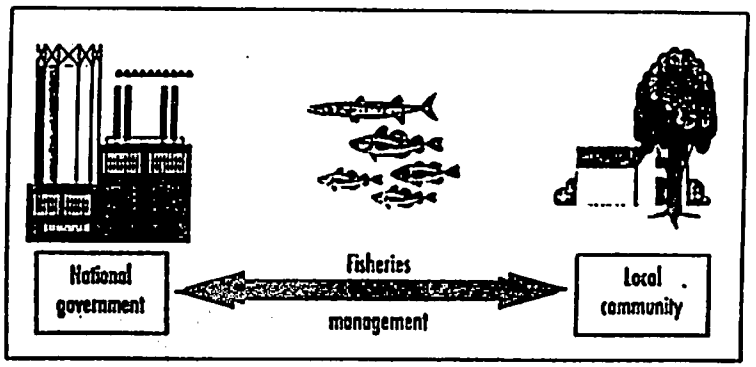


Fig. 1. Fisheries co-management.

Co-management is defined as the sharing of responsibility and/or authority between the government and local resource users/community to manage the fishery or resource (e.g., coral reef, mangrove shoreline habitat). There is a hierarchy of co-management arrangements (Fig. 2) from those in which the fishers are consulted by the government before regulations are introduced to those in which the fishers design, implement and enforce laws and regulations with advice from the government. The amount of responsibility and/or authority that the state and various local levels have will differ and depend upon country-and site-specific conditions. Determining what kind and how much responsibility and/or authority should be allocated to the local levels is a political decision.

Given the different conditions, processes, needs and demands within the small-scale fisheries sector, there is no simple management solution appropriate for every community, region or nation. Co-management should not be viewed as a single strategy to solve all the problems of fisheries management. Instead, it should be seen as a set of

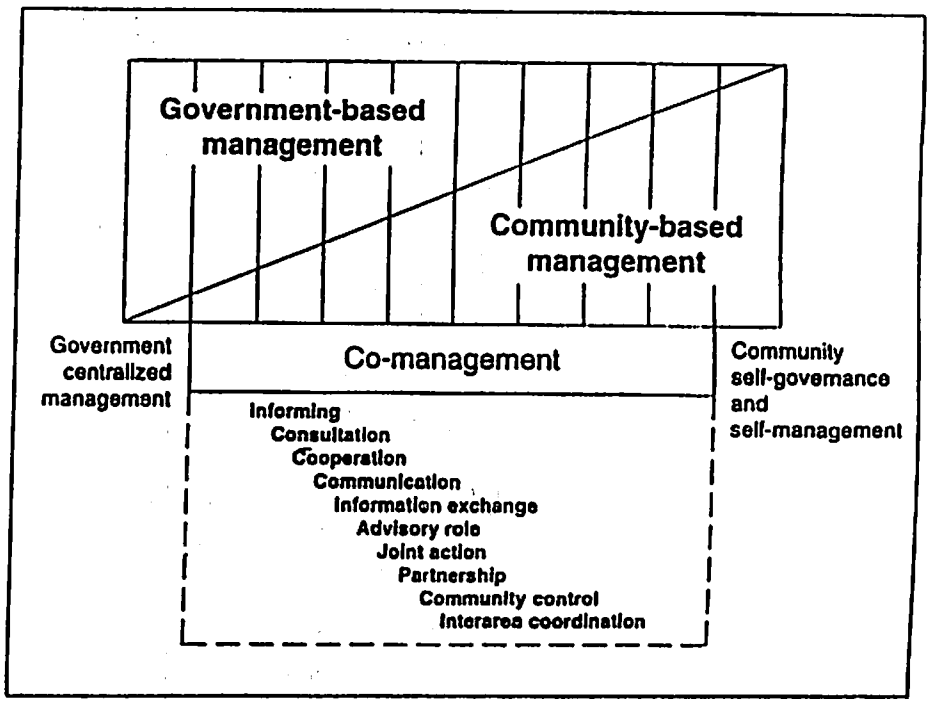


Fig. 2. A hierarchy of co-management arrangements (after Berkes 1994).

Managing the Commons

The "commons" include natural resources, such as fisheries, wildlife, forests, irrigation waters and pasture lands, which by their physical nature are not owned by individuals but are shared by a community of producers (e.g., fishers) and consumers. "Common property resources" share two important characteristics. The first is excludability or the control of access. The physical nature of the resource is such that controlling access by potential users is a problem and may be costly. For example, migratory fish species present problems for regulating access to fishing. The second characteristic is subtractability; that is, the fish harvesting activities of one fisher subtracts from or lowers the catch per unit of fishing effort of other fishers. The term "common property regime" is used to describe the system of property rights and rules under which the common property resources may be managed. Common property regimes aim to provide assurance that the resources on which all persons collectively depend will be available sustainably. In many parts of the world, rights to common property resources are all that separate the poor from destitution. Thus, development planners must eventually deal with the issue of institutional arrangements for property rights and rules over natural resources.

The "commons" has come to connote inevitable resource degradation. Many accepted that fishery resources which are held in common are often subject to overexploitation and degradation. They incorrectly identified all common property situations as being those in which entry into the fishery is uncontrolled, with no effective boundaries

around the resource, and no restrictions on how the resource is to be exploited. This situation is more correctly classed as an open access fishery. This popular notion of the nature of common property resources is misleading and has led to inappropriate policy recommendations and project implementation in the fisheries sector. Policy recommendations have often focused on how to create individual property rights rather than on how to limit access. Common property management where joint rights exist is a legitimate form of management and can be successful if access is controlled. Many government management arrangements failed to conceive of or recognize the existence of local community-based fisheries management (CBFM) institutions which could effectively manage common property fisheries resources.

Common property regimes are forms of management grounded in a set of individually accepted rights and rules for the sustainable and interdependent use of collective goods, that is, a resource that is managed and controlled by a group. Such a regime is composed of a recognized group of users, a well-defined resource boundary that the group uses and manages, and a set of institutional arrangements (rights and rules) for the use of the resource. Common property represents private property for the group of co-users. These regimes have been shown to develop when a group is highly dependent on a resource and when availability of the resource is uncertain or limited. If resource availability problems are repeatedly experienced, such as low or no catches, and if it is controlled by a single community of users, the fishers are likely to develop collective arrangements to deal with the problem.

The principal problem faced by group members of a common property regime is how to organize themselves. That is, how to change from a situation of independent action to one of collective action and coordinated strategies to obtain greater joint benefits and reduce joint harm. A sense of commonality , commitment and compliance must be established for the collective good. Problems on the allocation of catch and assigning duties for resource use must be overcome.

Common property regimes can be very effective at controlling access to the resource. Most common property regimes are based upon the exclusion of certain potential users. The entire community, sensing security of tenure and enjoying some of the benefits from access control, will actively take responsibility for monitoring and enforcement.

The establishment of common property regimes is a complex process that cannot be done solely by administrative decree. It must take into account general factors and their local context such as the nature of

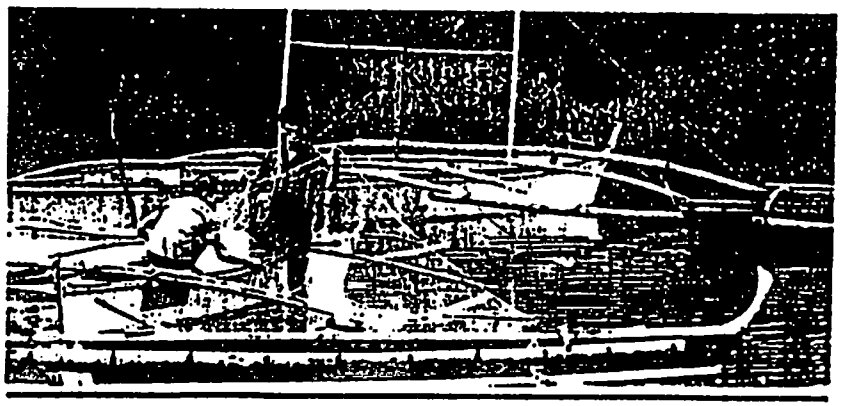
which these people depend are still largely natural fish populations. Harvesting of these resources has expanded over the last four decades but has now reached its upper limits and is even declining in many cases. Therefore, as human populations continue to increase, supply per person is starting to fall and will keep falling despite modest gains from aquaculture in some countries. Increasing competition for scarce resources will further stress fisheries management systems.

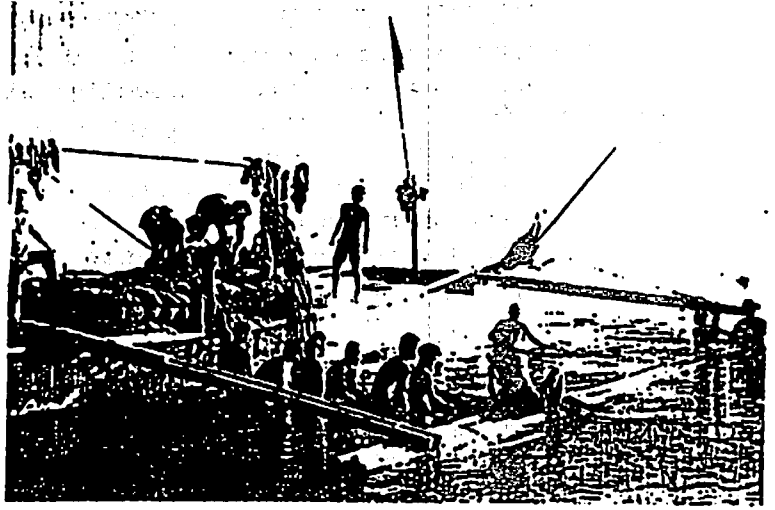
In most societies, small-scale fishers suffer the greatest deprivations as they have low social status, low incomes, poor living conditions and little political influence. They frequently compete for resource access with larger-scale fishers and other sectors of the economy. Small-scale fisheries are embedded in larger aquatic resource, and in social, economic and political systems. Many of the solutions to improving their standard of living lie outside the fisheries sector.

To prevent further degradation of fisheries resources, there is an imperative for better management. Many present fisheries resource management arrangements have failed to coordinate and restrain the many users, leading to depleted resources and conflict. Resource conflicts may be diminished, management better implemented and resources better-managed when fisher and other user groups are more involved in the management of resources.

The Search for Better Management Methods

Fisheries management experts recognize that the underlying causes of fisheries resource overexploitation and coastal environmental degradation are often of social, economic, institutional and/or political origins. The primary concerns of fisheries management, therefore, should





address the relationship of fisheries resources to human welfare; and the conservation of the resources for use by future generations. That is, the main focus of fisheries management should be people, not fish per se. Policy interventions, if they are to bring about lasting solutions, must address these concerns.

Fisheries management in many countries has been heavily influenced by the temperate scientific model of calculating maximum sustainable yield of a few key fish species and of the need for centralized administrative authority. This model has been shown to have limited applicability in multispecies tropical/subtropical fisheries. It also provides for little or no effective consultation with or participation from fishers. Fisher participation in management can provide a wealth of local or indigenous knowledge to supplement scientific information, to help monitor the resource and improve overall management.

Fisheries managers now recognize that a fishery cannot be managed effectively without the cooperation of fishers to make laws and regulations work. Fisheries management abounds with laws, rules and regulations in most countries; many of them are quite specific and well intentioned. However, the effective capacity of many fisheries agencies to regulate what goes on in widely scattered, often isolated fishing grounds, is distinctly limited. Under these conditions, the delegation of fisheries management and allocation decisions to the local fisher and community level may be more effective than the management efforts which distant, understaffed and underfunded national government fisheries agencies can provide.

Executive Summary

Co-management is defined as the sharing of responsibility and authority between the government and local fishers/community to manage a fishery or other natural resource. Co-management covers various partnership arrangements and degrees of power-sharing and integration of local- and government-level management systems. It may involve recognition and legitimization of traditional local-level management systems. It involves some degree of communal management of the resource. That is, a recognized group of fishers or an organization establishes and enforces community rules, norms and regulations for catching fish or using the resource, with support from the government.

Given the different conditions, processes, needs and demands within the small-scale fisheries sector, there is no simple management solution appropriate for every community, region or nation.

As a fisheries management strategy, co-management shows promise for addressing many of the issues of sustainability, efficiency and equity that exist in small-scale fisheries today.

The advantages of co-management, versus a centralized, top-down approach, could include lower management and enforcement costs, improved data reliability, a higher degree of acceptability and compliance with management measures, greater participation of fishers in management, and improved social cohesion and community development. Co-management is not, however, a panacea for fisheries management. The development of co-management systems is not automatic or simple; it can be costly to establish, require a long-term effort and have limited guarantee of success. Government administrative arrangements and fisheries laws and policies will generally require restructuring to support co-management.

Fisheries Co-Management and Small-scale Fisheries: A Policy Brief

Introduction

Global-scale changes in the supply, demand, value, management and uses of fisheries resources could threaten progress towards sustainable food security in many parts of the developing world, but they could also stimulate improved management and use of the resources. Decisionmakers are searching for better ways of managing all fisheries, including small-scale ones.

This policy brief addresses some of the issues and options available, arguing that recent lessons point to potential benefits in some fisheries from management partnerships between the government and local fishers and communities - fisheries co-management. The trend to greater formal involvement of users in management of resources was recognized in many chapters of the United Nations Conference on Environment and Development (UNCED) Agenda 21 Declaration and are enshrined in such international instruments as the International Convention on Biological Diversity ratified in 1993. This policy brief cautions, however, that co-management is not a universal panacea and more experience and research are needed to learn about the conditions leading to successful fisheries co-management.

In the developing world, 14 to 20 million people are directly involved in fisheries and aquaculture; 50 million if postharvest handling and marketing are included; and about 1 billion rely on protein from aquatic products as their main source of animal protein. The resources on

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