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Co-management in small-scale fisheries
- A synthesis of Southern and West African experiences -

Stream: Fisheries

Discipline: Economics and Management

Abstract

This presentation summarizes the findings from eight African countries where case studies of co-management arrangements in artisanal fisheries have been undertaken during the period 1996-97. The countries concerned are Benin, Côte d'Ivoire, Malawi, Mozambique, Senegal, South Africa, Zambia and Zimbabwe. In most of the cases co-management represents a new approach to fisheries management. In some cases, it has only been applied within the last 3-5 years and in a few it is merely being considered as an option. The comparison of cases at this early stage gives an indication as to what appears to be the critical issues in the planning and implementation of fisheries co-management arrangements in the African context.

The incentives of fishers and other stakeholders to cooperate among themselves and with government in the management of those fisheries in which they are involved are of two types. On the one hand the level of cooperation is determined by a number of key factors relating to the local politico-historical, bio-physical, economic and socio-cultural environment of the fishing communities and the fisheries. On the other, the incentives for cooperation are determined by the character of the decision-making arrangements in place for setting collective choice rules and, in particular, the operational rules for the fishery and thus the legitimacy of the arrangement in the eyes of the fishers.

The cases studied differ significantly as regards the political history of the countries and the character of their artisanal fisheries. Nevertheless, in all cases the co-management approach is intended to replace conventional, centralized management systems which have proved inefficient. The differing bio-physical environments seen in the cases represent three different types of ecological systems: lake/reservoir, lagoon/estuary and open coast. In most of the cases only a few fish species are target species and these are often subject to heavy fishing pressure or are already overfished. In most cases the fishers and their families are totally dependent on the fishery for their livelihood as with few exceptions, they have no alternative sources of income.

In Africa co-management institutions have mainly been established at local and district level and often exist within a nested system. However, several examples of consultative management institutions also exist at the national level. Representation differs from fishers only (in most cases) to a broader representation which includes fishers, fisheries administrators and local authorities.

The established co-management institutions are usually closely linked to existing traditional structures which mostly also represent the local authorities. In this way the co-management system incorporates traditional management practices, and thus religious institutions, and myths and magic have also become important management tools.

Generally, co-management arrangements have been implemented to encourage the resource users to become involved in establishing operational rules such as gear type restrictions (minimum mesh size and maximum length of seine or gill net), closed seasons and protected areas. Control and law enforcement is mainly left to government departments or wings thereof.

The different types of co-management arrangement seen in these case studies are classified in accordance with the typology presented by Sen and Raakjær Nielsen (1996). An analysis of the classification clearly indicates that, with few exceptions, co-management in the African context is government-based.

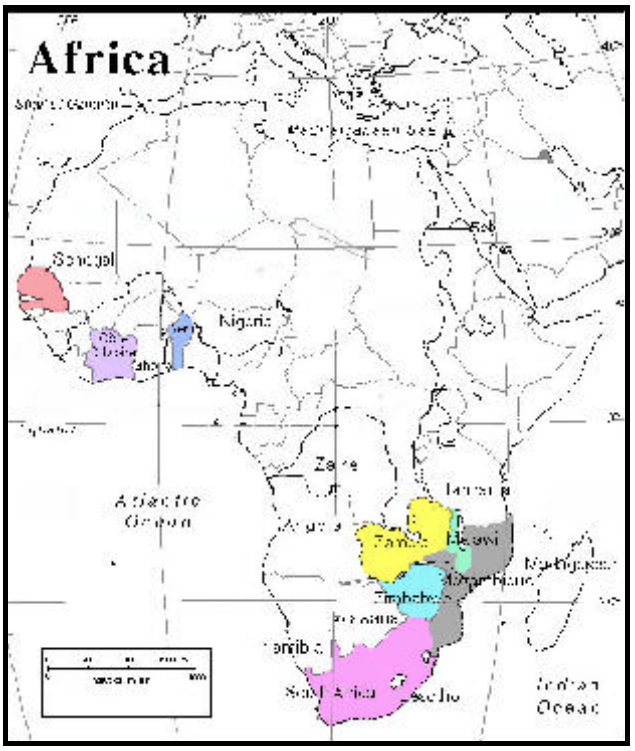
African experiences of co-management differ from other regions. In Africa it is used mainly as a mechanism for conflict resolution rather than for achieving sustainability of resources. Often, in Africa, fisheries management strategy is carried out in isolation, rather than as part of an all-encompassing resource management and development framework.

The outcome of the co-management arrangements in terms of natural resource stewardship, management system resilience, equity and efficiency is discussed and some very tentative conclusions are drawn that may be relevant to co-management arrangement design and implementation elsewhere. Areas for further research are also identified.

1. Introduction

This article summarizes the findings from eight African countries where case studies of co-management arrangements in artisanal fisheries have been undertaken during the period 1996-97. The countries concerned are Benin, Côte d'Ivoire, Malawi, Mozambique, Senegal, South Africa, Zambia and Zimbabwe (see map). (Atti-Mama 1997, Chirwa 1997, Donda 1997, Hachongela et al. 1997, Hara 1997, Hutton and Lamberth 1997, Jackson et al. 1997, Kebe 1997, Kponhassia and Angaman 1997, Lopes et al. 1997, Scholz et al. 1997, Sowman et al. 1997. All site specific observations referred to relate to these sources).

The case studies form part of a collaborative "Fisheries Co-management Research Project" between the International Center for Living Aquatic Resources Management (ICLARM), the Institute for Fisheries Management and Coastal Community Development (IFM), and National Aquatic Resource System research partners in Asia and Africa (NARS partners). The research project started in 1994 with funding from Danish International Development Assistance (Danida) and is intended to continue until 2003.



Map of Africa

Apart from an initiated or intended application of some form of fisheries co-management with each case the selection criteria for the cases have been (a) artisanal/small scale fisheries only; (b) representation of different resource systems; (c) research partners having a profound knowledge of the case he or she is documenting, originating from related personal involvement in research or development work. Formal

representativity by geography, resource system, socio-economic context or other has not been aimed at and also not been obtained.

In all the cases studied a common research framework (ICLARM and IFM, 1996) has been applied. This makes it possible to make comparisons between the cases and to draw some cautious conclusions about the African experience to date, even if the way in which the research framework has been used/interpreted in the field differs from one research partner to the next.

In most of the cases, co-management represents a new approach to fisheries management. In some, it has only been applied within the last 3-5 years, and in a few it is merely being considered as an option. Thus, to a large degree, fisheries co-management in Africa is still in an experimental phase. Thus, it would be premature to draw any firm conclusions on outcomes of the co-management arrangements studied in terms of efficiency, equity, resilience and resource stewardship. However, a comparison between the cases at this early stage of their implementation gives an indication as to what appears to be the critical issues in the planning and implementation of co-management arrangements in fisheries, at least in the African context. Hopefully, this information will be of interest to those involved in fisheries/resource management in other parts of the world, where co-management arrangements in small-scale fisheries is also on the political agenda.

2. Research framework

The research framework, which is based on the work of Feeny (1992), Hanna (1995), Oakerson (1992), Ostrom (1990) and Pinkerton (1989, 1993), establishes what are considered key factors which influence the institutional and organizational set-up of co-management arrangements. A graphical representation of the framework is given in Figure 1. Information is collected for a set of contextual variables comprised of a number of key attributes of the fish resources, the fishing technology, the market and the resource users. This is combined with information on the decision-making arrangements which cover the rights and rules governing access to, and utilisation and management of, the fish resources. The contextual variables and the decision-making arrangements determine the incentives for users to coordinate and cooperate, which in turn leads to patterns of interaction resulting in an outcome such as more or less sustainable and equitable use of the resources.

The framework intends to describe a complex and dynamic process where outcomes, incentives and patterns of interaction can affect the contextual variables and the decision-making arrangements. That means that the "system" is continually adjusting and reacting to changes and, seen from another perspective, that it may be altered to achieve a particular outcome.

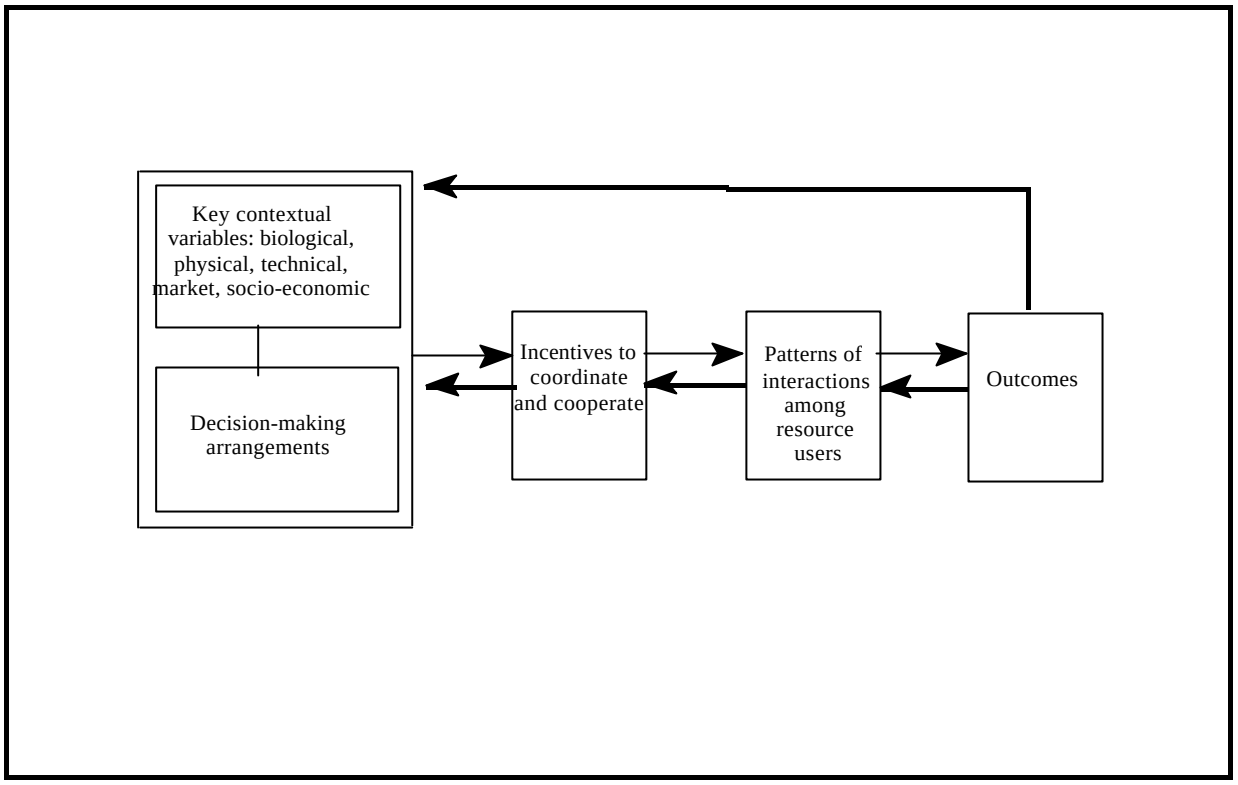


Figure 1: Research framework

3. Contextual setting of African cases

The incentives of fishers and other stakeholders to cooperate among themselves and with government in the management of those fisheries in which they are involved are of two types. On the one hand, the level of cooperation is determined by a number of key factors relating to the local politico-historical, bio-physical, economic and socio-cultural environment of the fisheries and the fishing communities. On the other, the incentives for cooperation are determined by the character of the decision-making arrangements in place for setting collective choice rules and, in particular, the operational rules and thus the legitimacy of the arrangement in the eyes of the fishers.

3.1 Political and historical context

The cases studied differ significantly as regards the political history of the countries and their artisanal fisheries. Nevertheless, in all cases the co-management approach is intended to replace conventional, centralized management systems which have proved inefficient and have failed to provide sustainable sector development or even to protect the productive capacity of the natural resource base. The centralized systems, which in most of the countries replaced existing and often quite successful traditional

management systems, were introduced during the colonial era and taken over by national governments upon independence. However, elements from traditional fisheries management systems still exist in many areas.

The centralized approach to fisheries management was maintained after independence mainly because it was the approach which had long been applied by the industrialized countries. In addition, the management problems and requirements for intervention at the time did not necessarily call for a consideration of the need for change in the management approach. The centralized approach was also well suited to the different political regimes which had succeeded colonial rule in Africa, whether it was the socialist planned economy as in the case in Zambia, Mozambique and Benin, autocratic rule which for many years was the situation in Malawi and Côte d'Ivoire, or apartheid as practised in South Africa.

Irrespective of what political systems have been in place in the past, fishers' trust in government authorities has always been at best, moderate. Fishers have hardly ever found themselves at the winning end of relationships with government. Therefore, wherever initiatives to establish co-management have been taken by government authorities, they have been met with profound scepticism by fishers who with good reason are suspicious of the motives and sincerity of government authorities when they propose collaboration and the sharing of management responsibilities. In their experience the government always sets the rules and regulations, and has the responsibility for their enforcement.

In many of the cases studies, the launching of co-management initiatives has coincided with a change of political regime, towards democratic rule. This change has given fishers and other local stakeholders the incentive to give collaborative management arrangements with government a try.

3.2 Bio-physical environment

The bio-physical environments included in the sample represent three different types of ecological systems, cf. Table 1.

	Lake/reservoir	Lagoon/estuary	Coastal
Benin		**0**	
Côte d'Ivoire		+	
Malawi (2 cases)	+		
Mozambique			+
Senegal			+
South Africa		+	+
Zambia	+		
Zimbabwe	+		

Table 1: Bio-physical environments of case studies

In Malawi, fisheries co-management is being tried out on Lake Malombe and Lake Chiuta. Lake Malombe is a shallow, 390 km^2 freshwater lake which is connected to Lake Malawi, one of the big African lakes, via the Upper Shire River. A total of 45 fishing villages with approximately 5,000 fishers are situated along Lake Malombe/Upper Shire River. Lake Chiuta is a 200 km^2 shallow freshwater lake shared between Malawi and Mozambique. The southern part is covered with emergent vegetation penetrable only by small canoes.

Zimbabwe and Zambia share Lake Kariba, a 5,500 km^2 man-made reservoir on the Zambezi River. On the Zambian side some 1,350 fishers live in 67 villages. On the Zimbabwean side 1,240 fishers are scattered in fishing camps within 7 concession areas.

The lagoon systems in Benin and Côte d'Ivoire comprise large, coastal, shallow lakes which are connected to the sea via channels, but also have an inflow of fresh water from rivers implying changing salinity levels with the dry and wet seasons. In Benin, Lake Nokue covers 120 km^2 with 37 fishing communities around the Lake with 13,500 fishers. In Côte d'Ivoire, the Aby-Tendo-Ehy lagoon complex extends over 424 km^2. The 3,000 fishers living in this area put most of their effort into the Aby Lagoon.

In South Africa, the estuary of the Olifants River is a small site on the Atlantic coast. The village of Ebenaeser, a fishing community, is situated around the estuary and has approximately 2,500 inhabitants.

The coastal sites are: Kwirikwidge in Mozambique, a fishing village with 2,250 inhabitants situated on the Indian Ocean coast near the town of Angoche in the northern part of the country; the villages Kayar and Saint Louis in Senegal; and in South Africa, the village of Arniston, a fishing community on the Southeast Cape with about 800 inhabitants.

3.3 The resources and the fisheries

Character and status of the fish resources

In most of the cases studied only a few fish species are target species. These are often subject to heavy fishing pressure or are already overfished. This applies to all the ecosystems studied whether the fish stocks were sedentary or migratory. Most often a co-management initiative can be seen to be related to a need for (improved) resource management because the stocks of one or more target species have become depleted. Only in the case of Lake Kariba is there no indication of a resource crisis relating to the target species, either on the Zambian or the Zimbabwean side. Here, the co-management initiative is driven by other concerns.

Character of the fishery

The cases studied comprise artisanal fisheries only. The commercial gear used is predominantly gill nets and seines of various types. Hook and line and cast nets are mostly used for subsistence fishing. Only in the case of Arniston, South Africa, is long line the common gear type used. The use of large seines

(open water and beach operated) with increasingly smaller mesh sizes (down to mosquito net) seems to have increased in recent years, and this has contributed significantly to the depletion of stocks.

Boats used in inland fisheries are unmotorized dug-out canoes, plank boats or in the case of Lake Kariba boats made of steel plate. Only on the coastal sites is the use of motorized boats and plank canoes widespread.

3.4 Economic and socio-cultural attributes

Dependence on fisheries

In all the cases studied, the fishers and their families are dependent on the fishery for their livelihood. In most cases, they have no alternative source of income or access to other sources of food production. Therefore they need an income to purchase all necessities. This explains why all the fisheries analyzed are market-oriented. Only fishers in Zambia and Zimbabwe who are of the dominant Tonga tribe and the fishers from Kayar in Senegal follow the tradition of combining (seasonal) fishing with the rearing of livestock and farming.

Homogeneity of resource users

In many of the cases, groups of different ethnic background and religious beliefs exploit the same water bodies and target the same species. In most cases only two ethnic groups are involved, but in the case of Zambia no less than four different groups exploit Lake Kariba. There is no report of conflicts between ethnic groups over access to or exploitation of fish resources. In Zambia some conflicts have arisen between the Tongas and the other groups, but this is specifically regarding access to land in new fishing community settlements. In Senegal, there has been a serious and long-term conflict between fisher-farmers from Kayar and full-time fishers from Saint Louis over access to the sea and its resources in the Kayar area.

In Côte d'Ivoire local fishers have had serious conflicts with Ghanaian fishers with the same ethnic background, who utilized modern gear which increased fishing effort dramatically and depleted resources in the jointly exploited lagoon system.

In South Africa, in the Arniston case study, the situation is still characterized by a *de facto* segregation of white and coloured people living within the Arniston fishing community. Whites mostly assume the role of boat owner/skipper whereas the Coloureds usually work as fishing crew. So far, conflict over access to resources has not been reported, but is highly likely to arise.

Ownership of means of production

In most of the cases two types of ownership co-exist: either the means of production are owned by the fishers/processors themselves or by those not directly involved in fishing activities. The capitalistic system of ownership seems to have led to more advanced technologies being introduced. This has increased

fishing effort and in many cases, caused the crisis in resource management. The *akadja* system in Benin in which parts of what used to be common fishing grounds are enclosed and privatized, represents another form of ownership which leads to an increase in fishing effort in those areas still serving as 'common'.

Market characteristics

In most of the case studies, many traders are involved in the marketing of produce, and fishers are not entirely dependent on just one or a few traders. In Southern Africa, fish processing and trading is predominantly a male activity, and the traders seldom live within the fishing communities. In West Africa, fish processing and trading is a female occupation which is often undertaken by the fishermen's wives.

Indigenous knowledge

Where the indigenous knowledge of the fishers has been investigated in the case studies, it seems that fishers possess a very good knowledge of the localization of the fish resources and the technical aspects of the fishing operation. However, little indigenous knowledge seems to exist on the dynamics of fish populations and the reproductive capacity of the various stocks.

Competing resource users/other stakeholders

With the exception of Lake Kariba, conflicts between fishers and other resource user/sector interests in the inland fisheries have not been mentioned. Lake Kariba is a very important area for tourism, with extensive recreational fishing, game viewing and boating. Conflicts between the tourism industry and fisheries over access to the lakeshore and adjacent waters are frequent, especially in Zimbabwe. In addition, conflicts between artisanal fishers and industrial fishers (*kapenta* operators) on the Lake are many, mostly as a result of the theft of *kapenta*, but also over access to fishing grounds.

In the case studies where fisheries in coastal areas have been investigated, it has been reported from Mozambique and Senegal that conflicts with industrial fishers are frequent, even in inshore waters where the industrial fishers operate without permission. Conflicts between artisanal fishers using different gear types in inshore areas have also been reported from Senegal.

The case notes from Côte d'Ivoire explicitly mention the influence that powerful individuals (in their capacity as politicians) originating from the fishing community may have on the local decision-making process.

3.5 Boundaries

All the inland cases have well defined geographical/physical boundaries. The lagoons, lakes and reservoirs are all surrounded by land. In contrast to their coastal counterparts, the notion that fish resources may not be inexhaustible has simply never occurred to the people in inland fishing

communities. The communities have always had rules, often expressed in religious terms, that traditionally protected the resource from over-exploitation.

The Olifants River fishery has particularly clearly defined boundaries; physically they are defined by the River's own banks and in the estuary by the River's mouth. Upstream, there is no boundary, but the target species, the *harder*, is marine and therefore can only make a limited migration upstream. It is therefore the physical conditions i.e. the reach of the saline water which determines the natural upstream migration boundary for the species.

The coastal areas studied - in Mozambique, South Africa and Senegal - are characterized by the absence of well defined physical boundaries and those target fish species that migrate along or from the coast are exploited. However, two of the locations have nearby reefs, Kwirikwidge in Mozambique and Arniston in South Africa, where some of the fish species targeted are sedentary; these conditions are somewhat similar to the lagoon case studies.

3.6 Access rights

In the lagoon case studies, each fishing village has an exclusive fishing territory. Within that territory there may be a closed area, where fishing can only take place for special occasions and with the consent of the village headman. Fishing in the village territory is open to fishers from neighbouring villages if they comply with the local rules and control is left in the hands of the village fishers. In Lake Nokue, Benin, there is a ban on establishing a*kadjas* within the village territory. On Lake Kariba fishing concession areas are defined on the Zimbabwean side and fishers are only allowed to fish within the concession area to which they have obtained access rights. On the Zambian side of the Lake, the intention is to establish exclusive fishing territories for each of the lakeshore villages as part of the new co-management policy.

On Lake Malombe, Malawi, there are no exclusive areas and access is open to anyone who has a fishing licence issued by the Fisheries Department. This allows migrant fishers to participate in the fishery but it has become evident that there is a need for a lake-wide fisheries association with representation from all Beach Village Committees to deal with questions of zoning and limitation of access rights.

In the Aby lagoon, Côte d'Ivoire, there is an informal agreement between the villages not to fish in the deep waters outside the village territories as these waters are traditionally considered to be fish sanctuaries. On Lake Kariba, the simple technology applied by artisanal fishers prohibits them from fishing in the deep waters offshore.

In Senegal, there is an exclusive 6 nautical mile zone reserved for artisanal fishers, established primarily to protect juvenile fish and to avoid conflicts between artisanal and industrial fishers. Fishing vessels over 250 tons are only authorized to fish outside the 12 nm zone. Apart from these regulations fishers are free to fish wherever they wish. This has caused some conflict in areas where fisher-farmers claim an exclusive right to the coastal waters adjacent to village land.

4. Institutional arrangements for co-management decision-making

4.1 Origin of co-management projects

The origin of existing or emerging fisheries co-management projects in Southern and West African countries can be found in the ongoing democratization process taking place in many of the countries concerned. This process has led to the decentralization of government policies, accompanied by pressure from international donor agencies to introduce co-management or at least establish a more democratic process in the formulation of fisheries policy objectives. Thus, the institution of co-management arrangements can, in most cases, be characterized as a 'top-down' and often also as a 'donor driven' process.

4.2 Legal framework

Generally, no legal framework is in place to support the co-management arrangements in the case studies reported. Malawi is the only country that comes closest to having fisheries co-management enacted in the national legislation. Empowerment of Beach Villages Committees (BVCs) was gazetted in June 1996 and proposals for incorporating community participation in the Fisheries Act have been detailed and presented to Parliament. However, Chirwa (1997) argues that even if BVCs are democratically constituted, they are not legally sanctioned, as no law exists from which they can derive their authority.

In Mozambique, the Fisheries Master Plan adopted by the Mozambican government, advocates the institution of co-management arrangements in small-scale fisheries. However, the Master Plan policy statements have not yet been translated into national legislation.

South Africa is in the process of adopting a new fisheries policy. It is very likely that the policy process will lead to national legislation, where co-management in one form or another will be enacted as a principle in South African fisheries management (Martin and Raakjær Nielsen, 1997).

With regard to Lake Kariba, national departments in both Zambia and Zimbabwe have management authority over their fisheries. In Zambia, the ongoing Agriculture Sector Investment Programme, which to a large extent is also a policy framework, promotes decentralization. This has moved the fisheries policy in the direction of community-based resource management (Jul-Larsen *et al.*, 1997). In Zimbabwe the co-management approach is inspired by the thinking embodied in the national Communal Areas Management Programme for Indigenous Resources (CAMPFIRE) programme relating to the wildlife sector, which was established in order to ensure that local communities would benefit from wildlife management policies. The CAMPFIRE concept has been adapted to fisheries with little success. In neither Zambia nor Zimbabwe is there the enabling legislation which ensures the empowerment of user groups and local communities with regard to fisheries management.

In West Africa where several examples of fisheries co-management arrangements exist (Horemans and Jallow, 1997), user groups are not given the necessary authority through enabling legislation. However,

there are examples of *de facto* recognition by some governments - Benin and Senegal - even if the co-management principle has not been formally institutionalized.

It is typical of all the cases documented that no collective choice rules are in place which involve user groups in decision-making as to who should participate in making operational rules. Fisheries management in Southern and West Africa is, generally speaking, still controlled by governments although as stated earlier some examples of co-management do exist. User groups are not legally empowered and their negotiating position versus that of governments' is consequently comparatively low, or as Chirwa (1997) points out: *"The local user communities are the recipients rather than the initiators of decisions. They, themselves, are managed, together with their resources"*. This statement seems to be applicable to most of the examples of co-management in Southern and West Africa and serves to emphasize the need for enabling legislation regarding co-management in order to empower user groups with management authority.

Under the present management arrangements user groups will often be patronized in possible disputes with government. The latter seems generally reluctant to devolve power and bestow legal rights and authority in fisheries management to user groups. However, devolution of management authority is obviously a sensitive issue for many governments and one that is not easily resolved. In several of the countries concerned, the democratization process is in its infancy and consequently very fragile. Given the political situation in most of these countries, it would be premature to look for major changes in government attitudes towards the relinquishing of power. In addition, devolution of management authority requires changes in laws, policies and administrative procedures, a process which can be both cumbersome and long-winded.

Viewed against this background, it may take years before enabling legislation is put in place in support of fisheries co-management. However, as governments in general terms begin or continue to promote co-management arrangements in fisheries, it is likely that user rights will be gazetted into national fisheries legislation as the democratization process moves forward.

4.3 Management institutions

In Africa, co-management institutions have mainly been established at the local and district level and often exist within a nested system. However, there are also examples of consultative management institutions at the national level e.g. the Fisheries Management Committee recently established in Mozambique (Lopes *et al.*, 1997), the planned Fishery Council in Senegal (Kebe, 1997) and the *de facto* co-management of the hake fishery in South Africa (Martin and Raakjær Nielsen, 1997). This seems to indicate a general move towards establishing consultative co-management institutions at the national level in many developing countries.

Different types of representation are found in the various co-management arrangements in Southern and West African countries, from fishers only in the case of Lake Nokoue, Benin to a generally much broader representation in the majority of cases, comprising fishers, fisheries administrators and local

authorities. The case of Aby lagoon in Côte d'Ivoire is the only example where fish processors (female fish-smokers) are represented.

It is a general observation from the cases studied that the co-management institutions established are very often closely linked to existing traditional power structures, usually represented by the local authorities.

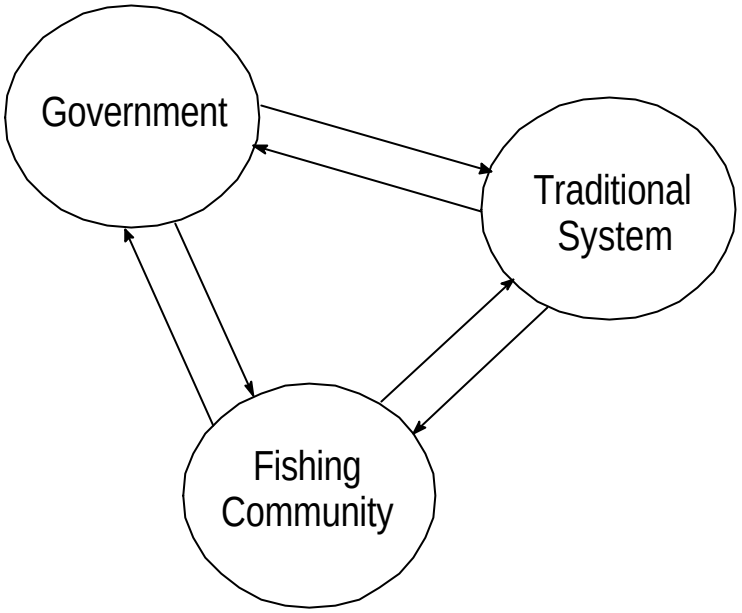


Figure 2: Co-management in the African context

Normally, a co-management arrangement is a government (national or local) - user group relationship. However, in the African context the traditional power system plays a very prominent role, particularly in natural resource management. Thus, fisheries co-management often becomes a three-party relationship (see Figure 2), where the traditional system often serves as the link between the government and the user group. Because the co-management arrangements are often closely related to traditional customs and practices, religious institutions and a belief in myths and magic may exert an influence on decision-making concerning collective choice and operational rules.

On one hand it can be argued that this type of co-management cannot be viewed as co-management in a strict sense as in reality it is just another form of 'top-down' management. True fishers may not be represented in the arrangement as they seldom hold powerful positions in traditional decision-making arrangements. On the other hand, such tripartite arrangements build upon and involve institutions which are considered legitimate by fishers and fishing communities. To use Weber terminology (Selznick, 1992), the legitimacy of this type of co-management arrangement is based on a combination of traditional and charismatic authority. The sustainability of such an arrangement will, to a large extent, rely on the personality of the chief and how he is regarded by the local community.

The fact that co-management arrangements in the African context are closely linked to the traditional system is not without its problems. It seems obvious that tensions will occur in the future as the democratization process moves forward. It is likely that in the long-term this process will undermine the authority of traditional leaders and that individuals outside the present power structures may in the course of the democratization process try to increase their own power at the expense of the traditional leaders. The outcome of such developments will have an impact on the resiliency of the co-management institution as it may change perceptions within the fishing community and the government on what are considered to be legitimate management institutions.

The lack of capabilities and/or aspirations among fishers and fishing communities to participate in the fisheries management process explains the lack of participation of true fishers in the decision-making process as described in most of the cases studies. Hutton and Lamberth (1997) emphasize that to be successful, the introduction of co-management in the South African line fishery will require investment in information sharing and education of local fishing communities. As stated by Pinkerton (1989) strong local institutions with human and financial resources are a pre-condition for co-management. In small-scale fisheries in Africa such institutions are hardly ever found. Thus, capacity building is in most cases a prerequisite for implementation of co-management arrangements.

4.4 Management tasks

Generally, co-management arrangements have been established to encourage user groups to become involved in the establishing of operational rules for the fisheries. In a few cases the arrangements also include monitoring, control and/or enforcement of regulations.

Operational rules

With a few exceptions, user groups are only involved in the determination of technical regulations such as gear type restrictions (minimum mesh size and maximum length of seine or gill nets), closed seasons and protected areas. In fact the Olifants River *harder* fishery is the only example among the case studies where user groups are directly involved in allocating access rights/licensing. Usually access rights allocation is a government responsibility, even if a few examples of consultation with user groups in the process do exist as in the Aby Lagoon fishery.

User groups have mainly been involved in the implementation stages and only to a limited extent actively involved in the planning phase. However, the general trend is for user groups to also become more involved in the planning phase.

Enforcement

Control and law enforcement is mainly undertaken by government departments or wings thereof. In Malawi the proposed changes in the fisheries legislation will make the BVCs responsible for enforcing operational rules in conjunction with the Department of Fisheries. In South Africa the Olifants River Fishing Committee is involved in the control of fishing. In most of the cases the user groups are mainly

involved in monitoring activities but there seems to be a move towards more involvement of users in control activities as well.

4.5 Typology of fisheries co-management arrangements

In Table 2 the various co-management arrangements studied have been typologized for user involvement in the setting of operational rules.

Case studies	**User involvement in setting operational rules**
Aby Lagoon, Cote d'Ivoire	Consultative
Arniston, South Africa	No arrangement in place
Kayar & St Louis, Senegal	Consultative
Kwirikwidge, Mozambique	Instructive
Lake Chiuta, Malawi	Consultative
Lake Kariba, Zambia	Consultative
Lake Kariba, Zimbabwe	Instructive
Lake Malombe, Malawi	Consultative
Lake Nokoue, Benin	Advisory
Olifants River, South Africa	Cooperative

Table 2: Typology of co-management arrangements

The classification used is that defined by Sen and Raakjær Nielsen (1996).

Type A: ***Instructive:*** There is only minimal exchange of information between government and users. This type of co-management regime is only different from centralised management in the sense that the mechanisms exist for dialogue with users, but the process itself tends to be government informing users on the decisions they plan to make.

Type B: ***Consultative*** Mechanisms exists for government to consult with users but all decisions are taken by government.

Type C: ***Cooperative*** This type of co-management is where government and users cooperate together as equal partners in decision-making.

Type D: ***Advisory*** Users advise government of decisions to be taken and government endorses these decisions.

Type E: ***Informative*** Government has delegated authority to make decisions to user groups who are responsible for informing government of these decisions.

In accordance with this typology, most African co-management arrangements can be classified as Consultative. Only in two cases does the co-management arrangement involve more than consultation. In the Olifants River case, a cooperative arrangement has been established, and only in the case of Lake Nokoue do user groups drive the process. As fisheries co-management is in its infancy in African fisheries, it is understandable that the process at this stage is mostly government-led.

Apparently, co-management should not be considered a very precise management concept, but rather as a strategy to involve and integrate user groups as participants in the decision-making process. Therefore, from an administrative point of view, it is useful to classify co-management arrangements into three types as suggested by Raakjær Nielsen and Vedsmand (1997):

(1) *Consultative,* where co-management takes the form of consultation with user groups at a central level;

(2) *Cooperative,* where co-management is a cooperative process between on one side the government and on the other side the traditional local power structure and the user groups;

(3) *Delegated,* where management authority (mainly the determination of operational rules) is delegated to user groups at the local/regional level.

It is our hypothesis that the evolution of co-management in Southern and West Africa will be a combination of the three types, often existing within a nested system. In some countries (Mozambique and Senegal) consultative management institutions have been established at the national level to advise the government on general management issues. The same arrangements might soon be the case in Malawi, Zambia and perhaps South Africa as well.

At the regional/local level it is likely that cooperative management arrangements will in the future increase in number, as government faith in co-management arrangements strengthens, and the capacity within the fishing communities to take part in fisheries management increases. Co-management arrangements will then slowly evolve to include more than just the setting of operational rules.

For some tasks, primarily the setting of operational rules, fishers are believed to be taking the lead. This means that delegated co-management will take place. These findings support the argument by Sen and Raakjær Nielsen (1996) that in general, the more specific the tasks (harvesting and market regulation), the lower the level at which decisions are taken.

In general, the information obtained from the case studies indicates that co-management arrangements, whatever the type, occur almost entirely during implementation and very seldom in the planning phase.

5. Incentives for cooperation

The overall rationale behind the introduction of co-management arrangements by governments differs from country to country. In particular, the failure of centralized systems to prevent overfishing of important stocks, the low legitimacy of the existing management institutions and the substantial costs involved for conventional management approaches to be effective, are among the main reasons why the governments of Malawi and Mozambique have set out to try an alternative approach.

The most important incentives for fishers/local communities to cooperate with government are:

- over-exploitation of fish resources
- conflict between artisanal fishers and semi- or industrial fishers
- lack of access rights
- poor living conditions of fishers and fishing communities
- conflict among artisanal fishers
- conflict between fisheries and other sector interests
- lack of representation in fisheries management decision-making

In all cases conflicts have arisen among several groupings within the fishers/local community. Thus, conflict resolution is a major incentive for fishers/local communities to participate in the decision-making process. Another important incentive also apparent in most of the cases are the poor living conditions of fishers and fishing communities and the fact that target fish species are becoming a scarce resource. The reason for the poor living conditions is, in some cases, a lack of access rights to the resources. Participation in the fisheries management decision-making process is seen as a means of improving living conditions and a way of obtaining access rights.

At government level the most important incentives to cooperate with the resource users are:

- centralized management has not been able to solve resource crisis situations
- over-exploitation of fish resources
- poor levels of compliance with regulations (low legitimacy of institutions)
- high costs of resource monitoring, control and enforcement
- donors promoting the policy of co-management
- avoidance of conflicts among resource users

The main incentive for governments to establish co-management arrangements is the fact that governments have not been successful in solving the present crisis affecting most important fisheries. Many governments have realized that they cannot handle the crisis alone and that they need the active involvement and support of the resource users themselves. Governments are also pushed by donors, who generally promote co-management in order to encourage a more democratic process, but also by the fact that there are only limited funds available for monitoring, control and enforcement in most countries.

Broadly speaking, the centralized management institutions are not perceived as legitimate by the users, and compliance with rules and regulations has generally been low. From a government perspective co-management is seen as a means to improve this situation. Co-management is also seen by governments as a mechanism for conflict resolution as user-group participation in the decision-making process is likely to increase legitimacy of regulations.

6. Outcome of co-management initiatives

All the co-management arrangements studied began just a few years ago, and it would be premature at this stage to draw any firm conclusions as to the outcome in terms of sustainability (resource stewardship), equity (effects on stakeholders in terms of benefit distribution, representation and information), efficiency (in comparison with other management arrangements) and management system resilience. To draw such conclusions the sites would need to be revisited. A monitoring process of this kind has been initiated within the present research project.

However, some general observations have been made that may give some indication as regards outcome. In the case of Malawi, positive results of the co-management approach were reported in terms of increased catches of the main target species both in Lake Malombe and Lake Chiuta (Scholz et al., 1997). New management regulations were adopted by the fishing communities and gazetted in 1996. They included gear type regulations and, in the case of Lake Malombe, the introduction of closed seasons and sanctuaries including fish aggregation devices. In terms of equity, management issues and measures are discussed openly among the fishers, and their feeling is that they are now part of the decision-making process. Where efficiency is concerned, the foundation of the Lake Malombe Fisheries Association in 1996 as a coordinating body for the Beach Village Committees is an indicator of an increase in management efficiency.

In Kayar, Senegal, the restriction on catch per trip for each line fishing unit, established and actively enforced by the local artisanal fishers' committee, represents a successful resource management policy aimed at maintaining sustainable fisheries at the local level.

7. Evaluation and future research needs

7.1 Lessons learnt

Given the fact that the co-management arrangements documented are all of very recent origin, one should be cautious not to draw firm conclusions on lessons learnt regarding the design and implementation of co-management systems. The conclusions reached in this section are only tentative and would need to be both verified and qualified through further research.

Co-management arrangement design

In most of the cases studied, co-management arrangements were established in response to resource depletion. Under such circumstances it would seem critically important that governments should not leave their local partners with management responsibilities that they are not capable of shouldering, be it for reasons of lack of knowledge or lack of resources. Indigenous knowledge among fishers is often related to the fish resources and is concentrated on aspects that are relevant to fish capture, and does not to any large extent comprise the biology of the resources. It would therefore be fairly impossible for local partners, if left alone, to decide on appropriate measures to facilitate the recovery of fish stocks. It would thus be the responsibility of governments to provide the scientific advice needed, to train the local partners to understand and appreciate the advice, and to ensure that any management measures taken are adequate.

The cases documented have demonstrated that conflicts among stakeholders (fishers) of different ethnic or religious affiliation are not a major problem in co-management arrangements as long as their fishing operations are of the same character or do not interfere with each other. Where both full-time fishers and fisher-farmers fish in the same area, conflicts may easily arise because of the differing perception of access rights and spatial ownership among the two groups. Also, where there is interference between different types of fishing gear in an area, conflicts may easily arise even among fishers of the same affiliation. Co-management arrangements would have to reflect such differences in interests of particular groups of resource users. Mechanisms for conflict resolution would need to be given high priority in the design of the arrangements, and management approaches that would minimize conflict (e.g. zoning of fishing grounds) should be adopted wherever feasible.

The scepticism of fishers, reported across the board, regarding the sincerity of government in the devolving of management responsibility should be taken into consideration in the design of co-management arrangements. Mistrust on either side would probably best be overcome if co-management arrangements were to be initiated in the consultative mode, with focus put on operational rules and their enforcement. As trust grows, and capacity for taking management responsibility increases at the local level, co-management arrangements may move towards more user group-based decision-making.

Traditional leadership systems, having high legitimacy with local people still play a key role in community governance in most African fishing communities. This should be properly reflected in the design of co-management arrangements to ensure the legitimacy of new institutional structures with fishers and other local stakeholders.

In most of the fisheries co-management cases documented, management focus is, for good reason, on the fish resources. However, significant success achieved from co-management of fisheries infrastructure has also been documented from countries in West Africa (Horemans and Jallow, 1997). Based on these experiences, when designing co-management arrangements it should be considered to what extent it would be more appropriate to focus on fisheries sector management, i.e. integrating the management of the resources into the management of the fisheries sector structure, including the infrastructure. This would better reflect the development context in which many co-management arrangements are being tried out.

Co-management arrangement implementation

In the implementation of a co-management arrangement it is important to observe that expectations of those involved in local committees etc., in terms of income or other benefits to be derived, are fully met. The case study from Lake Malombe, Malawi documents the long-term negative effect that the unmet expectations of local people have on the process i.e. they were expecting meeting allowances and free replacements for undermeshed nets, expectations that could not be met.

In the design of co-management systems a balance should be struck between the responsibilities given to institutions, groups and individuals and the means put at their disposal. The cases from Benin and Côte d'Ivoire clearly document that local management committees often feel that they are not given sufficient powers by governments to undertake what they have been mandated to do, and are also not given the physical means needed to effectively carry out their responsibilities e.g. to control fishing operations. Furthermore, none of the co-management arrangements studied have been able to show evidence that the flow-back of licence fees or other funding mechanisms for use by local management bodies were considered at the design stage.

7.2 Research needs

It is the overall hypothesis of the research project that fisheries co-management systems may in many situations be superior to centralized or community-based systems in terms of sustainability, equity and efficiency. To contribute to the test of this hypothesis, the cases analyzed would need monitoring over an extended period of time. It is only through regular visits to the sites that it would be possible to document the co-management system outcome in these terms.

The analysis has motivated some hypotheses on issues of critical importance to the design of co-management systems. One hypothesis is that conflicts between groups of fishers exploiting the same waters are rooted in the differences in fishing operations, typically the use of different fishing gear. Another hypothesis is that fishers' indigenous knowledge primarily relates to fishing operation and only to a very limited extent to the determinants of fish stock reproduction. A third hypothesis is that co-management systems do not obtain legitimacy among fishers if they do not incorporate (informal) traditional power structures at the village level.

Tests of these hypotheses should go hand in hand with a test of the overall project hypothesis.

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