Feasibility of fisheries co-management in Africa

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Abstract

The current, highly centralized approach to fisheries management seems to be incapable of coping with escalating resource depletion and environmental degradation. Co-management has been identified as an alternative. This paper compares various approaches to fisheries management and discusses their performance in relation to the nature of the fishery. It is concluded that in African fisheries, stringent institutional arrangements, poor human, technical and financial resources, and a limited time frame often thwart co-management approaches. However, with the right conditions and prerequisites, co-management can be successful in improving compliance with regulations and maintaining or enhancing the quality of the resource. The paper brings out the issues that require further research.

Introduction

As in many parts of the world, over-exploitation of fisheries is common in Africa. Traditionally, fishery management was entrusted to community leadership, typically a Chief working with the support of a council of elders. The fishery resource was often perceived as a gift from nature or various deities who made their wishes known through the elders. Rituals and sacrifices were often associated with traditional African fisheries management.

Ownership and access to the resource was communal. Family members inherit the resource and access is granted by kinship. Fishing communities have strong social and religious values with ethics and norms, which creates room for collective communal co-operation. Participation in such traditional institutions is often based on age and gender. Women, for example, are typically involved in fish processing and marketing. Adult men fish while older men spearhead decision-making based on their experience and knowledge. Youths are mostly involved in communal development projects.

Traditional management measures widely employed in African fisheries include, *inter alia*:

- Forbidding of fishing in certain areas.
- Closed days or seasons.
- Restrictions on fishing gears or techniques.
- Limiting access.

Offenders are punished through sanctions, fines or expulsion from the community. Such management practices seem to have worked well mostly because of strong group cohesion, emphasis on social obligations, consensus-based decision making and a high degree of social conformity (Horemans and Jallow 2000). Recently, these systems have been weakened by the erosion of traditional beliefs, disrespect for elders and the disintegration of social structures as a result of urbanization.

Since colonial times, centralized institutions have been in place to increase government control over resources. Policies are usually embodied in a Fisheries Act, Decree or Master Plan, which defines the authority and administration for management. The Department of Fisheries, in consultation with scientists, extension agents, community representatives and/or donor agencies, formulates policy and legislation. Fishery regulations mostly take the form of:

- Effort regulation (total allowable catch, limited fleet size etc.);
- Technical regulation (mesh size restrictions, gear specifications);
- Entry limitations (permits, licenses etc.); and
- Monitoring and surveillance (confiscation, fines, etc.).

The success of such centralized planning and regulation depends upon a government's ability to correctly analyze problems and enforce its will. Unfortunately, inadequate infrastructure, expertise and funding have resulted in: 1) a serious lack of data upon which to base effective policy and 2) the inability to enforce regulations. Together, these problems have rendered most modern fishery management policies meaningless. In many African countries, increased community involvement through co-management programs is being seen as a potential solution to this problem.

Fisheries co-management is the sharing of responsibility and cost for the sustainable management of a fishery between the government and the local community (Berkes et al. 1991; West and Brechin 1991; Pomeroy and Williams 1994; Jentoft and McCay 1995; Borrini-Feyerabend 1996; Raakjaer Nielsen et al. 1996; Sen and Raakjaer Nielsen 1996; Kuperan et al. 1998; Schreiber 2001; Hara et al. 2002). The concept of co-management is now synonymous with co-operative management, community based management, joint management and/or participatory management, but should not be confused with cooperative fisheries management which aims to establish coordinated joint management programs between states (Munro 1987, 2002). The key objective of co-management is the development of a strategy for collaborative decision-making that can lead to agreement

on management roles and responsibilities that generate local incentives for sustainable resource use (Hara 1999).

Co-Management in Africa

The basic challenge of co-management is the reshaping of government thinking to institutionalize collaboration between administration and resource users in order to end unproductive situations where they are pitted against one another as antagonistic actors (Baland and Platteau 1996). 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 (Raakjaer Nielsen et al. 1996). Government resource managers are often reluctant to share their authority or even part of it (Kuperan et al. 1998). Allowing fish harvesters to manage fisheries is felt to be almost as sensible as turning the hen house over to the fox, with harvesters lacking both the necessary knowledge about resources and capability of reaching consensus (Davies and Jentoft 2001). Population increases in fishing communities, market integration and technological innovations in gear and crafts as well as corruption and other patterns of human behavior can undermine co-management arrangements (McCay and Jentoft 1996). In addition, co-management is associated with high program design costs necessary to ensure effective participation (Hanna 1995) and these may outweigh the expected benefits (Kuperan et al. 1998).

On the other hand, long-term costs for monitoring and enforcement are low (Hanna 1995) as many recurring costs to government, such as patrols, record keeping and facilities maintenance, can be shifted from the central government to user groups. In addition, user participation draws upon the experience and expertise of fishers and increases the likelihood of compliance with rules and regulations (Jentoft 1989; Jentoft and McCay 1995). The institution of co-management regimes has reportedly helped strengthen small-scale fishing communities by increasing community cohesion and an elevation of pride in cultural identity and optimism about the future (McGoodwin 2001). To look at how the various costs and benefits of co-management might add up in Africa, nine case studies were selected, representing a range of both inland and marine co-management systems.

Benin: Lake Nokoue (Atti-Mama 1997)

The fishing site covers an area of about 12 000 ha, with a fishing population of 13 500. Many types of fishing gears are employed to catch a wide variety of fish species. Access to the resource is communal with poor compliance with regulations from the users. Lack of fishery data, high fishing pressure, and poor enforcement are the main management problems. The Department of Fisheries and the Center for Regional Rural Development administer fishery regulations with the local administration (Sous Prefet). The formation of fishery committees with the local fishermen, in consultation with the formal institutions, strengthened resource use and management. One of the paramount benefits of co-management in lake Nokoue was the sensitization program, aimed at training and education of fishers in the principles of fishery management. This has yielded better compliance with fishery regulations, and improved sustainability of the fishery.

Cote d'Ivoire: Aby Lagoon Complex (Kponhassia and Konan 1997)

This is a multi-species and multi-gear coastal fishery with a population of approximately 3 000 fishers. The Lagoon complex extends over an area of 424 km^2, which is a common property with territorial rights limiting access to certain areas. Fishing boats are 8 to 12m long but poorly mechanized. This is a low value fishery, targeting species with a variable market, but generally low market value. Conflicts over access rights are common. High fishing pressure and lack of reliable stock assessment are other key problems. The Directorate of Fisheries in partnership with the local administration (Government appointed Sous Prefet) has tried to regulate the high fishing pressure on the resource. A co-management structure, the Consultative Fishery Surveillance Committee, has been empowered to regulate and enforce government policies. Education and sensitization programs for greater user participation have been organized and have led to improved compliance and resource conservation.

The Gambia: Central River Division (Njie and Mikkola 2002)

This is a multi-gear and multi-species riverine fishery on the Gambia River used by 314 poorly mechanized fishers. There is a high influx of migrant and foreign fishermen with indiscriminate gear use and consequent environmental degradation. Human and technical constraints are evident, with inaccessibility of landing sites being a key management problem. The Department of Fisheries in consultation with the local traditional authority (village head and council of elders) and local Community Fisheries Management Committees devised a number of co-management approaches to common problems, which include the lack of fishery data, poor implementation of Government policies, weak enforcement of rules, and conflicts among resource users. Since the advent of co-management, there is greater user participation and better enforcement. Participatory control and surveillance has improved resource conservation as have the implementation of new seasonal and area closures.

Malawi: Lake Malombe (Donda 1996)

This is a multi-gear and multi-species fishery, with an area of about 390 km^2 and with a fishing population of about 2 300 and open access rights with low mechanization within the industry. Input cost is rather high, with a variable market structure, and poor technical facilities for fish processing and transportation of fish products. Management challenges include unregulated access, limited control and monitoring by the regulatory authority and over exploitation. The Department of Fisheries administers fishery regulations and has, in consultation with the local village authority and fisher associations, developed a co-management approach. Entry and gear restrictions have now been implemented, along with seasonal closures. Co-management has generally led to better compliance from resource users and greater participation.

Mozambique: Angoche District in Nampula Province (Lopes et al. 1997)

This is a multi-gear and multi-species coastal marine fishery with a surface area of 3 600 km^2 and a fishing population about 200 000. Although the fishery is poorly mechanized, the open access and common property nature of the resource makes it highly susceptible to over-exploitation. Moreover, the lack of alternate job activities within the community has been steadily increasing the number of

fishers and conflict among them is increasing. Poor processing and other marketing infrastructure limit the profitability of the fishery. From the point of view of management, stock assessment, regulation of effort and over-exploitation are key problems. The Marine Fisheries Administration, the Ministry of Finance and the Fisheries Secretariat undertake fishery management and regulation. This top-down structure has been strengthened through consultation with traditional local authorities and a council of Chiefs together with communal associations (Guias de Pesca) to co-manage the fishery. Consultative committees from both formal and informal institutions have been formed to address common fisheries problems and to manage the fishery resource in terms of regulation and encouraging compliance by users.

Nigeria: Lake Chad (Nieland 2000)

This is a mono-gear (basket) fishery with entry restrictions. Consequently, the fishery yields high catches and profits per unit area. However, high fishing pressure, poor fishery data, unclear property rights, and environmental degradation are increasingly common problems. The Department of Fisheries, together with traditional authorities have formed a Monitoring Unit that seeks to ensure compliance with management measures aimed at guaranteeing sustainability. User participation has increased, but capacity building and better legal structures are still required.

South Africa: Arniston (Hutton and Lamberth 1997)

This is another multi-gear, multi-species coastal marine fishery with a moderate level of boat mechanization. The biggest issue here is racial segregation and the absence of harbors. Conflicts are common, with illegitimate rules and fishery regulations left over from the Apartheid era. A Sea Fisheries Committee oversees fishery management and regulations under the Ministry of Environmental Affairs and Tourism. One of the greatest challenges is competition between industrial and artisanal fisheries, leading to high fishing pressure and problems with control and monitoring. However, consultations within the local fisher's forum, and amongst the local Communal Trust and the Sea Fisheries Committee have yielded fruits in a joint co-management approach. One of the most important outcomes of this has been the formation of co-operatives and communal organizations with a high degree of participation and legitimacy, which has been able to enforce fishery regulations and the increase the sustainability of resource use.

Zambia: Lake Kariba (Sen et al. 1997)

Lake Kariba is one of the largest man-made lakes in the world with 5 500 km^2 surface area, 300 km long and 40 km at its widest point. It is a multi-gear and multi-species fishery with open access, although preference is given to certain ethnic groups like Valley Tonga people. The fishermen often have conflict with other non-fishing resource users like Safari operators and illegal cross-border traders. This, coupled with a variable market structure, post harvest spoilage and poor returns, make risky the high investment costs. Multiple and destructive fishing gears like explosives, chemicals, poisons, jigging and illegal size nets have the potential to overexploit the resource. The lack of reliable catch and effort data thwarts management initiatives. The Department of Fisheries regulatory structure has been enhanced with local traditional institutions and committees in a joint participatory and consultative approach that has reduced conflict. In addition, more consultation and participation on the part of the resource users has led to better compliance with regulations.

Zimbabwe: Lake Kariba (Sen et al. 1997)

As is the case for the Zambian part of the lake, the Zimbabwe fishery on Lake Kariba is a multi-user resource, with the fishermen competing with other users for access. The fishing population is about 1 240 with a form of government regulated access, but conflicts are common with other stakeholders. The fishery is poorly mechanized, with low economic returns, large post harvest spoilage and fixed market prices. One company is the largest single buyer and, therefore, practically determines the price of fresh fish. The company often provides fishers with nets and some foodstuff on credit. Repayments are usually made with fish. Fishing is generally regarded as risky due to the presence of game scouts, crocodiles and hippos. The use of destructive fishing gear and a high fishing effort is unsustainable. This is compounded by unreliable fishery data. The Department of Fisheries, Parks and Wildlife, in consultation with the Lake Kariba Fisheries Research Institute, is responsible for administering fishery regulations. Together with traditional local authority and fishery development committees, a new co-management approach has led to the formation of exclusive fishing zones and closures and has gone a long way in resource conservation. There is now greater user participation, with trust and cooperation between the resource users and the fishery officers, which has lead to legitimacy and compliance with fishery regulations.

Analysis of Case Studies

The case studies represent typical African fisheries in that they are generally multi-species and use a range of gear types. Motorized boats are rare. Tenure is mostly common property and open access, with consequent conflicts between traditional and new users displaced by poverty into fishing. Resource over-exploitation, lack of respect for management decisions and environmental degradation are other common problems.

From these cases, several common denominators that have engendered successful outcomes can be identified. These should be considered as key elements that any effort at sustainable co-management of African fisheries needs to consider:

- Participation: The legitimization of laws and the harmonization of traditional and colonial enforcement systems through active participation by all resource users.
- Management: The provision of adequate financial, technical and intellectual resources to make, explain and enforce regulations.
- Transparency: An honest willingness on the part of governments to relinquish exclusive control of natural resources and the establishment of trust and confidence among the various partners.

Participation

A key aspect of successful management involves the delegation of managerial responsibility to traditional fishery institutions with active participation by fishers. This process has variously led to the formation of consultative committees, sensitization programs on resource

sustainability, control and surveillance systems and conflict resolution entities. In many cases, this emphasis on user involvement has necessitated education and other capacity building initiatives so as to enhance effective participation and consultation.

Traditional property rights, customary laws and agreements in African fisheries dictate access, ownership, seasonality or fishing hours, permitted gear types and penalties for breaking the rules. Such customary tenure systems work best where ownership is limited and clearly defined. Within offshore or open-access fisheries, migratory (non-indigenous) fishers often make local laws difficult to enforce.

The establishment of local informal organizations within fishing communities goes a long way to institutionalize local participation. These organizations, associations or co-operatives tend to build up a sense of solidarity and trust. For successful co-management, such local institutions should be strengthened where they exist, and new ones created where they are non-existent. These social structures are essential in communal integration, consensus decision making and as a body to which management responsibility can be delegated.

Management

The size of the resource and the number of fishers or other resource users is a critical component of success. Among the cases reviewed, success tends to be easier to achieve in inland fisheries and small waterbodies. In effect, the smaller the water body, the more likely that co-management will work. A major part of this success is the ability to capture sufficient biological data to enable the formulation of efficacious management strategies.

Fishing communities are composed of households and family units with complicated kinship relationships being a crucial factor in access to resources. In small homogenous communities, cohesion and effective communication can help build consensus. Heterogeneous communities need to respect different ethnic, religious and social values so as to foster harmony. Fishery managers should take into consideration overlapping communities with reference to priorities and resource use. States can help to enforce communal property rights by facilitating co-operation within and among communities.

Poor allocation of financial resources causes lack of compliance and poor user participation in management. The increased sense of ownership within fishing communities makes monitoring easier as the resource is seen as a personal property thereby increasing on compliance and sustainability. However, government cannot pass on to communities all the responsibility for data collection, analysis, formulation of regulations and enforcement without also providing some funds to support their work.

Relevant skills in fisheries biology and ecology, fish processing, marketing and other business skills are essential for successful management. Training of local institutions and users in conflict resolution, consensus building and resource use are also helpful.

Transparency

Successful collaboration between the state and local resource users requires trust, credibility and reliability. Central government must be flexible, both with respect to occasional lapses on the part of communities and in the development of creative means of enforcement that take local cultural values into consideration.

Co-management requires incentives for users to participate effectively. Such incentives can be social, economic or communal. Community development quotas can be instrumental, particularly within societies where communities lose benefits to other stakeholders.

The role of the government in establishing conditions for co-management is crucial, particularly in the creation of legitimacy and accountability for institutional arrangements and the delineation of power sharing and decision-making.

Institutions should be respected, with stakeholders having the confidence to trust their opinions. It is important that local institutions be empowered and enlightened as to their function, rights and responsibilities, membership and organizational arrangements. Good local leadership, which has the respect and trust of the locals, and is able to create consensus around key decisions, can play an important role.

Conclusion

There is no single model or formula for the successful implementation of fisheries co-management. It depends to a large extent on the extent to which limiting factors can be overcome and the willingness of institutions to harmonize their activities. Local users, through education and empowerment, can act responsibly in resource use. However, sustained funding and the willingness to co-operate and participate in power sharing, despite discords or other limiting factors, are crucial to success.

Before undertaking a co-management initiative, there is a need to carefully examine the feasibility of various approaches as different African states may respond quite differently to such arrangements. Exactly how the sharing of rights and responsibilities can be negotiated will vary from place to place.

Future research should target institutional arrangements at the government and local levels, capacity building of the local resource users, the development of trust and confidence between the actors, and determine rights and rules to govern users. Questions that future research could target are:

- How long can the traditional beliefs, rules and authorities work in the modern society?
- Has foreign aid altered fisher's perception of their role in management, thereby making it more difficult to implement co-management programs?
- Would co-management still work under current conditions of high population densities and transient fishing communities?

Answering these questions would go a long way towards setting the stage for co-management approaches.

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References

Atti-Mama, C. 1997. Trends in the management of continental fisheries in Benin: The case of Lake Nokoue. Paper presented in a regional workshop on fisheries co-management research in Mangochi, Malaŵi, 1997:1-20.

Baland, J.M. and J.M. Platteau. 1996. Halting degradation of natural resources; is there a role for rural communities? FAO and Claredon Press, Oxford, UK.

Berkes, F., P. George and R.J. Preston. 1991. Co-management. alternatives 18(2):12-18.

Borrini-Feyerabend, G. 1996. Collaborative management of protected areas: tailoring the approach to context. International Conservation Union, Gland, Switzerland.

Davies, A. and S. Jentoft. 2001. The challenge and promise of indigenous peoples fishing rights-from dependency to agency. Marine Policy 25:223-237.

Donda, S.J. 1996. The management of artisanal fisheries in Lake Malombe and Upper Shire River. Paper presented at the Participatory Fisheries Management Programme (PFMP) progress review meeting in Mangochi, Malawi 1996, 10 p.

Hanna, S. 1995. Efficiencies of user participation in natural resource management, p.59-67. ***In*** S. Hanna and M. Munasinghe. Property Rights and the Environment: Social and Ecological Issues. Biejer Int. Inc., Washington, D.C., US.

Hara, M. 1999. Fisheries co-management: a review of theoretical bases and assumptions. Southern African Perspectives 77:1-32. University of the Western Cape, Belville, South Africa.

Hara, M., S. Donda and F.J. Njaya. 2002. Lessons from Malaŵi's experience with fisheries co-management initiatives, p. 31-48. ***In*** K. Gehep and M.T. Sarch. (eds.) 2002 Africa's Inland Fisheries – The Management Challenge. Fountain, Kampala, Uganda.

Horemans, B., and A.M. Jallow. 2000. Present state and perspectives of marine fisheries resource co-management in West Africa. Programme for the Integrated Development of Artisanal Fisheries in West Africa (IDAF). WP/W4, 29 p. Cotonou, Benin.

Hutton, T. and S.J. Lamberth. 1997. Opportunities for Co-Management: the Application of a Research Framework to Case Study from South Africa. Paper presented in a regional workshop on fisheries co-management research in Mangochi, Malaŵi, 1997.

Jentoft, S. 1989. Fisheries co-management: delegating government responsibility to fishermen's organizations. Marine Policy 13(2):137-154.

Jentoft, S. and B. McCay. 1995. User participation in fisheries management: lessons drawn from international experience. Marine Policy 19(3):227-246.

Kponhassia, G. and A. Konan. 1997. The traditional management of artisanal fisheries in Côte d'Ivôire: The case of Aby Lagoon. Paper presented in a regional workshop on fisheries co-management research in Mangochi, Malaŵi, 1997.

Kuperan, K., N. Mustapha, and R. Pomeroy. 1998. Transaction cost and fisheries co-management. Marine Resource Economics 13:103-114.

Lopes, S., E. Poiose, J. Wilson, J.L. Kromer, L. Manuel Cululo and R. Pinto Ascensao. 1997. From no management towards co-management? A case study on artisanal fisheries in Angoche district, Nampula Province, Mozambique. Paper presented in a regional workshop on fisheries co-management research in Mangochi, Malaŵi, 1997.

McCay, B.J. and S. Jentoft. 1996. From the bottom up: participatory issues in fisheries management. Society and Natural Resources 9:237-250.

McGoodwin, J.R. 2001. Understanding the culture of fishing communities: a key to fisheries management and food security. FAO Fisheries Technical Paper 401:1-287. FAO, Rome, Italy.

Munro, G. 1987. The management of fishery resources under extended jurisdiction. Marine Resources Economics 3:271-296.

Munro, G. 2002. Cooperative versus non cooperative fisheries management arrangement. Paper presented in the workshop on the management of shared small pelagic fishery resources off North West Africa, Banjul, The Gambia, 2002.

Nieland, A. 2000. Traditional management systems and poverty alleviation in Nigeria. Paper presented in seminar on livelihoods and inland fisheries management in the Sahelian zone, Quagadougou, Burkina Faso, 2000.

Njie, M., and H. Mikkola. 2002. Management and development of the Gambian River fisheries: a case for the co-management in inland fisheries resources, p.228-239. ***In*** K. Gehep and M-T. Sarch. (eds.) Africa's Inland Fisheries - The Management Challenge. Fountain, Kampala, Uganda.

Pomeroy, R.S. and M. Williams. 1994. Fisheries co-management and small scale fisheries: a policy brief. ICLARM, Manila, Philippines.

Raakjaer Nielsen, J., S. Sen , S. Sverdrup-Jensen and R.S. Pomeroy. 1996. Analysis of fisheries co-management arrangements: a research framework. ICLARM and IFM Fisheries Co-management Research Project working paper 1. Manila, Philippines.

Schreiber, D.K. 2001. Co-management without involvement: the plight of fishery communities. Fish and Fisheries 2:376-384.

Sen, S., P. Hachongela, J. Jackson, I. Malasha, W. Murirtirwa and K. Nyikahadzoi. 1997. An analysis of emerging co-management arrangements the Zambian and Zimbabwean inshore fisheries of Lake Kariba: a case study applying a research framework developed by the Institute for Fisheries Management and Coastal Community Development (IFM) and the International Centre for Living Aquatic Resources Management (ICLARM). Paper presented in a regional workshop on fisheries co-management research in Mangochi, Malaŵi, 1997.

Sen, S. and J. Raakjaer Nielsen. 1996. Fisheries co-management: a comparative analysis. Marine Policy 20(5):405-418.

West, P.C. and S.R. Brechin. (eds.) 1991Resident peoples and national parks. University of Arizona Press, Tucson, US.

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