

The community-based approach to fisheries management in North-East Nigeria : A socio-economic analysis

Arthur Neiland, Mane-Therese Sarch, Sunday Madakan, Bernard Ladu and Donald Hassett.

Abstract

The following paper presents the results of a detailed investigation into the distribution, characteristics and performance of fisheries management systems in the major fisheries of north-east Nigeria (Upper River Benue, Lake Chad and the Nguru-Gashua Wetlands). A key focus of the research was to examine the possibilities for using a community-based approach to fisheries management in the future, taking into account relevant socio-economic factors. Overall, it was found that traditional management systems (community-based and operating through the traditional administration) were the most common and widespread system. These systems were found to perform well, in terms of attaining objectives, promoting compliance, reducing conflict between users and sustaining the resource. Fishers operating within the traditional systems earned positive and high financial and economic profits. The paper concludes that the existing community-based traditional management systems could provide a good basis for the future development of a co-management regime in many parts of N.E. Nigeria. However, there are some constraints, which need to be addressed including a stagnation of government policy, and important socio-economic changes (e.g. privatisation of common property resources) which may reduce the effective utility of traditional management systems.

Key words: small-scale fisheries; inland fisheries; management systems; community-based management; co-management; Nigeria.

1. Introduction

Decentralised approaches to natural resource management, of which community-based management is one type, have received an increasing amount of attention from governments around the world in recent years in response to the failure of centralised management and the need to search for improved approaches (Pomeroy and Williams, 1994). In the case of the inland fisheries of West Africa, including such major fisheries as the River Niger, the River Benue, and Lake Chad, it has been documented that riparian communities often represent the *de facto* managers, although national government have overall *de jure* responsibility for resource management (Scudder and Conelly, 1984; Kone, 1985; Neiland *et al.*, 1994). In the following paper, this dichotomy, and its implications for the future management of inland fisheries in West Africa, based on research carried out recently in N.E. Nigeria, will be examined. Special attention will be given to the influence of socio-economic factors (e.g. community organisation and decision-making processes, income sources) on the effectiveness of fisheries management, since these factors have been recognised as having an important role to play in understanding the way fishery systems work (Lawson, 1977; Charles, 1988).

The paper is divided into four parts. Firstly, community-based approaches to natural resource management in general, and to fisheries management specifically, are outlined. Secondly, descriptions of the study regions in Nigeria and

the importance of the local fisheries are provided together with a brief account of the research undertaken. Thirdly, the characteristics of fisheries management systems operating in the regions are described, and analysed, based on our field research. Fourthly, there is an examination of the possibility that a community-based approach to fisheries management could become increasingly important in Nigeria in the future. In particular, an evaluation is carried out of the possibilities of using community-based systems within a co-management framework (in co-operation with government).

2. Community-Based Approaches to Natural Resource Management In Developing Countries

2.1. Development of the concept

A community can be defined in various ways

"... a body of persons in the same locality", or

" ... a body of persons leading a common life, or under socialistic or similar organisation" (Chambers Dictionary, 1995 Ed.)

Ostrom (1994) identifies a community as a group of persons with a particular commonality of "culture", which is described as a bundle of attributes including generally accepted norms of behaviour, a common level of understanding of action arenas (areas of interaction), a particular homogeneity of preferences and a particular distribution of resources among members.

Community-based approaches to natural resource management, as an approach within the study of planned development, has its origins in the convergence, largely during the 1980s, of two elements: a rediscovered movement towards community development and empowerment, and the growing consciousness of the limitation of natural resources as a factor in development. In parallel, workers such as Ostrom (1990, 1992, 1994) and Bromley (1989) have advanced the study of institutional arrangements, property rights and the use of resources. In particular, conventional wisdom that resources held in common (often by communities) will invariably be overexploited ("the tragedy of the commons") has been shown to not always hold true. Berkes *et al.* (1989) report that communities dependent on common-property resources have adopted various institutional arrangements to manage those resources, with varying degrees of success in achieving sustainable use.

There are several traditions of community-based development action. One, liberal tradition is seen in India's National Community Development Programme of the 1950s and 1960s; another, radical tradition, in the Latin American work of Paulo Friere (1972). Possibly a third, separate tradition is the work of "animateurs ruraux" in Francophone countries.

In India, the community development movement had a basis, on the one hand, in Christian traditions of missionary and charitable work; on the other, in the Gandhian programme for rural social change. Following independence, the Nehru government invited an American, Albert Mayer, to carry out a pioneer project in Uttar Pradesh that was later taken up nationally as the National Community Development Programme. However, the considerable success of early cases proved not to be replicable by bureaucratic means on a national scale. By the

1960s, the village-level workers of the programme had become, not the catalysts of rural social change that had originally been envisaged, but minor functionaries largely concerned with routine agriculture extension, most of whose time was taken up by record-keeping (Alliband, 1983).

The Indian initiative was copied in the 1950s, with greater or less commitment, by governments in various other countries, but suffered much the same fate elsewhere and had effectively petered out by the late 1960s. It ran into three problems:

- (i) resistance by privileged rural strata of anything that threatened to undermine their dominant position;
- (ii) the bureaucratisation of the system once it became a department of government;
- (iii) the rise, in the 1960s, of large-scale international aid and strategic development planning.

Whereas "community development" had been based on a moral critique of the social and institutional bases of rural poverty - and was therefore essentially political - economic planning treated poverty as a technical problem, which could be solved by the application of scientific techniques. The development plans of the 1960s and 1970s were almost universally strongly centralised and relied on outside experts to determine people's needs on their behalf.

A current of populist criticism accompanied this paradigm of centralised development from the start, arguing the need for empowering local people within their communities to decide their own needs and to manage their own affairs. However, it was not so much the moral force of this critique as the perceived failure of centralised development to achieve its aims that turned the attention of development workers towards local institutions and participatory involvement at the community level.

There is a sense in which the community-based approach to development has a natural affinity to Non-Government Organisations (NGOs), and the pluralist approaches to funding and intervention, and certainly many small-scale NGO initiatives working with local communities have been successful compared to much larger centrally-planned projects. However, some large-scale state bureaucracies began in the 1970s to experiment with "de-bureaucratising" themselves and to build up local-level self-managing institutions. The Philippines National Irrigation Administration is the best-documented case of this (Bagadion & Korten, 1991).

2.2. *Communities and natural resource management*

In many developing countries, colonial policies of "protecting" natural resources from the people who used them were inherited by post-colonial states in the form of government departments, which mostly survived the hand-over of power relatively intact. However, the funding and manpower available for resource management under the new regimes were insufficient, and growing populations put additional pressures on the system, which could not be adequately policed.

The failure of state bureaucracies in developing the world adequately to conserve natural resources became manifest in the 1970s. Desertification and famine such as those in the Sahel focused attention on the importance of resource management issues. While at first these crises were widely blamed upon the

ecological ignorance and mismanagement of local users, empirical work gradually demonstrated the intimate knowledge that many rural people had of their environments (e.g. Brokensha *et al* 1980). Gradually a perception grew among many development workers, inverting the previous scale of values, and casting governments as the enemy of conservation, by breaking down the traditional management systems that had lived "in harmony with nature". This new perception, and the renewed interest in community-based programmes in development, converged in the 1970s and early 1980s in a new idea of giving users of natural resources the primary responsibility of managing them. As a follow-on there have been many experiments in working with local communities in different countries to promote the establishment of local institutions to manage the community's own environment for the community's own benefit.

2.3. Aims of the community-based approach

The community-based approach ("CBA") to renewable natural resource management implies that decisions as to the use of such resources are made at community level, with a view to their sustainable use. The aims of the "CBA" as a planned approach can be set out under the planning objectives of efficiency and equity, as follows:

Efficiency

- (i) Resource use efficiency
Sustainable use of resources and protection from undesired uses.
- (ii) Administrative efficiency
Speedier and more effective decision-making and implementation with regard to resource use, at reduced financial cost.

Equity

- (i) Political equity
Greater involvement and influence by local people in decisions affecting their lives ("empowerment").
- (ii) Economic equity
The distribution of benefits from resource management so that poor people get an equal, or more than equal share.

It is important to recognise that, as with any approach with a number of aims, some of these may conflict in practice. The reasons why communities are expected to achieve these results, and the assumptions and conditions upon which this occurs, are examined in detail by Hassett (1994).

Overall, it can be concluded that locating management authority at community level has the potential under certain circumstances to increase the efficiency both of administration and of resource use itself. With regard to equity, the results of community management will only be equitable to the extent that community social structure is itself equitable, in terms of the distribution of wealth and of political influence. Equity between communities is a factor to be considered, and one which will probably involve mediation at a higher level of government.

2.4. Community-based approaches in fisheries management

Fisheries have an important socio-economic role in many developing countries. An estimated 14 to 20 million people are directly involved in fisheries and the number may reach as high as 50 million (including the post-harvest sector). Altogether about 1 billion people rely on aquatic products for their main source of animal protein. Not surprisingly, over the last 30 years fisheries have been the focus of various development initiatives sponsored by organisations such as the World Bank and the United Nations Development Programme (UNDP). A majority of projects have been technology-led based on the premise that production increases would lead to increases in the living standards of fishers and their communities, and have also advocated and attempted to transfer Western-originated and centrally-controlled systems of fisheries management.

More recently, there has been a general shift in attitudes by fisheries experts regarding fisheries development approaches as the result of the convergence of a number of elements, and an exploration of alternative solutions to fisheries problems. Firstly, it has been recognised that fisheries development based on technology-led approaches have been widely unsuccessful. Secondly, it is also recognised that fisheries are increasingly overexploited and that centrally-controlled management systems have had only limited success. Thirdly, the problems of fisheries overexploitation and fishing community poverty must be viewed within the context of the wider social, economic and political systems of which fisheries are just one constituent part. Associated directly with this is the need to improve policy, which impacts directly or indirectly on the fisheries sector, with particular reference to the definition of policy objectives for management and development. Fourthly, it is now recognised that many fisheries, as an example of a "common property resource", have been managed effectively in the past by local community-based fisheries management institutions, which have often been displaced or ignored by centrally-controlled management systems.

Traditional systems have often evolved based on the delimitation of property rights and their control by communities or fisher groups in both inland and coastal environments. The organisation of use rights and the ability by the group to exclude other users has brought in turn benefits to the participants in the system. Management strategies within traditional systems can be classified as intentional or inadvertent (Klee, 1980). The former includes commonly restrictions on fishing time and the use of gear. Inadvertent strategies have included ritual prohibition of fishing areas and technical inadequacies. Examples of traditional fisheries management systems can be found in Japan (e.g. FAO, 1993), Sri Lanka (e.g. Alexander, 1980), Pacific (e.g. Dahl, 1988), Ivory Coast (e.g. Garda, 1980), North America (e.g. Pinkerton, 1989) and many other places.

The possibility that traditional fisheries management approaches could provide a basis for improved management in certain situations is presently being explored by various agencies (e.g. FAO, 1993, ICLARM: see Pomeroy and Williams, 1994) through a co-management approach. As Williams and Pomeroy (1994) explain, the type of common property regimes in fisheries, which evolved through traditional management practices, can rarely now provide the answer to contemporary management problems. A more pragmatic approach is to develop a partnership between fishing communities and government in a co-management strategy where responsibility for fisheries management is shared. Community-based management is seen as a central element of co-management, the key idea being that self-involvement in the management of the resource will lead, for example, to a stronger commitment to comply with the management strategy and sustainable resource use. However, the ICLARM initiative also recognises that co-

management may not be workable or suitable for all fisheries, and the pre-conditions or facilitating factors for development will have to be carefully analysed.

In a recent article, Sen and Nielsen (1996) have defined fisheries co-management as an arrangement where the responsibility for resource management is shared between the government and user-groups. Co-management is considered different from community-based resource management because government is also involved in the decision-making process concerning the management of the fishery. As Sen and Nielsen emphasise, the delineation between community-based management and co-management can be awkward in practice. However, they have managed to identify five broad types, according to the relationship between government and the users ([table 1](#)).

3. Researching Inland Fisheries in N.E. Nigeria

3.1. Background

The arid zone of Sub-Saharan Africa (9°N to 13°N) contains some of the most productive inland fisheries in the whole of the continent, mainly in the form of large areas of seasonally inundated tropical wetlands (FAO, 1995). The north-eastern part of Nigeria, which is located centrally within this zone, contains three major fisheries - the Upper River Benue, Lake Chad and the Nguru-Gashua Wetlands (Fig.1). The fisheries play an important role in the regional and national socio-economy providing employment, income, food, and trading opportunities. The fisheries are operated almost exclusively, by thousands of artisanal fishers using unsophisticated gears, exploiting multi-species fish resources within a complex of river, lake, floodplain and swampland environments (Neiland *et al.* 1997).

The management of the fisheries resource is the *de jure* responsibility of the Federal Government of Nigeria, operating through the State and Local Government hierarchy. However, traditional rulers and community leaders often represent the *de facto* managers at the grassroots level in certain locations. Overall, fisheries management in N.E. Nigeria consists of a patchwork of systems, with their origins in both modern and traditional approaches (Madakan, 1997).

In recent years, there has been some concern that the fisheries of N.E. Nigeria have become increasingly overexploited (Sagua, 1989; Neiland *et al.* 1990; NEAZDP, 1991), leading to a reduction in socio-economic benefits to the local economy. Factors such as the increasing commercialisation of fisheries production are thought to have contributed to the erosion of traditional management systems, while the modern management systems have proved to be unworkable for various reasons, including poor government funding for the fisheries administration (Madakan and Ladu, 1996).

3.2. The TMAF Research Project

In response to the need for a better understanding of inland fisheries in the arid zone and to investigate the possibilities for designing a more effective approach to fisheries management, the Traditional Management of Artisanal Fisheries (TMAF) research project was initiated in 1993. A particular focus of the project was to investigate whether the traditional management systems, which were perceived to be successful and appropriate, could be used as a basis for a community-based approach to fisheries management in the future.

Sponsorship for the research was provided by the UK Overseas Development Administration (ODA) for 4 years, and the work was undertaken by the University of Portsmouth (UK), in collaboration with the University of Maiduguri (Nigeria) and the Federal University of Technology Yola (Nigeria), using the three major fisheries described above as the focus for the study.

3.3. Research Framework

A detailed account of the research framework which was evolved by the TMAF Project to study the local fisheries management systems is provided by Sarch *et al.* (1997). In brief, two major research themes, the Investigation of Fisheries Management Systems (IFMS) and the Fisheries Information Monitoring System (FIMS) have been developed to provide a complementary comparison of the characteristics and performance of the local fisheries management systems (three types of systems were identified: modern, traditional and a mixture of modern/traditional). In turn, the outcome of this work will be used as a basis for evaluating the potential for community-based management approaches (within a co-management framework) using the types of criteria established by workers such as Ostrom (1992), and Sen and Nielsen (1996).

As explained in Sarch *et al.* (1996) the IFMS has used variety of research techniques (e.g. key interviews, group discussions, participatory approaches) to collect mainly qualitative information using a village case-study approach on the characteristics of the management systems (e.g. management hierarchy, management methods), the context of fisheries management (e.g. socio-economic and natural environment) and the evolution of the management systems over time (e.g. reaction to change/problems in the wider environment).

The FIMS has operated in parallel to the IFMS and has collected a wide range of multi-disciplinary information about the fisheries over 12 months, using a variety of survey approaches (e.g. random sample surveys of active fishermen to gather quantitative catch assessment and socio-economic data) as described in Sarch *et al.* 1997. The FIMS data is complementary to the IFMS data, and also provides a means to cross-validate the findings of each study.

The IFMS and the FIMS findings combined provide an effective means to describe the fisheries and the fisheries management systems of N.E. Nigeria. In addition, it is also possible to carry out an evaluation of the performance of fisheries management in N.E. Nigeria based on the criteria given in [table 2](#) as a starting point for understanding the potential for better management in the future. In the next section, the fisheries management systems will be described and evaluated.

4. Systems of Fisheries Management

4.1 Classification, distribution and characterisation

Based on the work of the early work of the TMAF Project (Neiland *et al.* 1994), three types of fisheries management system were identified and subsequently studied on a village case-study basis: Traditional, Mixed and Modern. A preliminary definition of the three types is presented in [table 3](#).

The distribution of the different types of fisheries management system in each of the three fisheries based on TMAF survey results is shown in [table 4](#). It is clear that the "traditional" type of management system is most common in the Upper River

Benue and the Nguru-Gashua Wetlands, whereas at Lake Chad, the mixed and traditional types were of almost equal importance.

An attempt was also made to characterise the different management systems. The framework developed by Durand (1993) consisting of four main elements of management systems (Objectives of management; Methods of management; Decision-making authorities; Level of application) was used for this.

Before reviewing the results of the characterisation ([table 5](#)), two initial observations should be made. Firstly, the village-based studies of the management systems revealed that there was considerable variation within each management system type, and also important interactions and overlaps between systems. The complexity of local level institutional arrangements has highlighted the limitations of our research framework, which had set out to draw generalisations about the management systems. Secondly, the importance of recognising the difference between how institutions operate in theory (*de jure*) and what actually happens in practice (*de facto*) has been emphasised in the approach used. The challenge is to explain any divergence between the two states; a key point made by Schlager and Ostrom (1992) in their studies of common property resources.

Modern systems

The modern systems of fisheries management in N.E. Nigeria have been based on Western "top-down" approaches to fisheries management, and are relatively young, having been established in the process of the development of the modern Nigeria State (since 1960). Fisheries are classed as state property (*respublica*), in that ownership and management is held by the nation state. The *de jure* arrangements include a wide range of objectives (often conflicting), with a production-led orientation which, it is implicitly assumed, will lead to welfare benefits for fishers. Methods include effort and catch regulations in an attempt to maximise yield (MSY approach). The decision-making authorities are the Federal and State Governments, which interface with fisher communities through the field officers of the State Department of Fisheries.

The *de facto* arrangements for the modern system have diverged from the *de jure* arrangements. This is illustrated by the case-study of Wuro Bokki on the Upper River Benue ([table 6.2](#)). Most importantly, although a "good fishing" campaign has been enacted to address fish stock conservation, the objectives and actions of the officials of the State Fisheries Department have, in recent years, been re-directed towards revenue generation for the State Government, through licence fees. The widespread inaction of the modern fisheries administration on almost all fronts has been attributed primarily to a lack of funding and other support from national government (Madakan and Ladu, 1996). More often than not, the fisheries administration of modern government collaborate at a local level with the more prominent traditional administration in certain activities e.g. settling disputes.

Traditional systems

The traditional systems of fisheries management in N.E. Nigeria have originated within the communities concerned, and conform with the definition of "traditional" provided by Berkes and Farvar (1989) i.e. practices which have historical continuity among a group of people. Under the traditional system (*de jure* with reference to traditional laws), the fisheries can also be classed as common property resources (*res communes*) in that use-rights for the resource are controlled by an identifiable

group (e.g. local community who may exclude others) and are not managed (*de facto*) by government of the modern state. As explained in Neiland *et al.* (1997), the objectives of the traditional systems in N.E. Nigeria are not easy to ascertain. However, three objectives have been identified, including the control of fishing rights and reduction of conflict, generation of food/income for the community, and conservation of fish stocks. The main method of management is the control of access, and the decision-making authorities are the leaders of the community and traditional government, although all users can have an input into the process ("bottom-up" approach), under certain circumstances.

The *de facto* arrangements for traditional systems also show some divergence from the *de jure* ones (The example of a traditional system is shown for Dagona village, Nguru-Gashua Wetlands, [table 6.1.](#)). As well as the *de jure* objectives, there is also an increasing trend for community-leaders to attempt to generate cash revenue through the traditional system. This approach is not necessarily at odds with the community-orientation of the *de jure* arrangements. However, there is also a trend for local elite's to attempt to privatise the fisheries resources and monopolise the cash revenue, with associated changes in management methods, decision-making, and levels of application.

Mixed system

Finally, an example of a "mixed system" is given in [table 6.3](#), in the village and fisheries environment of Kwatan Dawashi village in Lake Chad. The leaders of traditional government (village and district heads) and the Local Government (which has no formal *de jure* role in fisheries management) co-operate in the control and licensing of fishing areas. The arrangements are relatively new and have emerged with the establishment of *dumba* (or fish fence) fishing methods by recent migrant fishers. The mixed system is successful in ensuring that fishing sites are allocated without serious conflict resulting and that revenue is collected and passed to the leaders of both the Traditional and Local Government. Overall, the arrangements of the "mixed system" provide a good example of how local-level fishery management arrangements can be adapted to accommodate a new fishing system through the co-operation of both traditional and modern government.

There is a similarity in the methods of regulating fisheries throughout the 12 case-study communities. The large majority of methods concern the control of access of fishers to the fishery. This is most frequently done on a temporal basis, the aquatic environments in each of the study regions are highly seasonal depending upon the flood state. Often, access to fishing is open during the peak flood and it is only when the flood begins to recede that access is restricted.

The next most frequent method is through restrictions concerning the gears and fishing methods which are permitted. For example at Lake Chad, the use of lines of fish traps during the receding flood is licensed whereas access to fishing with many other gears is free; the use of cast nets is prohibited by one Local Government in the Nguru-Gashua Wetlands. Occasionally seasonal and gear restrictions are combined with regulations which depend on whether the potential fisher is a member of the family, community or ethnic group of the regulators. For example, in the Nguru-Gashua Wetlands and along the Upper River Benue, members of the ethnic groups, which claim to be the original settlers in the two regions, receive preferential access to fishing with certain gears.

In contrast to the widespread use of measures, which control the access of fishers, measures which control the movement of fish are less frequent. For example, a remote case-study community along the Upper River Benue uses fences to provide a refuge for fish during the peak flood when fishing effort is at its most intense in that area; another community in the Nguru-Gashua Wetlands use fences to enclose fish in pools of residual floodwater.

4.2. Evaluation of fisheries management systems

The results (key aspects) of the IFMS and FIMS studies are pooled in [table 7](#) below to assist in the evaluation of the different fisheries management systems. However, as the results show, it has been difficult to make a clean-cut distinction between management system types in the study regions. Not only were traditional management systems the dominant type, but also where modern systems were found they tended to overlap and interact with the traditional systems. It should be noted that while the IFMS results relate to particular systems studied in case-study fishing villages, the results of FIMS relate to specific fishery environments as a whole. However, it is possible to locate each of the village sites in a particular environment, in order to relate the findings of the two studies (IFMS and FIMS). As such, the account below is a synthesis of the overall findings by study region, and where possible the role or influence of particular management systems have been highlighted.

4.2.1. Achievement of management objectives

The degree of success in achieving particular objectives can be used to assess the performance of a management system (Devine et al. 1985). On this basis, modern systems of fisheries management in N.E. Nigeria did not perform well (i.e. they did not attain either their *de jure* or *de facto* management objectives to any significant degree; Tables 5 & 7). In contrast, the traditional systems were performing well, and almost all management objectives were achieved to some extent.

Specifically, where the objectives of fisheries regulation were primarily to derive a financial benefit, whether for a local aristocrat, the community, or the traditional administration, these were largely being met. Fishing can clearly be a financially rewarding occupation (e.g. at Lake Chad, fishermen in the open waters during the dry season could earn on average up to N2,000 / day, compared to the farm labourer wage rate of N100/day, as reported in Neiland *et al.* 1995: FIMS Quarterly Report No.1.). It is therefore no surprise that local authorities with an interest in revenue generation try to tax this activity.

On the other hand, where the objective of both local communities and the State fisheries Department were to sustain livelihoods (e.g. Upper River Benue), the widespread switch of resources out of fishing or to fishing elsewhere seems to suggest that the systems of regulating fishing were less successful, and that fishing opportunities and fishing incomes have been reduced. This conclusion appears to be borne out by a recent assessment of fishing income (Neiland *et al.* 1997); the results of which show that fishing income in the Upper River Benue is lower than in the other two study regions.

4.2.2. Compliance with management measures

Compliance with fisheries regulations was widespread at Lake Chad and in the Nguru-Gashua Wetlands. However, the level of participation in securing a licence

or permission to fish varied with the season. Regulatory authorities, particularly those attempting to generate revenue from granting access to fishing, were probably most active during the peak fishing periods which often corresponded to the rising/receding flood periods. Disputes and conflict arise where communities were unhappy with the regulatory regime. For example, the Takari community in the Nguru-Gashua Wetlands was unhappy with the ban on cast nets and conflict has occurred when they have used this gear (our investigations have shown that this gear is highly effective and profitable). Compliance with the fisheries regulations of both local communities and the State Fisheries Department was less frequent along the Upper River Benue. Non-community members often ignored fisheries regulations, and funding constraints prevent the State Fisheries Departments from enforcing their good fishing campaign.

4.2.3. Conflict associated with fisheries management

Despite frequent instances of severe conflict between farmers and cattle-herders over access to land in all three study-regions, there were very few cases of conflict over fishing resources associated with any particular management system. There were ongoing disputes along the Upper River Benue where local communities were protesting about their loss of access to traditional fishing grounds. However, these have not developed into severe conflict (i.e. violence). There were cases of conflict over fishing at Lake Chad, which have subsequently been resolved. The only example of on-going violent conflict was in Gashua, where trouble had erupted over the ban on cast-nets implemented by the traditional administration and backed by the modern administration.

4.2.4. Robustness to change

Each of the case-study communities has experienced significant changes in their natural environment in recent years. Frequently these changes have included a shrinking of the aquatic environment which many of the communities have perceived as detrimental to fish catches. Many of the case-study communities also attribute a decrease in catches to a range of other factors which include modern methods of fishing, competition with migrant fishers and the availability of other occupations, such as dry season farming. Many of the traditional systems have been able to adapt to changes in both the natural resource base and how it is exploited. However, in two cases, Gashua and Worro-Bokki, the traditional and mixed systems of fisheries regulation have not been able to cope with the changes brought about by rapid urbanisation. The development of Worro-Bokki as an important international border town has coincided with a collapse in the traditional fisheries regulation system; in Gashua, non-compliance with fishing regulations is causing severe conflict.

4.2.5. Fisheries production compared

The fisheries production from the wetland environments, in which the mainly traditional fisheries management systems were located, was calculated in terms of fish catch (kg) per hectare of floodable wetland area per year and aggregated for the different constituent environments (e.g. open river and floodplain biotopes in the case of the Upper River Benue). This was in turn compared to the expected fisheries yield from tropical wetlands of 40-60 kg/ha/yr. (After Welcomme, 1985). In the case of the Upper River Benue and the Nguru-Gashua Wetlands, the annual fisheries production (28-29 kg/ha/yr.) was below the expected yield for tropical wetlands. In the case of Lake Chad, consisting of open lake water and marginal

floodable areas, the fishery output was significantly higher at 151 kg/ha/yr. However, these average global figures should be treated with caution, as the assessment of the fisheries a tropical floodplain environment is extremely problematic, as we have explained in a related paper (Neiland *et al.* 1997). It has been assumed in the comparison above that, other things being equal, the guideline of 40-60 kg/ha will provide an average sustainable harvest from year to year.

4.2-6. Financial productivity of the fisheries

The net financial value of fisheries production per member of fishing households per year was based on a series of detailed surveys of fishing income (ref.: Neiland *et al.* 1997). The Lake Chad system demonstrated the highest value, with an annual value of Naira (N) 6,752/person. This can be explained by a high unit productivity of the fishery and strong local market prices for fish. Interestingly, although the fishery yields for the both the Upper River Benue and the Nguru-Gashua Wetlands were similar (28-29 kg/ha/yr.), the overall financial value of the catch per person was higher in the Nguru-Gashua Wetlands (N3432/person/yr.) compared to the Upper River Benue (N102/person/yr.). This was explained by the higher annual total catch of fishing households in the Nguru-Gashua Wetlands plus a stronger regional market compared to the Upper River Benue.

4.2.7. Economic productivity of the fisheries

The determination of the net economic profit per person from fisheries in the three study regions again shows the importance of fishing at Lake Chad where the value was N9,753/person/yr., compared to N5,289/person/yr. for the Nguru-Gashua Wetlands and N229/person/yr. for the Upper River Benue. The methodology and results of this economic assessment are given in detail in Neiland *et al.* (1997). Briefly, from an economic perspective, efficient management will result in the generation of an economic surplus from the use of a fishery resource, and if this surplus can be captured and used appropriately, welfare benefits will accrue to society. In N.E. Nigeria, and in particular, at Lake Chad, fishers were found to be achieving a high level of economic performance, and this was almost certainly related to the operation of local management systems, which impose property rights on the fishery and prevent the dissipation of rents.

4.2-8. Sustainability of the fisheries systems

Thomas (1996) has reviewed the concept of sustainability with reference to African floodplain fisheries. He has identified three tiers to the use of the sustainability concept as summarised in [table 8](#).

For this brief analysis, the third tier or multi-dimensional approach to sustainability will be used to examine the fisheries systems in N.E. Nigeria. Three key points arise from the results of the present study.

Firstly, the underlying environmental fluctuations, which characterise the Sahel-Savanna region, make any prediction of the size and status of fish resources from year to year very difficult. In other words, it is difficult to judge how sustainable any particular resource level will be in either space or time.

Secondly, the traditional management systems, which have evolved in N.E. Nigeria, appear to incorporate ecological, economic and social dimensions. The

fishers have an indigenous knowledge of the dynamics of the fisheries resources (ecology), which ensure that a particular level of fishing activity (economic) is undertaken to achieve a particular catch and also integrated into local farming systems. In turn, the integration of fishing and other activities, ensures that the local fish-farmers have a secure livelihood upon which communities can be maintained (social).

Thirdly, the sustainability of the fisheries systems, which have been built upon the institutional arrangements within communities and between communities (and which by definition define the relationship between resource-users and the resource), are now threatened by various factors. Rapid population growth, increased demand for access to resources and the re-definition of resource use rights by government or private individuals without the involvement of the local communities, have meant that the delicate balance between ecological, economic and social aspects of resource usage in the Sahel-Savanna has been disrupted in certain locations, resulting in unsustainable resource usage patterns and the dissolution of traditional management systems.

The sustainability of traditional management systems into the future is threatened in all parts of N.E. Nigeria by the types of factors of change indicated. For the time being, many traditional systems are still in operation, and it seems likely that two factors will become increasingly important. Firstly, the rate of change, since community-based systems appear to be highly adaptable, as long as the rate of change is not too great (Madakan, 1997). Secondly, the role of government, since the impact of change might be moderated with appropriate policy and assistance.

4.3.8. Overview

The fisheries management systems operating in N.E. Nigeria are largely based within the traditional administration and that the role of the modern Nigeria government administration is less important in the fisheries sector. Although the precise characteristics of the systems varied between villages and locations, in terms of management measures, management structure and level of application, the major objectives were similar, usually the generation of revenue for the regulators. In addition, fishers operating within the fisheries of the three regions were found to realise positive net financial and economic profits on average. The systems were on the whole quite effective in achieving their objectives, promoting compliance with regulations and minimising conflict. However, although the systems were robust to change on the whole, and demonstrated some evidence of adaptability, certain traditional systems exhibited a fragility in the face of factors such as major environmental change and urbanisation. The sustainability of the systems into the future will depend upon key factors such as the rate of "change" within the rural environment, and the role of government in moderating the impacts on rural communities and promoting adaptive management new circumstances. Table 9 provides a summary of the assessment of the institutional performance of traditional fisheries management systems using the criteria established by Gibbs and Bromley (1989).

5. Development of Co-Management Strategies

The possibility that traditional fisheries management approaches could provide a basis for improved management in certain small-scale fisheries is presently being explored by various research agencies around the world. However, it seems unlikely that traditional approaches can provide the answer to contemporary

management problems without some modification or development. In the case of the traditional systems found in N.E. Nigeria, their ability to resist and adapt to certain modernisation pressures such as urbanisation and commercialisation can be limited. In the long-run, the adaptive design and development of traditional management systems in a co-management strategy, whereby communities and government share the responsibility for fisheries regulation, will have to take place, probably using some form of participatory approach which incorporates information-sharing, research and testing (co-management as a "process").

ICLARM (see Pomeroy and Williams, 1994) provide a set of criteria which can be used to assess the potential for developing co-management arrangements. Although the authors also point out that more research is required to establish evaluative criteria for such outcomes as sustainability, equity and efficiency of fisheries co-management systems, in order to assess whether the traditional management systems in N.E. Nigeria, and their context, offer some potential for the future development of co-management strategies, the findings of the current study have been integrated into the ICLARM framework as shown in [table 10](#).

There are many factors at the level of the fishery environment and within the nature of the fishing villages and communities in N.E. Nigeria which could facilitate the development of a community-based co-management approach in certain locations. For example, the fisheries are well defined and there is a strong association between communities and their fishery environment. Local management systems might also provide the basis for future development, providing a structure and operation which might be adapted to meet the objectives of improved resource usage and administrative efficiencies (Section 2.3. above).

However, there also appear a number of less favourable factors. Firstly, there are questions of equity which must be addressed. For example, it has been found that some valuable fisheries are managed and controlled by the most powerful and wealthiest members of the community (the rural elite). The possibilities for other fishers or members of the community can share the control of the use of the fishery resources and the resulting benefits appear to be minimal. Clearly, the fishers of N.E. Nigeria should certainly not be treated as a homogeneous socio-economic grouping in attempting to address issues of fisheries development. A second difficulty is the political and policy context in Nigeria. Regarding fisheries development and the decentralisation of management, fisheries and agricultural policy in Nigeria has stagnated over the last ten years and there is an urgent need for new policy development to provide an appropriate framework for the future. At the moment, other key facilitating factors (e.g. enabling legislation and recognition of community empowerment) are not in place. Given the fluctuating political situation in Nigeria over the last five years, it is difficult to predict future developments regarding these factors.

It is worth observing that a form of co-management already exists and appears to work quite well in N.E. Nigeria - the "mixed" form of fisheries management system which was identified as part of the typology of systems ([table 3](#)) and illustrated using the example of Kwatan Dawashi village at Lake Chad ([table 6.3.](#)). Here the traditional administration provides the underlying management framework, regulating fishing activity and collecting fees. A proportion of the fishing fees is passed to local modern government, which also helps with enforcement through local courts. The management system appears to be quite successful with the management objectives of generating revenue and reducing conflict being achieved. From an economic perspective, the fact that a portion of the economic rent, which is generated by the fishery, is captured and passed to government

means that the system is capable of generating wealth which can be used for the benefit of society. At the same time, the fisheries resource appears to be protected from over-fishing, and catches have sustained over time from anecdotal evidence - North (1990 cited in Sen and Nielsen) has observed that institutional change often occurs as marginal adjustments of old structures rather than radical innovations or total re-organisation, and that the process is always dynamic. Sen and Nielsen (1996) have concluded that the type of co-management regime, which is established, is determined by eight factors:

- * Capabilities and aspirations of user groups
- * Top-down or bottom-up approaches
- * Difficult decisions
- * Management tasks
- * Stage in the management process
- * Boundaries
- * Types of user groups
- * Political culture and social norms

In the case of the co-operative arrangements established through the "mixed" management system in N.E. Nigeria, the co-management situation has not arisen through an intentional policy of Federal Government, but has arisen through the type of marginal adjustments observed by North (op.cit.). Using the framework of Sen and Nielsen (1996), it is possible to see how this has occurred. The user-group and their traditional government were well organised and quite capable of co-operating with modern local government, which has been involved in issued fishing licences for some time. A co-operative arrangement was reached because local government did not wish to exert a dominant role in regulating the fisheries, and saw the advantages of allowing traditional government to do this (handling difficult day to day decisions). The fact that the floodplain fisheries at Lake Chad have a dear boundary allows community-based traditional government to exert strong influence over fisheries regulation, and because the user groups have a well-defined social homogeneity, there is a good response to traditional government.

Finally, at present the fisheries of N.E. Nigeria are generating benefits for rural communities, but there are also strong indications from the current research that the fisheries systems will have to face a range of threats in the near future. For example, it has been recorded that traditional management systems can breakdown under pressures such as urbanisation, and environmental change. It seems likely that such trends will increasingly affect other rural communities in the future. It is appropriate therefore that the need to plan for the future is recognised by government in order to anticipate and react to potential problems.

Clearly, the possibilities for a co-management approach to fisheries development and management should be given careful consideration by government, not only for theoretical reasons of achieving efficiency and equity, but also quite simply because the traditional community-based management systems of N.E. Nigeria appear from the current research to perform well, and might provide a basis for future management initiatives.

Berkes *et al.* (1989) in their study of different common property resource systems conclude that successful approaches to management are found in complementary and compatible relationships between the resource, the technology for its exploitation, the property rights regime and the larger set of institutional

arrangements. It was also proposed that combinations of property-rights regimes may in many cases work better than any single regime, e.g. the success of local level management often depends on its legitimisation by central government.

From Section 5.0 above, it was revealed that the development of co-management approach is constrained by issues, which are largely political in nature, at both a local and national level. There is no doubt that these issues are difficult to address. However, a starting point might be in the establishment of local fora, as a preliminary institutional mechanism, to promote a flow of information between fisher communities and government, or in other words between the *de facto* and *de jure* fisheries managers, leading to the investigation of the possibilities for co-operation and co-management through participation of relevant stakeholders. Interestingly, at certain levels of government (e.g. Local Government at Lake Chad), the process of co-management has already started.

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8. Bibliography

Alexander, P., 1980. Customary law and the evaluation of coastal zone management. *ICLARM Newsletter*, 3(2), 8-9.

Alliband, T., 1983. *Catalysts of development voluntary agencies in India*. West Hartford, CT: Kumarian Press.

Bagadion, B. and F. Korten, 1991. Developing irrigators organisations: a learning process approach. In; M. Cemea (ed)

Barbier, E.B., 1987. The concept of sustainable economic development. *Environmental Conservation*, 14(2), 101-110.

Barbier, E.B., W.M. Adams and K. Kimmage, 1991, *Economic valuation of wetland benefits: the Hadejia-Jama'are floodplain, Nigeria* (LEEC paper DP 91-02).

Berkes, P., D. Feeney, B.J. McCay and J.M. Acheson, 1989. The benefits of the commons. *Nature*, 340, 91-93.

Brokensha, D. et al., 1980. *Indigenous knowledge systems and development*. Washington DC; University Press of America.

Bromley, D.W., 1989. *Economic interests and institutions*. Oxford: Blackwell, Oxford.

Charles, A.T., 1988. Fisheries socio-economics: a survey. *Land Economics*, 64(3), 276-295.

Dahl, C., 1988. Traditional marine tenure: a basis for artisanal fisheries management- *Marine Policy*, 12(1).

Ekpo, A.H. and L.E. Etim, 1989, The performance of Nigeria's fishery sector an empirical analysis, 1976-85. *Geojournal*, 18(3), 291-295.

FAO, 1993. *FAO/Japan expert consultation on the development of community-based coastal fishery management systems for Asia and the Pacific* (FAO Fisheries Report No. 474). Rome: FAO.

FAO, 1995. *Review of the state of world fishery resources: inland capture fisheries*. (FAO Fisheries Circular No.885). Rome: FAO.

Friere, P., 1972. *Pedagogy of the oppressed*. Harmondsworth: Penguin.

Gibbs, J.N. and D.W- Bromley, 1989. Institutional arrangements for management of rural resources: common property regimes. In: Berkes, F. *Common property resources: ecology and community-based sustainable development*. London: Belhaven Press, 22-33.

Hassett, D., 1994. A review of the community-based approach to natural resource management. In: M.T. Sarch (ed.) *Traditional management of artisanal fisheries, N.E. Nigeria: Ongoing results and related research* (CEMARE Miscellaneous Paper No.29). Portsmouth: University of Portsmouth, Centre for the Economics and Management of Aquatic Resources.

Klee, G.A., 1980. (ed.). *World systems of traditional resource management*. New York: Wiley and Sons.

Kone, F.A., 1985. *Traditional fishing rights in the central delta of the Niger and the Lake region: conflicts and recommendations with a view to equitable and rational management of fishery resources*. (FAO (CIFA) Fisheries Report No. 360). Rome: FAO.

Lawson, R., 1977. New directions in developing small-scale fisheries. *Marine Policy*. (Jan).

Leopold, A., 1949. *A Sand County almanac and sketches here and there*. Oxford: Oxford University Press. (1987 Edition).

Madakan, S.P., 1997. Management of inland fisheries in N.E. Nigeria: institutional arrangements. In: A.E. Neiland (ed.) *Traditional management of artisanal fisheries, N.E. Nigeria. Final report*. (CEMARE Report No. 43). Portsmouth: University of Portsmouth, Centre for the Economics and Management of Aquatic Resources. 320-350.

Madakan, S.P. and B.M.B- Ladu, 1996, Investigation of fisheries management systems in N.E. Nigeria: regional level study. Report.

NEAZDP, 1991. *Fisheries now and in the future*. Report by the North East Arid Zone Development Programme.

Neiland, A., J. Weeks, S.P. Madakan, B.M.B. Ladu, 1994, *Traditional fisheries jurisdiction in N.E. Nigeria: results a survey at Lake Chad, the Upper River Benue and the Nguru-Gashua Wetlands* (CEMARE Research Paper No. 72). Portsmouth: University of Portsmouth, Centre for the Economics and Management of Aquatic Resources.

Neiland, A., J.P. Goddard, and G.M. Reid, 1990, The impact of damming, drought and overexploitation on the conservation of the marketable fish stocks of the River Benue, Nigeria- *J.Fish.Biol.* 37. 203-205.

Neiland, A.E.. 3. Jaffry, K. Kudaisi, 1997. Fishing income, poverty and fisheries management in N.E. Nigeria. In: A.E. Neiland (ed.) *Traditional management of artisanal fisheries, N.E. Nigeria. Final report*. (CEMARE Report No. 43). Portsmouth: University of Portsmouth, Centre for the Economics and Management of Aquatic Resources. 291-319.

Neiland, A., T. Jolley, K. Kudaisi, S. Jaffry, S. Madakan and B. Ladu, 1995 - 1996. *Fisheries information monitoring system for N.E. Nigeria*. (FIMS Quarterly Reports No. 1-4). Portsmouth: University of Portsmouth, Centre for the Economics and Management of Aquatic Resources.

Neiland, A., M.T. Sarch, S. Madakan, B. Ladu, S. Jaffry and S. Cunningham, 1994. *A socio-economic analysis of artisanal fisheries in N.E. Nigeria* (CEMARE Report No. 26b). Portsmouth: University of Portsmouth, Centre for the Economics and Management of Aquatic Resources

Neiland, A., M.T. Sarch, S. Madakan, B. Ladu and S. Jaffry, 1997. Characterisation of the inland fisheries of N.E. Nigeria including the Upper River Benue, Lake Chad and the Nguru-Gashua Wetlands. In: A.E. Neiland (ed.) *Traditional management of artisanal fisheries, N.E. Nigeria. Final report*. (CEMARE Report No. 43). Portsmouth: University of Portsmouth, Centre for the Economics and Management of Aquatic Resources. 33-72.

Neiland, A., J. Weeks, S. Madakan and B. Ladu, 1994. The *community-based fisheries of N.E. Nigeria* (CEMARE Report No. 28). Portsmouth: University of Portsmouth, Centre for the Economics and Management of Aquatic Resources.

Norton, B.G., 1990. Context and hierarchy in Aldo Leopold's theory of environmental management. *Ecological Economics*, 2,119-127.

Ostrom, E., 1990. *Governing the commons: the evolution of institutions for collective action*. Cambridge: Cambridge University Press, Cambridge.

Ostrom, E., 1992. *Grafting institutions for self-governing irrigation systems*. San Francisco, USA: Institute for Contemporary Studies.

Ostrom, E., R. Gardner and J. Walker, 1994. *Rules, games and common-pool resources*. USA: Michigan Press-

Pinkerton, E. (ed.), 1989. *Co-operative management of local fisheries*. Vancouver, B.C.: University of British Columbia.

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

Sagua, V.O., 1989. The current state of the fishery resources of the Lake Chad Basin and a programme for its management and conservation (GCP/INT/466/NOR). Rome: FAO.

Sarch, M.T., 1994a. Traditional management of artisanal fisheries, N.E. Nigeria: investigating fisheries management systems (CEMARE Research Paper No.80). Portsmouth: University of Portsmouth, Centre for the Economics and Management of Aquatic Resources.

Sarch, M.T., A. Neiland, S. Madakan and B. Ladu, 1995. An investigation of fisheries management systems in N.E. Nigeria, vol. I. Overview (CEMARE Report No. 32a). Portsmouth: University of Portsmouth, Centre for the Economics and Management of Aquatic Resources.

Sarch, M.T., A. Neiland, S. Madakan and B. Ladu, 1996. Traditional management of artisanal fisheries in N.E. Nigeria: a research framework. In; Proceedings of the VIIth Annual Conference of the international Institute for Fisheries Economics and Trade (HFET). Morocco, July 1996. (in press)

Schlager, E. and E. Ostrom, 1992. Property rights regimes and natural resources: a conceptual analysis. *Land Economics*, 68(3), 249-262.

Scudder, T. and T. Conelly, 1984. Management systems for riverine fisheries. Binghamton, NY: Inst. Dev. Anthro.

Sen, S. and J.R. Nielsen, 1996. Fisheries co-management: a comparative analysis- *Marine Policy*, 20(5), 405-+18.

Thomas, D.H.L.. 1996. Sustainable harvest from floodplain fisheries in Africa: looking beyond maximum sustainable yield (Discussion Paper). Edinburgh: University of Edinburgh, Department of Geography.

Table 1: Typology of co-management arrangements (After Sen and 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 that the mechanisms exist for dialogue with users, but the process itself tends to be government informing users on the decisions they plan to make.
Type B: Consultative	Mechanisms exist for governments to consult with users but all decisions are taken by government.
Type C: Co-operative	This type of co-management is where government and users co-operate together as equal partners in decision-making. For some authors, this is the definition of co-management.
Type D: Advisory	Users advise government of the 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.

Table 2: Criteria for evaluating the performance of fisheries management systems	
Criterion	Source of information for evaluation
Are the objectives at each level of the system?	IFMS/FTMS
How much conflict is associated with the system?	IPMS
Is there compliance with management measures?	IFMS/FIMS
How robust is the system to change?	IFMS
How biologically productive is the system?	IFMS/FIMS
How financially productive is the system?	IFMS/FTMS
How economically productive is the system?	FIMS
How sustainable is the system?	Review

Source: Sarch 1994a: CEMARE Res.Pap. No. 80.

Table 3: Typology of fisheries management systems in N.E. Nigeria	
Type	Description
"Traditional"	<i>Fishing restrictions are predominantly operated by the traditional administration.</i> Traditional leaders decide whether or not fishing is allowed, receive payment for allocating fishing rights- Enforcement of management measures is undertaken within the community.
"Mixed"	<i>Fisheries are managed by a combination of traditional and modern systems of administration.</i> Payments for fishing rights may be made to private individuals, traditional leaders and/or State or Local government officials. There may be co-operation in the enforcement of management measures.
"Modern"	<i>The traditional administration has no influence on the exploitation of the fisheries.</i> Fishers may require licenses from State or Local Government for some aspects of fishing. Enforcement of State or Local Government fishing restrictions is dependent on their staff in the field.

Source: Neiland *et al.* 1994: CEMARE Report No-28; Sarch 1994a: CEMARE Res. Pap. No. 80

Table 4: Distribution of fisheries amusement <i>system</i> by TMAF study region (% Bailing villages)			
System type	Upper River Benue	Lake Chad	Nguru-Gashua Wetlands
Traditional	70	44	60
Mixed	5	33	15
Modern	25	23	25
	100%	100%	100%

Source: Neiland *et al.* 1994: CEMARE Report No. 28.

Table 5: Characterization of Modern and Traditional Systems (*de jure, de facto*) of Fisheries Management in N.E. Nigeria

	Modern systems		Traditional systems	
	De jure	de facto	de jure	de facto
Objectives	* increased production * conservation of stocks * increased welfare of fishers (implicit)	* increased production *conservation of stocks * generation of revenue for government	*defence/control of fishing rights for community * generation of income/food for community * conservation of fish stocks	*defence/control of rights for community *food/income generation for community * conservation * generation of revenue for private owners
Methods	* input provision *gear/catch regulations * control of effort by licensing * credit, allocation and infrastructure development	*sponsored fishing * good fishing campaign * licence sales	*control of access *gear/catch regulations *fishing time	*control of access *gear/catch regulations *fishing time *sale of permission to fish * sponsored fishing
Decision-making authorities	*Federal Government * State Government * State Fisheries Dept.	*Federal Government * State Government * State Fisheries Dept * Local Government	*Traditional government *Community leaders	*traditional government *community leaders *Local government *Private owners
Level of application	* State Fisheries Dept to fishing communities	*State Fisheries Department * Local Government	*Community leaders to fishers	* All authorities to fishers * Local government to community leaders *community leaders with private owners
Performance assessment (are management objectives being achieved?)	* Very poor *Three objectives of the system are not being achieved	*Poor *Only revenue generation is being achieved	*Good-fair * All objectives being met at a low level	* Good - fair *All objectives met, but generation of income for private owners becoming dominant

Table 6

Table 6: Case-Studies of Fisheries Management Systems in N.E. Nigeria

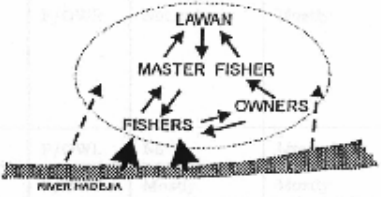
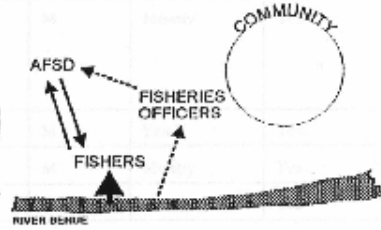
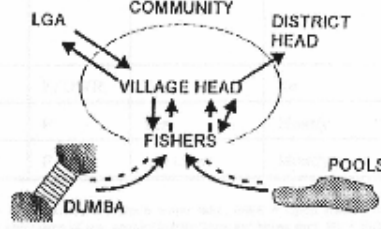
Type of Management System	Location	Institutional arrangements & fishing activities	Outcomes
1. Fisheries Management: Traditional system.	Dagona village - Nguru-Gashua Wetlands	<p>The district head or <i>Lawan</i> has jurisdiction over local fisheries in the River Hadejia and floodplain; fisheries are managed for the benefit of the community. Regulations are implemented by village master fisher or <i>Sarkin ruwa</i>, including gear and access restrictions. Fishers (mostly migrants) must pay a fee to fish; proceeds are re-distributed within the community. Poachers will be fined and have catch confiscated. Some floodplain pools are owned privately by local families; fishers must pay a fee and also give proportion of their catch to the <i>Lawan</i>.</p> 	<ul style="list-style-type: none"> * Management objective is achieved; * Dagona is prosperous; * No conflicts over fishing; * Owners of private pools are amongst wealthiest members of the community.
2. Fisheries Management: Modern system.	Wuro Bokki village - Upper River Benue	<p>Fishing in the nearby River Benue is monitored by officers of the Adamawa State Fisheries Department (ASFD) who have a post in the village. Management objectives are to conserve fisheries resources and sustain fisher livelihoods. Methods include mesh-size limitations as part of a "good fishing" campaign. Fishers must obtain a licence to fish and pay a fee to the State government. Fishers found not to be complying will have their gears and catch confiscated by the fisheries officers. Traditional management systems have broken down as the village has enlarged and become more commercially-active as an entre-port for nearby Cameroon.</p> 	<ul style="list-style-type: none"> * Fisheries have assumed a state of open access (<i>de facto</i>) * Fishing has decreased in importance; * Fishers are poor; * ASFD management objectives have not been achieved; * Limited compliance; * Conflicts over fishing rights have occurred.
3. Fisheries Management: Mixed system.	Kwatan Dawashi village - Lake Chad	<p>Fishing on the floodplain of Lake Chad is under the jurisdiction of village head (<i>Bukama</i>); mainly during the recession period when isolated pools and drainage channels are attractive fishing locations. There are two management objectives: to generate revenue and to avoid conflict. The latter provide the opportunity to construct <i>dumba</i> or fish fences made from rows of basket traps which catch retreating fish. For <i>dumba</i> silos, a fee is negotiated between fisher and <i>Bukama</i>; a proportion of this is passed to the Kukuwa Local Government. Previously, the <i>Bukama</i> had licensed <i>dumba</i> sites under the authority of the <i>Lawan</i> and the Joint Patrol (joint army operation of the four riparian countries of the Chad Basin). Fishing rights to isolated pools are sold before they begin to dry completely (fishing is banned up to this point). Part of the revenue is passed to the <i>Lawan</i>.</p> 	<ul style="list-style-type: none"> * Management objectives are achieved; * Revenue is generated; * Conflict is avoided;



Table 7: Evaluation of fisheries management systems in N.E. Nigeria

Study village	Type of management system ¹	Fishery Envirn. ²	Are management objectives met? ³	Is there compliance with management measures? ⁴	% Fishers with licenses or permission ⁵	Is the management system robust to change? ⁶	How much conflict is associated with the system? ⁷	How Productive is the fishery? (Kg/ha/yr.) ⁸	How financially productive is the system? (N/pers/yr.) ⁹	How Economically productive is the system? (N/pers/yr.) ¹⁰
Upper River Benue										
Bilachi Bwatiye	T	F/OWR	Not entirely	mostly	Open River : 68	Yes	Disputes	Mean value :28	Mean value : 102	Mean value: 229
Geriyo	T/M	F/OWR	no	limited	Flood-plain: 91	no	Disputes			
Rugange	T/M	F/OWR	Mostly	Mostly		Mostly	Disputes			
Wuro Bokki	M	F/OWR	no	limited		no	Disputes			
Lake Chad										
Dabar Shatta Kwata	T	M	Yes	Yes	Open Lake:80	Yes	Disputes	mean value : 151	mean value 6 752	Mean value 9753
Kwatan Dawashi	T/M	M	Yes	Yes		Yes	None yet			
Sabon Tumbu	T/M	M	Mostly	Yes		Yes	None yet			
Tumbun Naira	T	M	Mostly	Yes	Margin: 37	Yes	None			
Nguru-Gashua Wetlands										
Dagona	T	F	Yes	Yes	Open River: 93	Yes	None	Mean value: 29	Mean value : 3432	Mean value: 5289
Gashua	T/M	F/OWR	Yes	No	Flood-	Not entirely	Conflict			
Kurkushe	T	F	Yes	Mostly	Plain: 89	Yes	None			
Takvivir	T	F	Not clear	Mostly		Yes	None			

Notes:

- 1.T= Traditional; M= Modern; T/M =Mixed
2. OWL = Open water lake; OWR = Open water river; F= Floodplain; M= lake margins.
3. Yes = Objectives of everyone involved are being met; Mostly = Objectives of most people/institutions are being met; Not entirely = Objectives of few people/institutions are being met; No =Nobody's objectives are being met.
4. Yes =These is widespread compliance with management measures; Mostly =There have been occasional and minor instances of non-compliance; Limited =There have been several instances of non-compliance; No =There is widespread non-compliance.
5. Based on active fishermen surveys in FIMS, June 1995 – March 1996.
6. Yes = Management systems have adapted to change in most areas of the wider environment; Mostly = Management systems are currently in flux; Not entirely = Management systems are under threat of collapsing; No = Management systems have collapsed.
7. None = No conflict or dispute; None yet = Conflicts and disputes which occurred in the past have been resolved; Disputes = there are current disagreements over fishing; Conflict =There is on-going violence over access to fishing.
8. Mean estimates of yield per hectare of foldable area based on catch surveys of active fishermen.
- 9/10. Net financial and economic profit per person(per household) based on fisher surveys(see Neilland et al.1997)

Table 8 Approaches of the Concept of Sustainability applied to African Inland Fisheries (After Thomas, 1996)

Approach	Description	References
Maximum Sustainable Yield (MSY)	* Maximum off-take (e.g. yield in kg) of a particular resource which can be sustained without causing a decline in the abundance of the resource.	
Ecosystem Sustainability	<ul style="list-style-type: none"> Holistic approach which recognises that species management takes place within a wider ecosystem; <p>* Management must show concern for the ecological context in which resource producing units are embedded</p>	Leopold (1949) Norton (1990)
Multi-dimensional Approach to Sustainability	<ul style="list-style-type: none"> Recognises that sustainability of a physical barest is only one aspect of the sustainability of resource systems; Other dimensions include: ecological, social and economic, with various goals within each dimension; Trade-offs exist between goals in the different dimensions in order to maximise particular benefits for the whole system; Trade-offs and benefit streams also have a particular time dimension. 	Barbier (1987)

Table 9: Assessment of Institutional Performance for Traditional Management Systems in N.E. Nigeria (After Gibbs and Bromley, 1989)

Assessment criteria	Characteristics of a well-functioning common-property regime	General assessment of traditional systems in N.E. Nigeria
Efficiency	A minimum (or absence) of disputes and limited effort necessary to maintain compliance: the regime will be efficient.	Disputes are minimal and a high level of compliance is achieved.
Stability	A capacity to cope with progressive changes through adaptation, such as the arrival of new production techniques: the regime will be stable.	Changes such as variations in the hydrological regime and new technology have been accommodated; other changes such as population increases and urbanisation, increased demand for fishing and commercialisation have caused disruption in some cases (depending on the rate of change).
Resiliency	A capacity to accommodate surprise or sudden shocks: the regime will be resilient,	Sudden shocks such as changes in climate and new State government rules have been accommodated, but there is variation between communities which is not always easy to explain.
Equitability	A shared perception of fairness among the members with respect to inputs and outcomes: the regime will be equitable.	Up until recently, most community-based systems showed a high degree of equity. More recently, increased commercialisation and social differentiation has threatened equitability.
Overall assessment	n.a.	Traditional management systems in N.E. Nigeria, based on common-property regimes, are functioning well at the moment. However, there are serious threats to their stability and equitability, in particular which may undermine the systems in the long-run.

Table 10: An assessment of the potential for co-management in N.E. Nigeria (Based on criteria established by Ostrom; Pinkerton cited, in Pomeroy and Williams, 1994)

Criteria	Conditions required	Conditions in N.E. Nigeria	Preliminary assessment (favourable or unfavourable)
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 tie based on an ecosystem that the fishers can easily observe and understand. It should also be of a size that allows for management with available technology and communications.	Many villages located on The floodplains of the Upper River Benue and the Nguru-Gashua Wetlands are associated with dry season pools and lakes which are clearly defined and of which they have a good knowledge. The same situation exists at Lake Chad in the floodable margins. The boundaries of Lake Chad itself and the major rivers of N.E. Nigeria are more difficult to define and understand.	Favourable
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.	The rights to fish and participation within management systems appears to be well-defined in many villages and communities within the traditional administration. The number of participants appears to be appropriate for effective communication and decision-	Favourable

		making in many areas.	
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,	Many villages are associated with a residence population of fishers, although many fishers can also travel great distances to fish. Migratory fishers are a feature of many fisheries in N.E. Nigeria. Some villages particularly in the Nguru-Gashua Wetlands show a high degree of homogeneity, others in Lake Chad are inherently diverse in many respects. There is a need to define "community" particularly with reference to very diverse villages. On the whole, there appears to be a common willingness and understanding to deal with problems in the fisheries.	Favourable
4 Existing organisation	The fishers have some prior experience of traditional community-based systems and with organisations, where they are representative of all resource users and stakeholders interested in fisheries management.	There is a good experience of traditional community-based systems and organisations. However, there is strong heterogeneity (rich and poor) among fishers. In addition, not all stakeholders can participate in the decision-	Partly favourable

		making processes or receive an equal share of benefits - local elite's can be very prominent in controlling the fisheries.	
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.	There is little information on this aspect. Fishers seem to understand the impact of overexploitation although the means to limit this are not always obvious.	N.A
6. Participation by those affected	<p>Most individuals affected by the management arrangements are included in the group that makes and can change the arrangement decision about management.</p> <p>Arrangements are made by the same people that collection information on the fisheries.</p>	<p>The extent participation in decision-making varies between villages. However, there is evidence that the local elite's often have exclusive control of the fisheries, and regulation is imposed on others. The decision-makers appear to appreciate the dynamics of the fishery environment and fishing patterns (i.e. information is available to them).</p>	Partly Favourable
7. Management rules enforced	The management rules are ample. Monitoring and enforcement are able to be effected and shared by all fishers.	Management rules in the fisheries are well-defined and established. Monitoring and enforcement are	Favourable

		effective on the whole.	
8. Legal rights to organise	The fisher group or organisation has the legal right to organise and make arrangements related to its needs. There is enabling legislation from the government defining and clarifying local responsibility and authority.	Local organisations and groups in Nigeria must be sanctioned by government. The present political situation in Nigeria is not favourable for local empowerment. Local government as part of the Federal constitution has well-defined roles and possibly sets a precedent for further devolution of local responsibility.	Partly favourable
9. Co-operation and leadership at community level	There is an incentive and willingness on the part of fishers to participate actively with time, effort, and money, in fisheries management. There is an individual or core group who takes leadership responsibility for the management process.	There is Cupertino and leadership at community level in many villages throughout N.E. Nigeria. However, there appears to be a gap between "leaders" who control fisheries and the fishers who are "subject" to their control. It is unclear whether fishers would be willing to participate actively as local initiatives with time, money and effort.	Partly favourable
10. Decentralisation and delegation of authority	The government has established formal policy and/or laws for decentralisation of	There is no formal policy in fisheries or in other natural	Not favourable

	Administrative functions and delegation of management responsibility and/or authority to local government and local group organisation levels.	resources sectors to decentralise control to communities. Under the Federal Constitution decentralisation through Local Government is a feature, but the linkages do not vast, on the whole, to allow fishery stakeholders to participate in the allocation of fishing rights or the sharing of benefits.	
11. Co-ordination between government and community	A co-ordinating 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 conflict, and reinforce local rule enforcement.	There is a minimal level of co-ordination between government and fisher communities.	Not favourable