

## **Traditional Management Systems, Poverty and Change in the Arid Zone Fisheries of Northern Nigeria**

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*This paper, based on fieldwork results, explores traditional management systems (TMS) in the arid zone fisheries of north-eastern Nigeria with particular reference to their impact on rural poverty. The first section provides a historical background by tracing the evolution of the TMS since the nineteenth century, with reference to government policy on fisheries management and poverty alleviation. The second gives an overview of TMS, including definitions, distribution, principal objectives, regulatory mechanisms and the impact of TMS on the performance of the fisheries and on the livelihoods of rural people. The third considers the perceptions and attitudes of the fishing communities with regards to the fisheries and TMS. The paper concludes, paradoxically, that while TMS provide a basis for the sustainable livelihoods of many fishing people, they also reflect and enforce the social positions of the rich and powerful members of society who oversee them, at the expense of the poor. In the future, poverty alleviation in fisheries will need to incorporate both sectoral and non-sectoral strategies – dealing with the existing ‘paradox of TMS’ by encouraging appropriate institutional changes and community development, and recognizing the importance of employment creation in other sectors of the economy as a source of alternative income.*

**Keywords:** arid zones, fisheries, traditional management systems, poverty, Nigeria

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## INTRODUCTION

The arid zone of northern Nigeria, including both the Sahel and savanna regions, contains a number of important inland fisheries including those of Lake Chad, the River Niger and Kainji Lake, the Upper River Benue, Tiga Dam lake and the Nguru-Gashua Wetlands (FAO 1990, 159–92). With an estimated total annual production of between 60,000 and 100,000 tonnes, the fisheries provide up to 50 per cent of Nigeria's domestic fish supply, and form an important part of the livelihoods of thousands of rural people.

However, there is concern that Nigeria's rural population (60–70 million people out of a total population of 100 million), and especially those in the northern arid zone, are increasingly impoverished (World Bank 1996, 37). This is attributed by the World Bank to successive government policies which have steered most investment (physical, human, technological) into a few already capital-intensive sectors of the economy, mainly in urban areas, and largely in the south of the country.

In the case of rural people dependent on fisheries and aquatic resources in northern Nigeria, there is relatively little information available *a priori* on their poverty status or livelihood activities. However, given the close association between fisheries and poverty in many parts of the developing world (e.g. fishing communities have been characterized as 'the poorest of the poor' (Smith 1979, 6)), there must be cause for concern for the situation in northern Nigeria also.

One of the major reasons why fishing communities are often threatened by poverty is because fisheries are susceptible to over-exploitation, typically due to the impact of increased fishing effort within an open-access fishery or within a fishery which is not managed effectively. In simple terms, as catch returns fall with increasing over-exploitation, fishermen are unable to realize sufficient income to maintain an acceptable standard of living, unless they can find alternative employment (Smith 1979, 20). It may be contended that in practice it is the lack of alternative employment which is the principal cause of poverty amongst fishermen, rather than the over-exploitation of fisheries resources *per se*. However, there is no denying that the dissipation of economic surplus (resource rent) which commonly attends over-exploitation means that an important source of relief from poverty has effectively been lost (Wright 1990, 2).

Although many fisheries worldwide continue to operate under open-access and unmanaged conditions, it is recognized that certain African inland fisheries still retain traditional management systems (TMS),<sup>1</sup> which prevent

<sup>1</sup> Béné et al. state that 'traditional management systems refer to the various and diversified sets of resource-management systems and traditional local-level institutions (also often identified as community-based management systems), which are still currently operated by indigenous populations in developing countries and which are of direct relevance to the control and use of natural resources (in the present case fisheries resources) exploited by these indigenous populations. The term traditional is therefore used here as an antagonistic term to central government's management system rather than as a reference to the past, i.e. former systems that existed prior to colonial or independence

overexploitation (Brainerd 1991). In effect, therefore, TMS in African inland fisheries can offer some protection to fishing communities from poverty. However, poverty is a complex issue, and it is important to understand why it occurs in a particular rural setting, before attempting to undertake poverty alleviation interventions. For African inland fisheries, the question has to be asked 'do TMS have a future role in poverty alleviation for fishing communities?', especially when such systems are known to be vulnerable to the impact of change and also given the fact that many governments would prefer to manage fisheries on a more centralized basis through their own agencies.<sup>2</sup>

In this paper, the nature of TMS in northern Nigeria is explored with particular reference to poverty within the fisheries sector. Because information on the fisheries of northern Nigeria, and especially on traditional management, is relatively scarce,<sup>3</sup> the paper will focus on the north-eastern sub-region, where a number of international projects<sup>4</sup> have recently generated new and important research results on this subject. This paper draws primarily on the research findings of the Traditional Management of Artisanal Fisheries (TMAF) Project which provides the most extensive coverage of the appropriate subject areas. There are four sections. The first provides historical background on the evolution of TMS in fisheries in northern Nigeria from the nineteenth century to the present day, with reference where appropriate to government policy on fisheries management and poverty alleviation. The second section provides a brief overview of TMS in north-eastern Nigeria based on recent fieldwork, including definitions, distribution, principal objectives, regulatory mechanisms and impact of the TMS on the performance of fisheries and on the livelihoods of rural people.<sup>5</sup> The

periods' (2003, 294–5). Béné et al. also indicate that 'TMS usually rely on the accumulation of knowledge over many generations, where this knowledge is transmitted culturally. In that sense, they differ from science-based systems by the absence of testable hypotheses and generalizable theories and by the integration of moral and religious beliefs within the management process' (2003, 276).

<sup>2</sup> For an overview of poverty in fisheries in developing countries, including key concepts, ideas and approaches to poverty reduction see Béné (2003), and Neiland and Béné (2004).

<sup>3</sup> While the literature on the fisheries of northern Nigeria (based on detailed empirical studies) is relatively limited, there is a large and diverse literature on the agricultural systems and rural environment, and on social relations and social change in this region (for example, Adams and Kimmage 1992; Clough 1985; Hill 1977; Norman 1977; Shenton and Freund 1978; Tiffen 1972). This paper aims to contribute to this body of knowledge.

<sup>4</sup> The following research projects and development projects operated in north-east Nigeria during the 1990s and have provided information useful to understanding the nature and operation of the local fisheries and their management systems: (i) Traditional Management of Artisanal Fisheries in N.E. Nigeria (TMAF), Department for International Development 1993–1997, collaboration between University of Portsmouth, UK, University of Maiduguri, Nigeria and Federal University of Technology Yola, Nigeria – see Neiland (1997); Neiland et al. (2000a, 2000b); (ii) Hadejia-Nguru Wetlands Conservation Project (HNWCP), funded by Government of Nigeria, International Union for the Conservation of Nature (IUCN), Royal Society for the Protection of Birds (RSPB) and the European Union (UN) – see Thomas et al. (1993); Matthes (1990); (iii) North-East Arid Zone Development Programme (NEAZDP), funded by Government of Nigeria and the European Union (EU) – Marriott (1991).

<sup>5</sup> 'A "livelihood" comprises the capabilities, assets (including both material and social resources) and activities required for the means of living. A livelihood is sustainable when it can cope with and recover from stresses and shocks and maintain or enhance its capabilities and assets both now and in the future, while not undermining the natural resource base' (Chambers and Conway, cited in Carney 1998, 4).

third section considers the perceptions and attitudes of the fishing communities with regards to the fisheries and the TMS. A fourth section presents a set of conclusions.

## EVOLUTION OF TRADITIONAL MANAGEMENT SYSTEMS

The nature of the fisheries and TMS found in northern Nigeria today have been greatly influenced by the major changes which have occurred in the rural economy over the last two centuries. This section traces the evolution of the rural economy, from the pre-colonial subsistence economy through to the contemporary situation, highlighting where appropriate the role of government policies, and their impact on fisheries and TMS.

### *Pre-Colonial Period (c. 1800–1905)*

There is relatively little known of the fisheries of northern Nigeria during this period. Redmond, who researched through the national archives of Nigeria in Kaduna, and also undertook work on oral traditions, states that

. . . fish resources have long been exploited by societies in the region for both internal consumption and export . . . the main fishing groups [were] the Sorko, Kede and Kakanda on the Niger, the Wurbo and Jukun on the Benue, and the Buduma and Bede on Lake Chad. Groups among numerous other societies also fish. These include the Hausa, Kanembu and Bata. (1976, 1)

Sutton (1976, 5) indicates that fishing and other forms of livelihood activity were not mutually exclusive, and many fishing communities also farmed and traded. Agriculture formed the core economic activity of northern Nigeria during the nineteenth century. The region formed a major part of the Islamic Sokoto Caliphate, which consisted of 30 emirates. Watts outlines the social organization of rural Hausaland at this time, as follows:

The basic unit of production was the household (*gida*), perhaps embracing sons, clients, and slaves in a *gandu* structure in which the householder (*maigida*) organised production and distribution and paid taxation. Households were usually subsumed in communities (*garuwa*) controlled through the agency of a village headman. A proportion of the peasant surplus was expropriated by a ruling class of officeholders (*masu sarauta*) in the form of either labour, grain or cash . . . The state controlled by means of coercion, provided protection for the *talakawa* (peasantry) and travelling merchants, organised large-scale labour projects and acted as a guarantor in times of need. (1984, 126)<sup>6</sup>

<sup>6</sup> Watts (1984) is used as the main source for the historical and political economy background to this paper.

Given fluctuating and unpredictable rainfall levels and an associated high degree of variability in harvest in the Sahel–savanna regions, rural communities learned to cope with environmental risk. They developed an adaptive flexibility and adjustment capability to deal with drought and oscillations in the availability of food (famines in Hausaland are well-documented). Scott (1976) has suggested that pre-capitalist societies were to a large degree organized around the problem of risk and the guarantee of a minimum subsistence, a margin of security. He also called this a ‘subsistence ethic’ which can be divided into three aspects: a general proclivity towards risk aversion in agriculture (‘safety first’), a tendency towards mutual support (‘the norm of reciprocity’), and an expectation of minimum state support (‘the moral economy’).

Watts (1984, 129) built upon this approach, and suggested responses to environmental variability and food shortages at three levels: those of the household, the community and the regional state. For example, at the household level, local knowledge of particular cereal varieties and cropping strategies, and their orchestration across an extensive range of micro-environments, at regional levels, were used to offset the risk of variable rains (safety first). At the community level, the subsistence ethic was also expressed through social activities and institutions which functioned as, among other things, guarantors of a minimum food supply, e.g. food storage strategies. Perhaps the most important social institution in this respect was Mauss’s ‘logic of the gift’ (cited in Watts 1984, 130): those reciprocal and redistributive practices in peasant communities. This redistributive ethic, and its rationale of ensuring collective food security in arid zones, was reaffirmed ideologically through Islamic doctrine of gift-giving as obligatory for the rich and the officeholders. At the level of the state in nineteenth-century Hausaland, the upper echelons (the aristocracy and elites) were expected to act as the ultimate buffers for village level redistributive operations, that is, to step in to provide relief when situation conditions were desperate and beyond the capabilities of local organization.

In summary, Watts (1984, 132) emphasizes that security arrangements (for livelihoods and food security) were grounded in and inseparable from the architecture of the entire social formation and instrumental to its reproduction. Although there is almost no information from this period on fisheries, it is not too difficult to imagine how fisheries activities and the associated TMS would be integrated within the farming systems (as found in Nigeria today) and the security arrangements described by Watts.

### *Colonial Period (1905–1960)*

In brief, the colonial period produced major disruptions to the subsistence systems of the pre-colonial period. Colonialism in northern Nigeria was a process of incorporation of indigenous pre-colonial modes of production, through which they were articulated with the colonial, and the global, economy (Shenton and Freund 1978, 9). This was effected through taxation, export commodity production and monetization, leading to major changes in the social relations of

production. Ultimately, the adaptive capability of Hausa rural communities was undermined, and peasant producers became less capable of responding to, and coping with, both drought and seasonal food shortages. According to Watts

Traditional mechanisms and adjustments disappeared, the extension of cash cropping undermined self-sufficiency in foodstuffs, a dependence on world commodity prices (for cotton and groundnuts) amplified an already high tax burden and households became increasingly vulnerable to environmental perturbations such as drought and harvest shortfalls . . . [and as a result] four major famines occurred during the colonial period in 1914, 1927, 1942 and 1951. (1984, 133–4)

Some information on fisheries during the colonial period is provided by Sutton (1976) and Redmond (1976), from which three important inter-related changes can be highlighted. First, the mobility of both fishers and fish-traders increased as a result of *pax Britannica*; the colonial administration improved security of travel across Nigeria and also the means of travel through road and rail development. Second, modern fishing technology, especially nylon nets, were introduced and promoted. Third, fishing activity intensified in many areas (e.g. River Niger and Lake Chad), due to a combination of market demand from urban areas (and associated development of the fish trade), greater mobility and access to fishing grounds, and the new fishing gear available. There is no doubt that during the colonial period the nature of TMS in fisheries began to change. In the face of increasing intensification, some TMS simply ceased to function and the fisheries became open-access in nature. Other TMS adapted to intensification and maximizing output and returns (in line with market demands), as distinct from objectives relating to food security and equity of access. And in other TMS, there was undoubtedly a shift towards private ownership (as opposed to common property ownership), where powerful individuals could pursue individualized profit-making and capital accumulation (as opposed to collective community-based objectives of risk aversion and food security).

#### *Post-Colonial Period (Since 1960)*

At Independence in 1960, the Nigerian economy was dominated by agriculture; its major exports were groundnuts, cotton and vegetable oil. With the discovery of oil and expansion of its production from the 1970s, the economy grew with significant programmes of public investment and international borrowing. In the 1980s, with a fall in oil prices, Nigeria experienced negative economic growth, inflation, rising fiscal and trade imbalances and mounting international debt. Agriculture and other non-oil sectors were seriously neglected within a policy framework now constrained by price controls, limited foreign exchange and reduced trade (DFID 1994, 4). The Structural Adjustment Programme implemented between 1986 and 1992 has now been abandoned and the formal economy is once again in crisis.

With high rates of inflation and increasing food insecurity, financial stringency has caused the public sector to retreat further from the provision of goods and services. Nigeria's economy is highly dependent on the oil sector, which accounts for about 40 per cent of gross domestic product (GDP) and 85 per cent of the country's foreign exchange earnings. According to the World Bank (2001, 1), basic economic and social indicators place Nigeria among the 20 poorest countries in the world today. GNP per capita, at about US\$310 today, is below the level at independence over 40 years ago and below the US\$370 obtained in 1985. Economic mismanagement, corruption and excessive dependence on oil have been the main reasons for poor economic performance and rising poverty (World Bank 2001, 1). Nigeria has also experienced considerable political instability since independence with twelve different governments, four major coups and a civil war. Today central government continues to exercise considerable control, and both regional and local government autonomy is limited by central directive and by reliance upon the centre for financial support. Ethnic-centred politics continues to play a major role in Nigeria, and traditional government is integrally linked with the local power-base of politicians. According to DFID (1994, 6), all tiers of government are characterized by inefficiency, poor financial control and dwindling resources, which seriously impedes their ability to provide services, although performance varies.

Fisheries policy since 1960 has centred on a technology-led and productionist approach, with the general aim of establishing a modern fishing industry (Ladu and Neiland 1997, 390–5). Overall, the performance of Nigerian fisheries policy has been poor and few, if any, of its major development targets have been achieved. Small-scale fisheries remain an important part of the rural economy in many parts of Nigeria, and support the livelihoods of thousands of rural people for whom national government is remote and ineffective in meeting their needs. The failings of fisheries development policy can be explained by a range of factors including an inappropriate policy framework (which emphasized 'modernization' rather than capitalizing on indigenous strengths), the unstable political and economic context (frequent changes of government and policy have undermined fisheries development efforts), and the resilience and adaptability of artisanal fisheries in the face of pressures of modernization.

Nigerian governments have attempted to design and implement various strategies for poverty alleviation since 1960, principally through large public investment schemes and a series of national development plans. Although there has been some success, policy implementation for poverty alleviation has faced major problems including poor planning, under- or intermittent resourcing and instability caused by frequent government and administrative changes. Recent policy has focused on a range of activities commenced in the National Rolling Plan of 1990–92, including economic programmes for the empowerment of women, Primary Health Care (PHC) Programme and the Agricultural Development Programme (ADP). However, despite attempts to stimulate long-term economic growth, promote sectoral development in areas such as agriculture and fisheries, and address poverty, for much of the rural population of northern

Nigeria life appears to have become ever more difficult since 1960. There is a significant level of poverty (49 per cent according to the World Bank 1996, 37), with much of the rural population vulnerable to impoverishment. For authors such as Watts, the increasing vulnerability of communities in northern Nigeria to environmental fluctuations and variability in food supply is the latest phase in the changing political economy of the region. He makes a strong link between increasing social differentiation and vulnerability to drought as follows:

... in Hausa communities, a seasonal perspective on rural economy highlights the growing polarity between economic groups and the genesis of qualitatively different social relations. This process of differentiation is related to the hiring of labour, usury interest, and what is sometimes called antediluvian capital. These exploitative relations are quite frequently disguised at village level ... through a 'hegemonic, egalitarian Muslim ideology'. It is precisely because of the social relations of production that some households are increasingly incapable of responding to food shortages, and in view of the atrophy of the traditional buffering mechanisms, a drought may act as a catalyst by which economic inequalities are amplified and the slide towards impoverishment is hastened. (1984, 144–5)

In the 1970s, Hill (1977, 164–79) observed that while some village responsibilities for the provision of social security remained, this should not obscure the predicament of the rural poor, and that while few people actually starve in northern Nigeria there are many who are chronically and debilitatingly poor. Interestingly, Watts observed

... that although there is a widely held ethic among rural communities that the poor should be assisted in times of need, it would be a mistake to glorify this gratuitous dimension of village life and inflate the role of traditional leveling mechanisms ... the self-perpetuating poverty trap makes it almost impossible for those born into desperately poor families to improve their lot. (1984, 145)

In a more recent study of poverty in Nigeria, the World Bank (1996) concludes that northern Nigeria has higher levels of poverty than other parts of the country, which it attributes to lower rates of economic growth, and longstanding lags in the provision of health, education and other social services. The results of a large participatory poverty assessment (PPA) exercise (World Bank 1996) revealed some of the daily realities of the lives of the poor, including:

- Their negative and sceptical views of government programmes, ostensibly designed to help them, highlight the fact that these initiatives rarely succeed in reaching their intended beneficiaries.
- Poverty alleviation projects have little community involvement in their selection and design, and weak sustainability.
- The quality of public health and education services are often so low as to be considered not worth the effort of participation.

- Although government efforts cover a wide range of services, the poor place the highest priority on water supply and rural roads.
- The poor focus on their struggles to survive, highlighting the importance of family networks; the special needs of single and childless women; exploitation by leadership; extortionate credit schemes; the indifference of government authorities; and initiatives that come with promises but no practical help.

## OVERVIEW OF TRADITIONAL MANAGEMENT SYSTEMS

### *Definitions, Typology and Distribution*

By law, the Federal Government of Nigeria (FGN) has ownership and control of all natural resources (*res publica*) including fisheries, within its jurisdiction (i.e. national boundaries). The implementation of national fisheries policy, devised by the Federal Department of Fisheries (FDF), is the responsibility (*de jure*) of local state governments. However, it is widely acknowledged that many state fisheries departments in Nigeria have been constrained, for various reasons, including financial under-resourcing, in their ability to assume this responsibility. So who oversees and regulates the fisheries of northern Nigeria at the local level?

As part of the TMAF project, a random sample survey of 53 villages (of 194) in the three major fisheries of north-eastern Nigeria – the Upper River Benue, Lake Chad and the Nguru-Gashua Wetlands – in 1993–1996 revealed that a large number of different authorities and agencies participated, *de facto*, to varying degrees in the regulation of fisheries (Neiland et al. 2000b, 253). These included the major tiers of government in Nigeria: federal, state, local and traditional administrations. Despite the diversity of fisheries management systems at village level, which included some or all of these bodies, a simple typology was developed to facilitate further research, including three categories of traditional, modern and mixed systems.

‘Traditional systems’ are classed as those operated by the administration of traditional government. Fisheries come under the jurisdiction of traditional officers, such as village heads, chief fishermen (*sarkin ruwa* in Hausa) and district heads (one rank above village heads in the traditional hierarchy), who enforce regulations to control fishing activity. ‘Modern systems’ are operated by the administration of the Nigerian state. For example, fisheries jurisdiction and regulations are claimed and enforced by the officers of state government who make up the state fisheries department (often a sub-unit of, or subsumed completely within, the regional Ministry of Agriculture). Many senior fisheries officers have been trained in science-based fisheries management to higher education level. The focus of the management systems they endeavour to design and implement is the control of fishing effort through technical means such as gear regulations. ‘Mixed systems’ involve the participation of both the traditional and the modern government administrations of Nigeria in the jurisdiction and regulation of particular fisheries, by design and otherwise.

Table 1. Distribution of fisheries management systems in north-eastern Nigeria

Type of management system	No. of villages operating each management type (% total)			
	Upper River Benue	Lake Chad	Nguru-Gashua Wetlands	Total
Type I: Traditional	14 (74)	3 (37)	14 (56)	31 (58)
Type II: Mixed	4 (21)	5 (62)	8 (32)	17 (32)
Type III: Modern	1 (5)	1 (12)	3 (12)	5 (10)
Total	19 (100)	9 (100)	25 (100)	53 (100)

Source: Neiland et al. (2000b).

The results of the village survey (Table 1) revealed that fisheries management systems operated through traditional administration (Type I) or through a combination of traditional and modern systems of administration (Type II) were most common (90 per cent of villages). In other words, fisheries management systems exclusively through the modern administration (Type III) were not common in any region (10 per cent), confirming the lack of penetration of modern state administration into fisheries at local level.

#### *Principal Objectives and Regulatory Mechanisms*

Identifying and analysing the principal objectives of TMS in north-eastern Nigeria has proved to be problematic for researchers (Neiland et al. 2000b, 254). For example, interviews with traditional rulers in the sample villages in the TMAF project did not provide clear-cut answers. The objectives of control and authority over fishing grounds by traditional rulers were seemingly not explicit. Many traditional rulers simply indicated that fisheries jurisdiction and management were part of their people's tradition and culture.

In reviewing this outcome, it was accepted that – as in many small-scale fisheries elsewhere – management systems embedded in local social and cultural practices are not concerned with easily identifiable ‘first best’ solutions to the problems of fisheries management (e.g. maximum sustainable yield or maximum sustainable economic yield), but with more diffuse and less precise ‘second best’ or even ‘third best’ solutions. The latter may be concerned more with avoiding severe ecological, economic and social disturbances, such as stock depletion, reduction of conflicts between fishermen, and securing a minimum level of income from fishing (Willmann 1983, 24) – in short, objectives based on satisficing rather than optimizing principles.

However, objectives can be inferred from the methods and practices of traditional management systems. In the majority of the villages we studied in north-eastern Nigeria, fisheries were subject to the declaration and enforcement of property rights of different kinds, above all communal property rights, as opposed to private or state property regimes. The most common regulatory

method was control of access, involving a payment to the community via the local chief, or to the landowner (e.g. the owner of farmland, often a locally recognized entitlement, which is regularly flooded and exploited as a temporary fishery each year), in the form of a proportion of the catch or a cash payment. This ensures that the communal owners of fisheries (the local fishing community) gain some direct economic benefit from renting out the resource, especially to fishermen from outside their communities. Local fishermen (within the village) are usually expected to give a proportion of their catch to the fishery manager (usually the village head). This system can help support livelihoods as long as fishery managers redistribute some of this rental income. There was some evidence from the village studies that fishery managers, particularly village heads, do redistribute fish and financial payments received to the poorer members of their communities, especially during periods of poor harvests and food shortages (although this needs further detailed investigation). In addition, by exercising and enforcing access restrictions village leaders can protect fisheries from exploitation by 'stranger' fishermen from elsewhere, and thereby help to support the contributions of local fisheries to livelihoods, especially at times of greatest need. Likewise, access restrictions, combined with gear and effort regulations, can also support stock conservation.

In sum, the major objective of the TMS in north-eastern Nigeria was identified as the generation of revenue for fishery managers, usually community leaders who (ideally) redistribute some of that income. Other secondary objectives include the support of fishing livelihoods (through redistribution of rent revenue in cash and kind) and the conservation of fish stocks.

It is important to emphasize that the 53 villages included in the research project revealed considerable diversity in the TMS they operate. This diversity is related to factors such as local environmental and fishing conditions, the social characteristics and organizational structures of different local ethnic groups, including the nature of their political arrangements, and the importance of fisheries to local communities. Before examining in more detail two TMS case studies to highlight the relationship between these types of factors, the role of fisheries in rural livelihoods in north-eastern Nigeria is outlined to set the scene.

### *Fisheries and Rural Livelihoods*

Not surprisingly, fisheries activities made an important contribution to rural livelihoods in communities associated with the major fisheries, as shown by the field survey results presented in Tables 2 and 3.

In the Upper River Benue, where TMS predominated (74 per cent of villages), there were 5660 fishing households (57 per cent of total households) containing over 50,000 people. Fishing was mainly a part-time activity (68 per cent of total households) and contributed 37 per cent of total household income on average. A variety of occupations were undertaken by households within the fisheries sector, but catching fish was the main activity (99 per cent of total households). Farming was the major income source (50 per cent of total household income), with most households growing crops (99 per cent of total households), especially

Table 2. A profile of fishing households: occupations, production and income structure (mean values)

	<i>Upper River Benue</i>	<i>Lake Chad</i>	<i>Nguru-Gashua Wetlands</i>	<i>Overall mean values</i>
Population size (fisheries sector only)	50,940	39,400	42,182	44,174
Total fishing households (% all households)	5660 (57%)	9850 (36%)	6026 (55%)	7179 (49)
Household sample size (% total)	403 (4%)	484 (2%)	435 (4%)	441 (3%)
Time spent fishing (% total households)				
Full-time	32	10	3	15
Part-time	68	90	97	85
Total	100	100	100	100
Income sources (% total income)				
Fishing	37	54	37	43
Farming	50	39	56	48
Labouring	4	1	1	2
Others	9	6	6	7
Total	100	100	100	100
Occupations within fisheries (% households)				
Catching	99	94	97	97
Catching only	24	15	21	20
Catching, processing, trading, transport	25	26	37	29
Input supply	<10	<10	<10	<10
Household production and utilization				
Fish catch (tonnes/year)	0.87	5.34	3.08	3.09
Fish sold (% total catch)	67	81	77	75
Farm production, total (tonnes/year)	2.34	3.89	8.99	5.07
Farming activities (% households)				
Cropping	99	98	99	99
Livestock	78	52	64	65
Other farming activities	6	3	5	5
Use of hired labour (% households)				
For fishing	38	14	7	20
For cultivation of crops	64	66	73	68

Table 2. (cont'd)

	<i>Upper River Benue</i>	<i>Lake Chad</i>	<i>Nguru-Gashua Wetlands</i>	<i>Overall mean values</i>
Major crop products (tonnes/year)				
Cereals (maize, sorghum) (% sold)	1.49 (34%)	2.05 (35%)	3.74 (77%)	2.43 (49%)
Vegetables (% sold)	0.41 (3%)	0.29 (24%)	4.33 (65%)	1.68 (31%)
Grain legumes (beans, g/nuts) (% sold)	0.12 (11%)	0.80 (72%)	0.46 (62%)	0.46 (48%)
Roots/tubers (% sold)	0.21 (6%)	0.41 (32%)	0.09 (7%)	0.24 (15%)
Farm productivity (Crop output per adult, kg/year)				
Fishing households	625	1558	2306	1496
Non-fishing households	353	1348	2849	1517

Sources: Neiland et al. (1994); Neiland (1997).

cereals (1.49 tonnes/year), and keeping some livestock (78 per cent of total households). By contrast, in the Lake Chad region, where a ‘mixed’ type (traditional/modern) of fisheries management predominated (62 per cent of villages), fishing contributed the largest share (54 per cent of total income) to the average income of nearly 10,000 part-time fishing households (36 per cent of total households or 39,400 people), followed by farming (39 per cent), mainly of cereals (2.05 tonnes/year), and with less domestic livestock (52 per cent of households), due to the difficulty of integrating domestic livestock husbandry with fishing activities which require regular and extended fishing trips. Finally, in the Nguru-Gashua Wetlands, where TMS predominated (58 per cent of villages), fishing was a part-time activity for 6026 fishing households (55 per cent of total households, over 42,000 people). Farming (56 per cent of total income) of cereals (3.74 tonnes/year), vegetables (4.33 tonnes/year) and livestock (64 per cent of total households), was the major income source, followed by fishing (37 per cent of total income). In general, more households used hired labour for crop cultivation (68 per cent of total households) than for fishing (20 per cent of total households).

Further analysis of the livelihood and income data enabled the construction of a profile for fishing households in each region, based on mean values.<sup>7</sup> Overall,

<sup>7</sup> The determination and interpretation of household income on a quantitative basis presented some serious methodological challenges. For example, first, the value of marketed and non-marketed food was difficult to reconcile; second, income data were only available for one year and it was uncertain how this compared to other years (issue of representativeness); and third, the determination of gross household income based on fishing/farming production did not take account of costs such as debt repayment, taxes, gifts and loans (which would, of course, reduce the net household income) – nor of other sources of income. Overall, the quantitative data must be treated as indicative rather than definitive, allowing only a preliminary exploration of household income.

Table 3. Income analysis for fishing households: financial, economic and non-cash incomes (survey population and sample sizes shown in Table 2 above)

	<i>Upper River Benue</i>	<i>Lake Chad</i>	<i>Nguru-Gashua Wetlands</i>	<i>Overall mean values</i>
<i>Income analysis I.</i>				
<i>Net financial income<sup>a</sup></i>				
Per household (Naira/year):				
Fishing income (net)	917	27009	24022	17309
Total income (net)	2478	50016	64924	39139
Per person (Naira/year)				
Fishing income (net)	102	6752	3432	3429
Total income (net)	275	12504	9275	7351
<i>Income analysis II.</i>				
<i>Net economic income<sup>b</sup></i>				
Per household (Naira/year)				
Fishing only	2057	39011	37021	26029
Per person (Naira/year)				
Fishing only	229	9753	5289	5090
<i>Income analysis III.</i>				
<i>Non-cash income<sup>c</sup></i>				
Per person				
Fish quantity (tonnes/year)	0.03	0.25	0.10	0.13
Fish value (Naira/year, gross)	611	3804	2224	2213
Fish calorific value (kcal/day)	64	507	202	258
Fish protein value (g protein/day)	15	116	47	60
Farm (crop) value (tonnes/year)	0.92	0.57	0.43	0.64
Farm (crop) value (Naira/year, gross)	9054	5020	3796	5957
Farm (crop) value (kcal/day)	4044	4236	2200	3493
Total calories available (kcal/day)	4108	4743	2402	3751
Total value (Naira/year)	9665	8824	6020	8170

Sources: Neiland (1997); Neiland et al. (1997).

Notes: <sup>a</sup> Net financial income calculated (per households and per person) as net benefits (total revenues minus total costs) of fishing and other activities based on actual or market prices.

<sup>b</sup> Net economic income calculated (per household and per person) as net benefits (total revenues minus total costs, excluding transfer payments and depreciation) of fishing only, using shadow or adjusted prices.

<sup>c</sup> Non-cash income calculated (per person) as quantity of fishing and farming output retained by households (not sold at market) and valued using actual or market prices and standard calorific values for food.

fishing households caught 3.09 tonnes of fish per year, produced 5.07 tonnes of farm output (mainly cereals), and together with some minor income from other livelihood activities (e.g. labouring), this yielded a total net financial income of Naira 39,139/household/year (or US\$560/household/year). This was equivalent to an average income of Naira 7351/person/year (or US\$105/person/year). Fishing households sold most of their catch for cash (75 per cent of fish landed), but less of their farm produce (e.g. 48 per cent of cereals were sold). Fishing households also retained a proportion of fish and farm produce (for consumption, bartering, gifts and loan repayments, although there are no data concerning these aspects). This non-cash income (gross value only) was valued at Naira 8169/person/year (or US\$117/person/year), and also represented a total calorific food value of kcal 3751/person/day (including 60 g fish protein/person/day). Interestingly, on average, fishing households in north-eastern Nigeria generated a net economic income (Naira 26,029/household/year or US\$372/household/year) from fishing, and their level of farm productivity was similar (overall average for all regions) to that of non-fishing households (except in the Lake Chad region, where fishing households were more productive than non-fishing households).

What conclusions can be drawn from this preliminary analysis of livelihoods and income? In spite of the obvious methodological limitations (see note 7), on the basis of a sample of 1332 fishing households it appears that both fishing and farming are important livelihood activities in north-east Nigeria, which are capable, *on average*, of generating both financial and economic incomes. Fishing households undertake a diverse range of fishing and farming occupations, sell a high proportion of their produce to commercial markets, and also have high levels of non-cash income (including food calories and fish protein) available. The extent to which these livelihood activities contribute to poverty reduction is examined below.

#### *Case Studies of TMS in Fisheries of NE Nigeria*

On the basis of a number of detailed case studies by the TMAF project, important variations could be highlighted including the different management approaches used for floodplain and riverine fisheries, the role of pre-Islamic African traditions (with an emphasis on semi-autonomous, collective-action institutions) and Islamic traditions (with an emphasis on hierarchal, 'feudal' institutions) in shaping the organization of the TMS, and the varying degrees of interaction between TMS and modern state authorities.<sup>8</sup> Some of this important variation can be highlighted using the following two examples.

<sup>8</sup> Islamic invaders (mainly Fulani) conquered much of northern Nigeria in the early nineteenth century as part of a *jihad* led by Usman Dan Fodio. In effect, this added another layer on top of the already diverse extant cultures of the region, a situation which persists today. For an overview of the history and culture of northern Nigeria see Graf (1988).

*The Bade<sup>9</sup> villages of the Nguru-Gashua Wetlands (an example of a village-level pre-Islamic traditional management system)*

The village of Kurkushe is located on the floodplain of the River Katagum, and is a *Bade* village, a people with an established pre-Islamic ethnic and cultural identity. However, after many years of interaction with other peoples, the *Bade* have today also adopted and absorbed other characteristics, especially Islamic traditions (many *Bade* follow local religions also). The associated TMS is subdivided in its operation between the management of the main river passing beside the village, River Katagum, and that of residual floodplain pools. During the annual flood period, the river operates as an open-access system. However, once the floods start to recede, the river is divided into a series of sectors formed over the deepest water. Each of these sectors has been named under the local TMS.

The management of the river is the responsibility of the *Bulama* (village head) and his 'water management council'. This consists of the following village officers: the *Jarma* (fisheries supervisor, regulating the use of hooklines and calabash gourds; also collecting a proportion of the catch from these gears), the *Charaku* (fisheries supervisor, regulating the use of fishing nets), all *Mai Anguwas* (ward heads) and the *Sarkin Samari* (youth leader). The planning of fishing seasons and the resolution of conflict between fishers are the responsibilities of the *Mai Anguwas* and the *Sarkin Samari*.

The main objective of the water management council appears to be the maximization of fishing returns (i.e. catch and income). While villagers do not pay for fishing rights, they must give part of their catch to the water management council. All outsiders (defined as fishers not living in Kurkushe) must obtain permission from the council in order to fish. The river sectors are fished one at a time until each is exhausted. This process continues for several weeks until all the sectors are fished. As the sectors to be fished are determined randomly, only the villagers will know the current fishing sector, making it easier to detect outsiders. A four-part sequence of gear is permitted in each sector during the receding flood, as follows: large chamber traps (*sankiya*), hooklines fished by trial fishing (*zabi zuba*), clap nets (*homa*) and finally seine netting.<sup>10</sup> The clap nets are the most important gear in the sequence, accounting for the largest part of the catch.

The management of floodplain pools is different to that for the river in Kurkushe. The pools are owned by both individuals and families. The families of the *Bulama* and *Jarma*, in particular, own important floodplain fishing grounds. The owners often build a fish fence around the pools to prevent fish returning to the main river channel as the flood recedes. The decision to make pools available

<sup>9</sup> Words and phrases from local languages are shown in italics. The majority are *Hausa* words; the dominant language of northern Nigeria. In certain cases, words from other local languages (e.g. the *Bade* language) have been absorbed by *Hausa*. For simplicity, the origins of the different local language words are not specified in this article, and it can be assumed that most have been incorporated within the *Hausa* lingua franca unless otherwise indicated.

<sup>10</sup> For further explanation of fishing gears and fishing techniques in northern Nigeria, refer to Neiland et al. (1994).

for fishing is made by the owners in consultation with the village head. Once declared open, any member of the family (usually consisting of a number of households) can fish there freely. However, everybody else (outside the owning family) must pay the head of owning family before they can fish such areas. The owning family must also pay a proportion of this rental income to the village head as a tax, and it was reported that this money is in turn used for various community projects, including some redistribution to villagers in times of need (e.g. households that lack sufficient food during the dry season in particular).

*Dumba fishing at Lake Chad (an example of a neo-traditional management system associated with Islamic traditions)*<sup>11</sup>

A *dumba* is a row of fish basket traps (*gurun Mali* in Hausa), placed close together to form a fence across a channel or stream. Introduced to the western (floodplain) shore of Lake Chad by migratory fishermen from Mali in recent times, it is one of the most profitable local fishing techniques. The profitability of *dumba* fishing coupled with the limited availability of sites suitable for this practice has made it a target for regulation by various authorities. When *dumba* fishing started in the 1970s, a licence was not needed. However, traditional *Kanuri* administrators (*Kanuri*, the dominant ethnic group in Borno State, form part of the Islamic-based traditional government, headed by the *Shehu* or emir), who previously had no involvement with fisheries, suddenly became aware of the possibilities for regulation. As a result, all the *Lawans* (main village heads) now charge a site-specific licence fee for *dumba* fishing. In some districts, special assistants have been appointed to collect fees, in others this is the responsibility of the village head. In other areas, village heads cooperate with soldiers of the federal army and the police to enforce this system. The question must be asked whether the income generated is appropriated for the personal benefit of the administrators or regulatory authority.

*Dumba* ownership (i.e. a group of traps when placed in a specific fishing location) can be held by an individual or a group, and must be established with the permission of the local district head. For example, in the village of Dabar Shatta Kwatta, persons interested in setting up a *dumba* must first survey a suitable site and then contact the *Kaigama* (District Head's local representative). Together they must meet the *Kaigama* at his residence in Baga town (the administrative centre of the region) in order to negotiate the licence fee for the *dumba*. The fee will depend on each party's assessment of the potential productivity of the proposed site. Once a fee has been agreed the *Kaigama* prepares a licence

<sup>11</sup> Berkes and Folke emphasized the role of 'traditional ecological knowledge' within TMS, explaining that it 'refers to a cumulative body of knowledge and beliefs handed down through generations by cultural transmission about the relationship of living beings (including humans) with one another and with their environment . . . the word traditional is used to refer to historical and cultural continuity recognizing that societies are constantly redefining what is considered traditional . . . neo-traditional resource management systems are defined . . . as local resource management which does not have historical continuity but which is based on observations, experience and local knowledge of resource users themselves (as opposed to government scientists and managers)' (1998, 5).

which he passes on to the *Lawan* for his signature. In turn, the licence has to be endorsed by the local Army/Police Joint Patrol (a force established internationally by the countries of the Lake Chad Basin to oversee regional security). If a *dumba* is constructed without a licence, it will be removed by the local authorities and the fisherman responsible can be fined.

Interestingly, in 1994, the Marte Local Government became aware of the large amounts of revenue collected by the *Lawan*. It decided to intervene to take over responsibility for *dumba* licensing, giving a proportion of the fees to the *Lawan* in compensation. Traditional authorities always see themselves as subject to arrangements imposed by any tier of modern government, and thus accepted this arrangement. The Marte Local Government then imposed an annual fee of Naira 10,000 (US\$143) per *dumba* site. In 1995 the Federal Department of Fisheries, acting through the new Inland Fisheries Decree, informed all Local Government authorities that *dumba* fishing had been made illegal (for reasons of conservation). As a result, the licensing of *dumba* sites was stopped. Ironically, this has now allowed the Traditional Authorities, through the *Lawan*, to resume their previous control, and they have started to issue licences once more, in contravention of national policy.

In sum, the two examples of TMS show that fisheries production often depends on a sophisticated local level of organization, taking into account seasonal environmental fluctuations and fish distribution, and the use of specialist gears. While this is an important function of the TMS, the key issue is who actually benefits. It has been suggested that in the *Bade* system there is a high level of equitability, with the proceeds of the fishery flowing back into the community. In the *dumba* system, it is possible that local elites are enriching themselves at the expense of the local fishermen (a form of rent-seeking activity).

Our understanding of social relations within the fisheries concerned remains very limited to date, and it is difficult to judge which TMS is more equitable in terms of distribution of benefits. Davis and Bailey (1996, 262) emphasize that much of the literature on common property management assumes that locally controlled systems are likely to embody social justice, and that perceptions of fairness in access to and distribution of the resource are an important source of legitimacy and support for such systems. The missing element here is knowledge, and careful consideration, of power relations within communities. It is clear that local elites are quite capable of capturing control of regulatory arrangements and of the benefits of technological or (official) policy changes.

#### *The Performance and Impact of Traditional Management Systems*

As part of the TMAF project, the performance and impact of TMS was evaluated from a number of different perspectives as follows:

- against eight key criteria including achievement of objectives, compliance, conflict, robustness to change (or the ability to cope with the effects or impacts of change; in the worse case to avoid the destruction of key TMS institutions),

Table 4. Criteria for evaluating the performance of fisheries management systems

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*Criterion*


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1. Are the objectives at each level of the system achieved?
  2. How much conflict is associated with the system?
  3. Is there compliance with management measures?
  4. How robust is the system to change?
  5. How biologically productive is the system?
  6. How financially productive is the system?
  7. How economically productive is the system?
  8. How sustainable is the system?
- 

*Source:* Sarch et al. (1997).

outputs (production levels, financial and economic returns) and sustainability (Sarch et al. 1997, 135);

- comparison with the performance of a well-functioning common-property regime (Gibbs and Bromley 1989, 26);
- the poverty status of fishing communities associated with the TMS was assessed using a combination of quantitative and qualitative approaches (Neiland et al. 1997, 294–9).

Firstly, in order to evaluate performance of the management systems, eight key criteria were established as a basis for this, as shown in Table 4. Although this evaluation exercise represented a significant methodological challenge, given, for example, the diversity and overlapping nature of management systems and their associated institutional arrangements, the research team involved felt confident enough to make certain generalized conclusions based on the strength of the detailed research results, as presented in Neiland (1997).

In brief, it was found that, first, TMS were performing well with respect to achieving management objectives (where these could be clearly identified, as discussed above). Second, there was a high level of compliance with the fisheries regulations of the TMS, although this varied by fishery and with the season. Third, there was relatively little evidence of persistent conflict associated with TMS. Fourth, all the TMS in north-eastern Nigeria were subject to the impact of change, including a range of impacts in different locations such as environmental degradation (e.g. damming of rivers), urbanization (e.g. along the Upper River Benue, population growth and the expansion of certain villages and towns has increased demand for access to natural resources, and led to the disruption of local institutions and fishing-farming systems, when they are unable to cope with this increased pressure), and increased competition for fishing resources from migrant fishermen. Some of the TMS were able to cope with change better than others, and this often depended on the nature of the change (urban pressure has been a problem because it is especially difficult to deal with) and the rate of change (rapid change was also difficult). Fifth, in terms of fisheries production,

the yield/unit area (kg/ha) from Lake Chad was significantly higher than for the other two fisheries, which scored relatively low for tropical inland fisheries. Although requiring more investigation, there was some evidence that this could be attributed to a combination of over-exploitation and environmental degradation. Sixth, all three fisheries were generating financial and economic incomes for participating households based on average values.

Finally, in terms of sustainability, the fisheries were considered from an agro-ecosystem perspective (Conway 1993).<sup>12</sup> The highly dynamic and fluctuating environment of the Sahel-savanna presents certain challenges to attempting an assessment of fishery sustainability, for example, as the fisheries show considerable biological, socio-economic and institutional diversity, and are often integrated with farming systems, conventional assessment approaches in fisheries can not easily be applied. However, the evolution of locally adapted TMS in north-eastern Nigeria seems to provide an appropriate institutional framework to ensure future sustainability, unless emergent factors of change threaten to upset this relationship. For the future, it appears that two factors will determine the sustainability of the fisheries: whether TMS can cope with and adapt to the nature and rate of change, and the role of government policy in managing change.

Next, an interesting comparison can be made between the characteristics of the TMS in north-eastern Nigeria and the characteristics of a well-functioning common-property regime (Gibbs and Bromley 1989, 26), as shown in Table 5.

While accepting the difficulty of generalization given the diversity of TMS in north-eastern Nigeria, it was concluded that overall the TMS based on common-property regimes (the majority) appear to be functioning well at the moment. However, a number of serious threats to their sustainability were also identified. In particular, the stability of these systems was threatened, in certain locations, by factors of rapid change, including population increases and urbanization, and also intensification of fishing linked to high commercial demand. Another threat appeared to be a reduction in equitability within the systems. In certain locations, the fisheries were increasingly privatized by powerful individuals, who denied access to fishermen under local long-established free or reciprocal arrangements. Instead, the private owners preferred to rent out the fishery (access payments) or

<sup>12</sup> According to Conway (1993), an agro-ecosystem is 'an ecological and socio-economic system, comprising domesticated plants and/or animals and the people who husband them, intended for the purpose of producing food, fibre or other agricultural products [p. 48] . . . It is acknowledged that almost anything that is perceived as "good" from a writer's perspective can fall under the umbrella of sustainable agriculture (and fisheries) e.g. organic farming, indigenous technical knowledge etc. This can be confusing and results in concepts of little practical value. The often quoted definition of sustainable development proposed by the World Commission on Environment and Development (The Brundtland Report) – "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" – is a valuable policy statement but is too abstract for farmers, research scientists or extension workers trying to design new agricultural systems and develop new agricultural practices. For them a definition is needed that is scientific, is open to hypothesis testing and experimentation, and is practicable [pp. 46–7] . . . [there] are four agro-ecosystem properties or behaviours: . . . (of which) Sustainability is the ability of the agro-ecosystem to maintain productivity when subject to a major disturbing force' [p. 50].

Table 5. Assessment of institutional performance for traditional management systems (TMS) in north-east Nigeria (based on criteria from Gibbs and Bromley 1989)

<i>Assessment criteria</i>	<i>Characteristics of a well-functioning common property regime</i>	<i>General assessment of traditional systems in NE Nigeria</i>
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	Recent changes such as variations in the hydrological regime and new technology have been accommodated; other changes such as population increases and urbanization, increased demand for fishing and commercialization 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	Recent sudden shocks such as changes in climate and new regional government rules have been accommodated, but there is variation between local TMS, which is not easy to explain
Equitability	A shared perception of fairness among the members with respect to inputs and outcomes: the regime will be equitable	Most TMS showed a high degree of equity in the past; more recently, increased commercialization and social differentiation have threatened equitability
Overall assessment	–	Many TMS in NE 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

Source: Neiland (1997).

to employ fishers to harvest fish for lucrative commercial sales. The large financial returns (using either strategy) are made (and monopolized) by the private owners with apparently little regard for the wider community, which gains fewer benefits compared to previous, now superseded, local arrangements (an exploitative relationship).

Finally, the poverty status of fishing communities associated with TMS was assessed. Because of the methodological difficulties of poverty assessment in an African rural environment, a range of inter-related methods was used to provide as broad a perspective as possible, including (quantitative) estimations of annual household income and (qualitative) wealth-ranking of households within fishing communities (for details see Neiland et al. 1997). As explained above, it was found that although fishing households were catching between 1 and 5 tonnes of fish each year, and growing a variety of crops (yielding 2–9 tonnes/household/year), the average income (Naira 7351/person/year or US\$105/person/year) was below the international poverty baseline of US\$1/day. However, the average household also generated a reasonable supply of non-marketed food (0.77 tonnes/person/year of fish and crops, equivalent to kcal 3751/person/day, valued at Naira 8170/person/year), which could contribute to food security, if retained and consumed by the household. While the calculation of average values for household income represents a useful starting point, the wealth-ranking results (Table 6) showed that the fishing communities were strongly differentiated by income and wealth, ranging from ‘very rich’ to ‘very poor’.

Forty per cent or more of households in twelve case-study villages were impoverished. This condition was defined by the communities themselves as having insufficient food for the year, low cash income and reliance on other members of the community for help in times of need. Further exploration of why households are poor revealed that they tended to be subsistence farmers or labourers (i.e. groups of comparatively low social standing, with little power and few assets). They also tended to have no access to inputs or resources (good land and fishing areas) to allow them to undertake the most valuable occupations, defined by the communities as farming and fishing.

What conclusions can be drawn from the three perspectives provided on the performance and impact of TMS? Overall, the TMS in north-eastern Nigeria function well in terms of standard performance criteria for both fisheries management systems (e.g. economic returns) and common-property regimes (e.g. efficiency and stability). In other words, at present, TMS appear to provide an appropriate institutional framework for the generation of a wide range of benefits on a sustainable basis. However, the TMS also determine who gains access to these benefits, leading to significant socio-economic differentiation in fishing communities: – the powerful and wealthy members gain more from the TMS than their less powerful and poor neighbours.

## PERCEPTIONS AND ATTITUDES IN FISHING COMMUNITIES

Fishing communities in north-eastern Nigeria have considerable knowledge and experience of the fisheries on which they depend. As part of the TMAF project (Neiland et al. 1994, 155–72), an attempt was made to access this knowledge through participatory research (interviews with 66 village heads and 1316 household heads from 1322 randomly selected households) to document perceptions and attitudes concerning:

Table 6. Wealth-ranking of households with three case-study villages in NE Nigeria

<i>Village</i>	<i>Socio-economic stratum based on wealth-ranking<sup>a</sup></i>	<i>% village households</i>	<i>Occupations in each stratum</i>
Bilachi Bwatiye (Upper River Benue)	<i>Richest:</i> have assets such as grinding machines, animals, commercial vehicles, large farmlands and business in other towns; have enough food for their households and give help to others	16	Large-scale farming, fishing, livestock rearing, business
	<i>Rich:</i> have farmlands, fishing grounds and fishing materials, and enough food for themselves throughout the year	35	Fishing, farming, bricklaying
	<i>Poor:</i> mainly fishers and traders, especially fish traders. Their income is low and they do not have enough food/money for the whole year. They borrow or depend on others for a living	27	Fishing, trading, hunting
	<i>Poorest:</i> mostly old people who have small farmlands, and many children; most depend on others for a living	22	Small-scale farming, net-making
Sabon Tumbu (Lake Chad)		100%	
	<i>Richest:</i> large-scale farmers and fishers with access to capital and able to purchase farm inputs and fishing rights. They can feed their large families throughout the year and often assist others with loans during the planting period. They also own grinding machines and animal herds. The key members of the traditional hierarchy are in this group	17	Part-time fishing and farming
	<i>Rich:</i> mostly part-time fishers/part-time farmers. They can feed their families year-round but do not have the assets of the richest group	33	Part-time fishing and farming
	<i>Poor:</i> mainly farmers as few can afford to buy fishing rights. Their farming productivity is limited by their inability to buy insecticides and other farm inputs. They have trouble feeding their families year-round	39	Full-time farming
	<i>Poorest:</i> includes farmers and hired labourers. They cannot feed themselves year round and rely on loans	11	Hired labour and part-time farming
		100%	

Table 6. (cont'd)

Village	Socio-economic stratum based on wealth-ranking <sup>a</sup>	% village households	Occupations in each stratum
Dagona (Nguru-Gashua Wetlands)	<i>Rich</i> : access to productive farmland, fertilizer and occasionally mechanized traction. They can feed their family year-round and assist others. This group includes the key members of the administrative hierarchy in Dagona	14	Part-time farming and part-time fishing or trading
	<i>Middle</i> : rely predominantly on farming. They have limited access to productive resources, although they can usually provide for their household needs year-round	44	Full-time farming
	<i>Poorest</i> : Households in this group rely on subsistence farming and part-time occupations such as tailoring, barbering and labouring. They do not have access to modern farming inputs and cannot feed themselves throughout the year. They do not receive assistance from development agencies and rely on other community members for assistance	42	Subsistence farming and part-time occupations, e.g. labouring
		100%	

Source: Neiland et al. (1997).

Note: <sup>a</sup> The socio-economic strata were identified by the villagers themselves as part of the participatory wealth-ranking exercise. In the Upper River Benue and Lake Chad regions, four strata (richest, rich, poor and poorest) were designated, whereas in the Nguru-Gashua Wetlands, there were three strata (rich, middle and poorest).

- major changes which have occurred in the villages (over the last 30–50 years);
- major changes which had occurred in the fisheries;
- expectations for the future of the fisheries.

The results can be used to provide an insight into the possible role of TMS in the future, from the viewpoint of the fishing communities.

The major changes which have occurred in the villages, according to the village heads, are shown in Table 7. In the Upper River Benue, the major change (45 per cent) was the provision of public amenities such as drinking water, electricity and roads. A range of other changes were recorded less frequently, such as an increase in village size (15 per cent). In the case of Lake Chad, the most important change recorded was an increase in agricultural pests (29 per cent), followed by a reduction in the aquatic environment (14 per cent) and less fishing

Table 7. Major changes over last the 30–50 years reported by village heads

Major change	% Total responses from village heads		
	Upper River Benue	Lake Chad	Nguru-Gashua Wetlands
Increase in village size	15	5	5
Decrease in village size	3	5	6
More public amenities	45	0	5
More agricultural pests	0	29	23
Reduction of the aquatic environment	3	14	32
Expansion of the aquatic environment	7	5	0
Less fishing	5	14	2
More fishing	0	0	2
Less farming	0	4	7
More farming	3	10	2
Increase in farming/fishing costs	5	4	5
Technological improvements in farming/fishing	3	0	5
New sources of income	2	10	0
No changes	2	0	0
Increase in catch value	2	0	0
Deterioration of fishery management	0	0	2
Other	5	0	4
Total	100%	100%	100%

Source: Neiland et al. (1994).

(14 per cent). In the Nguru-Gashua Wetlands, two major changes were recorded: a reduction in the aquatic environment (13 per cent) and more agricultural pests (23 per cent). Interestingly, the nature or quality of fisheries management was not a prominent issue.

A majority of village heads indicated that major changes had occurred in the fisheries in the last 30–50 years. The changes reported varied by fishery (Table 8). In the Upper River Benue, the major change was the introduction of new gears (36 per cent), followed by the catching of less/smaller fish (18 per cent), but with a higher unit value (14 per cent). At Lake Chad, the dominant changes have been the deterioration of the aquatic environment (22 per cent), followed by the catching of less/smaller fish (17 per cent) and the introduction of new gears (17 per cent). An increase in the number of fishermen was also perceived to have been important (11 per cent). Similarly, for the Nguru-Gashua Wetlands, the major change was the deterioration of the aquatic environment (23 per cent), increased fishing costs (23 per cent) and a deterioration in the fishing environment (above); the nature or quality of fisheries management was not a prominent issue.

Table 8. Major changes fisheries over the last 30–50 years reported by village heads

Major changes	% Total responses from village heads		
	Upper River Benue	Lake Chad	Nguru-Gashua Wetlands
Catching less/smaller fish	18	17	3
Smaller catch, higher unit value	14	0	8
Deterioration in fishing environment	4	22	18
Deterioration in aquatic environment	4	22	23
Traditional gears now ineffective	0	0	3
New gears introduced	36	17	10
Decline of fisheries management	0	0	3
More fishermen now	7	11	0
Less fishermen now	7	6	5
Increased fishing costs	4	6	23
No changes	7	0	0
Village does not fish	0	0	5
Total	100%	100%	100%

Source: Neiland et al. (1994).

Finally, when household heads were asked about their expectations for the future of the fisheries, a majority (63–83 per cent) considered that fishing as an occupation would be better than at present (Table 9). When asked to give their reasons for this expectation, the answers varied by fishery (Table 10).

In the Nguru-Gashua Wetlands, where the largest majority of household heads thought that fishing would be better in the future (83 per cent), the major reason given was that the fishery environment, in particular the extent of the flood, would improve. Other major reasons included an improvement in the fishery economy (e.g. better fish prices), a general sense of optimism about conditions overall in fishing and, finally, the possibility of investing more capital. In Lake Chad, the two major reasons given were a general sense of optimism about fishing and an improvement in the fishing environment. By contrast, the heads in the Upper River Benue indicated that fishing would be better mainly because they would invest more capital and also because they expected the fishing environment to improve. Once more, as with the views of the village heads, the nature or quality of fisheries management was not raised as a major issue by the heads of fishing households.

In sum, the surveys of village and household heads provide a unique insight into the perceptions and attitudes of the fishing communities. It was clear that they were very aware of the changes affecting their livelihoods and communities, in particular the longer-term fluctuations in the aquatic environment and the impact of amenity provision. There was a clear acknowledgement of the impact of economic factors (e.g. fishing costs, capital needed) and environmental factors

Table 9. The future of fishing as an occupation as assessed by household heads

	% Total responses from household heads		
	<i>Upper River Benue</i>	<i>Lake Chad</i>	<i>Nguru-Gashua Wetlands</i>
Better	63	75	83
Worse	29	11	8
No change	8	14	9
Total	100%	100%	100%

Source: Neiland et al. (1994).

Table 10. Reasons given by household heads why the future of fishing will be better than now

<i>Reasons</i>	% Total responses from household heads		
	<i>Upper River Benue</i>	<i>Lake Chad</i>	<i>Nguru-Gashua Wetlands</i>
More capital	40	12	13
More labour/time	13	3	3
Fishery environment will improve	17	22	43
Fishery economy will improve	14	11	17
Improvement in management	2	10	2
Move into fishing	1	0	0
General optimism	4	34	19
Other reasons	11	8	3
Total	100%	100%	100%

Source: Neiland et al. (1994).

(e.g. annual floods) on the performance of fisheries. Overall, there was a general sense of optimism about the future. The fact that fisheries management was not raised as a major issue at all can be interpreted in a number of ways. It could be that fisheries management, and for villages we mean TMS, are perceived to be unimportant, irrelevant or even ineffective. However, this seems unlikely given the widespread occurrence and activity of TMS. It is more probable that the TMS are such an integral and well-developed part of the economic and cultural life of fishing communities that they are taken for granted, almost as a constant factor not to be questioned or doubted. It would appear that this acceptance also extends to the issues of unequal access and distribution of benefits, for there is comparatively little persistent conflict associated with the operation of the TMS, as indicated above.

The interpretation of perception and attitudinal surveys is, of course, notoriously very difficult. As Hamlich (1967, 35–7) indicated, one needs an in-depth understanding of such cultural and psychological factors as goal direction, reaction to stimuli, fatalism, and working conditions and values specific to particular social environments. Moreover, the village heads and fishing household heads interviewed are probably also the ‘insiders’ (e.g. Foell et al. 2000, 17) within the fishing communities: the principal participants in and beneficiaries of the TMS. For ‘outsiders’, for example, migratory fishermen not belonging to the dominant local ethnic group or poor fishermen with a low standing in their communities for whatever reason, the TMS may indeed be an important issue, especially when TMS work to exclude them from the fisheries and the benefits that inclusion can bring. At present, comparatively little is known about the social relations between ‘outsiders’ and ‘insiders’ connected with TMS, and between rich and poor in fishing communities, and their effects.

## CONCLUSION

Given the analysis presented, and taking into account the performance of Nigerian government policy in economic development, fisheries and poverty alleviation, how should we interpret this current phase in the evolution of TMS? The answer has to recognize that contemporary TMS in fisheries reflect the ‘untidy reality’ (after Graf 1988, xi) of northern Nigeria. A major paradox can be identified regarding the role of TMS in promoting sustainable livelihoods and poverty alleviation.

On one hand, it is possible to make a case that TMS allow, or even encourage, the impoverishment of vulnerable members of fishing communities by denying access to resources and reproducing, or promoting, exploitative social relationships highlighted by Watts (1984) and illustrated by the TMAF case studies above. In this case, TMS are not the inheritors of the ‘moral economy’ for rural people in northern Nigeria, but rather represent the effects of social, economic and political forces, initiated in colonial times, which handed the ownership and management of economic resources to local elites. Their practices centre on individualistic capital accumulation, at the expense of the peasantry, within capitalist social relations. In effect, over time processes of commoditization affect how TMS function, with certain continuities in social form masking changes in social content.

On the other hand, the TMS might be seen as the contemporary response of northern Nigerians to the risks and threats which this severe and unpredictable arid zone region has always presented to the pursuit of livelihood. There is no doubt that poverty is a major problem in northern Nigeria, and that fishing communities show evidence of this. There is also no doubt that there are exploitative relationships between rich and poor, between the powerful and the powerless, in places. However, it is also evident that family and community networks continue to provide an important mechanism for coping with risk in this environment. There is also evidence that the rich and powerful accept some

responsibility for the poor in their communities and that some redistribution in times of need takes place. Perhaps the most significant impact of the poor performance of government policy on economic development, fisheries development and poverty alleviation in northern Nigeria has been the establishment of mechanisms of even greater self-reliance by the fishing communities. In many locations, TMS which are clearly embedded in the social and cultural fabric of fishing communities have probably assumed an even more important role in sustaining livelihoods and poverty alleviation.

The reality of TMS today contains aspects highlighted by both these positions. The findings of the TMAF research showed that the TMS were widespread and diverse in their characteristics. In some locations, they contribute to fostering and reproducing poverty through patron–client exploitation and restriction of access to fisheries; in other locations, they contribute to sustaining livelihoods through more equitable resource management and redistribution of benefits. Why TMS develop in these different ways in different places requires further research.

It is also important to acknowledge that the sectoral analyses of poverty have their limitations. The TMAF research shows that many of the fisheries under TMS control not only support the livelihoods of thousands of people, but also generate a positive economic return within the economy. Of course, the major issue remains of who appropriates these economic benefits and what they do with them. From a fisheries management perspective, the answer to poverty alleviation is not simply to increase the degree of access to fisheries resources for poor people. If poor people were allowed greater access to the fisheries, for example by removing the restrictions operated by TMS, this would almost certainly lead to over-exploitation and the erosion of economic benefits sooner or later; the findings of the TMAF project confirm the net benefits of TMS.

The key point is that poverty alleviation needs to be addressed on a broader non-sectoral scale. The most effective way of helping poor fishermen (and those excluded from fishing) may be to create better employment opportunities in other sectors (Smith 1979, 20; Cunningham 1993, 18). By raising the opportunity cost of fishing, the ability of the fisheries to support sustainable livelihoods may be enhanced. The problem remains how to achieve this through mechanisms such as integrated rural development programmes, which incorporate interventions targeted at agriculture, fisheries and other elements of the local economy, and to do so in ways that mitigate or reduce, rather than reinforce and reproduce, existing structures of social inequality.

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