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Fishing and Farming at Lake Chad: Institutions for Access to Natural Resources

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Lake Chad is a vitally important wetland in the semi-arid Sahel corridor. It provides the basis of many thousands of livelihoods which depend on its seasonal fluctuations to renew fish stocks, farmland and rangeland. This paper describes how access to farmland and fishing rights has evolved on the Nigerian shore of the lake. The paper aims to assess the applicability of different institutional approaches to natural resource management on the lake shore. This is important because development interventions in the Sahel have frequently been based on institutional approaches may not have been appropriate to the situations in which they were used and in any event, are rarely universal. In examining which institutional approaches may be relevant at Lake Chad, it is anticipated that this paper will provide guidance for those seeking to invest in the fishing and farming livelihoods of the lake shore. Although many recent approaches to natural resource management have reflected a 'Tragedy of the Commons' approach, a growing literature both in support and critical of Hardin's (1968) thesis has followed. Four distinct approaches are identified and assessed here. These include: (1) those which have attempted to devise the most appropriate ways to privatise and/or impose state regulation of renewable natural resources; (2) critiques of these experiences; (3) models of institutional adaptation to resource scarcity; and (4) approaches which perceive institutions, such as those which govern access to natural resources, as a crucial determinant of social and economic development.

The western shore of Lake Chad has been under the jurisdiction of Borno State in its various guises since the end of the fourteenth century and is currently one of 36 states in the Federal Republic of Nigeria. Although the administrative status of Borno itself has varied, it has been dominated by a Kanuri aristocracy for most of its existence. The Kanuri administration has continued to operate in a remarkably similar way over the past one hundred and fifty years. Traditionally, it has played a crucial role in allocating access to farm land. In recent years, the 'Kanuri administration' has not only maintained its pre-colonial authority over farming on the lake shore, but has expanded it to cover new areas of the lake floor and the increasingly lucrative fishing opportunities which federal government has been unable to regulate. This success suggests that collaboration with the organisations which

operate such institutions could be beneficial, if not essential, to the success of natural resource management.

Keywords: Lake Chad, natural resource management, land tenure, fisheries management, sustainable rural livelihoods

Introduction

Institutions are social constructs which guide human behaviour. They range from laws which are formal and with which compliance is obliged, to informal conventions to which conformance is expected. The importance of such institutions in shaping the livelihoods of the poor has been increasingly recognised (e.g. Swift, 1989; Moser, 1998; Carney, 1988; Scoones, 1998). The aim of this paper is to examine the evolution institutions which govern access to farmland and fishing rights on the Nigerian shore of Lake Chad. These have been examined within a sustainable rural livelihoods (SRL) framework (Sarch, 1999). This considers the range of natural and social, macro and micro-level factors which determine the vulnerability of the poor and is designed to enhance understanding of how sustainable livelihoods may be achieved through development initiatives which aim for more than simply increasing incomes (Scoones, 1998; Carney, 1998). “A sustainable livelihood is one that can cope with stress and shocks and displays resilience when faced with adverse events” (Ellis, 2000: 137).

In focusing on the systems of access to farmland and fishing rights at Lake Chad, the paper aims to assess the applicability of different institutional approaches to natural resource management on the lake shore. This is important because natural resource development initiatives in the Sahel have frequently been based on institutional approaches that may not have been appropriate to the situations in which they were used and, in any event, are rarely universal. In examining which institutional approaches may be relevant at Lake Chad, it is anticipated that this paper will provide guidance for those seeking to invest in the fishing and farming livelihoods of the lake shore.

Four institutional approaches to natural resource management are considered in the first section of this paper. These are followed by a review of the natural and social context of Lake Chad and

research into fishing and farming livelihoods there. The third section presents an analysis of resource access institutions on the lake shore. The paper concludes with a discussion of the relevance of different institutional approaches to systems of natural resource access on the Nigerian shore of Lake Chad.

Institutional Approaches to Natural Resource Management

Like Malthus (1803) almost two centuries earlier, Hardin (1968) expressed a pessimistic view of the capacity of the environment to support population growth. Although not the start of the debate, the "Tragedy of the Commons" which Hardin described in 1968 has focused much attention on the issue of access to natural resources¹. The "Tragedy of the Commons" model predicts dire environmental consequences as the result of the human inability to restrict personal gain for societal benefit: "Ruin is the destination toward which all men rush, each pursuing his own best interest..." (Hardin, 1968: p. 1244). Rather than advocate population controls such as Malthus and subsequent supporters have done, Hardin advocated controlling access to the environment. He recommended privatisation of natural resources and state enforcement of exclusion from them. The implications of this are that natural resources exhibit a fixed carrying capacity and that producers will not develop their own systems regulating access to shared resources.

Although many recent approaches to natural resource management have reflected this approach, a growing literature both in support and critical of Hardin's thesis has followed. Several distinct approaches can be identified. The first includes work critical of confusion in the nature of the property rights described by Hardin (1968). A spectrum of property rights have subsequently been defined and distinguished from the shared resources to which they apply (see Ciriacy-Wantrup and Bishop, 1975; Bromley and Cernea, 1989; Schlaeger and Ostrom, 1994 etc.). The next group broadly concurs with the model of impending 'tragedy' and has attempted to devise the most appropriate ways to privatise and/or impose state regulation of RNRs. The experience of these approaches is examined next with particular reference to the Sahel.

Other authors have rejected the static notion of resource access arrangements implied by many economists, and envisage more complex and dynamic relationships between resource tenure and developments in resource use. Two contrasting approaches are considered here: those which envisage institutional adaptation as a process which responds to developments such as population growth; and those which perceive the institutions which govern access to natural resources, as a crucial determinant of social and economic development and are themselves manipulated to serve the interests of the powerful members of the societies in which they operate.

Institutional Intervention

Despite many instances where common property regimes have been successful, there are several recent examples of 'tragedies' occurring in natural resource management. Fish stock collapses in the Scottish herring fishery, the Canadian cod fishery, and the Peruvian anchovy fishery, each provide examples of 'tragedy' (Caddy and Gulland, 1983; Whitmarsh *et al.*, 1995; Charles, 1996; Roy, 1996; and see Cushing, 1982 and 1988 for the history of fish stocks). Although some have pointed to the large fluctuations that occur naturally in RNRs and have suggested that equilibrium in them is neither natural or normal, equilibrium frequently remains the objective of resource managers. Many theorists have concluded that state regulation and the privatisation of property rights are the only way to sustain these resources and much subsequent effort has concentrated on defining how the limits of resource use should be set (Mahon, 1997).

Biologists have concentrated on attempting to calculate the maximum sustainable yields (MSY) that may be harvested from a natural resource. They have relied on the state to enforce total allowable off-take rates or catches (TACs) typically through attempts to restrict access and/or quotas (Emmerson, 1980; Flam & Storoy, 1982; Fraser, 1979; Matthews & Phyne, 1988). Although linked to the MSY in concept, in practice the TAC is frequently the result of considerable negotiation between biologists, who cautiously seek TACs below MSYs, and resource users who lobby for a TAC to be based on the most optimistic assessments of MSY. Economists have focused on the market failure which they perceive to account for over-exploitation: where an economic rent is not charged for the use of a

resource, marginal production costs are too low, for example, as each new boat entering a fishery does not have to pay to enter, the marginal costs it incurs while fishing (e.g. the fishermen's time) are lower than the marginal returns (e.g. the fish which are caught) (Gordon, 1954). The result of low costs is to encourage entry into the fishery and ultimately to increase its exploitation beyond a sustainable level.

There have been successful state attempts to regulate access to fisheries. The transferable quota system introduced in Iceland has been noted for its success in sustaining the demersal fishery (Arnason, 1994). However, there are many more which have either failed in their objectives, for example the British Columbia salmon fishery (Fraser, 1979), and/or led to considerable dissatisfaction amongst fishing communities (Bailey and Jentoft, 1990). Despite the mandate provided by UNCLOS in 1982, there have been comparatively few attempts at state regulation of African fisheries (Lawson, 1986?). In West Africa these have been associated with the sale of offshore fishing rights to the European Union. The information which is available on the outcomes of state attempts to regulate African fisheries shows mixed results (Johnstone, 1996).

A widespread example of state regulation of natural resources in sub-Saharan Africa is the forest reserves created throughout the Francophone Sahel during the colonial era. They were established in areas which were thought to be vacant and under used and were subsequently managed by the state forest service with the objective of obtaining sustainable timber yields. These have generally failed, not least because their use and management by local villagers were underestimated (Shepherd, 1991). Villagers were reluctant to leave land fallow in case it should be seen as vacant and were inclined to overwork it rather than let it return to woodland (Thomson, 1983). A lack of enforcement has allowed many reserves to subsequently become open access (Freudenberger and Mathieu, 1993). The decline of systems of access to the forests, seasonal pastures and fisheries of the Niger Delta in Mali and their subsequent over-exploitation has also been attributed to the intervention of the colonial authorities and their nationalisation of natural resources (Kone, 1985; Brinkerhoff, 1995; Williams, 1998). Licenses issued by post-colonial governments for cutting wood and fishing in the Delta have further undermined the customary management of these resources (Moorehead, 1989; Quiensière *et al*, 1994). This process has also been observed in Senegal

where the government has permitted the conversion of both rangeland and forests to peanut fields (Freudenberger, 1991; Williams, 1998).

Exogenous adjustments to the institutions which govern access to natural resources have been initiated in anticipation of a range of potential benefits. Very generally, these can be divided into attempts, such as those described above, to achieve sustainable production through state regulation; and into attempts to improve the productivity of natural resources through the introduction of private property rights.

World-wide 'land reform' initiatives have been aimed at increasing agricultural productivity. These have been based on the notion that exclusive private property rights are a prerequisite to investment in the productive capacity of land: 'the land tenure system must be such that people feel secure in their decisions to invest in land' (Carswell, 1997: p. 2). Lipton and van der Gaag (1993) argue that efficient redistribution of land will normally increase farm output, if only because smaller farms are cropped more intensively. Others, notably Boserup (1965) have argued that the individualisation of tenure is the result of increasing productivity, the engine of which is population growth (Boserup, 1965; Netting, 1993). Although this process is essentially endogenous, state formalisation of private property rights is often seen as its conclusion (Platteau, 1996).

In Africa, a well known example of an external attempt to improve agricultural productivity is Kenya's strategy of land registration for smallholders initiated after the Mau Mau rebellion in the 1950s (Swynnerton, 1954). Haugerud (1989), however, argues that although agricultural productivity did improve in Kenya this was in spite of land registration rather than because of it. Although Tiffen *et al.* (1994) illustrated how population has grown and individualised tenure spread in Machakos District, this has been criticised for masking differentiation within Machakos (Rocheleau, 1995; Murton, 1999).

Institutional Erosion

Overall, the alternatives of state regulation and private ownership of natural resources have frequently been shown to have had little success in Africa, and in some cases, the reverse outcome, environmental degradation and reduced productivity has resulted. Several authors depict a situation where the depletion of natural resources previously held and used in

common has been the direct result of intervention from outside agencies. External organisations such as powerful rulers, colonial agencies and emerging nation states have either eroded or dissolved community-based access arrangements either in order to appropriate them or in the name of creating more sustainable or productive arrangements. This process has been observed not only in the rangelands, forests and fisheries of the Sahel but also in the access arrangements to a range of natural and 'common' resources in other parts of the world. (Bromley and Cernea, 1989; Jodha, 1986; Jodha, 1992; Platteau, 1996).

Whether or not external attempts to regulate access to natural resources can improve their sustainability and/or their productivity, there is consensus that, in Africa, external intervention has had an important impact on the institutions which do govern access to natural resources. However, in many situations the systems of access introduced during the colonial and post-colonial eras have not replaced customary systems. Rather, both systems have persisted and the administrative dualism of overlapping state and community systems of resource tenure has increased the vulnerability of previously community-based systems to abuse (Platteau, 1996; Williams, 1998; IIED, 1999).

Institutional Adaptation

Despite the considerable effort expended in improving the resource access institutions of the developing world, there is a wide body of literature which documents and explains processes of endogenous institutional adaptation and evolution.

The concept of adaptation has been used in the development of natural resources policy, where in contrast to Hardin's (1968) picture of resource users 'rushing to ruin', systems of resource access are envisaged as evolving in response to the costs and benefits associated with resource exploitation. Boserup's (1965) theory predicts that as population grows, land tenure will become increasingly individualised in the process of agricultural intensification. Netting (1993: p. 158) describes a range of examples which he uses to show that "land use determines land tenure". Demsetz's (1967) 'Theory of Property Rights' suggests an alternative outcome to the inevitable 'tragedy', where demand on a resource increases, for example through population increase, its value increases and the relative cost of excluding others from

its use decreases. It becomes worthwhile for producers to develop their own systems of regulating access to the resource (Demsetz, 1967). Hayami and Ruttan's (1985) 'Theory of Institutional Innovation' points to the role which technology may play in the balance between the costs and benefits of exclusion. They give the example of barbed wire in North America, which significantly lowered the cost of enclosing rangeland.

Wade's (1988) differs from other theories of property rights, in that neither environmental tragedy nor increasing exclusion is inevitable, rather common property can be the end result of institutional adaptation. He describes how systems of property rights develop in response to risk where the costs of privatisation and exclusion are high and the benefits uncertain. A fundamental difference in this approach is that it allows for the individual and community interests to coincide. Runge (1981; 1984), Ostrom (1990), Quiqqin (1993) and others have also identified circumstances where communal forms of property are economically efficient and have been successful in avoiding environmental 'tragedies'.

There are many examples which show how resource users can and do adapt systems of access to natural resources where it is in their interests to do soⁱⁱ. These have validated the adoption of community based approaches by both national and international development agencies which have both advocated and sponsored a range of local-level resource management initiatives, or 'community based sustainable development' around the world (Leach et al., 1997a). There have been several such initiatives in the Sahelⁱⁱⁱ. However, the outcomes of such processes vary as widely as the natural resources and resource users themselves (Toulmin, 1991; Painter et al., 1994; Brinkerhoff, 1995; Leach et al., 1997a). They have, however, often fallen short of expectations and their experiences do not point to widely or easily applicable policy measures (Western et al., 1994; Leach et al, 1997a).

Institutional manipulation

In contrast to models of institutional adaptation, North (1990) considers the process of institutional evolution as a determinant, rather than a result of economic development. He describes how underdevelopment can be attributed to the operation of socially inefficient institutions:

" ...activities that promote redistributive rather than productive activity, that create monopolies rather than competitive conditions, and that restrict opportunities rather than expand them...seldom induce the investment in education that increases productivity. The organisations that develop in this institutional framework will ...[make] the society even more unproductive and the basic institutional structure even less conducive to productive activity." (North, 1990: p. 9)

North (1990) argues that rather than to be socially efficient, institutions are created to "serve the interests of those with the bargaining power to devise new rules". More specifically, Leach et al. (1997b: p. 4) argue that the assumptions of distinct and consensual communities and of relatively stable local environments, which are fundamental to most community-based resource management initiatives, are incorrect. They suggest that the failure of such initiatives can be attributed to these assumptions and propose an "Environmental Entitlements Framework" in which co-users of natural resources use their varying rights and resources to negotiate for different levels of access (Leach et al, 1997b). The processes of codifying 'native' arrangements for access to land which Berry (1993) examined in former British colonies fit this framework well. She describes how this process generated a blizzard of claims and counterclaims and placed enormous power in the hands of those with contacts in the British Administration. Both North's (1990) and the environmental entitlements approach point to the crucial role of power relations in shaping the institutions that determine the use and management of natural resources. Although the community-level focus on resource users remains valid, consensus and co-operation between them cannot be assumed.

Lake Chad

The Lake Chad basin covers a large part of central Africa. The lake itself lies at the south-east extreme of the Sahara Desert and traverses the Saharan, Sahel and Sudan-Savannah agro-climatic zones. Although rainfall is low and variable in these zones, it has little impact on the volume of the lake which is "an accumulator of positive departures from the mean Chari/Logone discharge, rising in response to runs of wet years, falling with successive years of drought" (Grove, 1985: p. 146). Water from the Chari/Logone rivers flows into the lake at its

southern extreme and flows northwards and outwards encouraged by the lake's gradient and prevailing winds. This inflow peaks in October/November following the end of the rains in the southern catchment area and reaches a minimum in May/June at the start of the next year's rains. These flood waters take between one and two months to reach the Nigerian shore where water levels peak in January and reach their minimum in July (Olivry *et al.*, 1996).

In the past 25 years, annual rainfall in much of the catchment area has been reduced and the surface area of the Lake has varied considerably both on an intra and interannual basis (Sarch and Birkett, 2000). Three main ecological zones of the lake remain: firstly, the perennial areas of open water close to the inflowing waters of the Chari; secondly, the archipelago zones where water surrounds the dunes along north east coast of the lake; and thirdly, the swamps in the southwest which are seasonally inundated (Lemoalle, 1991). Although the limits of each of these zones are determined by the lake's level, the map in Figure 1 indicates the approximate location of these zones and the study area in the swamps of the Nigerian shore.

The western shore of Lake Chad has been under the jurisdiction of Borno since the end of the fourteenth century. Borno State is currently one of 36 states in the Federal Republic of Nigeria. Although the administrative status of Borno itself has varied, it has been dominated by the Kanuri ethnic group for most of its existence. (McEvedy, 1995). Migration during the latter part of the millennium has brought Shuwa Arabs from the east and Fulani pastoralists from the west. Recent settlers on the lake shore include Hausa families from across northern Nigeria who were attracted by fishing opportunities at the lake during the 1970s (Meeren, 1980; Neiland and Verinumbe, 1990). Although certain ethnic groups have particular traditions, e.g. the fishing traditions of the Hausa, households from a variety of ethnic groups fish, farm and/or herd cattle (Harris, 1942). This paper focuses primarily on the communities who have settled on the southwest lake shore. They include mainly Kanuri and Hausa households but also smaller numbers of Fulani, Shuwa and Yedina.

The Kanuri hegemony of Borno was named the 'Native Administration' by the British colonists (and is called the 'traditional administration' in this paper) who collaborated with them to develop their system of taxing the rural population (Temple, 1919). This had been based on a system of fiefs, either territorial or by association (by trade for example), allocated by the *Shehu*,

the suzerain, to either members of his family, favoured courtiers, or to high ranking slaves. Under this system, the population were obliged to pay a variety of taxes to the fiefholder who administrated the fief through a tax collector, a *Chima*, and a hierarchy of village heads, *Lawans* or *Bulamas* (Brenner, 1973). Brenner (1973: p. 112) describes how mutual interest was the primary justification for these administrative links:

"Barring drought or other causes of crop failure the peasantry could support itself without the aid of the state, which in any case did little to plan against possible famine. But the protection which the ruling classes provided was crucial, for without it a village might be the constant target of slave raids and looting forays."

Under the colonial system of taxation, the *Shehu* nominated District Heads, *Ajia*, who were responsible for collecting tax from the various regions throughout Borno. The *Ajia* delegated this task to sub-district heads, *Lawans*, who usually delegated to local agents known as *Bulama*, all of whom were expected to channel revenues upwards to the *Shehu*. Initially, in 1905/6 when this system was set up, the *Shehu* was required to pass half his receipts to the British (Palmer, 1929).

Since Nigerian independence in 1960, a modern government has operated in parallel with the traditional administration and consists of three tiers: Local, State and Federal. Although State and Local Governments can and do raise their own revenue, they mostly rely on Federal Government allocations. In contrast, the traditional administration raises most of its revenue at a local level predominantly by taxing the rural population.

There are five Local Government Areas (LGAs) which are adjacent to the Nigerian shore of Lake Chad. Although LGAs have a fishing and agriculture remit, the level of involvement in fishing and/or farming varies between each LGA. The study region includes the middle three, Kukawa, Mongonu and Marte.

The Borno State Government has a minimal involvement in the administration of the Lake and its immediate vicinity. This is partly due to international tensions. Outbreaks of armed clashes and rebel activity on islands in the lake have persisted since the 1970s and are largely associated with the succession of civil wars in the Republic of Chad. A multi-national 'Joint Patrol' has

been created in response to these outbreaks and has been monitoring the lake and prevent further violence. Along the western shore of the Lake, the Nigerian Army dominates the Joint Patrol.

Despite huge investments in irrigation (and smaller investments in fisheries) during the 1970s, development initiatives have achieved little lasting change at Lake Chad (Azeza, 1976; Kolawole, 1986; Hutchinson *et al.*, 1992; Sarch, 1999). Although linked to the Nigerian economy through the market for their produce, the households making their living on the Nigerian shores of Lake Chad are remote, both geographically and politically, from Nigerian policy makers. The villages in which this study was based have hardly been acknowledged by Federal Government. They have received negligible public investment in their welfare: most wells are hand dug; education is restricted to Koranic schooling for boys; medical facilities are only available in the large towns; and the security services usually monitor only transport nodes. The villages are reached either on unmarked tracks on the lake bed, or via channels in the swamp vegetation.

Research at Lake Chad

Fishing and farming livelihoods have been analysed using household survey data collected in 1993 and the findings of participatory research conducted with four communities on the lake shore during 1995. These exercises were undertaken as part of the British Government fisheries research project and the research techniques used are outlined below (Neiland and Sarch, 1993). The subsequent livelihood analysis examined these data in the wider context of the environmental fluctuations, socio-economic development and institutional changes described above.

The 1993 household survey aimed to gauge the relative importance of different sources of income to the communities living on the lake shore. A 1.8 per cent sample of the heads of an estimated population of 25000 sedentary households living on the south-west shore were interviewed in 1993. The study area included the eight sub-districts from Baga southwards along the lake shore whose heads, or *Lawans*, estimated the population of the lake shore villages from their knowledge of the taxes collected from these villages (see Figure 1). Previous analyses of the survey findings revealed that many of these households were small, young and had arrived at

their current location recently (Sarch, 1996; 1997). The majority (59 per cent) earned three-quarters of their income from farming, a significant proportion (36 per cent) earned income from a combination of fishing and farming and few (five per cent) households relied entirely on fishing income.

Unlike the systems described in many text books, the farming systems at Lake Chad are not readily assessed as 'shifting, 'semi-permanent' or 'permanent'; or extensive or intensive (Sarch, 1999). Farming systems in the study area have been developed to exploit the seasonal flooding of the lake shore (Sarch and Birkett, 2000). In key respects the farming techniques used are extensive: farmers rely on 'new' land to maintain fertility levels and labour is an important constraint to production; whereas in other respects, farming systems are intensive, three or more crops are often relayed within the season and although largely unmechanised, production is commercialised, with high levels of cash inputs and crop sales. In 1993, the value of farm sales represented over three-quarters of mean household output in the study region.

Similarly, the fishing systems on the lake shore have been developed to exploit seasonal flooding (*Ibid.*). Although estimates of fish production from the lake vary and the exact roles of the lake's contraction and the exploitation of fish stocks in this decline are difficult to ascertain, at least part of the reduction in production over recent decades is accounted for by the contraction of the lake (Stauch, 1977; Olivry et al., 1996)^{iv}. Following this contraction, the *dumba* method of fishing has become increasingly popular. A *dumba* is a row of fish traps which are placed across a channel of receding lake water. The traps are linked by small meshed netting which forces the fish in the retreating flood water into the traps. The *dumba* is especially effective as fish retreating with the receding flood cannot escape them, and they do not need to be baited.

The investigation of systems of access to farmland and to fishing rights in the study area was based on the findings of participatory appraisals conducted in four case-study villages in the study area during 1995. The appraisals were designed to understand the institutional channels of resource access, their context and evolution, and to enable contrasts and comparisons

between them. The further stages of the investigation used predominantly secondary sources to examine access institutions at the district, regional, and national levels.

Resource access institutions at Lake Chad

The results of this investigation are presented in this section. Systems of access to farmland are considered first and exclusive access to fishing rights is considered next. Analysis of secondary sources at national and regional level have been used to explain the evolution of the *de jure* or theoretical, systems of access and this is contrasted with what was learned at a village and district level about how access to farmland and fishing rights operates in practice.

Access to farmland in theory

Under the provisions of the 1978 Land Use Decree, all land in Nigeria was nationalised: "All land comprised in the territory of each State in the Federation are hereby vested in the Military Governor of that State and such land shall be held in trust and administered for the use of common benefit of all Nigerians." (cited in Uchendu, 1979: p. 69).

In theory this decree removed land from the trusteeship of families, communities and community leaders and replaced them by the State Governor; it also restricted individual interests in land to one of occupancy "...and [to] the sole right to and absolute possession of all the improvements on the land." (Ibid.: p.70). The decree vested the management and control of all non-urban land in Local Government. Individuals utilising non-urban land are assigned rights of customary occupancy which may be certified by Local Government. Local Government may also grant rights of occupancy to up to 500 hectares to an individual or organisation for agricultural purposes. As there are few 'urban' centres at Lake Chad, most of the land in the Nigerian Sector comes under the jurisdiction of the Local Governments adjacent to the Lake.

Mortimore (1997) envisages the 1978 Decree as the most recent formulation of the rights taken in the Fulani conquest of northern Nigeria in the early nineteenth century. Although not conquered by the Fulani, the system of administration operated by the Kanuri aristocracy in

Borno was not unlike the system of Maliki law imposed by the Fulani, in that it was also based on Islamic law (Palmer, 1929; Brenner, 1973). The rights in land associated with both systems were transferred to the British following their conquest and in 1908, "all lands in the Northern Provinces" were declared by Ordinance to be held in trust by the Governor for the people (Hill, 1972: p. 240).

Access to farmland in practice

In practice, the Kanuri aristocracy has retained almost total autonomy in allocating the land on the shores of Lake Chad. Apart from land acquired by the Federally sponsored South Chad Irrigation Project (SCIP) in 1973, farmland is allocated in much the same way as before the 1978 Decree. Currently, *Bulamas* act as ward or hamlet heads, they allocate land and collect taxes under the jurisdiction of the local *Lawan*, also known as a sub-district head. In addition to the revenue received from *Bulamas*, *Lawans* may also receive dues of various kinds from representatives who receive taxes from non-village sources, such as pastoralists and fishers. These tax bases parallel the territorial and associational fiefs granted by the *Shehu* in the pre-colonial era. Currently, *Lawans* are obliged to channel their tax revenues to Local Government^y. In practice, however, where *Lawans* do pass on a proportion of their revenue, this is to the '*Ajia*', or the District Head.

Although this system has evolved since Nigerian independence, it is similar in to the system which operated before colonisation. It differs, however, in an important respect. Whereas in the past the system was balanced by the need to defend itself - the aristocracy depended on the peasantry to replenish their armies and in return the peasantry were protected from the slave raids of hostile neighbours, when the British colonised Borno and undertook its defence, taxation and protection were divorced. The current state and local Governments receive little, if anything, from land taxation (see for example, the report of the Borno State Local Revenue Committee, 1982). The Joint Patrol receives nothing from these taxes either. It is funded, officially, by Federal Government and, unofficially, by the charges which its officers levy on movement around the lake basin.

Table 1 Access to farmland in four case study villages on the Nigerian Shore of Lake Chad.

<i>Village</i>	<i>Land allocated by</i>	<i>Taxes handled by</i>	<i>Taxes passed to</i>	<i>Year farming started</i>	<i>Major Changes</i>	<i>Conflicts</i>
Dabar Shata Kwata	<i>Bulama</i> of neighbouring Dabar Shata Gari	<i>Bulama</i> of Dabar Shata Gari	The <i>Lawan</i> of Baga	1981	None	Initially, with <i>Bulama</i> of Dabar Shata Gari over right to allocate land
Kwatan Dawashi	The <i>Bulama</i>	The <i>Bulama</i> 's assistants are overseen by the <i>Lawan</i> 's assistant	The <i>Lawan</i> of Dogoshi	1984	None	Periodically, between villagers and Fulani herders over access to lake water over farming land.
Sabon Tumbu	One of three <i>Bulamas</i> representing the main ethnic groups	The <i>Bulamas</i> ' assistants are overseen by the <i>Lawan</i> 's assistant	The <i>Lawan</i> of Baidari	1985	None	Recently, between transhumant farmers and Fulani pastoralists; and periodically within Hausa community over <i>Bulamaship</i>
Tumbun Naira	The 'acting' <i>Bulama</i>	The <i>Bulama</i> 's brothers and the <i>Bulama</i>	The <i>Lawan</i> of Mintar	1984	Village flooded and abandoned in 1994, few had returned to farm in 1995	None

(Source: Key interviews and group discussions during the participatory rural appraisals of the four case-study villages in 1995)

Details of the land access arrangements in four case study villages are provided in Table 1. The table shows that the arrangements for allocating the land have changed little since the settlement of each of the villages. Although the first settlers did not need to request land to farm, local aristocrats were quick to claim their taxation rights and especially so where

disputes over land have arisen. In most cases, the local *Lawan*, nearly always a Kanuri, asked the community to nominate a *Bulama* through whom they should channel their annual taxes. In return the *Bulama* was given the *Lawan's* authority to allocate residential and farmland and to settle disputes within his community. Disputes over the right to allocate farmland, such as that between the *Bulamas* of Daba Shata Kwata and Dabar Shata Gari, are usually settled in the favour of the Kanuri community where there is an option. In the case of Sabon Tumbu, similar disputes within the Hausa community have been settled in favour of the candidate with the ability to deliver the largest tax payment to the *Lawan*.

The size of the tax payments made to the *Lawan* is subject to annual negotiations: the *Bulama* must satisfy both the *Lawan*, on whose authority his position depends, and his community on whose support he relies. If taxes are too high or too low, he risks alienating one or the other. Although taxes are never welcome, they were not unexpected by settlers, since many of the lake floor farmers had come from home regions where similar systems had operated in the past.

Access to fishing rights in theory

No national legislation regarding the licensing or regulation of inland fisheries was enacted until the Inland Fisheries Decree of 1992. The decree charged the Commissioner for Agriculture in each state with the responsibility for licensing and regulating inland fishing. Certain regulations on gear are introduced in the decree and there is provision for the creation of further regulations at Federal level. Nonetheless, there remains no provision in the law for the ownership of water bodies. Rather, through assigning responsibilities to license and control inland fishing within each state to the Commissioner for Agriculture, it implies he is the trustee of the inland water bodies of each state (Inland Fisheries Decree 1992, Supplement to the Official Gazette Extraordinary No 75, vol. 79, 31st December 1992). Notwithstanding this, each LGA also has a remit for fishing which is usually the concern of a Department of Natural Resources (Madakan and Ladu, 1996).

Since the promulgation of the Federal Decree on Inland fisheries in 1992, the damming of inland water, and in effect - *dumbas*, has been prohibited:

"The appropriate authority shall regulate and control the building of dams, weirs or other fixed barriers or obstruction to ensure the free movement of fish, and where permission is granted to a person to build a dam, weir or other fixed barrier or obstruction, fish ladders shall be built to ensure free movement of fish." (Inland Fisheries Decree 1992, Section 10 [1]).

The Lake Chad Basin Commission's Joint Regulations on Fauna and Flora also effectively prohibit *dumbas*^{vi}. The regulations specify that member states will take the necessary measures to prohibit "... dikes, dams or other obstacles which hinder or prevent the migration of fish" (see part B, aquatic fauna, article 6; cited in Moschetta, 1991).

Access to fishing rights in practice

Both Federal and Local Government have attempted to manage fishing at Lake Chad. The LGAs in the study region endeavour to play an active role in regulating and taxing fishing in their areas. For example, in 1995 Mongono and Marte LGAs charged a 200 Naira license fee to fishers within their jurisdiction. However, compliance with measures such as these is limited by the lack of LGA resources and inability to their staff to reach the most productive fishing areas on the lake and enforce them. The Federal Fisheries Department has attempted to enforce the regulations of the 1992 Decree at Lake Chad through visits to the lakeside Local Government Areas and meetings to explain the stipulations of the 1992 Decree to LGA staff.

Table 2 Access to rising flood fishing from four case study villages on the Nigerian Shore of Lake Chad.

<i>Village</i>	<i>Restrictions enforced</i>	<i>Taxes/Fees</i>	<i>Taxes/Fees passed</i>	<i>Year fishing started</i>	<i>Major Changes</i>	<i>Conflicts started</i>
Dabar Shata Kwata	None	The <i>Bulama</i> expects an acknowledgement from fishers staying in the village	No further	1978	None	None
Kwatan Dawashi	None	None	N/A	1980	None	None

Sabon Tumbu	None	Fee paid to one of the three <i>Bulamas</i>	Used to meet tax demands of <i>Lawan</i> of Baidari	1985	None	None
Tumbun Naira	None	None	N/A	1984	None	None

Source: Key interviews and group discussions during the participatory rural appraisals of the four case-study villages in 1995

Table 3. Access to *Dumba* fishing during the receding flood from four case study villages on the Nigerian Shore of Lake Chad

<i>Village</i>	<i>Restrictions enforced</i>	<i>Taxes/Fees</i>	<i>Taxes/Fees passed to</i>	<i>Dumba fishing started</i>	<i>Major Changes</i>	<i>Conflicts</i>
Dabar Shata Kwata	Fishing at <i>dumba</i> sites is restricted and licences sold. Licences are endorsed and enforced by the Army	Negotiated through his village-based assistant and paid in cash to <i>Lawan's</i> representative. A further fee is also paid to the Army	The <i>Lawan</i> of Baga	1989	In 1993, conflict led to regulation and licensing of <i>dumba</i> site allocation, which had previously been on a 'first-come, first-served basis'	<i>Bulama</i> involved in dispute over the <i>dumba</i> licence which he paid for in 1995 and was subsequently ignored and <i>dumba</i> rights denied
Kwatan Dawashi	Fishing at <i>dumba</i> sites is restricted and licences sold.	Fees negotiated with and paid in cash to the <i>Bulama</i> who issues a LGA receipt	Kukawa LGA	1989/1990	In 1994, Kukawa LGA took over <i>dumba</i> licensing revenues from <i>Lawan</i> of Dogoshi (and the Army). Recent enforcement of 1992 decree challenges the LGA taxation of <i>dumbas</i>	None mentioned
Sabon Tumbu	Fishing at <i>dumba</i> sites is restricted and licences sold.	Negotiated through one of the three <i>Bulamas</i> . <i>Lawan's</i> representative decides whether to issue licence and accepts payment in cash.	A proportion is passed to the <i>Lawan</i> of Baidari (and on to District Head)	1989	In 1994, Marte LGA took over direct allocation and licensing of <i>dumbas</i> and then had to stop after the enforcement of the 1992 decree. The system then reverted back to its current status.	None mentioned

Tumbun Naira	Fishing at <i>dumba</i> sites is restricted and sites are allocated by the acting <i>Bulama</i> for an initial fee.	Taxes assessed in relation to catches and paid to acting <i>Bulama</i>	A proportion is passed to <i>Lawan</i> of Mintar (and on to District Head)	1989	The system of <i>dumba</i> regulation had evolved by 1993. Mongonou LGA considered taking over <i>dumba</i> licensing, but considered it too problematic	None mentioned
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Source: Key interviews and group discussions during the participatory rural appraisals of the four case-study villages in 1995

In practice access to fishing at Lake Chad varies with the season (see Tables 2 and 3). Fishing during the rising flood is more or less open access. Anyone with the means to do so can fish the rising flood waters. Rising flood fishing does not require permission and is not charged for directly. There are, however, indirect costs, for example the discretionary charges imposed by the Joint Patrol^{vii}. As the flood peaks and begins to subside, fishers have the option either to fish the area of open water remaining at the centre of the lake basin or to fish the pools and channels of residual flood water which remain around the villages of the study area (see Table 3). Access to these fishing grounds is restricted to those who pay for it, usually in advance.

The allocation and taxation of *dumba* sites has become an important focus of fisheries regulation since they were introduced in the 1980s. Since then, there has been considerable competition for suitable sites in which to locate *dumba*. Up until 1993, *dumbas* had been a source of conflict between *dumba* fishers and those down stream of them. In 1993, the conflict was resolved by a wealthy *Lawans*, who agreed to issue a written license which could be checked and (the exclusive rights of the licensee) enforced by the Joint Patrol, i.e. the Army.

Then in 1994, Kukawa and Marte Local Government Areas (LGAs) attempted to license and tax *dumba* and confusion developed over who had the right to license them. This was resolved when, in early 1995, Federal fisheries officers visited the LGAs and explained the regulations of the 1992 decree. These prohibit *dumba* and thus prevented LGAs from taxing them (see Table 2). Nonetheless, the use of *dumba* persists and the 'traditional' administration filled the void created by the withdrawal of Local Governments and expanded its authority over fishing, in particular over the allocation of *dumba*.

Although there was considerable variation in the systems of access to *dumba* which operated from each case study village, the profits to be made from *dumba* fishing were reflected in the ubiquitously high license fees which are charged for them. The exclusive rights to operate a *dumba* at a particular site were sold for as much as 10 000 Naira, or over US\$100 in 1995. Not surprisingly, the focus of access institutions has shifted away from other methods of recession fishing. In general, the exclusive rights to the fishing from a *dumba* site were sold for cash, in advance, on a seasonal basis. Purchasers of these could then sub-let these rights for various time periods during that season. *Dumba* sites are allocated by various agents of the local *Lawan*, although rarely the *Bulama*, with the objectives of revenue collection and conflict prevention. The second of these objectives is shared with the Joint Patrol whose officers also profit from their endorsement of the *dumba* licenses issued by certain *Lawans*.

Discussion and Conclusion

Rather than evolving from communities themselves as a response to their production strategies, the system of access to farmland on the current Nigerian shore of Lake Chad has been imposed by an aristocracy based in the towns and villages along the former lake shore. This system was familiar to most in the case-study communities and not unworkable as much of the agricultural production at Lake Chad is for sale. It is, however, largely arbitrary in that farmers have no say in who receives their taxes or in how they are spent. Unlike during the pre-colonial era when peasants received protection from the Kanuri aristocracy, the farmers of the lake shore receive nothing (other than access to farm the recently revealed lake shore) in return for the taxes paid to the *Lawan*.

Unlike the case for farmland, the systems of regulating access to fishing had been created recently. They have developed in response to the introduction of the highly profitable method of fishing which had led to conflict and confusion. Conflict between fishers developed over the impact of *dumba* on down stream fisheries and confusion existed between modern administrative agencies over *dumba* regulation and taxation. Large *dumba* profits were both a source of conflict and the motive for the traditional administration to resolve the conflict and benefit from the profits.

While fishing profits have inspired such a system, the nature of the receding flood fishing grounds makes the system possible. The pools and channels of residual flood water have visible boundaries and their shallow depth means that the *dumba* operating in them are clearly visible. Exclusive fishing is both possible and profitable. In contrast, the rising flood water is highly mobile and fluctuates in both its depth and extent on a daily basis. Attempts to delimit the rising flood fishing grounds either spatially or temporally are likely to be thwarted as it moves across the lake floor. Although fishing the rising flood is profitable, excluding fishers from it would be virtually impossible.

The institutions for access to resources at Lake Chad do not readily conform to existing models of resource tenure. The following discussion considers the extent to which those discussed at the start of this paper offer an explanation of resource access at Lake Chad. The first model to be considered was that outlined by Gordon (1954) and described as the 'Tragedy of the Commons' by Hardin (1968). This was based on the notions that environmental carrying capacity is finite, 'tragedy' ensues once this capacity has been exceeded and as the users of a resource will not voluntarily restrict their exploitation of it, the state must impose and enforce exclusive rights to the resource. This theory cannot be applied to Lake Chad where a major determinant of environmental carrying capacity is the extent of the flood and this fluctuates from year to year. The impact of resource exploitation on the capacity of the lake to support its population is unclear and in any event, is restricted by a variety of institutions which control access to the lakes resources.

The second model to be considered was the historical process of institutional erosion observed in the Francophone Sahel. The degradation of forests and rangelands throughout the region has been attributed to the partial imposition of 'modern' statutory measures to ensure

their sustainability. These not only failed in their objectives but undermined the customary tenure arrangements that did exist. The result has been a dual system in which the many areas where tenure is either unclear or not enforced have been over-exploited. A similar institutional dualism exists at Lake Chad and this also has had gaps in its coverage, for example in the allocation of fishing rights. However, the fortunes of the traditional administration at Lake Chad have differed in two important respects from those of the systems of customary tenure in the Francophone Sahel.

The first difference between the dual systems of resource tenure in the Francophone Sahel and those at Lake Chad is in the relationship between the traditional administration and the State. Rather than being undermined by 'modern' tenure arrangements, the British colonial policy of collecting tax through the traditional administration served to strengthen it. This legitimised what is essentially a system of feudal exploitation. The current system differs little except for, where in the past the 'Native Administration' passed on a proportion of the tax collected to the British, very little of the revenue from farm taxes reaches Local Government and the Nigerian Army which now defends the lake shore receives nothing from these taxes.

The second respect in which the 'Native Administration' at Lake Chad differs from customary systems of tenure in the Francophone Sahel is in its objectives. Whereas systems of customary tenure have been characterised as broadly benevolent in that they sustained rural livelihoods, at Lake Chad, the overriding and overt objective of institutions for resource access is profit. *Lawan's* collect taxes as rent on 'their' fiefs. The ability of such fiefholders to acquire and extend their fiefs has not been the result of any investment in or historical association with the lake floor which, after all, was only revealed after the lake began to contract in the 1970s. Rather their ability to instigate the institutions for access to the resources of the lake floor is a function of the power of the 'traditional' administrators to pursue their own interests.

The third model to be considered was that of the institutional development which Boserup (1965) and Netting (1993) have linked to the process of agricultural intensification generated by population growth and increased demand for land. This predicts that the intensity of

resource exploitation will determine the exclusivity of the property rights as resource users will develop institutions to exclude others from benefiting from their investment in the resource. Agriculture at Lake Chad has experienced neither intensification or institutional development in the way that Boserup, Netting and others have described. The contraction of the lake has prevented the establishment of long-term use rights to farmland and while farmers use a high level of working capital and sell a large proportion of their output, they have made minimal investments in fixed capital.

The process of institutional development at Lake Chad conforms most closely to the model propounded by North (1990) in which institutional evolution determines the outcome of economic development, rather than *vice versa*. North describes how where the evolution of institutions is driven by the interests of those with the power to devise them, nepotism, monopolies and underdevelopment results. For households making their living at Lake Chad, the result of this process is arbitrary taxation. The taxes imposed by the traditional administration are illegitimate because the obligation to pay them is not matched by a duty to provide. Such taxes are inimical to livelihoods because revenues are not used to provide the schools, health centres and other social and physical infrastructure that would enable households to build on their assets.

Despite the exploitation inherent in it, the system of land tenure at Lake Chad has important advantages over the system of fisheries management. The most important of these is that it works. The institutions for access to land are widely understood, they have almost complete compliance and they are stable. The households of the lake shore know when they will be expected to pay their farm tax, they know who they will pay, roughly what proportion of their harvest will be required and roughly what other households in the village will be paying. In contrast, the allocation of fishing rights varies from village to village, has required the army to prevent conflict, and has swung between the control of Local Government, the 'Native Administration' and the Army.

Although broadly benevolent and similar in their aims to sustain fish stocks and fishing livelihoods, the efforts of the Federal Fisheries Department and Local Government have conflicted and have resulted in failure. Federal attempts to enforce a ban on *dumba* fishing at

the beginning of 1995 prevented Local Government regulation of *dumba* fishing. The traditional administration subsequently resumed their allocation and taxation of *dumba* licenses and where disputes arose, the Nigerian Army were paid to endorse these 'traditional' licenses. *Dumba* fishing persists and Local Government has little control over it. Fisheries management, like the other modern administrative institutions at Lake Chad, cannot operate effectively because there is confusion over which agencies have jurisdiction over which areas, the formulation of regulations cannot keep up with the dynamics of the lake, and the organisations charged with enforcement are so poorly funded that when their staff are in a position to enforce a regulation, their personal needs, for example to bring food home, take priority.

Although farm taxes are neither accounted for nor invested in the communities who pay them, the understanding which all involved have about the way they are collected is an advantage. Most of the other taxes imposed at Lake Chad are not only illegitimate but inconsistent as well. The allocation of exclusive fishing rights is an example of this as are the capricious demands for payments made at the checkpoints operated by the Joint Patrol. The inconsistent nature of these taxes severely constrains the ability of farmers and fishers to plan for them and adjust their livelihoods accordingly.

These conclusions indicate a radical route forward. That is to address the inconsistent nature of much taxation at the lake. Whether or not the taxation is legitimate, if it is at least transparent, then households could adjust their livelihoods to cope with it. Lowering the transaction costs involved in both acquiring and allocating access to fishing grounds, for example, would be in the interest of both the households making their living on the lake shore and the individuals making a living on their backs. This would not require rigid regulations. The comparative success of the traditional administration in allocating farmland can be partly attributed to their flexibility in adapting to the changing environment at Lake Chad. If formulae, rather than fixed amounts or dates, for the taxes which must be made could be established and disseminated, this would reduce the transaction costs for all involved.

Acknowledgments

The research at Lake Chad was undertaken as part of the Traditional Management of Artisanal Fisheries Project (TMAF). TMAF was funded by the UK Overseas Development Administration Project No R5471 and conducted by the University of Portsmouth (UK) in collaboration with the University of Maiduguri (Nigeria) and the Federal University of Technology, Yola (Nigeria). Further analysis of this research has been made possible by an ESRC research studentship awarded to Marie- Thérèse Sarch

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Legislation

1977 Joint Regulations on Fauna and Flora of the Lake Chad Basin Commission, ratified by the Federal Government of Nigeria in 1988

1978 Federal Government of Nigeria Land Use Decree

1982 United Nations Convention of the Law of the Sea - Articles 61 and 62

1992 Federal Government of Nigeria Inland Fisheries Decree

ⁱ In a similar vein to Hardin, Olson (1965) argued that if an individual can derive a benefit from a public good in any event, there would be no reason for she or he to contribute to the good. Other authors have described this theory using the 'prisoners' dilemma' where individuals are offered a choice between co-operation with each other or defection. If both co-operate and stint in their use of the common resource its over-exploitation is not inevitable. However, the theory predicts that joint users of a common resource have no incentive to stint in their use of it as they cannot be sure that their co-users will do likewise, rather they will pursue the 'free-rider' strategy and will ultimately over-exploit, leading to "tragedy". (Runge, 1984; Moorehead and Lane, 1993; Wade, 1988)

ⁱⁱ For example: Acheson (1975) describes how 'fief' holders have created exclusive rights to the lobsters of the Maine coast; McGoodwin (1983) describes a variety of indigenous mechanisms of self regulation in unmanaged fisheries; Wade (1988) shows how users developed a system of managing access to irrigation; Child (1993) describes how rural communities in Zimbabwe now manage and market their wildlife successfully; and Kurien (1995) describes how communities are acting collectively to rejuvenate coastal fisheries.

ⁱⁱⁱFor example the *Programme National de Gestion des Terroirs Villageois* in Burkina Faso (see Toulmin, 1991) and a similar strategy for forestry management in Mali (see Brinkerhoff, 1995).The TMAF project, through which research for the thesis was conducted is an example of such an initiative funded by the UK DFID to promote community-based solutions to perceived fisheries management problems. The recent UK DFID sponsored Capacity Building for Decentralised Development (CBDD) project based in central Nigeria is another example.

^{iv} Extrapolating from figures for the fish sold in the two key, lake-side markets, Sagua (1991) estimated an average annual production of 56 000 tons (fresh weight equivalent) between 1986 and 1989. This is a fraction of the figures calculated by Duran (1980) for the 1970-1977 period which allow a comparable estimate for average annual production of 243 000 tons.

^v Since 1976, village heads (i.e. *Lawans* rather than *Bulamas* who are officially described as ward or hamlet heads) have, in theory, been the paid employees of Local Government (see Thomas, Jimoh and Matthes, 1993). This is not, however, always the case for the *Lawans* whose areas of jurisdiction are adjacent to Lake Chad. The power and status of individual *Lawans* varies considerably: those with least are most likely to attend LGA sessions and those with most will not. LGA officials may even seek audiences with the most powerful *Lawans*, for example, the *Lawan* of Baga.

^{vi} Although the Lake Chad Basin Commission's Joint Regulations on Fauna and Flora were ratified by the member states (Nigeria, Niger, Cameroon and Chad) in 1988, they have not been enforced in Nigeria.

^{vii} In theory, fishers were required to have licences issued by the LGA. In practice, the LGA does not enforce compliance with this however members of the Joint Patrol can ask to see these licences and can extort payment when they are not presented immediately.