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INLAND FISHERIES, POVERTY, AND RURAL LIVELIHOODS IN THE LAKE CHAD BASIN

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ABSTRACT

The objective of this paper is to describe the livelihoods of the rural populations of the Lake Chad Basin area (Sub-Saharan Africa), and in particular to assess the role of inland fishing activity in these livelihoods. For this purpose, a combination of activity and wealth ranking exercises was carried out in 64 villages of the Basin, completed by a series of comparative analyses of the ethnic composition, accessibility to fishing grounds and fishing gear ownership across the different socioeconomic strata of the populations. The analysis shows that for the entire area, households, irrespective of their wealth levels, still rely to a very large extent on subsistence-based economy where the three major activities (fishing, farming, and herding) are closely integrated. With respect to fishing activity the survey demonstrates the central role of this activity (in terms of income, labor, and food supply) for all wealth groups. But the analysis also reveals that there is no one-to-one relationship between the contribution of fishing activity and the wealth (or poverty) level of the households. In particular the analysis suggests that well-known adages such as “the fishermen are the poorest of the poor” or “the fishery is the activity of last resort” do not reflect the complexity of the real situation.

Introduction

In Sahelian and Sub-Saharan Africa, but more generally in developing countries, one of the key conclusions that emerge from rural development research is the need to recognize the heterogeneity of rural communities and the diversity of their

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livelihood strategies. Even small local communities are made up of diverse assemblages of different socioeconomic strata characterized by different livelihood strategies and economic portfolios (Ashley and Carney 1999; Ellis 1999; Toulmin et al. 2000). Depending on where they stand within these socioeconomic strata, households and individuals have highly differentiated access to resources and opportunities, much of which is systematically linked to ethnicity, gender and ownership of assets, as well as knowledge, networks and experience acquired over time. Consequently, while the poorest households will depend heavily upon a given combination of crops and/or natural resources (usually common pool resources) for their food security and income generation, the better-off, because they face different socioeconomic and institutional constraints and opportunities, will develop (sometimes radically) different activity portfolios. In this context, understanding the contribution of the different rural activities to the household and local economy and identifying their respective potential (positive or negative) effects on poverty levels and wealth differentiation is one key-element for the design of appropriate rural development policies.

Within the very arid and difficult environment of the Sahelian region, Lake Chad and its associated riverine system have always played an extremely important role in the livelihoods of the thousands of people living in these areas.¹ However, the multiple outbreaks of armed clashes and rebel activities, and more generally the overall political instability, which has been characterising the overall region, notably Chad and Nigeria since the end of the 1970s, has led to the progressive withdrawal of national and/or international research teams (e.g., ORSTOM in Chad) and to the almost total interruption of research and monitoring activities in the area. Consequently, the whole Basin is now suffering an important information deficit—FAO for instance considers the national statistics for this region to be unreliable and incomplete (FAO 1995)—and it is currently extremely difficult to make any accurate and up-to-date assessment of the economic (in particular inland fisheries) activities taking place within the Basin. Faced with this lack of information, national policy-makers and planners but also international development agencies are severely constrained in their ability to generate and implement rural development policies appropriate and adapted to this area.

In 1999, the European Commission funded a 3-year research project: “Sustainable development of African continental fisheries: a regional study of policy options and policy formation mechanisms for the Lake Chad Basin” within the INCO-DEV Framework “Co-operation with Third Countries and International Organisations.” The main objective of this project, which was based on the collaboration of riparian countries (Nigerian, Cameroonian, Chadian) and European (French and British) experts, was to carry out a multi-disciplinary research programme to address some of the major fisheries planning and policy constraints faced in this part of Sub-Saharan Africa, in particular (1) poorly established policy-formation mechanisms, (2) lack of relevant data and information, and (3) limited institutional capacity. As part of this project, a livelihood analysis

was carried out throughout the Lake Chad Basin region. The main objective of this livelihood analysis was to expand our knowledge of the—so far very poorly understood—livelihoods of the rural communities living in the region² and, in particular, to assess the exact contribution of the fishing activities to the livelihoods of these populations.³

Fishery and the Rural Poor

In the literature, the conventional perception is that fisheries (especially small-scale fisheries in less-developed countries) and rural poverty are closely related. Thirty years ago, the Food and Agricultural Organization already stated: “The people engaged in these activities and their families continued, with few exceptions, to live at the margin of subsistence and human dignity” (FAO 1974, quoted in Copes 1989:6). This view, which is still largely accepted nowadays (see, for instance, Smith 1979, 1981; Panayotou 1982; World Bank 1982; Wright 1990; Cunningham 1993; Payne 2000) is in fact embodied in the two famous adages: “fishermen are the poorest of the poor” (e.g., Bailey 1988:142) and “fishery is the activity of last resort” for the poor (e.g., Townsley 1998:142). The underlying logic of this general perception is that fisheries, due to the open-access nature of the resources which acts as a safety valve, attract a large number of people, especially—but not exclusively—in rural areas where alternatives for other economic activities may be low. The last resort dimension of fisheries is therefore of great importance and relevance to the poor, since the latter are generally those with even more limited access to land and/or other resources. In this case, the open-access nature of the resource appears as the key mechanism which permits the safety valve mechanism to function and allows people to enter the fisheries when their access to other activities or resources are (economically or institutionally) limited or impeded. Within this approach, the open-access nature of the fisheries seems, therefore, a positive factor.

However, the open access nature of the fisheries, because it allows (too) many poor people to enter the fishery, is also viewed as the process which leads to the economic and eventually biological over-exploitation of the fish stock. This over-exploitation means lower catch and leads to further impoverishment of the already poor (and usually landless) fishers. This downward spiral of poverty further reinforces the second aspect of the conventional wisdom, namely the perception that fishers are the poorest of the poor. For instance, Bailey, Cycon, and Morris (1986) state:

Yet, despite...significant investment by international donor agencies and the governments of developing nations, small-scale fishermen remain among the poorest of the poor within developing nations. (P.1270)

This conventional perception of fisheries as last resort activity and fishermen as

the poorest of the poor—tends, however, to oversimplify the complex social and economic interactions which take place within the community over the access to the resource. In particular, because it is based on the assumptions of open-access, it assumes an equal—and free—access to the resource. This assumption may lead to a simplification or even a misrepresentation of the reality and preclude understanding of the role that fisheries play in rural people's livelihoods and especially in poor rural households' livelihoods. The present livelihood analysis is aimed at improving the understanding of the exact nature of this relationship between fisheries and poor households in the case of the Lake Chad Basin populations.

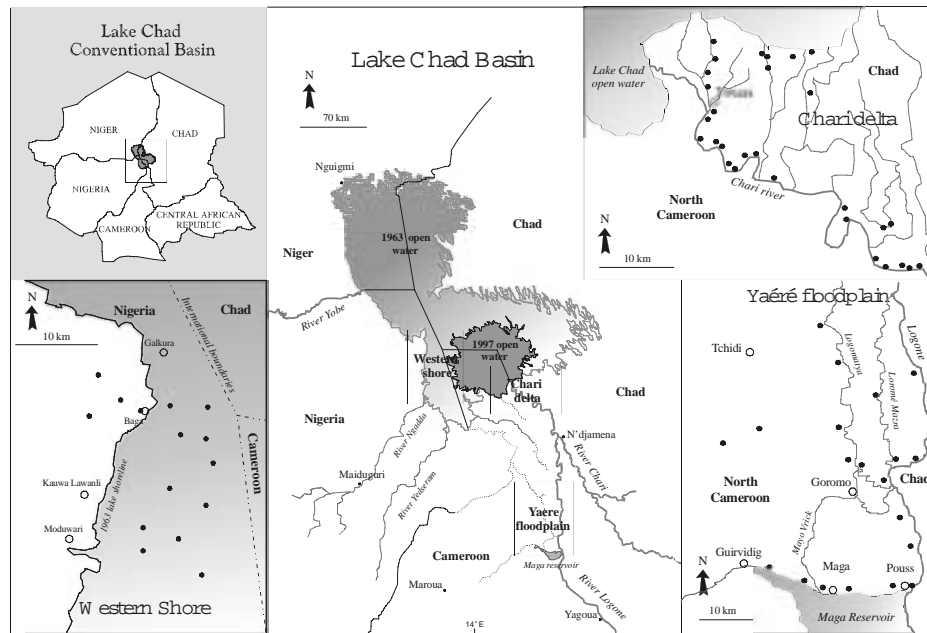
Background and Context

The Physical Environment: A Sahelian Wetland Rather Than A Lake

Lake Chad is a large shallow lake lying at the centre of a semi-arid basin (Sudano-Sahelian savannah region) shared by four riparian countries: Chad, Niger, Nigeria, and Cameroon (Figure 1). Lake Chad's size has greatly varied over centuries, mainly due to Sahelian climate variations, but it is usually accounted as the fourth largest lake in Africa. The nature and extent of the Lake environment includes both lacustrine and floodplain components, and the dynamic of the Lake is largely dictated by the seasonal patterns of discharge of the two major influent rivers of the Basin, the Chari and Logone. Because the basin is very flat and the lake shallow, the surface of the lake varies widely, especially in its southern and eastern parts, in response to even small change in the seasonal inflow. Each year during the flooding period (Sept.-Dec.), the lake's open-waters expand largely and flood the surrounding flat basin areas which become remarkably comparable to a floodplain environment. In particular, the receding floods leave numerous temporary ponds and inundated oxbows, swamps and marshland which are fished by the populations of the Lake's shores.

The Human Environment: A Spatial and Temporal Intricacy of Rural Activities

Sagua (1991) estimated the number of rural households engaged in fishing activities in the Lake Chad Basin to be as high as 200,000 persons. However, although fishing activities are generally recognized to constitute a key-element in the economy of floodplains or wetlands all over the world, the few case-studies carried out in sub-parts of the Basin (Sarch 1997; [Neiland et al. 2000](#)) or in other Sahelian wetlands (Kolawole 1991; [Kimmage and Adams 1992](#)) have shown that fishing fits within a flexible and strongly seasonal matrix of various and diversified activities. During the same season, the local populations are alternatively or simultaneously fishers, herders, and farmers, and each piece of land is potentially a fishing ground, a grazing area and a cultured field, depending on the period in the flood cycle.

Lake Chad Conventional Basin Under Study*

*Top left map: general location within the whole Lake Chad Conventional Basin of the region concerned by the study (see footnote 1). Central map: detailed location within that region of the three specific areas included in the survey: the western shores of the Lake, the Chari delta and the Yaéré floodplain. The black dots on the local maps (bottom left and right hand side maps) indicate the villages surveyed in each area.

The intricacy of these activities creates a major difficulty when one attempts to evaluate the potential benefits, costs and equity implications of future rural development interventions. The impacts of these interventions cannot be evaluated correctly through mono-sectoral assessments, but must instead be carried out through integrated (holistic) frameworks in which the different sectors of the local economy are viewed together as a joint production activity. In particular, with respect to fishing activities, this implies that, if one wishes to provide more adequate support to local populations through their development, it is necessary to extend understanding of the place and contribution of fishing within the diversified livelihoods of these populations. The present socioeconomic survey was therefore designed to integrate the multi-activity dimension of the local economy, with, in particular, an emphasis on the interactions (linkages and complementarity in terms of income and food supply) between the different activities undertaken by the households as part of their livelihoods.

Research Methodology and Data Collection

The data collection was conducted from October 1999 to July 2000 using qualitative methods derived from Rapid Rural Appraisal (RRA) techniques, completed by a thorough literature review conducted in each country (Ladu et al. 1999; Zakara 1999; Mindjimba and Njock 2000). The regions included in the survey cover the three major zones of fishing activities within the Lake Chad Basin. These regions are located (1) along the south-west part of the Lake area (Nigeria), including large zones of the seasonally exposed lake-bed; (2) the Delta of the Chari river, including the Chari river itself and the south-east part the Lake shore (Chad); and (3) the Yaéré floodplain located at the border between Cameroon and Chad, along the Logone river (see Figure 1).⁴ Within these three regions, 64 villages were selected randomly and sampled.⁵ In each village, the data were collected through semi-structured group interviews and mapping exercises conducted with village key-informants. The key-informant groups were generally constituted of about 8 to 15 persons including the *Bulama* or *Blama* (village head) or *Lawan* or *Djaoro* (ward head), other members of the villages' council, and "ordinary" villagers (generally a mix of young and old men).

The first element of the survey was a wealth ranking exercise. The objective of this wealth ranking exercise was to analyse the nature and degree of the wealth stratification (heterogeneity) within the populations of the Lake Chad Basin. For this, both wealth level (or symmetrically poverty level) and associated stratifying criteria were identified in each village by the respondent groups. The decision to use a participatory approach was made in order to respect the local definition of poverty and wealth. It was recognized that a money-metric approach or use of fixed sets of pre-defined quantified variables would not allow one to embody adequately the locality-specific context of household wealth and its regional and ethnic variations.

Once the wealth groups had been identified, an activity ranking exercise was then carried out for each wealth group in each village. For this, the group of key-informants were asked to classify the main activities operated within each wealth group, from the most predominant to the least predominant activity, according to two criteria: (1) the allocation of households' labor (time-effort) over the whole season to each activity and (2) the contribution of each activity to the households' overall incomes. This distinction between allocation of effort and contribution to income was introduced to attempt to embody the high degree of subsistence that characterizes the populations' livelihood in this area.⁶ A (desk-based) weighting procedure reflecting the ranking was then used to aggregate and re-organize the data across villages within regions (Yaere floodplain, Chari delta, and western shores of the Lake) through two parallel rankings: (a) an activity ranking within each wealth group (within-group between-activity ranking), and (b) a wealth group ranking for each activity (within-activity between-group ranking). The two analyses (a) and (b) were conducted in parallel for the two criteria

(1) and (2) mentioned above.⁷

The activity ranking exercise was complemented by the analysis of (a) ethnic composition,⁸ (b) fishing ground accessibility⁹ and (c) level of food (in)security¹⁰ for each wealth group (the information related to these three analyses was collected during the group interviews and then aggregated within each area, using procedures detailed in footnotes 8, 9, and 10). The objective for the first two analyses was to determine to what extent ethnic composition and accessibility to fishing grounds play a role in the wealth differentiation process of rural fishing communities. The food security assessment was carried out in order to evaluate and compare the degree of vulnerability/poverty of the different wealth groups within the villages. Although poverty is now recognized to be a multi-dimensional issue, food insecurity remains one of the most visible, and probably the first, sign of extreme destitution. To evaluate this degree of food insecurity,¹¹ three criteria were used: (a) the food (fish and farming products) auto-consumption rates, that is, the proportion of fish and farming products auto-produced/harvested which are home-consumed (as opposed to commercialized); (b) the food-purchasing capacity such as the capacity of the households to purchase foodstuff (e.g., meat) through monetary or bartering channels; (c) the food self-sufficiency rate, that is, the capacity of households to supply themselves with sufficient food to avoid any period of food shortage over the whole season.

Finally, additional information regarding the villages and their vicinities was collected through mapping exercises (distance chart) of selected landmarks—including water-bodies, grazing, and agricultural areas—and seasonal calendars of the rain and river-flood cycles and associated activities performed by the villagers. This set of additional data was used to complete and cross-examine the information obtained during the group interviews. Further to reduce the possibility of bias and/or misinterpretation during the data collection, the interviews were conducted by teams of trained, local enumerators familiar with the local area and speaking the local languages. All the interviews were preceded by an introductory visit to each village under the supervision of the national researchers. The overall framework of the survey is synthesized in Box 1.

Overview of the Three Regions

A large number of different ethnic groups were observed throughout the survey, in very different proportions. The Mousgoum in the Yaéré, the Sara and Kotoko in the Chari delta and the Hausa, Fulani and Kanuri along the western shores of the lake are the dominant groups, but nine other ethnic minorities were identified. The ethno-demographic information obtained through the survey is summarized in Table 1.

Table 2 displays the various water-bodies used by the local populations for their fishing activities. In aggregate, eight different types of fishing grounds are exploited across the basin. Seasonal ponds and receding channels are the type

Box 1. Analytical Framework of the Livelihood Analysis used for the Survey

| | |
|--|---|
| <i>Step 1. Introductory visit to each village</i> | |
| <i>Step 2. Wealth stratification assessment</i> | |
| > | Objective: identify and analyse the nature and degree of the wealth stratification (heterogeneity) of the rural population of the Lake Chad Basin |
| > | Methods: |
| o | Participatory wealth ranking exercise*, to identify |
| | (a) The different wealth groups (socioeconomic strata) |
| | (b) The wealth differentiating criteria |
| <i>Step 3. Within each wealth group</i> | |
| 3.1. Livelihood assessment | |
| > | Objective: identify the portfolio composition and the livelihood strategy of each wealth group |
| > | Methods: |
| o | Participatory ranking exercise* according to two criteria: |
| | (a) Income contribution, |
| | (b) Allocation of labour |
| 3.2. Fishing resource accessibility assessment | |
| > | Objective: determine the degree of inequality between the wealth groups regarding the access to fishing grounds |
| > | Methods: |
| o | Comparative analysis of the access to fishing grounds between wealth groups* |
| 3.3 Food security assessment | |
| > | Objective: determine the degree of vulnerability to food insecurity within each wealth group |
| > | Methods: participatory group interview* using three criteria: |
| o | Auto-consumption rate |
| o | Food-purchasing capacity |
| o | Food self-sufficiency |
| 3.4 Ethnic comparative analysis | |
| > | Objective: determine the potential correlation between wealth and ethnic origins |
| > | Methods: |
| o | Comparative analysis of the wealth groups' ethnic composition* |
| <i>Step 4. Spatial and temporal local information</i> | |
| > | Objective: Complete and eventually cross-check data obtained from activity and wealth ranking exercises |
| > | Methods: |
| o | Mapping exercises (distance chart): Water-bodies, grazing and farming fields |
| o | Seasonal calendars: rain and river-flood cycles, villagers' activities |
| * <i>Data acquisition</i> | |
| Semi-structured interview of villagers including village heads, members of village's council and 'ordinary' villagers. | |

of water-bodies most commonly used, followed by rivers (Logone and Chari), the open waters of the lake and the permanent ponds and oxbows. The comparison between regions shows that the Yaéré floodplain offers the largest diversity of exploitable water-bodies, followed by the Chari delta and the western shores of the Lake.

The fact that the seasonal ponds and receding channels are, in aggregate, the most common type of water-bodies fished across the basin indicates that a large part of the fishing activity has developed as a temporary activity so as to

Table 1. Ethno-Demographic Details on the Villages Surveyed

| Area | Characteristics | | | | |
|------------------|-----------------------------|----------------------------|----------------------|--|---------------------------------------|
| | Number of villages surveyed | Estimated household number | Estimated population | Average village size (households / heads) | Average household size ^(a) |
| Yaéré floodplain | 15 | 874 | 9020 | 42 / 429 | 10 (3 / 7) |
| Chari delta | 29 | 1022 | 12497 | 35 / 431 | 12 (5 / 7) |
| Western shores | 20 | 2930 | 24240 | 195 / 1616 | 8 (2 / 6) |
| Total | 64 | 4826 | 45757 | | |
| Ethnic Group (%) | Chari delta | Western shores | Yaéré floodplain | | |
| | Arabs Shua (32) | Hausa (27) | Mousgoum (67) | | |
| | Kotoko (19) | Kanuri (25) | Massa (10) | | |
| | Zakoua (9) | Fulani (16) | Kotoko (10) | | |
| | Kanembou (7) | Marigi/Michican (11) | Sara (7) | | |
| | Foulbé (7) | 'Chadians' Bararas (9) | Foulbé (3) | | |
| | Bornou (7) | Arabs Shua (7) | Shua (3) | | |
| | Hausa (6) | 'Malian' Bozo (4) | | | |
| | Boulala/Massa (3) | | | | |
| | Total per area | 9 (100) | 8 (100) | 6 (100) | |

^(a)Total head (adult / Children).

Source: Field survey Yaéré / Chari delta / Western shores (Oct.1999 - July 2000).

Table 2. Types of water-bodies exploited in Lake Chad Basin

| Type of water-body | Number of villages exploiting a particular type of water-bodies | | | |
|----------------------------------|---|-------|-------------|----------------|
| | Aggregate (%) | Yaéré | Chari delta | Western shores |
| Seas. ponds & receding channels | 39 (30) | 9 | 15 | 15 |
| Main river ^(a) | 30 (23) | 8 | 22 | - |
| Lake Chad's open waters | 22 (17) | - | 8 | 14 |
| Perm. ponds & oxbows | 15 (12) | 1 | 13 | 1 |
| Tributaries ^(b) | 9 (5) | 9 | - | - |
| Artif. reservoir ^(c) | 6 (4) | 6 | - | - |
| Irrig. channels | 4 (3) | 4 | - | - |
| Floodplain | 3 (2) | 3 | - | - |
| Total | 128 (100) | 37 | 58 | 30 |
| Number of different water-bodies | 8 | 7 | 4 | 3 |
| Number of villages | 64 | 20 | 29 | 15 |

Notes: ^(a) Main river = Chari and/or Logone; ^(b) Tributaries of the Logone = Logomatya, Loromé Mazéra, Mayo Vrick and Petit Goroma; ^(c) Maga reservoir (see Fig.1 for location).

Sources: Field survey Yaéré / Chari delta / Western shores (Oct.1999 - July 2000).

adapt to the seasonal dynamics of the environment and, in particular, to make the most of the seasonal flooding. The analysis of the flood-cycle calendars (see Table 3) reveals however that, despite the geographical proximity of the three regions, important differences occur in the flood-related events. In particular, the difference in the duration of rainy and dry seasons indicates that the populations along the western shore probably face more severe climatic conditions than in the Yaéré floodplains. As will appear below, these differences strongly influence the livelihoods of the populations and their ability to cope with their environment.

Not surprisingly, the activity calendars indicate that the seasonality that characterizes the hydrological environment of the Lake area affects not only fishing but the activity portfolio of households as a whole. The livelihoods of households and communities appear to be based on a strongly seasonal matrix of various and diversified activities, the pattern of which is largely influenced by the local water-flood regime. Although some local divergences exist, a general scenario can be identified for each region.

In Chari Delta region, fishing is practised throughout the year on Lake Chad, river Chari and its tributaries and the permanent ponds, with periods of productivity and yields varying as follows: important catch/activity in time of water recession and low waters (Jan.-Apr.); decreasing catch/activity during the flooding period (Jul.-Sept.) followed by even lower catch during periods of high waters with dispersion in the Delta plain (Oct.-Nov.). In the seasonal ponds created by the

**Table 3. Comparative Analysis of the Flood-Related Events in the Three Areas
(Based on the Analysis of the Seasonal Calendars)**

| Area | Events | Period | Duration (months) |
|----------------|------------------------|----------------------|-------------------|
| Yaéré | Dry season | January – April | 4 |
| | Rainy season | May – September | 5 |
| | Flooding (floodplain) | August – October | 3 |
| | Receding period | January – March | 3 |
| Chari delta | Dry season | January – May | 5 |
| | Rainy season | June – September | 4 |
| | Flooding (Delta plain) | September – November | 3 |
| | Receding period | December – March | 4 |
| Western shores | Dry season | November – June | 7 |
| | Rainy season | July – August | 2 |
| | Flooding (Lake-bed) | November – December | 2 |
| | Receding period | February - April | 3 |

Sources: Field survey Yaéré / Chari delta / Western shores (Oct.1999 - July 2000).

recession, fishing goes on from September to December, depending on the size and location of the ponds. Agriculture, especially rain-fed agriculture (millet, sorghum, maize), is widespread in the delta and lasts practically five months, with sowing taking place in July. Low-flood farming is carried out close to permanent water-points (Lake Chad and Chari river). In these specific areas agriculture is practised on a larger scale than fishing during certain hydrological periods (high waters and flood, August to October). Animal husbandry is limited to stabling practised throughout the year.

Along the western shores of the Lake, the predominant activities are also largely determined by the hydrological pattern of the flood. Fishing is done all year round on the Lake's open-waters and between April to July on the seasonal ponds and receding channels. Some permanent pools (present in one village) are fished all year round as well. Farming is carried out almost throughout the year as the communities practise both recession and rainy season farming. Usually the first planting of maize, millet, and beans starts in January at the beginning of the lake recession and these crops are harvested in June to July before the onset of rains. The second planting of crops for rain-fed systems starts in July and August with harvest three months later in October to November at the beginning of the dry season. Animal herding, mainly for small ruminants and cows is traditionally practised by the populations of the region. Free grazing or foraging is restricted to all animals except at the end of harvest in October to November and before the start of recession planting in January and February.

In Yaéré floodplains, although fishing is practised all year round, its intensity varies according to the type of water-body. The peak period along the Logone occurs from July (as the water rises) until March, while along the Logomatya (Logone tributary) it takes place from August to December. Fishing in the floodplain itself, which is less intense than on permanent water-bodies, follows the floods in September and ceases in February. In permanent ponds, fishing is carried out during the dry season (October to April) until the Logone and Logomatya offer more attractive grounds. Finally, for the villages in the vicinities of the (artificial) reservoir of Maga, fishing takes place during the open fishing season (September to June). In agriculture, millet sowing follows the rains in June, while rice fields are sown later in July. These crops are harvested in October at the end of the rainy season for millet, and in December for rice. Small ruminants are traditionally kept in during the rainy season, and allowed to stray within the village during the dry season. Cattle movements, on the other hand, are restricted within villages during the wet season, while the system of free grazing around the villages is operated during the rest of the year.

Inter-Group Livelihood Analysis

The section above outlined the seasonal pattern characterising the rural livelihoods of the Lake Chad Basin populations. It also shows that the multiple elements of the local economy, in particular fishing, farming and cattle-holding are

closely integrated, and that it would be misleading to speak about fishermen, farmers or pastoralists, as if they were groups of people distinct from one another. In that respect, these findings reinforce the observations made by other studies in similar Sub-Saharan and Sahelian wetlands (Kolawole 1991; [Kimmage and Adams 1992](#); [Thomas 1995](#)), and the very few case studies which have been carried out recently in some sub-parts of the Basin (Sarch 1997, 2000; and along the western shore of the Lake see [Neiland et al. 2000](#)). The present section extends further the analysis by examining and comparing the specific role played by each activity within the different wealth groups.

Wealth Stratification

The criteria listed by the key-informants during the participatory wealth assessments are presented in Table 4 (top part). Although these criteria vary between regions and between villages within the same region, a certain degree of homogeneity emerges from the respondents' answers. In none of the three areas is income *per se* considered as one major criterion of wealth. Instead, the "number and/or type of fishing gears," "farmland ownership," and "herd size" were systematically identified as key-criteria of wealth stratification by the respondents. This result can be related to the fact that all households in the basin, irrespective

Table 4. Wealth Ranking Exercise

Top part: wealth criteria and their frequency of occurrence in respondent's answer aggregated per area (percentage in bracket). **Bottom part:** proportions of the 3 wealth groups (in percents of households) within the three areas surveyed.

| Wealth criteria | Frequency in informant answer (%) | | | |
|--|-----------------------------------|----------------|------------------|-----------|
| | Yaéré | Chari delta | Western shores | Overall |
| Number / types of fishing gear | 15 (26) | 26 (25) | 7 (30) | 48 (26) |
| Herd size | 15 (26) | 26 (25) | 3 (13) | 44 (24) |
| Farmland ownership | 20 (35) | 19 (18) | 4 (17) | 43 (23) |
| Pirogue ownership | 2 (4) | - | 5 (22) | 7 (4) |
| Income | 5 (9) | 13 (13) | - | 18 (10) |
| Privileged access to fishing grounds | - | 11 (11) | - | 11 (6) |
| Others (plough ownership, engine size, etc.) | - | 9 (9) | 4 (17) | 13 (7) |
| Total occurrence | 57 (100) | 104 (100) | 23 (100) | 184 (100) |
| Wealth group stratification (% household across villages of the same area) | | | | |
| Wealth groups | Chari delta | Western shores | Yaéré floodplain | |
| G1 | 22 | 17 | 19 | |
| G2 | 38 | 32 | 30 | |
| G3 | 40 | 51 | 51 | |
| Total | 100 | 100 | 100 | |

Source: Participatory wealth ranking exercise Yaéré / Chari delta / Western shores (Oct.1999 - July 2000).

of their wealth level, are still heavily involved in a subsistence-based economy, where fishing, farming, and cattle-holding represent the three pillars of the system.

In 55 out of the 64 villages surveyed, the interviewees identified three wealth groups that they termed “the poorest,” the “less poor” (or sometimes the “intermediate group”), and the “rich.” These groups are from now on noted as G3 (poorest), G2 (less poor), and G1 (rich). In six villages, the interviewees emphasized the absence of rich households and distinguished only two groups: “the poorest” and the “less poor.” Further analyses showed that these two groups are more or less comparable with the G2 and G3 groups of the 55 other villages. Finally, in three villages, respondents identified only “rich” (G1) and “less rich” (G2) households. Table 4 (bottom part) shows the sizes of the three wealth groups when they are aggregated across villages within regions. The poorest group (G3) systematically embodies the largest number of households in the three regions. In the Yaéré floodplain and along the western shores of the Lake this group represents 51 percent of the total number of households surveyed, and 40 percent in the Chari Delta.

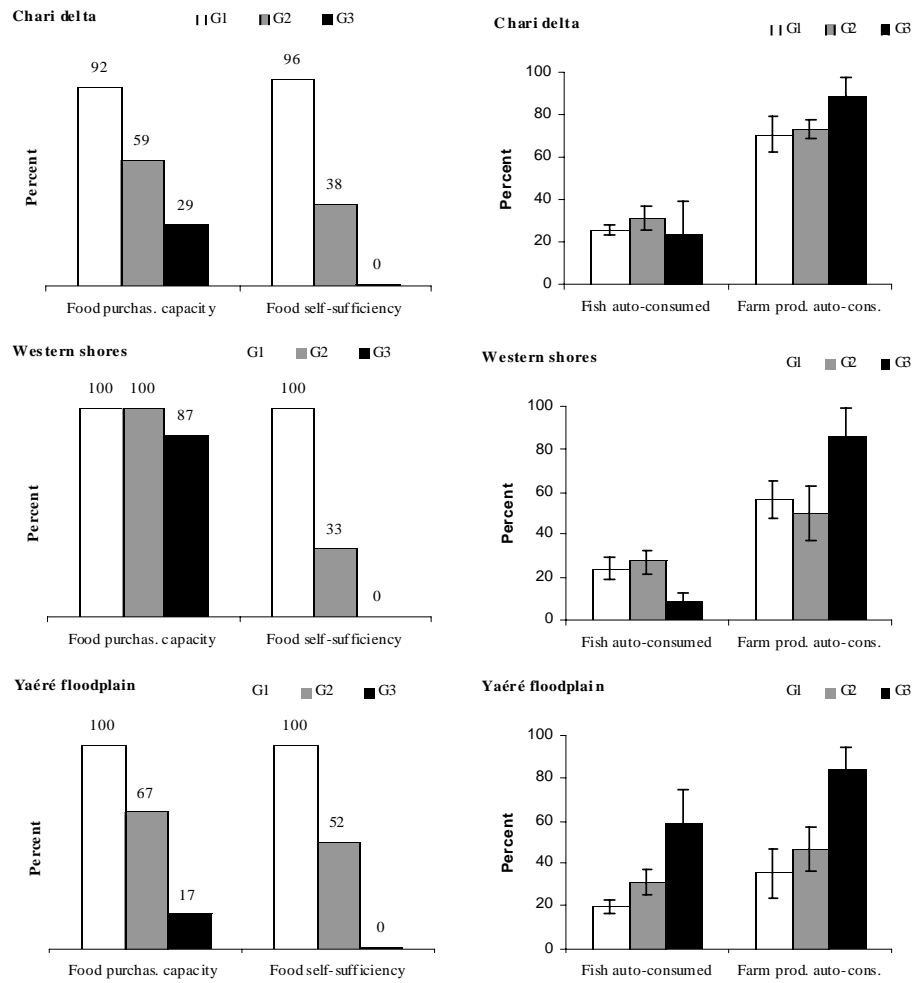
Vulnerability to Food Insecurity

The food security assessment (Figure 2) reveals that households are not equally endowed with respect to food endowment. In all three regions, the proportion of villages in which the households can afford to purchase foodstuff (food purchasing capacity) in addition to the food that is self-produced decreases with poverty. The rate is particularly low for G3 households in the Chari delta and in the Yaéré floodplain (29 percent and 17 percent respectively). More critically, while the G1 households are self-sufficient over the whole year in almost 100 percent of the villages within the Basin (in fact 96 percent in Chari delta and 100 percent for the two other regions), this rate of self-sufficiency falls to 38 percent, 33 percent, and 52 percent for G2 households (respectively in Chari delta, along the western shore and in the Yaéré) and there is no village (amongst those surveyed) where G3 households were said to be able to ensure a year-round food self-sufficiency.

In Yaéré floodplain and Chari delta, this food shortage takes place essentially during the critical period between the end of the dry season and the beginning of the rainy season (May to June). This period, which is named the “*soudure*” (literally the “seam”) by francophone local people, occurs when river fishing is low, permanent ponds have been fished out, and the main rain-fed crops (millet, rice or maize) of the previous season have been exhausted or sold out. In normal years this shortage can extend to over about one month for the more destitute households, but it could expand over two months in the very severe drought years and affect a larger part of the population. Along the western shores, the structure of the food shortage is almost comparable for the G2 households, although it takes place latter during the year (between August and October), when the seasonal

Figure 2. Relation Between Food Security and Wealth in the Lake Chad Basin

(Illustrated through the rates of purchasing capacity (a), self-sufficiency (a), and fish and farm-product auto-consumption (b) identified for each wealth group).



Notes: (a) the values (%) on the bar graphs indicate the proportion of villages for which the wealth group considered satisfy the criteria; (b) single value estimated by the key-respondents in each village, averaged at the regional level (error bars: 95% confidence interval).

pools created by the lake recession have dried out but the rain-fed crops (maize, millet) have not yet been harvested. In contrast, the food shortage faced by the poorest households (G3) of both the Chari delta and western shores seems to be “structurally” different. The survey indicates that for these households this food shortage is chronic (occurring almost all year round) and not associated to one particular period of the year as it is the case for the *soudure*.

In the Yaéré, a more detailed analysis of the data (Béné et al. 2003b) shows that the households which face the *soudure* have developed two distinct risk-strategies¹²: (1) to sell heads of livestock and (2) to borrow money and/or food (usually millet) from the richest households of the community. This food and/or money is then usually reimbursed during the same season when the new crops are harvested. The situation seems to be more critical for the poorest households of the Chari delta and western shores faced with chronic food shortage. Although the data do not allow an in-depth investigation on this issue, it is interesting to note how the difference in the nature of the food shortage seems to have impacted upon the role of fish as a marketable commodity. This is in particular suggested by the last two sets of diagrams on the right hand side of Figure 2. These diagrams represent the proportions of foodstuff self-produced (both fish and farming products) which are home-consumed. Several remarks can be made. First, the positive relationship between the rate of self-consumption of farming products and the households’ poverty level indicates that, as one could expect,¹³ crops are used in the first place by the poorest to cover their food requirements. The figure, however, reveals also that within each wealth group the rate of self-consumption of farming product is always higher than that of fish. This trend suggests that there is an asymmetry in the way households use fish and farming products. Households, disregarding their wealth level, tend to favour the income contribution of fish over its nutritional property, at least to a higher extent than for farming products. In this respect, and in relation with the food shortage situation mentioned above, it is interesting to note also the difference between the poorest households in the Yaéré floodplains (facing a seasonal food shortage) and these in the Chari delta and western shores of the Lake (facing a chronic food shortage). For the households facing a seasonal food shortage, the rate of self-consumption follows what might be considered as the expected pattern, that is, augments with poverty—the same relation is true also for farming products. In contrast, for the poorest households facing a chronic food shortage in the Chari delta and along the western shores of the Lake, the relationship is reversed: in these areas the poorest households consume a lower proportion of their catch than the better-off households. It seems that for these households, fishing activity is therefore used essentially as an income generating activity: the catch is sold to buy some cheaper foodstuff (essentially millet). This hypothesis will be confirmed below through the analysis of the activity ranking.

Activity Ranking Exercise

Table 5 synthesizes the results of the livelihood analysis based on the activity ranking exercise. On a global scale, in terms of labor allocation, the G1 households of the three regions are characterized by a similar livelihood strategy: Fish > Farm > Trade \cong Herd. This result indicates that, disregarding the region, the better-off households within the whole Basin always invest the largest part of their labor (time-effort) in fishing-related activities, followed by farming, and then, at a more or less equal degree, trading and herding. Fishing also played a major role in G2 households since it ranks first in terms of income contribution for the three regions. The labor invested in fishing, however, varies between regions.

In the Yaéré floodplain, cattle-holding is the only activity for which the labor allocation remains more or less constant across the three groups. Trading (which includes retail and/or small trade of fish, farming and/or other housing-related products) seems to be a dominant activity for better-off households but stays inaccessible to the poorest. As far as farming is concerned, G2 households invest approximately the same amount of labor and derive the same proportion of income as G1 households. Comparatively, G3 invest more labor but derive lower incomes. In contrast, the role of fishing in household livelihoods increases with poverty: fishing appears to be comparatively more important for G3 households (both in term of labor and contribution to income) than for G2 and G1 households. This result suggests that the poorer the households in the Yaéré, the more they rely on fishing.

In the Chari delta, farming, fishing, cattle-holding, trading, and wood-cutting are the main activities. However, as in the Yaéré, the importance of each activity varies greatly according to wealth level. Fishing is the dominant activity for the better-off households which invest the largest part of their time and effort in this activity and derive the largest proportion of their income from the commercialization of their catch. Trading is predominantly operated by G1 (and G2 to a much lower extent) but stays out of reach from the poorest households. Farming is the dominant activity of G2 households although fishing also contributes to a large part to their incomes. Herding is a source of minor revenues for both G1 and G2. As far as the poorest households are concerned, the analysis shows that they mainly rely on wood-cutting, which appears to be the central element of their livelihoods both in terms of labor and income contribution.

Along the western shores of the Lake, the livelihood strategies of the G1 and G2 households are relatively comparable with these of the two equivalent groups in Chari delta. In particular, in both G1 and G2 groups the households invest a significant amount of labor in fishing and derive the largest part of their income from the commercialization of their catch. They are both also highly involved in farming which is their second major activity. The distinction between G1 and G2 is mainly related to the relative contribution of trading activities to their

Table 5. Synthesis of the Activity Ranking Exercises Carried out in the 3 Areas (Yaéré, Chari Delta, and Western Shores)

| Area | | Yaéré floodplain | |
|---|----------|--|--|
| Ranking criteria | | Labour allocation | Contribution to income |
| Within-group between-activity ranking | G1 | Fish. > Farm. > Trade \equiv Herd. | Farm. > Fish. > Trade (Herd. \equiv 0) |
| | G2 | Farm. \equiv Fish. > Herd. \gg Trade | Fish. \equiv Farm. \gg Herd. \equiv Trade |
| | G3 | Farm. \equiv Fish. > Herd. \gg Trade | Fish. > Farm. > Herd. (Trade \equiv 0) |
| Within-activity between-group ranking | Fishing | G3 > G2 > G1 | G3 > G2 > G1 |
| | Farming | G3 > G2 \equiv G1 | G1 \equiv G2 > G3 |
| | Trade | G1 \gg G2 \equiv G3 | G1 \gg G2 (G3 \equiv 0) |
| | Herding | G1 \equiv G2 \equiv G3 | G3 > G2 (G1 \equiv 0) |
| Area | | Chari delta | |
| Ranking criteria | | Labour allocation | Contribution to income |
| Within-group between-activity ranking | G1 | Fish. > Farm. > Trade \equiv Herd. | Fish. > Farm. > Trade \gg Herd. |
| | G2 | Farm. > Fish. \gg Herd. \equiv Trade | Farm. \equiv Fish. \gg Trade \gg Herd. |
| | G3 | Wood \gg Farm. \equiv Fish. \gg Herd. | Wood \gg Fish. > Farm. (Trade \equiv Herd \equiv 0) |
| Within-activity between-group ranking | Fishing | G2 > G1 > G3 | G2 \equiv G1 > G3 |
| | Farming | G2 > G1 > G3 | G2 > G1 > G3 |
| | Trade | G1 > G2 (G3 \equiv 0) | G1 > G2 (G3 \equiv 0) |
| | Herding | G1 > G2 \gg G3 | G1 > G2 (G3 \equiv 0) |
| | Wood | G3 (G2 \equiv G1 \equiv 0) | G3 (G2 \equiv G1 \equiv 0) |
| Area | | Western shores | |
| Ranking criteria | | Labor allocation | Contribution to income |
| Within-group between-activity ranking | G1 | Fish. > Farm. > Trade \equiv Herd. | Fish. > Farm. > Trade (Herd. \equiv 0) |
| | G2 | Fish. > Farm. > Trade \equiv Herd. | Fish. > Farm. > Trade (Herd. \equiv 0) |
| | G3 | Labor. \gg Fish. > Farm. \gg Herd \equiv Trade | Labor. \gg Fish. \equiv Farm. (Trade \equiv Herd \equiv 0) |
| Within-activity between-group ranking | Fishing | G2 > G1 > G3 | G2 > G1 > G3 |
| | Farming | G1 \equiv G2 > G3 | G2 > G1 > G3 |
| | Trade | G1 > G2 (G3 \equiv 0) | G1 > G2 (G3 \equiv 0) |
| | Herding | G1 \equiv G2 \gg G3 | (G3 \equiv G2 \equiv G1 \equiv 0) |
| | Laboring | G3 (G2 \equiv G1 \equiv 0) | G3 (G2 \equiv G1 \equiv 0) |

Source: Participatory activity ranking exercise Yaéré / Chari delta / Western shores (Oct.1999-July 2000).

Notes: The symbols “ \gg ”, “ $>$ ”, and “ \equiv ” hold respectively for: “ranks much higher than,” “higher than,” and “similar to.”

incomes. As it is the case for the two other regions, G1 households derive a substantially higher proportion of revenues from trade than G2 households. In contrast G3 households are not involved in trading at all. They are employed mainly in wage labor through small daily jobs, for example, farm clearing/weeding; fish processing (descaling and degutting); fish packaging and loading.

Further Analyses on Fishing Activity

To complete the livelihood analysis presented above and to gain a deeper insight into the specific role of fishing in the household livelihood and wealth differentiation process, a series of complementary analyses focussing specifically on various aspects of this activity were carried out.

Comparative Analysis of Fishing Gear

First the type and number of fishing gear owned by the households within the different wealth groups were investigated in each village. The results of the analysis show that apart from the dragnet or seine (*tauraw*) which is owned almost exclusively by G1 families but operated collectively,¹⁴ all groups in all areas use the same set of traditional, individually operated, fishing gear, namely gillnets, traps (Mali traps or *goura*), hook-lines, cane trap (*ndurutu*), castnets, and dipnets (*sakama*)—with some local exceptions (e.g., castnets are not used along the western shores). While no apparent difference seems to exist between wealth groups in terms of *types* of fishing gear (see next paragraph, however), in contrast a large dissimilarity exists in terms of *number* and *size* of gear owned by households. In particular the comparison for the three most common types of gear (gillnets, *goura*, and hook-lines) shows that the richer households (G1) hold a larger number of units of each gear compared to the other wealth groups (see Table 6, top part). For illustration, along the western shores of the Lake, G1 households own on average 2 times more hook-lines than G2 households ($G2/G1 = 0.5$) and almost 10 times more *goura* than G3 households ($G3/G1 = 0.11$). In that respect, the comparison of the series of ratios $G2/G1$ and $G3/G1$ suggests that the difference between the wealth groups in the Yaéré is proportionally less marked than in Chari delta or along the western shores.

Also very informative is the analysis of the average number of *types* of fishing gear owned by the households as a function of their wealth level. Although we mentioned earlier that the three wealth groups own overall the same types of fishing gear, the range of type of gear appears to decline with poverty (see Table 6, bottom part). In other words the poorest have a lower diversity of fishing gear in comparison to the more wealthy households. The decline is specially marked along the western shores and in the Chari delta where the number of gear types per household is even smaller than 1 for G3 households, reflecting the fact that a significant number of the poorest households in these regions own no fishing gear at all.

Table 6. Fishing Gear Ownership

| Area | Fishing gears | Estimated number per household [Range] (average) | | | | |
|---|---------------------------|--|----------------|----------------------|------------------|----------------------|
| | | G1 | G2 | G2/G1 ^(b) | G3 | G3/G1 ^(b) |
| Yaéré | Gill nets | [2-6] (4.2) | [1-5] (2.4) | 0.57 | [0-2] (1.2) | 0.29 |
| | Hook-lines ^(a) | [2-15] (6) | [1-10] (4) | 0.67 | [1-5] (1.6) | 0.27 |
| | Goura traps | [15-100] (50) | [2-50] (26) | 0.52 | [2-30] (12) | 0.24 |
| Western shores | Gill nets | [3-30] (11) | [3-12] (6) | 0.55 | [0-2] (0.5) | 0.14 |
| | Hook-lines ^(a) | [7-40] (24) | 7-20 (12) | 0.50 | [3-6] (4.5) | 0.19 |
| | Goura traps | [100-600] (142) | [20-120] (73) | 0.51 | [0-20] (15) | 0.11 |
| Chari delta | Gill nets | [4-30] (12) | [2-10] (4) | 0.33 | [0-2] (1.1) | 0.09 |
| | Hook-lines ^(a) | [3-15] (9) | [2-10] (5) | 0.56 | [1-5] (3) | 0.33 |
| | Goura traps | [10-100] (77) | [5-100] (83) | 1.08 | [0-25] (9) | 0.12 |
| Average number of different types of fishing gear owned by households | | | | | | |
| Wealth groups | Chari delta | | Western shores | | Yaéré floodplain | |
| G1 | 3.78 | | 3.73 | | 3.31 | |
| G2 | 3.20 | | 3.13 | | 3.25 | |
| G3 | 0.96 | | 0.46 | | 2.80 | |

Top part of the table: Comparative analysis of the number of gill nets, hook-lines and *goura* per household for the different wealth groups (range estimated by the key-respondents in each village).
Bottom part of the table: Number of different types of fishing gear owned by households of each wealth groups (average across villages of the same area).

Notes: ^(a) standardised 1000-hooks ; ^(b) ratio of average values.
Source: Field survey Yaéré / Chari delta / Western shores (Oct.1999 - July 2000).

Table 7 synthesizes the distinctive features of the households' livelihoods as identified through the comparative livelihood analysis (previous section) and fishing gear analysis presented just above.

Wealth Groups' Ethnic Composition

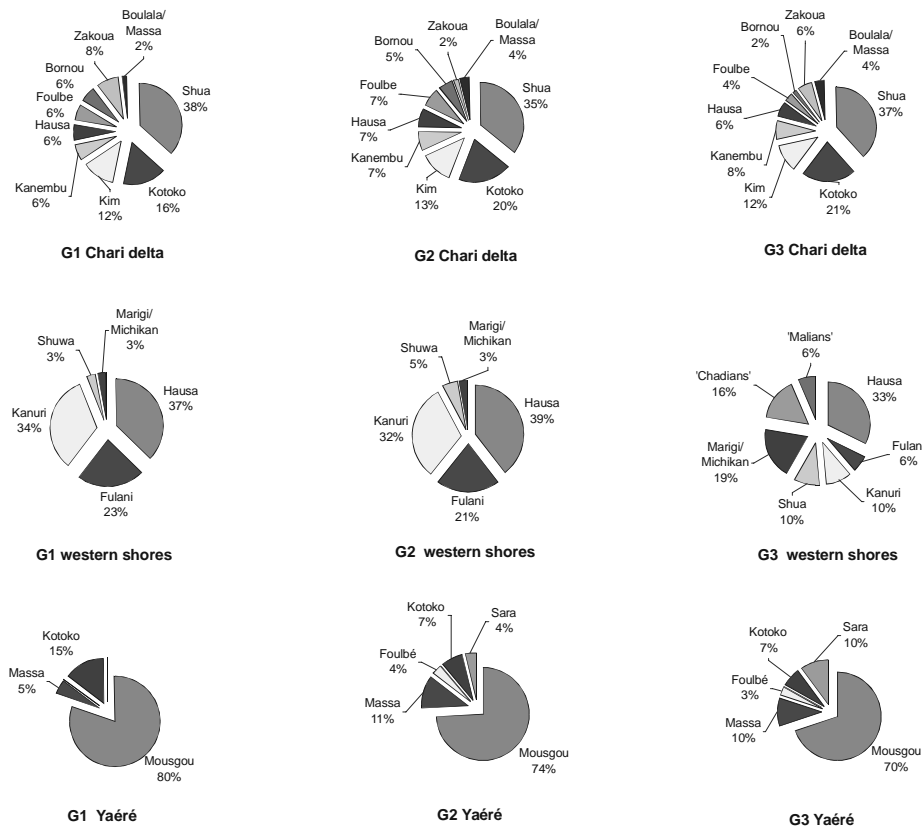
Kin systems, ethnic or socio-cultural groups, religious affiliations have been for long recognized to play a major role in social status and distribution of wealth endowment in rural African societies (Peters 1994; Behnke 1994; Devereux 1996; Brock and Coulibaly 1999; Vedeld 2000). To evaluate (at least partially) the degrees of this potential inequity in the case of the communities of the Lake Chad Basin, a comparative analysis of the ethnic composition of the wealth groups was carried out during the survey. Figure 3 shows the results of this analysis for the three regions. Confirming the initial results of Table 1 which show that the high multi-ethnicity of the Lake Chad Basin populations, the within-group comparison gives a further insight into the socio-ethnological structure of the Lake Chad Basin populations. In particular, and in opposition to our own initial assumption, it does not reveal any patent sign of ethnic discrimination between wealth groups,

Table 7. Comparative Summary of the Households' Livelihoods for the 3 Areas Surveyed

| Area | | Livelihood Characterization |
|-------------------------|----|--|
| Yaéré floodplain | G1 | Larger fishing gears and inputs (e.g., expensive seine 'Taraaw' and beach seine), large rice plots and/or farmland, derives income from commercialisation of catch and farm product surplus, engages in trading (retail and/or small trade of fish, farming and housing products); possession of large livestock herds (perceived as a sign of wealth/prestige). |
| | G2 | Smaller fishing inputs (no seine, essentially gillnets, castnets, Mali traps 'Goura'), smaller farms on more marginal land (lower productivity/more exposed to flooding), smaller livestock herds (mainly goats), petty trading; commercialisation of their catch and farm products surplus. |
| | G3 | Very small farm, generally operate at subsistence level of production, i.e., no commercialization; borrow money or food from better-off; may sell part of their livestock (used as a form of saving and capital), mainly rely on fishing both for protein and income generation. |
| Chari delta | G1 | Larger fishing inputs, such as large (and expensive) seines, gillnets (10-12 bundles) and Mali traps, larger farm land; commercialises large part of catch but also farm products, large livestock herds (cows, goats, etc.), engage in trading. |
| | G2 | Smaller fishing inputs (no seine, 4-6 bundles of nets, Mali traps); smaller farm, petty trading; commercialises surplus of fishing catch and farm products. |
| | G3 | Critically poor, little subsistence farming/fishing; hardly owns fishing inputs (1-3 net bundles) or farmland; engages mainly in wood-cutting or seine operating. |
| Western Shore | G1 | Larger fishing inputs such as nets (5-10 bundles), big boats and 25-40 HP outboard engines for fishing in Lake open-waters, large acreage of farm land (5-7 acres), larger livestock herds (cows, rams, goats, etc.) for fattening and selling and possession of motor vehicles for transportation; buying and hoarding of grains especially corn and beans; main source of income: fishing. |
| | G2 | Less fishing inputs and gears (2-5 bundles of net), smaller boats with smaller outboard engines (10-25 HP), smaller farm size (2-3 acres), livestock and petty trading; main source of income: fishing. |
| | G3 | Critically poor, little subsistence farming/fishing; hardly owns fishing inputs and/or land; engage mainly in labor, e.g., farm clearing/weeding; fish descaling and degutting, fish packaging and loading. |

although some differences are noticeable. Along the western shores, the ethnic composition of G1 and G2 is perfectly comparable both in terms of proportion and composition (Hausa, Fulani, and Kanuri constituting the three major ethnic groups). In contrast, in the poorest section of the population, two groups of "foreigners," coming from Mali (Bozo) and Chad (mainly Bararas) are also present (in relatively small proportion, however). In Yaéré floodplain, G2 and G3 compositions seem remarkably similar and diverge from G1 only by the presence

Figure 3. Results of the Ethnic Comparative Analysis for the Three Areas Surveyed in the Lake Chad Basin.



of a small number of Sara (found mainly in the poorest group). In Chari delta, both the composition and proportion of ethnic groups within the three wealth groups are very similar across the communities.

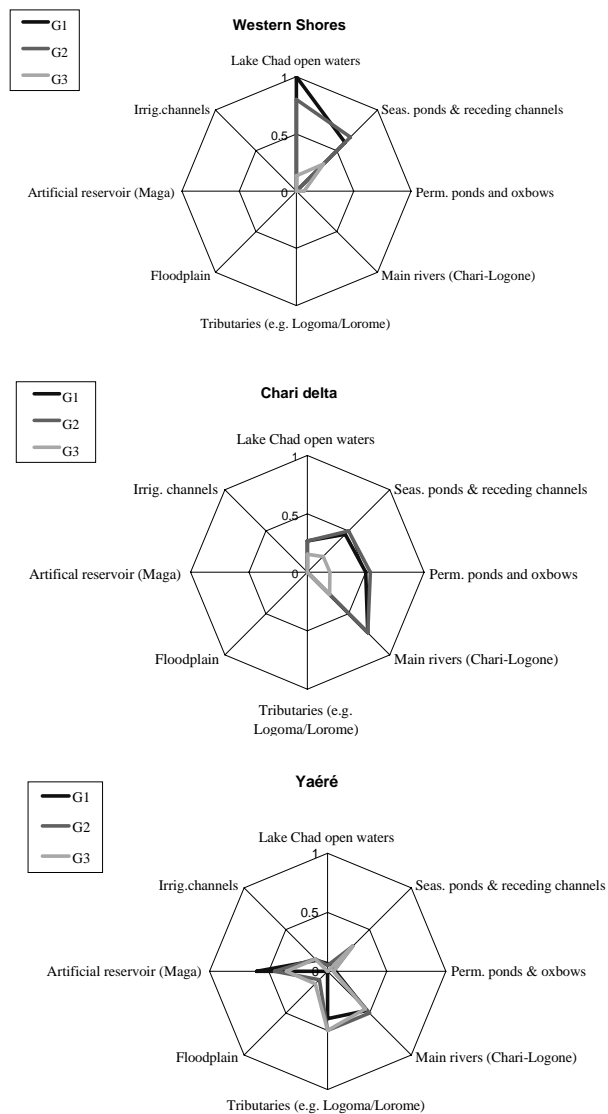
Access to Fishing Grounds

As for ethnicity, a large number of social and/or ethnographic studies have emphasised that in Africa (but more generally in a large number of countries around the World), control to and restriction of access to fishing grounds is often a factor of wealth stratification within communities (Davis and Bailey 1996; Kremer 1994; Fay 1989; Kassibo 1994; Neiland et al. 1997). It was therefore anticipated that some form of access discrimination within the Lake Chad Basin's villages in favour of the richest/more powerful groups would be observed. To evaluate the

degree of this potential inequity, a comparative analysis of the water-bodies exploited by the different wealth groups was undertaken within each village. The result is synthesised in Figure 4. The different polygons reflect the types and proportions of water-bodies accessed by the different wealth groups of the villages (aggregated per region)(see note 9).

The comparison highlights some very instructive features which are disguised in the (global) typology presented in Table 2. In particular, while the polygons' shape and size are remarkably similar between the three groups in the Yaéré

Figure 4. Results of the Comparative Analysis on Accessibility to Fishing Grounds



floodplain, indicating that all households in that region have access to the same fishing grounds irrespective of their wealth level, the situation is radically different in both the Chari delta and western shores regions. In these regions, the average value of accessibility of the poorest households (G3) to each water-body are significantly smaller than those of the two other groups, suggesting that the poorest households have reduced access to the fishing grounds in these regions.

Discussion

Limits of the Analysis

The methods used to collect the data of this livelihood analysis contain a certain number of biases and drawbacks that it is necessary to highlight and debate before moving onto the main points of this discussion. The first limitation, perhaps, is that the survey has taken the wealth group as the principal unit of investigation. The appropriateness of wealth group as an adequate unit of analysis for rural development research can be much questioned, essentially on the basis that it assumes a high homogeneity regarding the objectives, constraints, strategies and level of wealth of the households constituting these wealth groups. However, the magnitude of the drawback depends on the nature of the enquiry and the objective of the analysis. In the present case, the objective was to identify and compare local populations' livelihood and livelihood strategies at the local scale between wealth groups, and at a large scale between regions within the Basin. Using the wealth group as our lowest unit of analysis, although it did not reflect the within-group heterogeneity, permitted us to expand the scope of the survey beyond the usual isolated village-studies and thereby to reveal, despite the local-specificity of each village, the general trends characterizing each region. This analysis is, furthermore, one of the first studies conducted on (inland and marine) fisheries where the fishing communities have actually been disaggregated into wealth groups and where access to fishing grounds, ethnic composition, gear ownership and food security have been analysed at the wealth group level and not at the global community level. It remains true, however, that within-group analyses of individual households would have allowed us further to assess the heterogeneity within each wealth group.

Second, although we adopted an integrated framework in which fishing was only regarded as part of the households' multi-activity portfolio, our main focus was on the fishing activity and its contribution to the households' livelihoods and wealth differentiation. This emphasis does not mean that the importance of the other activities must be undervalued. For instance, it is clear from the activity-ranking exercise that the role played by the trading activities in the wealth stratification and economic take-off of the households is also central—if not more important than that of fishing—and would therefore have required much more attention than it has received in this study.

Finally we assessed fishing only through its economic (income), labor and subsistence (food) dimensions. Its social component has been almost completely ignored in this analysis. In particular, the place that fishing activities have in the very complex network and social organization developed through the “subsistence ethic” described, for instance, by Scott (1976) in pre-capitalist peasant societies has not been addressed at all in this survey, despite some anecdotal information suggesting its existence.¹⁵

Role of Fishing Activities in Rural Livelihood and Wealth Stratification

The comparative analysis of the activity-ranking exercise offers a good starting point for discussing the role of fishing in rural livelihoods (and wealth stratification) of the Lake Chad Basin populations. The analysis reveals that this contribution varies between wealth groups within the same region but also between regions for the same wealth group. The first major conclusion of this study, therefore, is that the original question which motivated this study (what is the contribution of fishing activities to the livelihood of rural populations?) cannot be correctly answered if one does not distinguish the different wealth groups that constitute the local populations/communities considered and look at the specific role that fishing activities played in the livelihoods of the households within each wealth strata.

In the present case, the wealth ranking exercise highlights several points. First it indicates that across the whole Basin, the wealthier households always invest the largest part of their labor (time-effort) in fishing activities. Furthermore, this high labor investment is usually successfully transformed into revenues. For instance, both in Chari delta and along the western shores, fishing activity contributes to the largest share of the G1 and G2 households' income, while in the Yaéré fishing is ranked second after farming for the better-off households. In fact, in the Yaéré floodplain, a more detailed analysis of the situation (Béné et al. 2003b) shows that the specific land tenure system, associated to the relative scarcity of the non-flooding land, plays a major role in the predominance of farming over fishing activities for the better-off households. In contrast, the poorest households of the Yaéré tend to privilege fishing (both in terms of labor and contribution to income). In this respect, the analysis of the accessibility to fishing grounds suggests that the relative inter-group equity of access which characterises the water-tenure system in the Yaéré is certainly one of the major factors which allows the poorest households of this part of the Basin to make fishing the central element of their livelihoods.

The situation is quite different in the Chari delta and along the western shores of the Lake. In those two regions, fishing remains relatively inaccessible to the poorest who have to find alternative activities for their main source of income (in the Chari delta, they rely mainly on wood cutting, while along the western shores of the Lake they provide their labor for hire. This empirical observation

(i.e., the poorest can only access a marginal part of the water-bodies) diverges significantly from the widely accepted view that fisheries, due to the open-access of the resource, can easily be entered (by the poor) and therefore offers a general redistributive mechanism which compensates for unequal access to land and/or other factors of production. [Bailey and Jentoft \(1990\)](#) for instance assert:

The open access nature of fishery resources and the ease with which people can enter a fishery with limited experience or capital investment, means that there are few obstacles to seeking a livelihood at sea. (P. 337)

If this is indeed the case (at least in theory) in a situation of pure open-access resources, the present empirical case suggests that the generalization of this “fisheries as last resort activity” perception could be misleading and mask the fact that in some areas fishing is clearly an activity of the rich, characterized by a non-equal accessibility endowment where the poorest are usually those who face the endowment failure. For instance, in the case of the Chari delta and western shores of the Lake Chad, only the wealthiest households have access to the whole range of water-bodies (amongst those available), while the poorest are marginalized or even excluded from some of these water-bodies/fisheries.

This marginalization of the poorest is due to several factors which can be categorized into two main causes—the *direct* (financial) and *indirect* (technical) restrictions. The *direct* restriction results from the various legal/locally legitimated fees and illegal taxes that are imposed for the access to the water-bodies. The detailed analysis of the local institutional arrangements in the region (Béné et al. 2003a) shows that in the totality of the villages surveyed in the Chari delta and along the western shores of the Lake, acquiring the rights of access to a restricted fishing ground systematically involves some form of fee payment, either in cash or as a proportion of the catch (or both). A large part of these fees is levied by the local traditional authorities, but the survey also reveals the existence of large-scale illegal taxation systems operated by soldiers of the Joint Patrol Forces¹⁶ or even by central government agents. These different institutionalized and/or illegal fees (which overlap each other) represent financial barriers to entry to the fisheries which more particularly affect the poorest.

Simultaneously, the poorest households also face *indirect* (or technical) restrictions of access to certain fishing grounds resulting from their inability to acquire the adequate fishing gears necessary to fish these water-bodies. The case of pirogue—indispensable to fish the open-waters of the Lake—is one obvious example. Not surprisingly, pirogue ownership had been ranked as the fourth major criterion of wealth differentiation by the interviewees. The *tauraw* used for seasonal and/or permanent ponds in the Yaéré floodplain is another illustration. This type of fishing gear is exclusively owned by the richest households which can afford its acquisition and operating costs. Depending on its size, the price of a *tauraw* ranges from 300,000 to 1 million CFA while the average monthly salary for a

rural civil servant in North Cameroon varies from 45,000 to 200,000 CFA. Interestingly enough, the *tauraw* was systematically recognized by the interviewees as one of the most productive type of fishing gear for pond fishing.

These different examples illustrate how the poorest are financially excluded from the most productive fisheries due to their inability to afford the types of fishing gear required. Therefore, and conversely to what it is often assumed or asserted in the literature, the present analysis suggests that the open-access that characterizes a fishery or a specific water-body does not necessarily mean that the latter will be accessed by every household in the community. The cost of acquiring or operating the necessary gear(s) may prevent the poorest from entering the supposedly open-access fishery. Interestingly, this mechanism of exclusion does not necessarily operate solely for the most expensive fishing equipment. Even in the case of the most common/less expensive fishing gears (*goura*, castnets, hooklines),¹⁷ the data shows that the poorest households possess on average 3 to 10 times fewer units of these types of fishing gear than the better-off. The data even shows that a significant part of the poorest households along the western shores and in the Chari delta does not even own any of these inexpensive types of fishing gear.

Access to fishing resources and grounds is therefore strongly determined by wealth. But, in turn, wealth is also determined by fishing activity. Indeed, fishing appears clearly to influence the wealth differentiation process in the sense that the better-off—who can afford a larger number of (more efficient) gear—are in a better position to transform their labor investment into a higher income in comparison to the poorer households who fish on marginal and usually less productive grounds with less efficient equipment. Quoting Lipton, Devereux (2001, pp. 6, 24) emphasizes, “labour productivity is normally the main difference...in [households’] effectiveness in converting a year’s work into a year’s income...[This] links poverty with an inability to generate adequate returns to labour.” In contrast, for the better-off households of the Lake Chad Basin, the income generated from fishing is usually re-invested either in more efficient or larger fishing gear or even in non-fishing activities. [Neiland et al. \(2000\)](#), for instance, using individual household income data, were able to show that along the western shores of the Lake the better-off households usually use a large part of the income generated by the fishing to purchase farming inputs (such as fertilizers and seeds, and also to hire farming labor). Finally, the evidence—revealed by the participatory wealth ranking exercise—that the communities themselves perceive ownership of fishing equipment as one of the first signs of wealth is also a strong indicator that fishing activity has become a key element of the wealth differentiation process for these populations.

The second major conclusion of this analysis states that, although the access to fishing grounds is strongly related to wealth, there is no one-to-one relationship between wealth and the contribution of fishing activities to the livelihood of households. As the results of this survey have shown, fishing can represent the

vital activity on which the poorest and most deprived households of a community will rely to generate both income and food in the absence of equitable access to land (as in the Yaéré floodplain). In these cases fishing can be seen as the “last alternative of the poorest.”¹⁸ But fishing can also constitute a powerful lever for wealth differentiation and a central element in the livelihoods of the better-off households who use it to generate revenues to be re-invested in various fishing or non-fishing activities (including labor hiring). Numerous interviewees emphasised for instance that households have for long realized that additional investments in fishing inputs (through new fishing gear or more labor allocated to this activity) can generate instantaneous income surplus, in contrast to farming activities where several months (until the harvest time) would have to pass, before eventual benefits might be returned from the investment. Given the very high environmental and political uncertainty that characterizes these Sahelian regions, this capacity of fishing to generate instantaneous gains represents (according to the experience of households) an enormous advantage over farming.

An important lesson from the above discussion is therefore that the way fishing contributes to the livelihoods of households is remarkably complex and difficult to assess and that the relation between wealth (or poverty) and fishing activities is more than ambiguous. This last point brings additional support to the few recent field studies (Kremer 1994; Neiland et al. 1997; Neiland 2000) which tend to question the long-established view that fishermen are the poorest of the poor and that fishing will always remain a societal safety valve for surplus labor. In fact, as the livelihood analyses carried out in the Chari delta and along the western shores of the Lake suggest, one can even observe situations where the poorest are too poor to be fishermen! In those circumstances, the strong perception that “fishery rhymes with poverty” (Béné 2003), still widely held by experts from international agencies and decision-makers, is far too simplistic to reflect or embody the complexity of the reality. This perception, unfortunately, has prevented the development of adequate frameworks to assess the actual relationship which exists between fisheries, poverty, and wealth, and to identify the conditions which could make this activity a powerful tool for poverty alleviation and rural economic development. There is in that domain an urgent need of further empirical and conceptual research.

NOTES

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- 1 In this paper “Lake Chad Basin” refers to the rural areas directly under the physical influence of the Lake’s open waters and related lacustrine and floodplain system (tributary rivers, oxbows, marshlands, floodplains and seasonal and/or permanent pools). It doesn’t refer to the entire geo-political entity of the “Lake Chad Conventional Basin” (which covers the five countries now included in the Lake Chad Basin Commission, i.e., Niger, Nigeria, Cameroon, Central African Republic and Chad).
- 2 In this article, “livelihoods” refers to the means of living, supports of individuals and households, and “livelihood strategies” to the different voluntary processes by which individuals and households develop and operate one or several activities on a subsistence and/or commercial basis in order to maintain or improve their standards of living. Livelihood and livelihood analysis are therefore understood in a more restrictive sense than in the holistic “Sustainable Livelihood Framework” (SLF) developed by IDS (e.g., Chambers and Conway 1992, Scoones 1998) and recently adopted by DFID (e.g., Carney 1998). In particular, in our case, livelihood analysis focuses only on some aspects of the natural, economic, physical and institutional dimensions of the populations under concern and does not include any “human asset” (such as education, health, or knowledge).
- 3 In addition to this rural livelihood analysis, three other analyses were carried out as part of the overall research project: (1) an analysis of the local institutional arrangements, with a particular focus on the fisheries traditional management systems; (2) a market monitoring system carried out simultaneously in different parts of the Basin (i.e., Far-North Cameroon, West Chad, and North East Nigeria); and (3) an analysis of the fishery policies and fishery policy implementation at the national (Cameroon, Chad, Nigeria) and regional (Basin) levels (Neiland and Béné 2002).
- 4 No area was surveyed in the northern part of the Basin. Following the droughts of 1972 and 1984, the open waters of the Lake shrank substantially in the early 70s and 80s and totally withdrew from the northern part of the Basin (see the “1997 open water” limits in Figure 1), leaving the Niger shores (e.g., Nguigmi) completely dried, separated from the open waters by more than 180 km. No fishing activities have been observed in this part of the Lake since the late 70s. However, following the two successive massive floods of 1999 and 2000 it has been reported that the water has spilled back into the northern part of the Basin and reached again the shores near Nguigmi in November 2000, only few months after the survey was conducted.
- 5 The total number of villages included in the survey was determined by time, accessibility and budget constraints.

- 6 In this article subsistence is defined as an economic system adopted by households primarily organized around a domestic mode of production which depends heavily on natural resource harvesting and mainly geared towards home-consumption (i.e., not commercialized and therefore not income-generating). For a comprehensive review and discussion of the different definitions of subsistence proposed in the literature, refer to Sharif (1986).
- 7 For illustration, in the village of Gala in Yaéré floodplain, the key-informants identified that for the group of the richest households, farming was the predominant activity in terms of contribution to income, followed by fishing and trading (herding being only carried out at the subsistence level in this wealth group). At the same time the key-informants indicated that the predominant activity in term of labor for the same wealth group was fishing, followed by farming, trading and finally herding. The result of the within-group between-activity ranking in terms of contribution to income for the group of the richest households in Gala is therefore: Farming > Fishing > Trading (no Herding). Using the (desk-based) weighting system, farming was accredited 3, fishing 2, trading 1 and herding 0. Simultaneously in terms of labor the ranking is: Fishing > Farming > Trading > Herding and the weights are respectively 4, 3, 2 and 1. Reiterating this weighting procedure for each village and aggregating the results by region allowed us to work out two “aggregated” rankings (one for each criterion) in each region. The analysis of the within-activity between-group ranking was carried out following a similar weighting procedure, except that the information was organized and analyzed by activity and not by wealth group.
- 8 For this, the ethnic origins of the households constituting the different wealth groups were listed in each village by the informants’ groups. The number of times each ethnic group was mentioned in each wealth group was then summed up at the regional level and weighted against the total number of ethnic groups observed in this wealth group.
- 9 For the analysis of the fishing ground accessibility, the investigation was done through a two-step procedure. First, the exhaustive list of water-bodies (seasonal and/or permanent ponds; rivers and tributaries; Lake’s open waters, receding channels, floodplain, etc.) located in the vicinities of each village was completed. Later during the group interview, the key-informants were also asked to list the various water-bodies accessed/exploited by the households of the different wealth groups. The number of times each wealth group accesses one type of water-body was then aggregated for each region and weighted against the number of village sampled in each region. This procedure allowed us to derive an average regional value of accessibility (index of relative access) to each water-body for each wealth group, ranging from “0 to 1.” A “0” value for a type of

water-body indicates that the wealth group considered has no access at all to this type of water-body throughout the entire region, while a “1” value means that the wealth group considered accesses this type of water-body in all the villages sampled).

- 10 To evaluate this degree of food insecurity, three criteria were used (see text for detail): (a) the auto-consumption rates of fish and farming products; (b) the food-purchasing capacity; and (c) the food self-sufficiency rate. The fish and farming products auto-consumption rates were estimated in each village by the key-respondent and then averaged at the regional level. For both the food purchasing capacity and food self-sufficiency criteria, the interviewees were asked at the village level to indicate whether or not the households in each wealth group satisfies the criteria considered. The answers were then aggregated (separately for each wealth group and for each criterion) at the regional level through the calculation of the percent of villages for which the criteria were satisfied.
- 11 Food security is defined by Riely et al. (1995) as a “situation where all people at all times have both physical and economic access to sufficient food to meet their dietary needs for a productive and health life.” For a detailed discussion and presentation of other criteria used to estimate food security, see those authors.
- 12 Following Ellis (1998) we make the distinction between risk-strategy actions (set of voluntary, pro-active behavior or decisions) and coping strategy (involuntary, reactive behavior or decisions).
- 13 This relationship is in agreement with the empirical “law” which predicts that in rural area the poorer the household, the higher the auto-consumption rate.
- 14 Seine nets (*tauraw*) or dragnets, which were recognized by the interviewees as being very productive fishing gears, are owned by the richest households (generally from G1) who have the financial resources to acquire them and engage labor to operate them. The number of people necessary to operate a dragnet is a function of its size. Usually a group of 5 to 16 people operates the seine, either from the shore or from boat (on the open-water of the Lake). Seine owners usually utilize kin relations or hired labor (usually males from G3) to operate the seine. Payment for the labor, based on a share remuneration system, is usually in cash, although it may be (more rarely) directly a share of the catch. In few villages in the Yaéré floodplain where no body from the village owns any *tauraw* individually, the villagers may borrow one from the neighbouring villages. In that case, the proceeds from the sale are usually used for financing “Communal Interests Projects” such as the construction of a new school or the maintenance of local roads and river embankments.

- 15 Scott (1976) suggests that the capacity of pre-capitalist peasant communities to cope in a risky environment was related to their organisation around the concept of “subsistence ethic” which can be subdivided into three aspects: a general proclivity towards risk aversion (safety first), a tendency toward mutual support (the norm of reciprocity), and an expectation of minimum state or local elite support (the moral economy). With respect to this aspect of moral economy, several key-informants along the western shores of the Lake mentioned the occurrence of gifts (in form of fish occasionally distributed by the better-off households to the poorest). Likewise the example of the seine operated in common by villagers in some communities of the Yaéré where the revenues derived from the catch are then used to finance Common Interest Projects could be interpreted as an illustration of mutual support amongst these communities.
- 16 The Joint Patrol Forces are regular armed forces from the four riparian countries which were initially deployed in the region to ensure the security of the local populations.
- 17 For comparison, the purchasing cost of a *goura* in North Cameroon is only about 1,500-2,000 CFA.
- 18 In this respect, the data also revealed that in other part of the Basin where the poorest face even more severe living conditions (in particular chronic food short age—like in Chari delta or along the western shores), these most deprived households will privilege the income rather than the nutritional potential of fish: they will systematically sell the largest part of their catch to buy cheaper food. This conclusion, which was derived from the analysis of the auto-consumption rate of self-produced food (see Figure 2), was also confirmed through anecdotal information. For instance, along the western shores of the Lake, interviewees explained that when payment for dragnet labor were made in kind and not in cash (see note 14), the fish were usually almost completely sold in order to obtain cash for other household needs.

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