

# Evaluating Livelihood Strategies and the Role of Inland Fisheries in Rural Development and Poverty Alleviation: The Case of the Yaéré Floodplain in North Cameroon

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**Abstract.** It is usually assumed that most, if not all, small scale fishing communities, particularly in tropical countries, represents the poorest and most disadvantaged part of rural societies. As a result, these populations have been targeted for poverty alleviation by fisheries development programmes since the early 60's. Unfortunately many of these programmes have failed in achieving their objectives due to a lack of understanding for the complex livelihood strategies and networks of socio-economic and institutional relationships which characterise the different strata of these societies. In the present paper, we attempt to address the issue of poverty and rural livelihood strategies for the fishing communities of the Yaéré floodplains of the Lake Chad Basin (Cameroon, Africa). For this, we carried out an socio-economic assessment of the Yaéré floodplain population through a wealth / activity ranking exercise combined to an analysis of the land / water tenure systems. The result shows that the floodplain population is made up of different wealth groups characterised by distinct livelihood strategies. In particular it is shown that the poorest rely in a larger proportion on fishing activities while the better off mainly rely on farming. The analysis emphasises the key-role of the local water tenure system in this livelihood strategy distinction. The relation between wealth and food insecurity as well as the different factors governing the wealth differentiation process are analysed. The implications for poverty alleviation and rural development programmes at the micro-level are briefly discussed.

*Many communities of fishermen are poor but it should be realized that they are not necessarily poor because their livelihood is fishing. They are often already poor and landless individuals who are able to subsist by fishing.*  
Dunn (1989 p.4)

## Introduction

It is usually assumed that most, if not all, small scale fishing communities, particularly in tropical countries, represent the poorest and most disadvantaged part of rural societies (see for instance Smith, 1979, Smith 1981, World Bank 1982). As a result, these populations have been targeted for poverty alleviation by fisheries development programmes since the early 1960s. Unfortunately many of these programmes have been based on sectoral analysis of the economy. With this uni-dimensional perspective, government's or international interventions have frequently failed in achieving their objectives, due to a lack of understanding of the complex livelihood strategies and networks of socio-economic and institutional relationships which characterise these communities (FAO 1984, Bailey and Jentoft 1990, Platteau 1989). In the present paper, we attempt to address the issues of poverty and rural livelihood strategies for the fishing communities of the Cameroonian

floodplains of the Lake Chad Basin (**Fig.1**). The main objective of the study was to assess the contribution of the fisheries activities in the development process of the local economy, in order to provide guidance for future rural development and poverty alleviation policies within the context of these North Cameroonian floodplain areas<sup>1</sup>.

In the floodplains of North Cameroon, called the "Yaérés"<sup>2</sup>, fishing fits within a complex and flexible matrix of various activities. During the same season, the local populations are alternatively fishers, herders, and farmers, and each point of the Yaéré floodplains is potentially a fishing ground, a grazing area and a cultured field, depending on the period in the flood cycle (Fritsch 1970, Sarch 1997). On the whole, the multiple elements of the floodplain economy are closely integrated, and it is simplistic to speak about 'fishermen', farmers' or 'pastoralists', as if they were groups of people distinct from one another. This intricacy of activities carried out simultaneously or alternatively by the population creates a major difficulty when trying to estimate the benefits, costs and equity considerations of development policies.

Fig.1. Location of the Yaéré floodplain within the African continent. This area of the Lake Chad Basin\* is located in the extreme north of Cameroon, on the west bank of the Logone River which materialises the natural border with Chad. The numbers on the Yaéré floodplain map indicate the location of the 21 villages surveyed in Cameroon. The rectangle areas noted 1 and 2 are the Nigerian and Chadian zones where similar surveys have been conducted.

\* The conventional Basin includes the following 5 countries: Niger, Nigeria, Cameroon, Central African Republic, and Chad.



In fact, the existence of these interdependent activities implies that potential interventions (both for rural development and poverty alleviation) can not be assessed through a mono-sectoral or mono-activity approach, but must instead be considered through an integrated assessment approach in which the different sectors of the economy are viewed together as a joint production activity.

The present socio-economic survey was designed and conducted to integrate this multi-activity based system. The fishing activity was considered as one sub-element of the diversified portfolio adopted by the Yaéré populations. In particular, emphasis was put on the interactions (linkages and complementarity) that exist between the different activities undertaken by the households as part of their livelihood diversification<sup>3</sup>.

In addition, the analysis also attempted to take into account the heterogeneous nature of the rural communities. One of the key conclusions that emerges from recent social research is that even small rural communities are not homogeneous but instead are made up of different socio-economic strata characterised by distinct livelihood strategies (Vosti and Reardon 1997, Ashley and Carney 1999, Ellis 1999). While the poorest part of the community will depend heavily upon a given combination of crops and/or natural resources for its food security and income generation, the better-off part of the community, because it faces different socio-economic and institutional constraints and opportunities, will probably develop a radically different portfolio. Unless livelihood strategies are distinguished within each stratum, there is always a danger that development or poverty alleviation policies, even if they adopt an integrated approach, result in unintended and sometimes negative impacts on some of the groups that make up these communities.

Therefore, to correctly assess the role of fisheries in the Yaéré population livelihood and to evaluate their potential contribution in poverty alleviation, it was necessary to introduce a stratification framework in the analysis, which allowed distinguishing between the different socio-economic strata (wealth groups) of the floodplain communities. This was done through a participatory wealth-ranking assessment where the different wealth groups (abbreviated w.g. from now) that make up the villages' population were distinguished. The respective livelihood strategy of each group was then identified through the completion of an activity-ranking evaluation. The data was gathered through a framework inspired from the methodology developed in the Rapid Rural Appraisal (RRA) approach. The term RRA has been originally used by Chambers (1981) to denote specific field survey techniques or data collecting procedures which were developed for the rapid study of land-based resource systems and activities such as agriculture, health, or

forestry. These RRA methods are now widely recognised and broadly adopted in rural assessment and development interventions (see Chambers 1992 for a detailed review on RRA).

Recently, ICLARM relied on these RRA techniques to develop an analytical framework for the rapid assessment of fisheries communities (Pido et al 1996, 1997). This framework, however, is adapted to the context of Asian coastal communities. For inland fisheries, and especially African inland fisheries, a framework appropriate to the specificities of the communities (in particular the multi-resource based livelihood of the floodplain communities) is still missing. There was thus a need to develop an integrated diagnostic tool designed to quickly document and evaluate, at the community level, the fisheries activities within the socio-economic and institutional context of African floodplains. The project, from which this socio-economic study is extracted, is the first attempt to propose such an Inland Fisheries Assessment<sup>4</sup> framework. It largely relies on experience gained during the earlier DfID project conducted in north-east Nigeria (Neiland 1997).

To present and discuss the results of this study, the article is organised as follows. The methodology used for the wealth and activity-ranking assessments and their statistical treatment is detailed in Section 2. The results are presented in Section 3 and then discussed in Section 4 with a particular emphasise on livelihood diversification strategies. The implications that these results induce in terms of rural development and poverty alleviation policies for the Yaéré floodplain are then presented in the conclusion.

## **Materials and methods**

### *Data collection and field survey techniques*

The field-survey was undertaken from October 1999 to January 2000 in 21 villages. For each village, the socio-economic assessment included the following combination of methods: (a) a semi-structured group interview<sup>5</sup> of key-personages (village head "*Lawan*", or ward head "*Blama*") in presence of other notables or members of the village's council; (b) participatory mapping exercise of selected landmarks within the village's vicinity, including the seasonal and permanent ponds, the river and their tributaries, the irrigation channels, and the grazing and farming areas; (c) seasonal calendar of the rain and river-flood cycles and associated seasonal calendar of the activities performed by the communities.

Table 1. Ethno-demographic details on the villages surveyed.

Number of villages surveyed	Estim. number of households	Estimated population	Average village size <sup>b</sup>		Average household size	Adult / Children <sup>c</sup>
21	874	9020	42	10	3 / 7	
Ethnic Group <sup>a</sup>	Mousgoum 67 %	Massa 10 %	Kotoko 10 %	Sarra 7 %	Foulbé 3 %	Arab Choa 3 %

<sup>a</sup> Frequency amongst the villages (in percent). <sup>b</sup> in number of households. <sup>c</sup> average number of adults and children per households.

The data acquisition was built up on the presumption that the socio-economic structure of the community was known by the key-personages of the village. The presence and participation of other notables during the interviews reduced the possibility of (in)voluntary bias and/or error in the key-respondent's answers and increased the reliability of the information collected.

#### *Data analysis and statistical tests*

The first step of the field-survey was the identification of the different socio-economic strata of the villages' community through a wealth-ranking exercise. This wealth-ranking exercise was carried out in each village through a participatory approach<sup>6</sup> where the different w.g. were distinguished qualitatively "from the richest to the poorest" according to a set of wealth-criteria conjointly defined by the respondents<sup>7</sup>. The respondents were also asked to identify potential social, cultural, and ethnic factors which could prevent households from rising and/or falling from one wealth group to another.

Once the w.g. were established and their sizes evaluated, the livelihood strategy of each stratum was identified through an activity-ranking exercise. During this exercise the respondents were asked to identify and to rank the activities within each group, from "the main to the least important" activity. This ranking procedure was carried out between the different activities according to two criteria. First in term of allocation of labour (time-effort) over the whole season and secondly in term of contribution to the overall household income. Once ranked, the activities were weighted according to their ranks. Using the same weight vector for every group throughout the whole set of villages, and assuming that the w.g. were comparable between villages, the procedure allows to work out the aggregate weight of each activity in term of labour allocation and income contribution within each group. The complete procedure is detailed in Bene et al (2000).

This ranking exercise was accompanied by a series of questions. The objective was (a) to evaluate the degrees of poverty within each w.g. through an estimate of the food insecurity faced by each w.g.; (b) to determine whether the different groups within a same village have access to the same water-bodies; and (c) to determine whether the ethnic composition differ between w.g. within a same

village. The data obtained from the questions on the access to the water-bodies and the ethnic composition of the groups were tested using a test of similarity (two-sample case) and the degrees of (di)similarity between the groups was estimated by computing their resemblance functions using three different indices: the Ochiai, Dice, and Jaccard indices. The details of the similarity test procedure and resemblance functions computation are given in Bene et al (2000).

## **Results**

### *Demographic information*

Twenty-one villages were surveyed. Their location within the Yaéré floodplain is shown in **Fig.1**. These 21 villages include an estimated number of 874 households and cover a total estimated population of 9020 persons. The average village size is 42 households with an average household size of 10 persons (3 adults and 7 children). Six different ethnic groups are present in these villages. The Mousgoum are by far the dominant group in this part of the floodplain. They represent 67% of the ethnic groups identified and are found in all but one village. The Massa and Kotoko are the two more numerous minority groups (each accounting for 10% of the ethnic group composition). The other minorities are the Sarra (7%), Foulbé (3%) and Arab Choa (3%). **Table 1** summarises these different ethno-demographic details.

### *Wealth-ranking*

For 16 of the 21 villages, the respondents distinguished 3 w.g.: the "poorest", the "less poor" (or medium group), and the "rich", from now respectively noted G3, G2, G1. For the remaining 5 villages, the respondents emphasised the absence of rich people in the communities and distinguished only two groups: "the poorest" and the "less poor". In the rest of the analysis, these two groups were assumed to be comparable to the G2 and G3 groups of the 16 other villages. The wealth-criteria used by the respondents for the ranking procedure are indicated in **Table 2** along with their frequency of occurrence over the whole set of villages. When aggregated through the 21 villages, the richest group (G1) includes 170 households (i.e. 19% of the total number of households surveyed), the poor (G2) 260 households (i.e. 30%), and the poorest (G3) 444 households (i.e. 51%). To the question whether it is possible for any household of their village to pass

Table 2. Wealth ranking exercise. First column: wealth criteria and their frequency of occurrence in respondent's answer (percentage in bracket); third column: factors identified by the respondents as possible causes for household wealth up-grading. Frequency of occurrence in respondent's answer (fourth column).

Wealth criteria	Frequency (%)	Factors of wealth up-grading	Frequency (%)
Herd size	15 (25)	"Luck in activity" <sup>a</sup>	11 (37)
Number of fishing gear	13 (23)	Increase of input	8 (26)
Size of crop plants	11 (19)	Increase of labour	6 (20)
Number of crop plants	9 (16)	"More means" <sup>b</sup>	3 (10)
Income	5 (9)	Appropriate choice of	2 (7)
Type of Fishing gears	2 (4)	strategy by the	
Engine / pirogue ownership	2 (4)	household	
Total occurrence	57 (100)		30 (100)

<sup>a</sup> "Luck in activity" is the direct translation of the expression used by the respondents. It refers to a good season allowing an expected increase in catch or crop. <sup>b</sup> Here the term "means" embodies skills and/or access to capital, credit, and information.

from one group to another the respondents answer affirmatively in 100% (of the 21 villages).

The factors, which were identified as being the major determinants to a potential up (down) -grading of a household wealth level, can be regrouped into 5 main categories. They are listed in **Table 2**. The most frequent factor (37%) is (in respondents words) "luck in activity", i.e. a favourable season which would permit a subsequent increase in catch/crop harvest.

#### *Activity ranking*

In terms of labour allocation (**Fig.2**), the activity ranking shows that all groups are involved in the same set of activities: farming, fishing, cattle-holding, and trading. However, the proportion of labour allocated to each activity varies between wealth group. The trade activity represents a significant component for G1 households' portfolio (19% of G1's total activities' labour allocation) but its contribution is minor for G2 and G3 (respectively 4% and 2% of their portfolios). Conversely, the contribution of fishing and farming activities increases with poverty (from 30% to 42% for farming and from 33% to 40% for fishing. Cattle-holding is the only activity for which the aggregate rank remains more or less constant throughout the 3 groups (between 16% and 20% of the total household' labour allocation).

For the second criteria (i.e. contributions of the different activities to the household income) the ranking exercise also shows notable disparities between the w.g. (**Fig.3**). While farming stays more or less constant for the 3 groups with an aggregate contribution rank varying between 39% and 46%, fishing contribution increases with poverty, passing from 31% to 52% between G1 and G3. The same trend is observed, to a lower extent however, for herding which passes from 0% to 9% of the income contribution between G1 and G3. Conversely, trading activities, which contributes 25% of G1's total

activities' income, represents only 5% for G2 and is completely absent from G3's income<sup>8</sup>.

#### *Test on access to water-body and ethnic composition*

The test of similarity regarding the access to water-bodies is displayed in **Table 3**. It shows that the 3 w.g. are highly similar ( $P < 0.001$  for the 3 pair tests) with respect to the question of water-body access. This is confirmed by the resemblance function computed between the w.g. The degree of similarity varies between 0.68 and 0.90 depending on the criteria used. For ethnicity, the test (**Table 4**) shows that the 3 w.g. are also highly similar ( $P < 0.001$  for the 3 pair tests). The 3 indices of resemblance present very high values (between 0.75 and 0.96).

#### **Discussion**

##### *Wealth differentiation and access to the floodplain resources*

Three wealth groups were identified across the villages, based on the wealth level: the rich, the poor and the very poor. The wealth criteria used by the respondents to distinguished these w.g. (**Table 2**) shows that income *per se* is not considered by the community as one major criterion of wealth. Instead the respondents pointed out the herd size, the number of fishing gears and the size of the crop plants. This result is in line with the fact that the households of the Yaéré, whatever 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 line with this observation, the fact that herd size appears as the most frequently cited wealth criterion in a population that is in majority Mousgoum reflects the socio-cultural importance of herd for this ethnical group, as emphasised by Harkes (1993, p. 24) "*The financial situation of a Mousgoum is reflected in the size of his herd of cattle and other animals. The herd forms a reserve to rely on in difficult periods and especially the cows are important because they are necessary to pay the bridgework at a marriage*". More surprising is the fact that ownership of water-bodies is not

Fig.2. Allocation of labour between the different activities \* within each w.g.

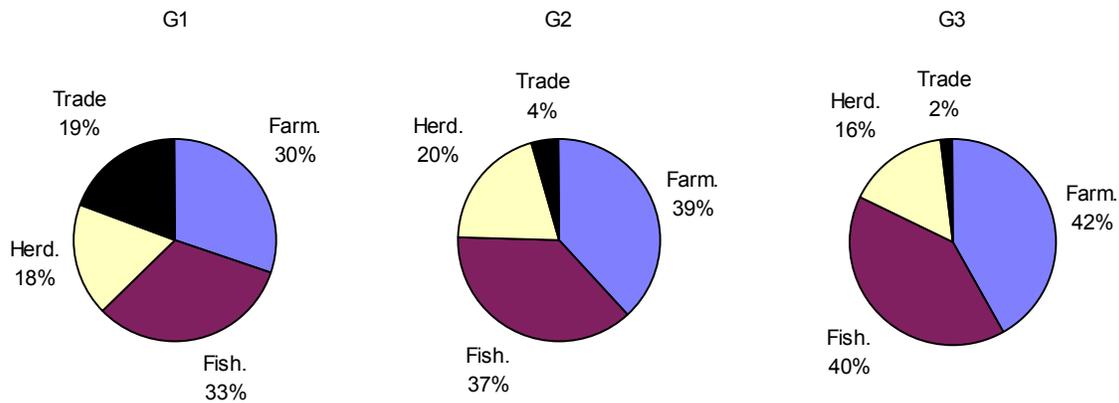
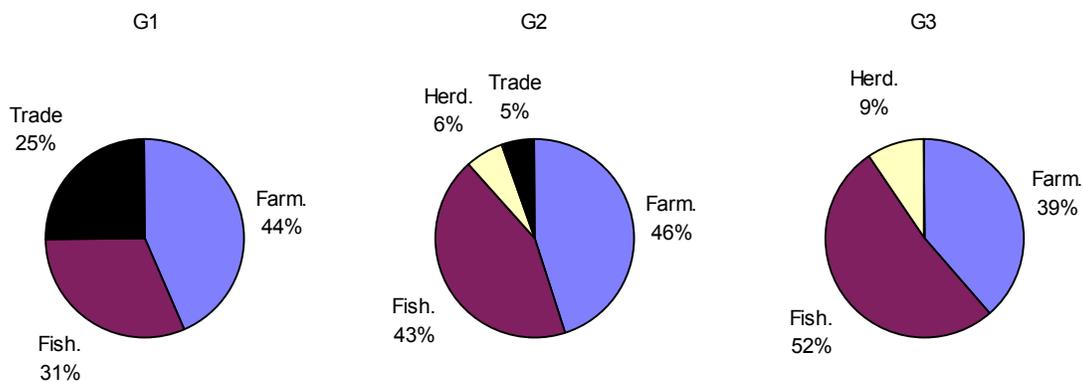


Fig.3. Income contribution of the different activities \* for the 3 w.g.



\* The percentages represent the aggregate weights of each item as computed through the ranking procedure described in Bene et al (2000).

cited as one key-factor of wealth differentiation. Indeed, it is widely reported in inland fishing communities and floodplains fishing communities in particular, that the pattern of wealth distribution usually reflects largely the distribution of rights access to the water-bodies surrounding the villages (Ahmed et al. 1997, Fay 1989). Privileged access or property rights hold on water-bodies (generally the more productive ones) secure large benefits (either directly through private catch or indirectly through rent) to the group or individual households who own or control the access of these water-bodies. Ownership or exclusive access rights are thus usually a major factor of wealth differentiation. This is for instance what is observed in three regions of north-east Nigeria (Upper River Benue, Lake Chad Nigerian border, and Nguru-Gashua Wetlands) where Neiland et al. (1997, p.300) noticed that "*the richest fishers are those with ownership and access rights, whereas the poorest fishers are marginalised or excluded entirely from the most productive fisheries*". On the contrary, in the present case, ownership of, or privileged access to specific water-bodies, even if they may occur, do not seem to play a key-

role in the wealth differentiation. This result, which could be thought to be biased by the privileged position of the respondents, is in fact cross-checked by the test on accessibility to the water-bodies (Table 3). When compared by pairs within each village, the w.g. appears to be highly similar in regard to the access to the water-bodies exploited the community.

It seems therefore that conversely to what is observed in a large number of places, the wealth stratification in Mousgoum society is not generated or amplified by institutional inequities on access to the resource. In that sense the Mousgoum society seems to be more egalitarian than most of the societies in rural Africa. This information can be related to the observation made by Harkes (1993). The following passage from her report gives a good overview of the situation:

*In the beginning of this century the animistic Mousgoum arrived from Chad and settle south on the floodplain. From Pouss situated near Lake Maga [see Fig.1] some Mousgoum moved further north; (...) After*

Table 3. Test of similarity on water-body access between the w.g. The null hypothesis is that there is independence in the contingency, i.e. the cases of co-access to the same water-body are randomly distributed within each village. For 1 d.f. and  $\alpha = 0.05$ ,  $\chi^2_{th} = 3.84$ . Test procedure: if  $\chi^2_{obs} > \chi^2_{th}$  one rejects the null hypothesis.

Pair tested	Test		Indices of similarity		
	$\chi^2_{obs}$	Probability	OI	JI	DI
G1 - G2	91.6	$P < 0.001$	0.83	0.71	0.83
G1 - G3	85.8	$P < 0.001$	0.81	0.68	0.81
G2 - G3	157.4	$P < 0.001$	0.95	0.90	0.95

Table 4. Test of similarity on ethnic composition between the w.g. The test procedure is similar to that in Table 3.

Pair tested	Test		Indices of similarity		
	$\chi^2_{obs}$	Probability	OI	JI	DI
G1 - G2	69.6	$P < 0.001$	0.86	0.75	0.85
G1 - G3	82.9	$P < 0.001$	0.85	0.73	0.84
G2 - G3	91.4	$P < 0.001$	0.96	0.92	0.96

having had permission from the Sultan, they settle at the border of the Logone river. (...) Contrary to the Kotoko the Mousgoum have a more egalitarian social system. They live according to a patri-linearly clan-system where the clan-elder has the authority within the family.

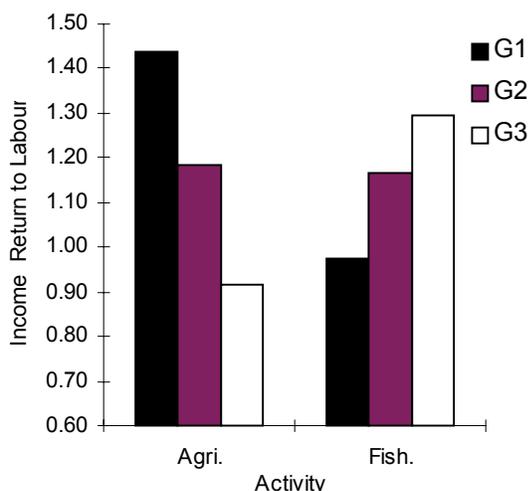
In older days, leadership over the community was not evident, but when necessary (at certain occasions or when problem had to be solved) the village-elders would organise themselves (von Est 1993). Responsibility with regard to the different activities was shared by various people. Decisions and rituals concerning agriculture were for example taken by the Anaka the chief of the earth (who was usually the oldest man of the founding lineage), while for the fishery another chief was appointed, the Mana (von Est 1993). Nowadays these functions have been more or less abolished; a function that came into existence during the French reign [the author means the French colonial period] is that of the village headman, the Blama<sup>9</sup>. He is a descendent of the oldest family in the village, but he is not necessarily the oldest family-members. His function can be regarded as a representative towards authorities. Further it is his duty to collect the yearly taxes and other communal expenses. Certain important decisions, like the opening of fish-reserve, are taken by the Blama. But at other occasions a commission is formed on the spot. (...) There are no hierarchical categories for men to enter, their age defines their position. Also the women have more freedom compared to the Kotoko. Mousgoum women can own land and cattle and are allowed to fish. So what we can see is that the egalitarian character of the system continues to exist. Harkes, 1993 p. 16

In direct relation with the description above, other interesting information revealed by the survey is that in the totality of the villages (100%), the respondents declared it was possible for any household to move up (or

down) along the wealth "gradient" without any ethnical restriction. This information, which is rather unusual for rural African societies where kin systems, ethnic groups, and/or religious affiliations usually play a major role in social status and distribution of wealth endowment (Fay 1989, Freudenberger and Matthieu 1993, Peters, 1994, Behnke 1994, van der Breemer et al. 1995, Laurent and Mathieu 1995) was nevertheless confirmed by two other elements of the survey. First, the test of similarity performed on the ethnic composition of the w.g. (Table 4) indicates that within each village the three groups are all similar with respect to their ethnic composition. Secondly, the respondent recognised that the predominate element which can cause changes in the wealth level of household is the "luck-in-activity" (using the direct translation of their own words), that is to say, the occurrence of good environmental conditions over a period long enough to ensure a substantial increase in the crop harvest or the catch (Table 2). It is very unlikely that this "environmentally-based" factor would be mentioned with such a large propensity (37% of the answers) if the wealth endowment process was actually socially or ethnically (pre)determined.

All these different results suggest therefore that in this part of the Lake Chad Basin neither the access to the water-bodies nor the wealth level are conditioned by or tied to some social and/or ethnic considerations. However, with regards to the abundant literature which witnesses that exclusion systems determined on ethnic and religious filiations are widely implanted in fishing communities of southern United States, India, the Philippines, Indonesia, Sri Lanka, etc. (Davies and Bailey 1996), but also in some other part of the Lake Chad Basin (Harkes 1993, Neiland et al. 1997, Drijver et al. 1995), the present situation looks like an exception rather than the general case.

Fig.4. Change in the Income Return to Labour between the 3 w.g. for both agricultural and fishing activities.



#### *Role of the different activities in the livelihood strategies of floodplain communities*

By comparing their respective aggregated weights, one can achieve a better understanding of the contribution of each activity and the way these activities are inter-related within the wealth groups' livelihood strategies. From Fig.2 and Fig.3, it is clear that trading is an activity that characterises the better off. Both labour allocation and income contribution of this activity decrease very rapidly with poverty level and trade is the only activity that is completely absent from G3 portfolio<sup>10</sup>. It is therefore an activity which stays "inaccessible" to the poorest and which is an important element in the wealth stratification. What is not totally clear, however, is whether this activity is the "engine" or only the symptom of the wealth distinction process, in other words, whether the households are rich because they are involved in these trading activities, or whether they are involved in trade because they had initially accumulated assets which permit them to invest in that activity.

As far as farming is concerned, Fig.2 shows that the allocated labour significantly increases with poverty, while the contribution to income stay more or less constant across the w.g. (Fig.3). This means that the poorest allocate a larger amount of time and effort to this activity, but that this extra labour is not transformed in subsequent income. This suggests that the crops are essentially used by the poor to cover their food requirements and are not commercialised<sup>11</sup>. Conversely, the contribution of the fishing activity in the total household income increases with poverty, as illustrated in Fig.3. It represents more than half of the total income for the poorest group G3. This means that the poorest people, the more they rely on fishing to generate their revenue. This increase in income contribution for the poor

is achieved through an increase in the amount of labour allocated to this activity (Fig.2). Globally, it can be said that both in terms of labour allocation and income generation the importance of fishing activity in the household livelihood increases with poverty.

The analysis suggests that farming and fishing have strictly opposite roles in the livelihood strategy of the households, depending on their wealth level. This opposition can be illustrated through the computation of the income return to labour for each of these two activities. The income return to labour of an activity is the ratio {income contribution / labour allocation} for the activity considered. In absence of qualitative estimates for the income and costs associated to the activities, this index gives a rough idea of their economic efficiency measured in terms of effect on the revenue. The indexes were computed for the two activities (fishing and farming) and are presented on Fig.4. They clearly display opposite trends. The return to labour for farming activity increases with wealth, which means that the contribution of one unit of labour invested by better-off people's in farming has more impact on their revenue than the same unit of labour invested by the poorest people. Conversely, the income return to labour for fishing activity augments with poverty, which means that the contribution of one unit of labour invested by poor household in fishing activity has more impact on their revenue than the equivalent unit of labour invested by better-off people.

The determinant factor in this opposition between farming and fishing activities is the difference in tenure system between land and water. While access to water-bodies (and therefore to fishing activity) is not restricted (in the sense is open to every member of the community), the land, on the other hand, is privately owned on a family basis. In these circumstances, the richest who can purchase larger plots (and certainly more efficient tools), produce large amounts of rice and/or millet and commercialise the surplus, thereby ensuring significant revenue. Conversely, the smaller amount of arable land that can be acquired by the poor hardly produces enough to cover their food requirements. No surplus is extracted from the harvest and the households auto-consume most, if not all of it. The access to the fishing grounds, which is not limited in this part of the floodplain, represents therefore the only way for the poor to generate some cash-income that is used to support consumption and essential current expense in order to survive.

#### *Livelihood diversification*

The review of the literature on diversification indicates that there are broadly two major and apparently conflicting perceptions about this type of strategy. The first one supports a rather negative interpretation of the phenomenon (Bernstein 1992, Cekan 1992, Davis 1996). Based on the precept that historically the progression

from low to high standards of living normally involves a transition from diversification to specialisation, this approach sees diversification as an involuntary backward response to crisis in which the multiplication of activities results from an adaptation necessary to ensure survival in the context of a structural, annual gap between food production and consumption needs. In this perspective, diversification does not contribute to the achievement of sustainable livelihoods, but to a cycle of impoverishment that may begin with a "normal" hungry season, but which may then possibly lead up to the creation of household indebtedness, low food stocks, sale of assets (like livestock) and an inability to bounce back after temporary setbacks. In that perception, the diversified activities are used to "*fill the food gap left once production and exchange entitlements have failed to meet minimum food requirements*" (Davies 1996, p.238) and the diversification process itself is seen as a "diversification for survival".

In contrast, the second approach presents a much more positive aspect of diversification (Mortimore 1989, Stark 1991). Within this approach, diversification is seen as a deliberate strategy adopted by pro-active households, and based on the principle of "portfolio" risk-spreading. In the case of rural activities, the adoption of a diverse portfolio is expected to contribute to the sustainability of rural livelihood because it will improve its long-run resilience in the face of adverse trends or sudden shocks (Campbell 1990, Carter 1997). It is for instance what is observed in West Africa where Sahelian people have historically always preferred to diversify than to intensify primary production activities (Painter et al. 1994). In this view, diversification is particularly beneficial in a strongly seasonal environment (as in the present study) where seasonality creates food insecurity due to the mismatch between uneven farm income streams and continuous consumption requirements (Ellis 1998). Certain authors (e.g. Hazell and Haggblade 1993) go even further and assert that diversification does not only contribute to reducing the adverse effects of the environment uncertainty, but for the most proactive (or lucky, or successful) of the households, diversification can also become the way to better adapt and take advantage of this uncertain environment, and eventually to accumulate assets. This is the "diversification for accumulation" approach (Hart 1994).

In which of these two situations can the populations of the Yaéré floodplain be located? Are they struggling to survive as the very high rate of food deficit faced by the poorest group seems to indicate, or are they successfully adapting to and taking advantage of the seasonal environment to accumulate slowly but surely assets?

The answer is probably both. As emphasised earlier, it seems clear that a large proportion of the population (essentially the households of the G3 group, but maybe

also some of the G2 households) is still facing recurrent food shortages and does not seem to be in control of its destiny. For these households the future is essentially dictated by the hazards of the environment. In areas where people livelihood depend so heavily on natural resources, changes in environmental situation have usually a very large impact on the community well-being. This reality is what the respondents expressed when they admitted that the key-factor which conditions the wealth improvement (or decline) of households is "luck in activity". For the poorest part of the population, diversification is therefore the expression of their daily struggling in trying to make ends meet. For them diversification is indeed a matter of survival.

However, diversification seems also to be a positive factor of economic development, as suggested by the relation between the number of activities undertaken by the households and the wealth level. On average, Households from the poorest group are involved in 2.4 activities (95% CI = 0.3), these of the intermediate group in 2.9 activities (95% CI = 0.2) and the wealthiest in 3.4 activities (95% CI = 0.4). It seems therefore that the size of the portfolio increases with wealth. A Mann-Whitney Rank Sum test (not shown) was performed on the G1 and G3 data to test this hypothesis. The test confirms that the number of activities operated by G1 households is statistically larger than that in the G3 group ( $P < 0.001$ ).

It is tempting at this point to conclude that, in the present case, we are in a positive scenario where diversification strategy appears to be associated with higher household well-being. However, this would be under-estimating the complexity of the processes at work. In fact the activity ranking analysis (Fig.3) already suggested that the difference in the portfolio size is essentially due to the absence of trade activities in the poorest group portfolio. This absence emphasises another aspect of the diversification which is not necessarily obvious from the dichotomy "survival" vs. "accumulation" briefly presented above. The ability of households to adopt more profitable diversification strategies (such as trading in the present case) depends on access to the means required to pursue such activities, such as skills, location, access to capital and credit, education, etc. (Reardon 1997, Dercon and Krishnan 1996). Hussein and Nelson (1998) emphasise that in this process, the poorest group are usually the one who faces the most barriers to accessing a high degree of diversification and the frequent outcome is a widening disparities between the incomes of rural poor and the better-off. This is exactly what is observed here where the better off are able to diversify in more profitable activities than the poor.

To sum up, the analysis shows that the process of diversification may not be as "dichotomic" as it is suggested by the two classical approaches presented in the

literature. The present case suggests that the diversification can be simultaneously a survival strategy and the way to increase access to income. In fact these two perceptions may be regarded as different stages of the same development process. Their simultaneous occurrence within the same community is due to that households are not all located at the same place at the same time along this dynamic process of development. This is also the conclusion that Ellis seems to achieve from his literature review: "... *diversification obeys a continuum of causes and motivations that vary across families at a particular point in time, and for the same families at different point in time. (...) These distinctions reveal that policies aimed to achieve more resilient or more sustainable rural livelihoods need to recognise not just the positive attributes of diversity for achieving those ends, but also distinctions about the different nature of that diversity between individuals, households, and larger social or economic areas.*" (Ellis 1998, p. 7). This last remark leads to the final section of this paper, which can be introduced by the following question:

#### **What are the implications of the present results in terms of policy?**

The first point to emphasise is that the old received wisdom which echoes "*they are poor because they are fishermen*" may not perfectly reflect the complexity of the mechanisms that govern the process of wealth differentiation. Poverty is a complex, multi-dimensional problem which can not be simply explained by the nature of the economic activity operated by the population. In fact the present situation suggests reversing the viewpoint: "they are fishermen because they are poor (and landless)". Indeed, in this floodplain area where arable land is rare<sup>12</sup> and privately owned, the poorest rely on the "equity of access"<sup>13</sup> that characterises the regime of the local fishing grounds to compensate their limited access to land and use the fishery in a larger proportion to secure their food requirements and income. Fishing acts therefore as a major component of the poor's livelihood strategy and in that respect, the existence of equity of access to the water-bodies resources has a tremendous importance for the more destitute households of the floodplain. Consequently, fisheries (and the related activities such as smoking and drying which are usually operated by the fishermen household members) must become a top-priority for poverty alleviation programmes in that area since the changes induced by these programmes (through micro credit programmes for instance), if appropriately designed, will have a significant impact on the poorest part of the floodplain communities. Within this logic any policies that aims at improving the conditions of the natural resources, if not based on a restriction of access, will also benefit in a larger proportion the poorest part of the floodplain population and can therefore be regarded as essential component of any poverty alleviation programme.

This analysis also points out a major conclusion in fisheries policy domain. The higher dependence of the poor on the fishery activity induces that any change in fisheries policies and/or regulations is likely to affect the poor in a larger proportion. This point reveals its full significance when one realises that inland fisheries are generally ignored and left out from the policy and planning process. Effort focuses on coastal fisheries and the resulting legislative framework, which usually embodies inland fisheries by default, is mainly adapted to coastal fisheries issues. As a result, inland fisheries regulations, when they exist, are very rarely adapted to the specific conditions or requirement of inland fisheries. In addition to be inappropriate to, and therefore inefficient for inland fisheries, the regulations will therefore hurt more intensively the part of the floodplain population which relies heavily on these fisheries, that is to say... the poor. One understands here the whole importance to separate marine and inland fisheries which have so little in common. In fact given the intricacies that exist between inland fisheries and the other rural activities, especially farming and herding, it would make much more sense to co-ordinate the planning and policies design of these inland fisheries in combination with these of farming and herding rather than that of marine fisheries.

This last comment leads to what is certainly the major lesson in term of policies of this study. Any attempt to address issues such as poverty and development in rural areas can not be successful if undertaken from a mono-sectoral point of view. To be appropriate, development programmes or poverty alleviation policy should be based on assessments which aim at achieving a thorough analysis of the linkages existing between the different activities operated by the households targeted. This conclusion, which was already fully justified for rural areas in general, is even more legitimate for floodplain areas. In these regions, only integrate approach assessments will be able to embody the exact dimension of the livelihood strategies developed by the local populations. In the present case, this type of integrate approach allowed to describe and better understand the complexity of the household livelihood of the Yaéré. In particular it helped to identify and clarify essential but not necessarily apparent (or even comprehensible at first sight) results, such as the fact that agriculture and fisheries play opposite roles in population livelihoods, depending on the poverty level of the populations, or that the same diversification strategy is actually be developed to respond to two different (and opposite?) objectives (survival or accumulation), depending on the wealth entitlement situation of the households considered.

Finally, it should be emphasised that these results describe the different socio-economic processes active at the community level. This analysis therefore only provides a micro-level vision (or interpretation) of the

floodplain fisheries situation which does not integrate the larger geographic scale issues. To be pertinent, that analysis should be combined with information associated to questions related to the national and regional dimensions of the basin. Secondly, the present analysis only focussed on the socio-economic dynamics of the community. It did not attempt to address any of the issues related to the institutional arrangements and organisations present at this community level, and in particular it did not tackle the major issue induced by the overlapping of the formal (i.e. *de jure*) and traditional (*de facto*) fisheries management systems (see note 6). Nor did it address the fundamental question of the relationship between poverty, inequity and resource conservation (for an introduction to this issue in a general context see Davies et al. 1991 or Baland and Platteau 1999). Nevertheless, despite these limitations, it is believed that this study did provide some pertinent elements for the planning and design of development policies within the specific context of African floodplain environment.

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## Notes

<sup>1</sup> Two similar surveys are being carried out within the Nigerian and Chadian areas included in the project (see Fig.1 for details).

<sup>2</sup> In Fulani (a pastoralist ethnic group of the Sub-Saharan region) the term "Yaéré" designs the high perennial grasses that grows each year in the floodplains after the inundations. During the dry season, these yaérés are grazed by the herds of local residents and the livestock of transhumant Fulani pastoralists which migrate from

Niger, Nigeria and Chad to the Yaéré. When the plains are flooded, the grass, combined with the herbivore dung, provide a very rich and fertile environment that is used by the fish as a reproduction and nursery area.

<sup>3</sup> Ellis (1998, p.5) defines livelihood diversification as "the process by which rural families construct a diverse portfolio of activities and social support capabilities in their struggle for survival and in order to improve their standards of living".

<sup>4</sup> The results presented in this article summary only the first part of the data acquired in North Cameroon through this inland fisheries assessment. The second part is a field-based assessment of the institutional arrangements (in particular of the customary fisheries management systems existing in the villages and the way they overlap with the government centralised regulations). This institutional analysis is currently being performed (i.e. Mai-July 2000) in the Cameroonian, Nigerian and Chadian sectors of the Lake Chad Basin.

<sup>5</sup> The semi-structured interview framework has been devised based on the authors' prior experience of the local area, and completed by a thorough secondary data review. The objective of this interview was to obtain the data necessary to carry out the wealth and activities ranking previously mentioned. The maps and seasonal calendar were used to complete and cross-check the information obtained through the interviews. To further reduce the possibility of bias and/or misinterpretation during the data collection, the interviews were conducted by a team of local enumerators (all familiar with the local area and speaking the local languages), under the supervision of the local researchers. The interviews were conducted following a preliminary "introductory" visit to each village.

<sup>6</sup> The choice to rely on a participatory approach, where both the wealth level (or symmetrically the poverty level) and the associated stratifying criteria were not identified through an artificially predefined frame but instead by the respondents themselves, allowed to respect the local definition of poverty and wealth. Poverty and wealth are indeed highly context-dependent concepts that can be correctly defined only through a local consensus based on socio-economic and ethno-cultural criteria that field-workers, as outsiders, can not appreciate in the short period of time usually available for an exercise in community ranking (Grosvenor-Alsop 1989).

<sup>7</sup> One can argue that the village notables' perception on poverty and/or wealth is likely to differ from that of people belonging to the poorest fraction of the community, and consequently that wealth-rankings may not reflect the actual community wealth gradient. Several studies have addressed this issue in the literature (see for instance Grandin 1983, 1988). It appears in fact that even in the case of strongly stratified communities such as the Indian caste society, the responses of informants (whatever their social status) are highly correlated with

income groups based on per capita income (Grosvenor-Alsop 1989). It seems therefore that disparity in social status does not affect informant responses and it is now widely admitted that wealth ranking is an appropriate tool to use for social analysis even in stratified societies.

<sup>8</sup> Strictly speaking, the fact that for the G3 group the labour allocation of the trading activity turns out to be small (2%) but not nil is not consistent with the fact that the contribution of this activity to G3 income is nil. Even if it is likely to be small, its income contribution should be positive. It is reasonable, however to assume that this inconsistency, due to a non perfect perception or reporting of the reality by the respondents, does not affect the major conclusions of this analysis.

<sup>9</sup> Note that the definition of the *Blama* given by Harkes differs from ours. According to our sources, the *Blama* is the ward head and the village headman is the *Lawan*.

<sup>10</sup> See note 9, however.

<sup>11</sup> It is also very likely (though this information can not be verified from the present survey) that the poorest are facing a lower productivity than the richer group, which further explains the increase in labour allocation observed in the G3 group.

<sup>12</sup> Fritsch, for instance, in his description of this part of the Yaéré floodplain, wrote "*L'agriculture cantonnée sur des superficies réduites se signale par son caractère relativement intensif. La culture fondamentale demeure celle du mil rouge de saison des pluies. Elle se concentre sur les terres exondées. (...) La population et les cultures se concentrent (...) sur une infime fraction des terres, celle qui échappe plus ou moins à la crue, si l'on ne tient compte que des terres exondées les densités locales dépassent fréquemment 100 habitants / km<sup>2</sup>*" (Frisch 1970, p. 123).

<sup>13</sup> Although the local water-bodies are regarded by the community as common property, the use of more conventional terminology such as open access, common property, etc., used to characterise the different types of property/use right regimes would require a complete description of the institutional arrangements at work in this part of the floodplain, and in particular a thorough analysis of both traditional (i.e. local) and formal (i.e. centralised) fisheries management systems. This is part of another study (see note 5). The term "equity of access" denotes here merely the fact that there is no discrimination regarding the access between the different households.

<sup>14</sup> In addition to CEMARE (U.K.) the project involved the Institute for Research in Development (ex-ORSTOM) (France), the Ministry of Livestock, Fisheries and Animal Production (Cameroon), the National Institute for Freshwater Fisheries Research (Nigeria) and the Lake Chad Basin Commission (Chad). It has built upon an earlier DfID funded project "Traditional Management of Artisanal Fisheries in North Nigeria" coordinated by CEMARE (Neiland 1997).