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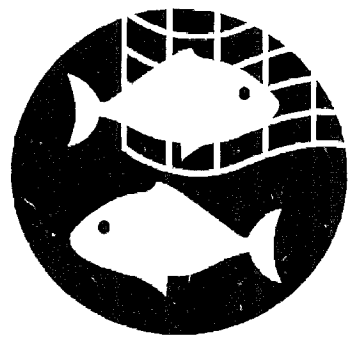
NUTRITIONAL HABITS AND FOOD CONSUMPTION PATTERN OF FISHING COMMUNITIES AROUND LAKE KAINJI, NIGERIA

by S. Dreschl, S.O. Alamu and F. Adu

Nigerian-German (GTZ)
Kainji Lake Fisheries
Promotion Project



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S. Dreschl
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F.A. Adu

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0 Executive Summary

This report presents the findings of a nutrition survey carried out for the Nigerian-German Kainji Lake Fisheries Promotion Project (KLFPP) in March/April 1995. The KLFPP, which commenced in 1993, is aimed at the preparation and, to an extend, the implementation of a management plan in order to achieve sustainable and optimum exploitation of the fish resources of Kainji Lake. Consequently, the fisheries management policies developed by the project may include the ban of certain fishing gears, an increase of the minimum mesh size of nets, as well as the introduction of new fishing methods.

To effectively consider the impact of the planned polices on the nutrition situation of the affected communities, this study was carried out to obtain closer information on the food habits and food consumption patterns of the fishing population, especially the quantification of fish and small fish in particular, consumed at the household level.

A standardised questionnaire was used to collect releveant information on demographic, educational, and occupational profiles, as well as on income, expenditures, agricultural production and food habits. A 24-h-recall protocol was used to access the quantitative food intake. For comparative reason, both fishing and non-fishing household were interviewed.

The information was collected in 39 villages in the southern sector of Kainji Lake. The sample comprised of 430 households with a total population of 3089 persons.

The literacy level of the Kainji Lake population, of which 56 % were Hausa, was rather low. About 85 % of men and 96 % of women had no formal education. The households consisted mainly of nuclear families. On average the fishermen had one child more than the non-fishermen. Nearly 40% of all the children were below the age of six years.

Nearly all heads of household had a supplementary occupation. Most of the fishermen (95 %) had farming as a supplementary income source, a few also traded (30 %) or sold farm products (10 %). The main occupation for wives of fishermen was fish trading, while the wives of non-fishermen traded more with cooked food and household products. About 13 % of the wives of fishermen were fisherwomen. Children started helping their parents at an early age, with boys mostly involved in farming and fishing, and girls in trading.

The income of fishermen was significantly higher than that of non-fishermen. About 64% of the fishermen had an income of more than 2000 Naira a week, as opposed to only 43% of the non-fishermen. The income was averagely higher on the east side of the lake than on the west side. The months of relatively low income for most fishermen were October to Feburary, during the harmattan season, in which fish catches were also at their lowest. Most important fish in terms of total income was Clupeid, followed by Labeo and Tilapia. Clupeids however, fetched the lowest unit price, while the highest was derived from Lates.

Weekly expenditure for 88 % of fishermen was below 1,000 Naira. A significant difference ($p=0.01$) between the expenditure of fishermen and non-fishermen could be observed, with the fishermen spending more. Both groups investigated spent about 45% of their total weekly expenditure on food.

Farming was practised by almost all households, irrespective of main occupation. Sorghum was grown by more than 90% of both fishermen and non-fishermen. Rice and maize were grown in more than 65% of all households interviewed, while about 50% of all the households grew groundnuts. About 57% of fishermen and 44% of non-fishermen households cultivated millet. While sorghum, maize and millet were cultivated almost exclusively for own consumption, the opposite applied to rice and groundnuts, for which most households, both fishermen and non-fishermen, sold the greater part of their harvest. Generally, the amount of harvest, especially for rice and maize, and the price per sack sold was higher for fishermen than for non-fishermen.

About 88% of the fishermen and 81% of the non-fishermen owned livestock such as cows, sheep, goats, and chicken. With exception of goats, the average number of livestock owned by fishermen was higher than that of non-fishermen. Only about 25 to 30% of the animals owned were used for own consumption, with most animals being reared for capital and income reasons. The non-fishermen sold more of their livestock than the fishermen, especially cows and sheep.

The average calorie consumption per person of the communities around Kainji Lake was 2058 kcal, covering about 90 % of the recommended daily intake, taking into consideration the age distribution and level of physical activity. Although fishermen households generally spent more money on food, the calorie consumption per person was lower than for non-fishermen households due to the significantly higher number of meal members in the fishermen households.

On the average, 71% of total daily calorie consumption was derived from carbohydrates, while protein and fat supplied 15 % and 14 % of total daily calorie intake respectively. As such, the general recommendations as to the amount of total calories to be derived from the various food categories were met only for protein. A higher than recommended percentage was derived from carbohydrates with a consequent lower than recommended intake of fat.

The main staple food in Kainji Lake area was sorghum, with an average of 43% of the total daily energy intake coming from this source, while other staples were millet and rice, which accounted for 13% and 12% of total daily intake respectively. Fish accounted for 30 % and 24 % of total daily protein intake for fishermen and non-fishermen households respectively. Sorghum was the second most important source of protein. About a quarter of all households had a less than suffucient daily consumption of protein.

Citharinus, Tilapia and Synodontis were the most often consumed fish. Given additional resources, the prefered fish were Lates and Catfish. Alestes and Labeo were the least liked fish. Clupeids were hardly consumed.

Breast feeding was widely practised in Kainji Lake area. However, apart from about 20 % of wives of fishermen introducing weaning foods relatively late, the weaning food was inadequate in terms of both quantity and quality. Food taboos were applied to certainn groups such as pregnant women and children having malaria measles and cough, thus depriving them of important nutrients at critical periods. General, religious based taboos were also observed.

The prevalence of diarrhoe in Kainji Lake area was high, moreso for children of fisheremen with a point and period prevalence of 40 % and 60 % respectively.

1 INTRODUCTION

Kainji Lake, situated in Niger and Kebbi States in North-west Nigeria, was formed in 1968 by damming the river Niger. Primarily built for the generation of hydroelectric power, the construction of the dam has resulted in the creation of the largest man made lake in the country which also provides the villages around it with fish and furthermore, can be used for secondary purposes, such as irrigation and transport. With a surface area of 1270 km^2 and a length of 137 km, the lake is one of the most important freshwater fish sources in Nigeria and contributes significantly to the national fish requirements. For people living around the lake, fish is a primary source of food and income.

The Nigerian-German Kainji Lake Fisheries Promotion Project(KLFPP) commenced in 1993. The aim of the project is the preparation and, to an extent, the implementation of a management plan in order to achieve sustainable and optimum exploitation of the fish resources of Kainji Lake. New fisheries management policies for the lake could include the ban of certain fishing gear (e.g. beach seines) and an increase of the minimum mesh size of certain nets, the introduction of closed seasons and closed areas as well as the introduction of alternative fishing methods in order to be able to exploit fish stocks in the lake without damaging others.

Some of the fisheries management options listed above could have a negative impact on the nutrition security of communities residing in the fishing villages around the lake if the small fish species caught by the small mesh nets contribute significantly to the dietary intake of these communities. Therefore, consumption patterns and needs have to be considered in introducing any management method. As such, the KLFPP needed to obtain information on the food habits and consumption patterns of the fishing communities, especially as regards the quantities and importance of small fish consumed at household level.

Systematic and recent quantitative information on the nutritional situation of communities around Kainji Lake was almost non-existent. The only studies found were carried out by O.O. Men (1975) and Adekolu John (1983), who reported on nutrient intake of the rural population of Kainji Lake area and carried out some anthropometric measurement to assess the nutritional status of the people. Since then, no reliable survey has been carried out. Information on differences between fishing and non-fishing households around the Kainji Lake as regards nutritional habits and patterns does not exist.

Furthermore, as at the time of this survey, no reliable quantitative information existed on household income and expenditures of the fishing communities and on the proportion of money spend on food as compared to total expenditures. Since these variables are important in obtaining a clearer picture of the nutritional and economic situation for advanced impact assessment of new fisheries management regulations in the fishing villages, they were integrated as part of the study.

2 METHODOLOGY

2.1 Standardised questionnaire

A standardised questionnaire was designed according to the "Manual for assessing the nutritional situation of populations" (GTZ/Gross, 1989) and "Manual for social survey on food habits and consumption in developing countries" (Hartog et al., 1983) and adapted to the conditions prevailing in the Kainji Lake area. The questionnaire consisted mainly of closed questions which allowed only for a range of well defined and categorised answers. Some open questions were integrated which covered areas such as food avoidances and food preferences. However, for purposes of data entry and analysis, answers to these questions also had to be categorised to some extent.

Since information from the heads of household and from the wife who cooked the households food the previous day was to be collected, the questionnaire was divided into three subsections. One set of questions was designed for the heads of household and one for the relevant wife. A third set of questions concerning the nutrition and health of children below 5 years of age, also to be answered by the interviewed women, was developed. Incorporated in the womens subsection was a set of questions to determine food intake data for the assessment of diet adequacy through a 24-h-recall. This method estimates the food actually eaten, as recalled from memory, in the previous 24 hours. Because nutrient requirements change with physical status, the interviewed women were asked to state how many pregnant or breast feeding women and how many sick people took part in the meal.

The draft of the questionnaire was discussed and appropriate readjustments were made during the survey team training and again after the pre-test, in line with the specific areas of interest, the local situation and problems encountered. Subsequently, possible answers were coded, resulting in the final questionaire (Annex 2).

Additional sources of information were informal interviews with project staff, teachers and member of the communities, as well as secondary sources such as relevant literature and results from other studies carried out for the project.

2.2 Equipment and measurements

During the interviews, the amounts of food eaten in the household were quantified and recorded according to local measures such as mudus, milk tins, spoons and other commonly used containers. For the analysis of the individual food consumption, these measurements were converted into their gram equivalent through predetermined weight equivalents of the local measures.

To assess the quantities of fish consumed, the women were asked to describe the type and size of fish and the number of pieces used for preparation. Furthermore, they were asked if they had used dry or fresh fish. To get a reasonably precise estimate of the quantities of fish consumed at household level, each species of fish was given 3 subcategories of either small, medium or large size, and the average weight (in grams) of each subcategory, to be used for consumption calculations, was determined from a previous survey on mean weight of different types of fish carried out in March/April 1995.

2.3 Sample size

For sampling purposes, the Lake was divided into two sectors, northern and southern, which as determined by previous surveys, are fairly homogenous as regards demographic, economic, as well as educational patterns. For logistical reasons, the southern sector was chosen as survey area. Then, the southern sector was divided into east and west sides, and the villages on each side listed. Of the total of 120 villages, 50 were on the west side while 70 were on the east side. The results of this study are based on the information collected from 39 villages, 17 on the west and 22 on the east side of the lake. The number of villages included in the sample on each side corresponds to the concentration of fishing villages along each side, which is higher on the east side, with an average of 2.5 villages per 10 km shore line (du Feu, 1993). The villages on each side were numbered and a third on each side chosen at random with a selected begin.

In each village, a 22% random sample of the total number of households, consisting of a proportional number of fishermen and non-fishermen, was interviewed to get the sample of 430 heads of household. In Wara, the biggest village in the sample, it was decided to take a sample of 40 households.

The list of sample villages and number of interviewed fishermen and non-fishermen households is presented in Annex 3.

All together, 430 households were interviewed, with 258 on the east and 172 on the west side of the lake. The investigated population totaled 3089 people, comprising of 430 heads of household, 668 women and 1991 children.

For comparison reason, the heads of household were divided into subgroups of fishermen (n=247) and non-fishermen (n=183) households. The group of non-fishermen also included occassional fishermen (n=83), which were described seperately were appropriate.

Children under 12 years of age comprised 72% of all children, and accounted for about half (46.4%) of the total sample population.

2.4 Survey team

The survey team consisted of 2 female and 2 male experienced field researchers, all of whom could speak Hausa. Because of observance of the islamic practise of keeping married women within the compounds, where the women must not be exposed to men from outside, it was necessary to include a female interviewer in each team in order to reach the women.

Prior to the actual field work, the aims of the survey and some basic nutritional knowledge were introduced to the team members. They were trained in the methodology of the 24-hour recall, and a simulated interview was carried out in Hausa to improve on interview techniques. In addition, problems which might occur during the interview and ways of solving these were discussed.

The survey teams were supervised by the nutritionist consultant.

2.5 Data collection

Prior to data collection, the target population was informed of the purpose of the survey and of the wish to visit their homes for interviews, so that co-operation was assured in advance from local leaders or representatives.

A pre-test of 16 questionnaires was carried out in two villages not included in the sample. Subsequently, the survey team discussed necessary changes, additional questions and possible answers for the codes in the questionnaire. The survey commenced on the 20th of March.

During the field phase, each village was visited by the entire team a day before the actual interviews in that village were to be held, to further intimate the head of village and village representatives with the objective of the survey. They were also requested to list the number of fishing and non-fishing households. The randomly selected households were then informed of the interview which was to be held the following day.

In many cases, it was difficult to meet the heads of household at home, because they were on the lake, on the farm, out because of celebrations or the different market days.
As such, the time of interviews had to be adapted to the time table of the survey population. Usually, they were conducted between 9 a.m and 3 p.m. the time when the fishermen were mostly at home, and in the evenings after their return. On market days (see Annex 4), the interviews took place very early in the morning or late in the evening.

On the day of interview, the interviewers were accompanied by a guide who led them to the households. At the end of each interviewing day, the completed questionnaires were collected for discussion and corrections.

2.6 Data analysis

Data compilation and analysis were carried out using several programmes. A Lotus 1-2-3 computer spreadsheet was used to enter and analyse the various subsections of the questionnaire. Calculation of simple descriptive statistics consisting mainly of mean values and frequency distribution were carried out with this programme.

The 24h- food recall data was analysed using Data Ease. The food intake data was analysed using a data bank which contained the nutrient composition of different food items, based on international food composition tables (FAO, 1969). For the analysis of the fish consumption data, a data base, based on a composition table of 10 commercially important fresh and mechanically smoked fish from Kainji Lake (Eyo, et al. 1986) was created. For each type of fish, the data base was subdivided into categories, according to different sizes (small, medium, large). Fish for which no composition data was available were grouped with similar fish of known composition.

Analytical statistics were done with SPSS-PC Version for Windows.

The final report was written in Words for Windows Version 2.0. The integrated graphic programmes of Word for Windows and Power Point were used for all graphics and figures.

3 SOCIO-ECONOMIC CHARACTERISTICS OF THE STUDY POPULATION

3.1 Demographic profile

The households consisted mainly of the nuclear family, which includes the head of household, his wife or wives and their children. The households of fishermen had, on the average, 7.4, while the households of non-fishermen had 6.8 permanent household members during the month prior the interview. The average number of children was 5 and 4 for fishermen and non-fishermen respectively.

Table 1: Average number of permanent household members, Kainji Lake area, 1995

members of household	fishermen	non - fishermen
	n	n
children	4.8	4.3
wives	1.6	1.5
total household members	7.4	6.8

About 51% of fishermen were found to be monogamous as compared to 56 % of non-fishermen.

Table 2: Distribution of number of wives per head of household, Kainji Lake area, 1995

Wives	fishermen (%)	non - fishermen (%)
1	51.0	55.7
2	40.1	38.3
3	7.3	4.9
4	1.6	1.1
Total	100	100

The age distribution of children in the survey area is presented in Table 3. Nearly 40 % of all children were younger than 6 years.

Table 3: Age distribution of children, Kainji Lake area, 1995

age (years)		%
0 - < 6		38.8
6 - < 12		33.2
12 - < 18		18.0
18		10.0

More than half of the population were Hausa (56%), while rest of the sample was a mixture of different ethnic groups. The ethnic composition of the west and east sides of the Kainji Lake differed in respect of the relative size of the various groups as well as their diversity. On the east side a larger percentage of the population were of Hausa origin, while variety of ethnic groups was larger on the west side.

Table 4: Ethnic composition, Kainji Lake area, 1995

Ethnic groups	%
Hausa	56,3
Lopawa	16.5
Busawa	0.5
Gungawa	5.6
Nupe	1.6
Others	19.5
Total	100

3.2 Educational profile

The educational system in Nigeria comprises of six years of primary education, 3 years of junior secondary school, 3 years of senior secondary school and a further option of technical schools, training colleges, polytechnics and universities. Primary school enrolement age is six years.

A relatively high percentage of the adult population in Kainji Lake area had little or no formal education (85% of men and 96 % of women). About 40% of men and women had gone to Koranic schools, which teaches islamic values and morals and some arabics words. According to a study carried out in Wawu, a village also included in the sample of this survey, it is the sole decision of the father as to wether or not to send children to islamic school (Alamu & Mdaihli, 1995).

Slightly more than one third (39%) of the children in the sample were younger than 6 years and therefore not eligible for school education. About 79 % of the children of or above school age (n=1219) had never been to a formal school, while 38% were in Koranic school. The rest were either presently still in primary or secondary school, with the exception of those who dropped out at one point or the other.

Table 5: Distribution of men, women and school age children according to literacy level, Kainji Lake area, 1995

	men		women		children	
Education	**n**	**%**	**n**	**%**	**n**	**%**
none	176	40.9	381	57.1	498	40.9
primary, not complete	15	3.5	3	0.2	124	10.2
primary complete	20	4.7	13	2.0	78	6.4
secondary	20	4.7	4	0.6	51	4.2
koranic school	187	43.5	264	39.5	465	38.1
adult education	10	2.3	1	0.2	-	-
others	2	0.5	1	0.2	3	0.3
Total	**430**	**100**	**668**	**100**	**1219**	**100**

3.3 Occupational profile and income sources

In order to identify the income sources and labour pattern of the communities living around Kainji Lake, the heads of household were asked to list all the permanent members of the household and the main and where applicable, other occupation of each member. Thus, not only the occupation of the heads of households, but also the occupation of women and children could be determined.

Main occupation is defined as that to which more than half the total working hours are devoted. Second occupation is defined as that to which less than half the total working time is devoted (Hartog A.P.et al.,1983).

3.3.1 Heads of household

Of the total sample of 430 heads of household, 247 (57 %) with fishing as their main occupation, and 183 (43 %) with non-fishing activities as main occupation were selected. Of the non-fishermen, 128 were farmers, going by the above definition, while 22 were traders and 33 had a main occupation other than fishing, farming or trading (Annex 5).

Nearly all heads of household had a second occupation besides their main occupation (Annex 5). Most of the fishermen (95%) did some farming. Besides the full time farmers, more than 80% of all other occupational groups mentioned farming as supplementary occupation.

More than 60% of the farmers gave fishing as second occupation, 20% stated trading and 12% had second occupations other than fishing or trading. Most of the full-time traders engaged in farming.

As would be expected, nearly all the fishermen (99%) derived their cash income mainly from fishing activities. Supplementary income sources for fishermen were trading for about 30%, sale of farm products for about 10% and sale of livestock for 4% of the fishermen (Annex 6). The contribution of the sale of farm products and livestock to their income was not as important on a weekly basis as it was for the annual income. The figures in Sections 3.6 and 3.7 give detailed information about the income from the sale of farm products and livestock in the

year preceeding the interview.

Of the 183 non-fishermen, 83 had fishing as their second occupation and for most of them (99%) it was also a supplementary source of weekly income. They are thus refered to as occasional fishermen. About 32% of non-fishermen made a weekly supplementary income from fishing of above Naira 2000. As such, fishing appears to be a significant source of income not only for fishermen, but also for a relatively large percentage of heads of households with main occupations other than fishing.

3.3.2 Women

Through the influence of Islam, the movement of women is confined to within their own compounds. They are allowed to come out only very early in the morning before daybreak, or late in the evening, when it is dark. Consequently, in the past, it was assumed that none of the women in the fishing communities carry out fishing activities. During a survey carried out in 1994 (Alamu & Mdaihli, 1995), it was found that 10% of a sample of fisherfolk were women, operating with their own equipment. Further, it was found that most wives of fishermen bought fresh fish from their husband which they then smoked and sold, making an income of their own. In most cases, elder women or children were sent to sell the fish in the market or it was sold to traders who came to the village.

This section describes the income sources and labour pattern of the women who were interviewed during the survey (n=430).

Out of the 430 interviewed women 228 wives of fishermen and 169 wives of non-fishermen derived a weekly income from their activities.

Out of all wives of fishermen who had an income, 46 % made their weekly income from fish trading. Also, 14 % of wives of occasional fishermen with an income made this through fish trading. For the wives of non-fishermen, who had an income, the more significant sources of income were the sale of cooked food (38 %), groundnut cakes (23 %), and farmproducts (19 %). In comparison 28 %, 9 % and 11 % respectively of the wives of fishermen derived an income from these sources (Annex 7).

3.3.3 Children

Children also have a role to play in supporting the livelihood of the household. The boys are involved either in farming or fishing activities, while the girls are mainly involved in fish processing and sale of home-made food products.

Out of the total number of 1991 children who are permanent members of the households, about 34% were said to have a main occupation. Most of them were involved in fishing (n=380), trading (n=165) and farming (n=83). The most often mentioned second occupation was farming (n=348), fishing (n=68), and fish processing (60). The money earned by the children was given to the parents in most cases.

3.4 Weekly income and expenditures

This section gives an overview of the weekly monetary income and of the weekly expenditures as a whole and for nutrition in particular. The expenditures for food are part of total expenditures.

3.4.1 Weekly income

The distribution of the households according to income categories is presented in Table 6.

Table 6: Distribution of fishermen and non-fishermen according to weekly income categories, Kainji Lake area, 1995

	total		fishermen		non - fishermen	
Naira	**n**	**%**	**n**	**%**	**n**	**%**
0 - 100	4	0.9	1	0.4	3	1.6
101 - 500	30	7.0	7	2.8	23	12.6
501 - 1000	85	19.8	42	17.0	43	23.5
1001 - 2000	74	17.2	38	15.4	36	19.7
> 2000	237	55.1	159	64.4	78	42.6
Total	430	100	247	100	183	100

The preceeding table shows that on the average, fishermen had higher weekly cash incomes than non-fishermen, with 64% and 43% earning more than 2000 Naira respectively. Conversely, close to 40% of the non-fishermen earned less than 1000 Naira a week, with only 20% of the fishermen falling into this income category. The difference between the incomes of the two occupational groups studied was found to be highly significant (p=0,000). It should be noted that income does not necessarily infer actual profit.

A comparison of incomes on the east and west sides of the lake showed that the percentage of high income earners (more than 2000 Naira) was higher on the east side than on the west side, irrespective of occupation. For example, 71% of the fishermen on the east side belonged to this income category, compared to only 54% on the west side. Similar observations were made for the non-fishermen.

Table 7: Distribution of fishermen and non-fishermen according to geographical location and weekly income categories, Kainji Lake area, 1995

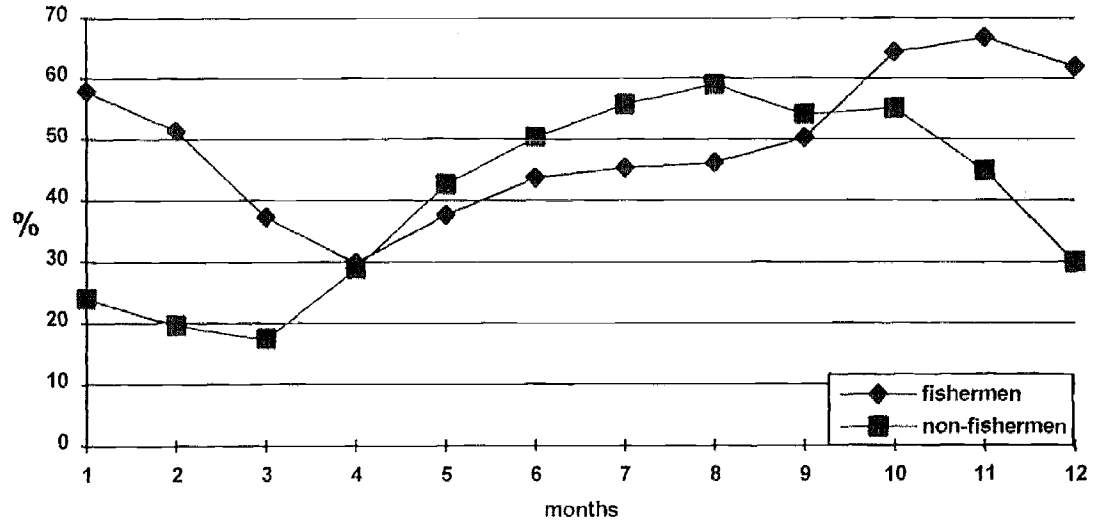
	west side		east side	
Naira	FM (%)	NFM (%)	FM (%)	NFM (%)
0 - 100	1.1	2.5	-	1.0
101 - 500	5.4	20.3	1.3	6.7
501 - 1000	23.6	22.8	13.0	24.0
1001 - 2000	16.1	17.7	14.9	21.2
> 2000	**53.8**	**36.7**	**70.8**	**47.1**
Total	100	100	100	100

Most of the women interviewed who engaged in income generating activities had an income of between 100 Naira and 500 Naira a week. Only some women were able to make more than 1000 Naira a week (Annex 7 and 8).

3.4.2 Seasonality of income

Fishing and farming activities are seasonal occupations. As such, the heads of household were asked to state the months of the year with relatively low income (Fig. 1).

Figure 1: Frequency distribution, months of low income, fishermen and non-fishermen .. Kainji Lake area.1995



For most of the fishermen, the low income months are the months of low fish catches during the harmattan season, from October to February. The survey period was carried out during the months of highest income (March to May). From May onwards, the fishermen also work on their farmlands, devoting increasingly more time to farming activities, particularly during the harvest season, which begins in August.

For most non-fishermen, the month with the lowest income were between the planting and harvest seasons, from June until November. Same as for the fishermen, the survey period also coincided with the months of highest income for the majority of non-fishermen. The percentage of heads of household who had low incomes in these months was the lowest, as compared to other months of the year.

3.4.3 Fishing as source of income

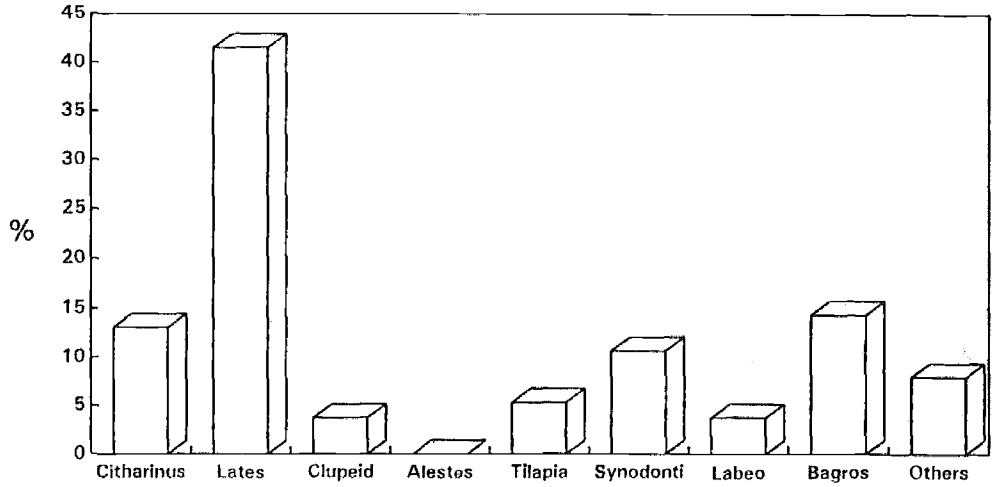
The catch seasons for the different types of fishes are presented in Table 8.

Table 8: Main catching seasons for various species of fish, Kainji Lake area,1995

Type of fish	**Season**
Citharinus	January - May
Lates	May - July
Clupeid	all year
Alestes	June - December
Tilapia	May - August
Synodontis	April - July higher season
Labeo	all year, but higher in April - July
Catfish	April to September
Others	May - August

In terms of monetary household income, Clupeids made the most significant contribution, followed by Labeo and Tilapia, while Lates, Bagros and Citharinus made only minor contributions. Conversely, the unit price was highest for Lates and lowest for Alestes and Clupeid (Fig. 2)

Figure 2: Percentage of fishermen stating various fish species as having highest unit price, Kainji Lake area, 1995



3.4.4 Total weekly expenditure and weekly expenditure for food

Statistical tests (Kruskal-Wallis) suggests, that the total weekly expenditures as well as the food expenditures of fishermen households are higher than those of non-fishing households (p= 0.0000 and p= 0.0074 respectively).

About 40 % of the fishermen spent between 500 Naira and 1000 a week as compared to only 24% of the non-fishermen. Further, 50% of fishermen, compared to nearly 70% of non-fishermen had total weekly expenditures of up to 500 Naira (Tables 9and 10).

Both fishermen and non-fishermen households spent almost half of their total expenditures on food, (44 % and 48% of total expenditures respectively).

Table 9: Expenditure per week, total and food, fishermen, Kainji Lake area, 1995

Naira	total expenditure per week		food expenditure per week	
	n	%	n	%
0 - 100	5	2.0	68	27.5
101 - 500	119	**48.2**	149	**60.3**
501 - 1000	97	**39.3**	22	8.9
1001 - 2000	15	6.1	6	2.4
> 2000	11	4.5	2	0.8
total	247	100	247	100

Table 10: Expenditure per week, total and food, non-fishermen, Kainji Lake area, 1995

Naira	total expenditure per week		food expenditure per week	
	n	%	n	%
0 - 100	14	7.7	71	**38.8**
101 - 500	109	**59.6**	91	**49.7**
501 - 1000	44	**24.0**	17	9.3
1001 - 2000	13	7.1	4	2.2
> 2000	3	1.6	-	-
Total	183	100	183	100

3.5 Land use system

Almost all fishermen (98 %) and non-fishermen (100 %) on both sides of the lake owned farmlands.

More non-fishermen than fishermen had inherited land. An explanation for this could be that many fishermen migrated to the area about 25 years ago and could not inherit land, but were dependent on allocation of communal land (Alamu & Mdaihli, 1994). The majority in both groups farmed on communal land. Only a few in each group had bought or leased land.

Table 11: Ownership of farmlands, fishermen and non-fishermen, Kainji Lake area, 1995

ownership of land	**total**		**fishermen**		**non - fishermen**	
bought	51	12.1	27	11.2	24	13.3
inherited	59	14.0	22	9.1	37	20.6
leased	30	7.1	21	8.7	9	5
owned and leased	1	0.2	1	0.4	-	-
public land	205	48.8	111	46.1	94	52.2
free land	75	17.8	59	24.5	16	8.9
Total	421	100.0	241	100.0	180	100.0

3.6 Crop cultivation

Most of the crops produced by the communities around Kainji Lake were food crops which included cereals, tubers and legumes (Figures 3 and 4). Sorghum was grown by more than 90% of both fishermen and non-fishermen. Rice and maize were grown in more than 65% of all households interviewed, while about 50% of all the households grew groundnuts. About 57% of fishermen and 44% of non-fishermen households cultivated millet. Corresponding figures for cowpeas are 17% and 20% respectively. Other crops, including yams, were grown by relatively more non-fishermen than by fishermen. The variety of crops cultivated follows almost the same pattern for both fishermen and non-fishermen.

Figure 3: Percentage of fishermen growing various crops, Kainji Lake area, 1995

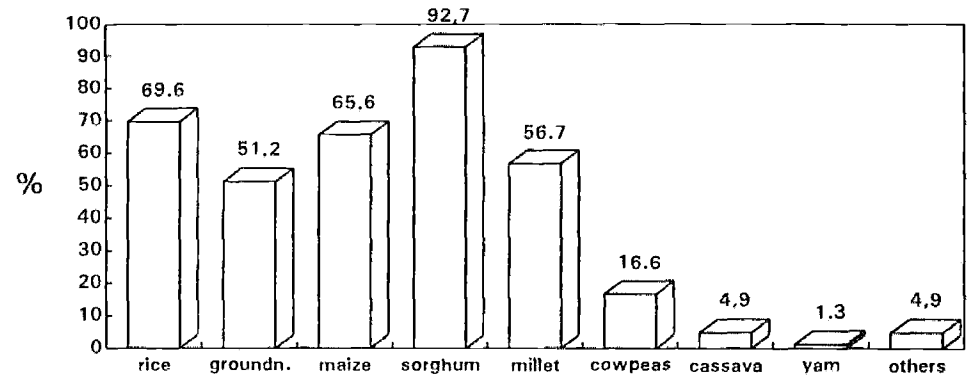
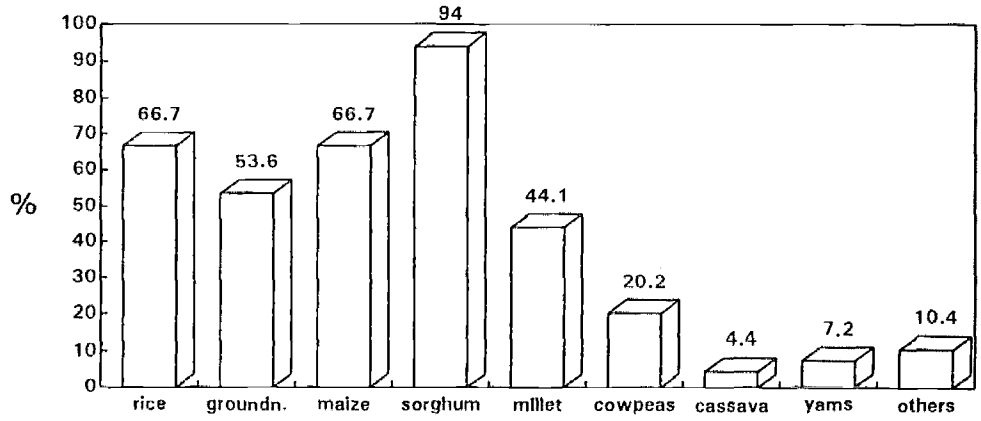


Figure 4: Percentage of non-fishermen growing various crops, Kainji Lake area, 1995



It appears that fishermen were in some cases, more successful farmers than non-fishermen, e.g. the harvest of rice and maize was significantly higher for fishermen than for non-fishermen (p= 0.0045 and 0.0002).

Table 12: Average harvest (sacks) in the year preceeding the survey, fishermen and non-fishermen, Kainji Lake area, 1995

	rice	groundn.	maize	sorghum	millet	cowpeas	cassava	yam	others
FM	33.1	21.2	19.1	39.5	32.0	5.0	29.7	4.7	11.1
NFM	30.9	18.7	14.2	38.9	20.2	6.0	16.8	18.3	6.8

Note: i) fm= fishermen; nfm= non-fishermen.

ii) Table does not compare harvest/acre, only total harvest.

iii) Table reflects average harvest of only those fishermen, non-fishermen who practised farming.

The results suggest that the fishermen either have bigger farms or more harvest per acre than the non-fishermen. In both cases, fishermen's higher cash income could be the reason. More cash available would enable fishermen to hire labour, hence to have bigger farms. It also could mean that fishermen could buy more or better inputs such as fertilizer. It could also be that fishermen, since many of them are migrants which have been exposed to different living circumstances, are more advanced in their farming methods.

From the nutritional points of view, it was of interest to determine the proportion of total harvest sold and that used for own consumption. Figures 5 and 6 show a tendency that can be observed for both fishermen and non-fishermen. Sorghum, maize and millet were cultivated almost exclusively for own consumption. Only some household sold the harvest. The opposite applied to rice and groundnuts, for which most households, both fishermen and non-fishermen, sold the greater part of their harvest.

Figure 5: Proportion of harvest sold/kept for home consumption, fishermen households, Kainji Lake area, 1995

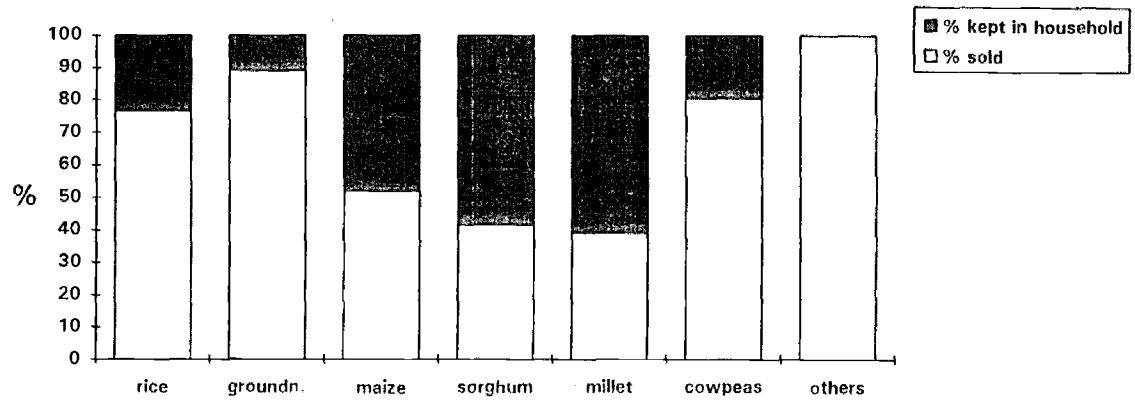
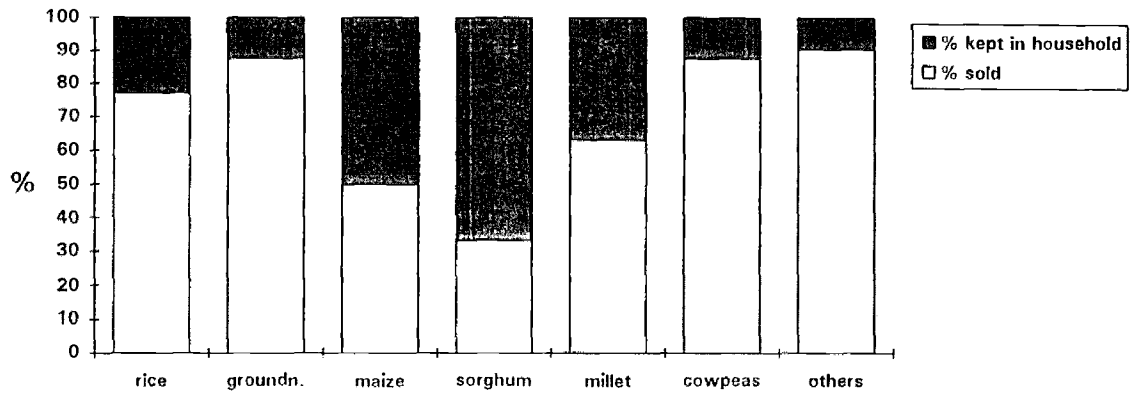


Figure 6: Proportion of harvest sold/kept for home consumption, non-fishermen households, Kainji Lake area, 1995



The fishermen sold their farm products at slightly higher unit prices than non-fishermen. One explanation for this could be that the fishermen, not being as dependent on the farm income as the non-fishermen, could afford to sell their products later in the year, when prices were higher. For example, at the time of our study in March/April the price of a 50 kg sack of maize was 600 Naira, whereas in July, shortly before the next harvest was expected, the price for the same quantity of maize was 1200 Naira.

The average income from the sale of various crops in the year preceeding the interview was 19,769 Naira for fishermen and 16,608 Naira for non-fishermen. The difference was statistically significant (p=0.0153)[1].

3.7 Livestock

About 83 % of all households owned livestock.

Table 13: Distribution of fishermen and non-fishermen according to livestock ownership, Kainji Lake area, 1995

	fishermen		non - fishermen	
Livestock	**n**	**%**	**n**	**%**
yes	217	87.8	147	80.8
no	30	12.2	36	19.2
Total	247	100	183	100

Comparing the ownership of livestock for fishermen and non-fishermen on the east and west side of the lake it appears, that proportionally more fishermen than non-fishermen on the western banks own livestock (Tables 14 a and b).

Table 14 a: Livestock ownership on the west and east sides, fishermen, Kainji Lake area, 1995

	west side		east side	
Livestock	**n**	**%**	**n**	**%**
yes	85	91.4	132	85.7
no	8	8.6	22	14.3
Total	93	100	154	100

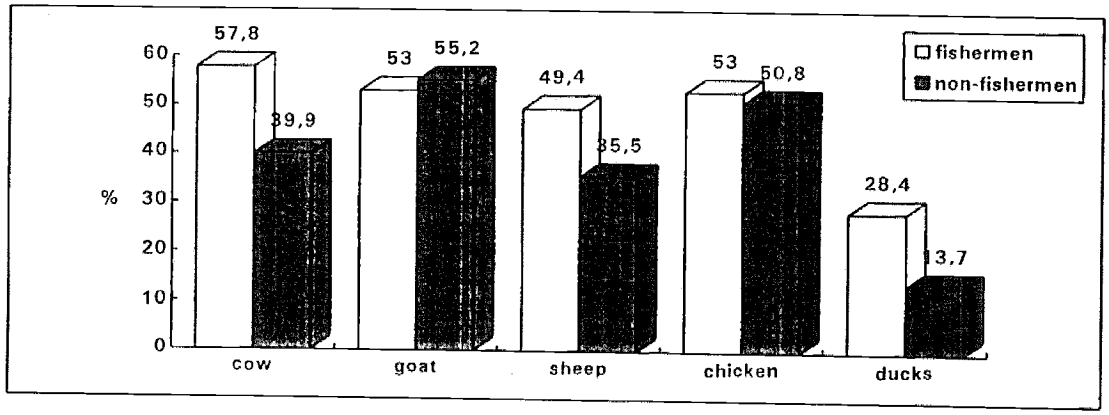
Table 14 b: Livestock ownership on the west and east sides, non-fishermen, Kainji Lake area, 1995

	west side		east side	
Livestock	**n**	**%**	**n**	**%**
yes	58	73.42	89	85.58
no	21	26.58	15	14.42
Total	79	100	104	100

[1]The figures refer only to those fishermen and non-fishermen who made an income from farming and not to the total number of sampled fishermen and non-fishermen.

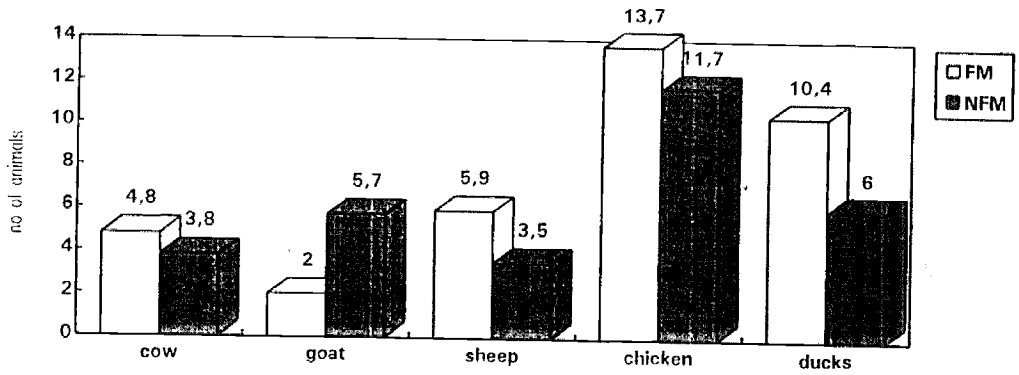
Figure 7 shows the percentage of fishermen and non-fishermen households who owned livestock. A comparison of the two groups showed that a higher percentage of fishermen than of non-fishermen owned cows, sheep and ducks.

Figure 7: Percentage of fishermen/non-fishermen who owned livestock, Kainji Lake area, 1995



With exception of goats the average number of livestock owned by fishermen was higher than that of the non-fishermen. Also, the range of the numbers of animal was much wider for fishermen than that of the comparison group. For example, there were fishermen who owned up to 60 cows and 65 sheeps and 100 chicken. The highest numbers of cows owned by the non-fishermen was 22, with corresponding figures for sheep and chicken at 19 and 50.

Figure 8: Average number of livestock owned by fishermen and non-fishermen, Kainji Lake area, 1995



Note: Reflects average number of livestock of only those fishermen and non fishermen who possesed livestock (see Figure 7)

Figures 9 and 10 give detailed information about the utilisation of the livestock the year preceeding the interview of those households in both groups who kept livestock. On the whole, the non-fishermen sold more of their livestock than the fishermen, especially cows and sheep, although the fishermen owned a larger number of them.

Many of the non-fishermen were agro-pastoralists, whose main sources of income were from farming and keeping of livestock, whereas the main source of income for fishermen were fishing activities, with the sale of farm products and livestock as an supplementary source of income

As regards home consumption of livestock, neither fishermen nor the non-fishermen consumed

the cows they owned themselves. Differences regarding the utilisation were found for sheep and ducks. Whereas the non-fishermen used about 44% of their sheep, the fishermen used only about 14% for home consumption. More than 60% of the sheep of the fishermen were kept as capital.

As mentioned above, the fishermen owned more ducks than the non-fishermen and they used 27% for home consumption, whereas the non-fishermen consumed none of their ducks, prefering to sell or to keep them.

In summary, only about 25 to 30% of the animals owned were consumed by households, with most animals being reared for capital or income reasons.
Apparently, only sheep seem to be a major source of protein for the non-fishermen. Nearly 45% are reared for own consumption. Detailed information as to the meat consumption of fishing and non-fishing households is presented in Chapter 4.

Figure 9: Proportion of livestock sold/consumed/kept in the household, fishermen, Kainji Lake area, 1995

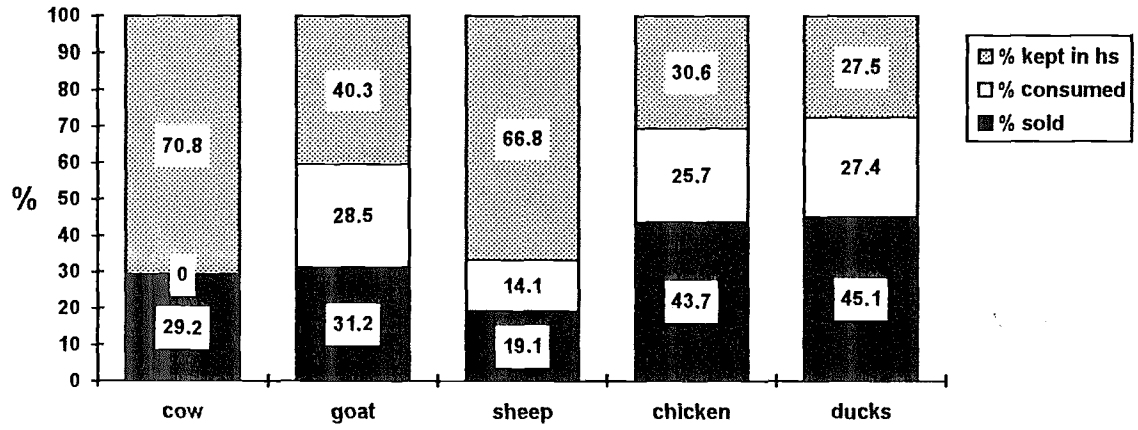
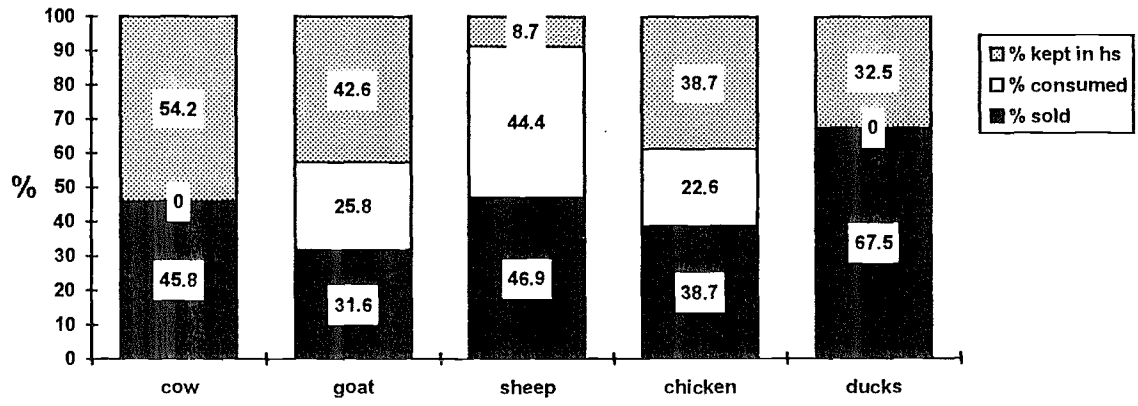


Figure 10: Proportion of livestock sold/consumed/kept in the household, non-fishermen, Kainji Lake area, 1995



Comparing the incomes received from the sale of livestock, the fishermen fetched a higher price for each animal. For example, fishermen , on average, sold their cows for 13,126 Naira ,

while non-fishermen got only 9. 120 Naira. Similarly. a chicken fetched fishermen 97 Naira whereas a non-fisherman only got 73 Naira.

Reasons for this could be the higher and more regular incomes that fishermen made from their main income source, making them less dependent on income from the sale of livestock, and also their higher mobility, giving them more opportunities to sell their livestock.

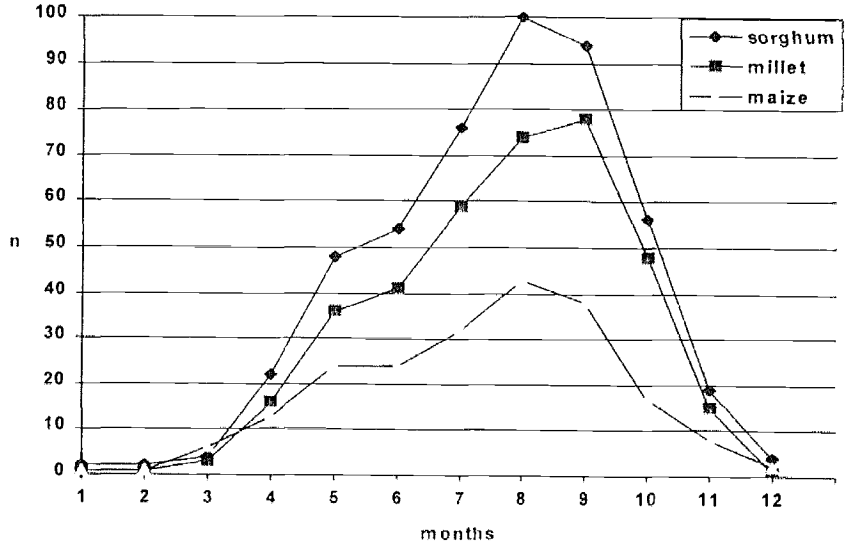
The total average income the year previous the interview was, for those fishermen who sold livestock (n=61) 9 380 Naira, and for non-fishermen (n=37) 8 660 Naira.

4. FOOD CONSUMPTION AND FOOD HABITS

4.1 General information

To determine periods of scarcity, the heads of household were asked to state a yearly calendar in which food scarcity occurs. More than half of the population experienced seasonal food shortages during the year (69% fishermen and 57% non-fishermen households). The differences between the groups are statistically significant (p= 0.018). The main period of food shortage was between May and October, corresponding to the period between planting and harvest seasons, and the food items concerned were sorghum, millet and maize, the main staple foods. Figure 11 shows the months of foodshortage for fishermen households. The pattern is similar for non-fishermen households.

Figure 11: Months of food shortage of main staples for fishermen households, Kainji Lake area, 1995



Providing money for food was the responsibility of the heads of household in 92 % of all households. Some wives assist their husband in staple food provision with their own money. Only few households depended on money provided by older children or other persons.

The average number of meals consumed per day in all householde was three, with snacks such as mangoes and oranges eaten between meals.

The traditional morning food was pap made out of sorghum or millet. For lunch and dinner soft boiled rice, maize, sorghum and millet (tuwo) was prepared, eaten with a soup with fish or meat. In general, household work is shared by all wives and children living in one compound and cooking was done on rotational basis by the wives. Most women cooked outside the house on a three stone oven.

4.2 Nutrient Intake; quantity and source

This section gives an overview of the average daily calorie (energy), protein and fat consumption of communities living around Kainji Lake and compares these to the recommended daily requirements. Further, the relative contribution of various types of food items to the overall energy, protein and fat intake is examined in order to obtain a clear picture of the composition and adequacy of the diet.

In describing the food habits and consumption pattern of the population, it was considered necessary to split the non-fishing group (as regards main occupation), into the subcategories of absolute non-fishing households and occasional fishing households, as it could be expected that households who had fishing as their supplementary occupation have other food consumption patterns than households who do not engage in fishing at all.

4.2.1 Calories

The average calorie consumption per person of the communities around Kainji Lake, calculated by using the average energy values of foods consumed, was 2058 kcal, which falls short of the recommended daily per caput intake of 2228 kcal for a predominantly young population with a high level of physical activity (Schofield, 1990, p.86f). All three groups cover, on the average, about 90% of their daily energy needs.
The average daily calorie intake per person stands at 2081 kcal for fishing, 1932 kcal for occassional and 2107 for non-fishing households. The significance level between occasional fishing and non-fishing households is p= 0.085.
A breakdown of the three occupational groups according to calorie consumption categories, as presented in Table 15, revcals considerable differences, particularly between non-fishing and occasional fishing households, as regards the spread across the various consumption categories.

Table 15: Distribution of calorie consumption, fishermen, ocassional fishermen and non-fishermen, Kainji Lake area, 1995

Household Status	Calories (in kcal)				
	< 1000	1000 to < 1500	1500 to < 2000	2000 to < 2500	>= 2500
fishing					
%	3.2	16.6	27.1	28.7	23.9
N	8	41	67	71	59
occas. fish.					
%	7.2	21.7	28.9	19.3	22.9
N	6	18	24	16	19
non-fish.					
%	4.0	17.0	20.0	33.0	26.0
N	4	17	20	33	26
%	4.2	17.7	25.8	27.9	24.2
N	18	76	111	120	104

Nearly half of the total population investigated consumed below their recommended daily needs. In althogether 47 % of fishing households, the average daily per caput calorie consumption was below 2000 kcal. Corresponding figures for occasional fishing and non-

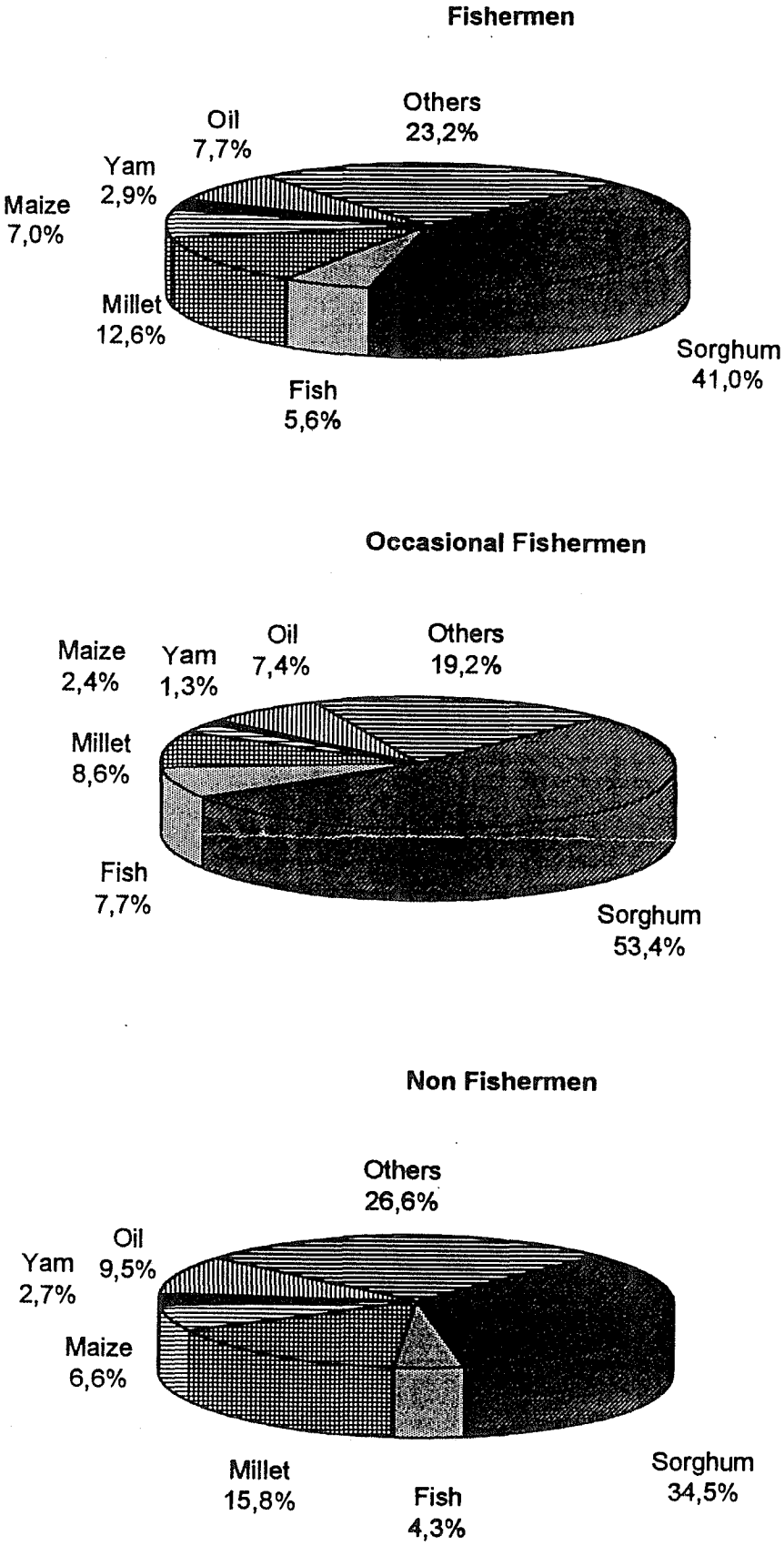
fishing households were 58 % and 41 % respectively.

The main staple food in Kainji Lake area was sorghum, with an average of 43% of the total daily energy intake coming from this source, while other staples were millet and rice, which accounted for 13% and 12% of total daily intake respectively. Fishermen households derived 41%, 13% and 7%, occasional fishing households 53%, 9% and 2% and non-fishing households 35%, 16% and 7% from these foods respectively, infering the least variation of staples for occasional-fishing households.

Less than 15% of the energy intake was derived from palmoil, groundnut oil and sheabutteroil. The percentage of energy coming from oil was higher for the non-fishing group (10%) than for the other two groups.

Food items like vegetables, beans ,yam ,cassava, meat, milk and sugar contributed less than 5% each to the energy intake in all groups.

Figure 12: Sources of energy in the diet, Kainji Lake area, 1995



4.2.2 Protein

The average protein consumption of persons living around Kainji Lake was 70g/person/day, which adequately covers the recommended intake of between 50 and 70g/day. There was no statistical difference in the protein intake of the different groups. Both fish and sorghum, the main staple food, are rich in protein and as such contribute significantly to the protein intake. However, it should be noted that about a quarter of all households had a daily per caput consumption of less than 50g of protein (Table 16). This is most likley to be so for households with low average calorie consumption.

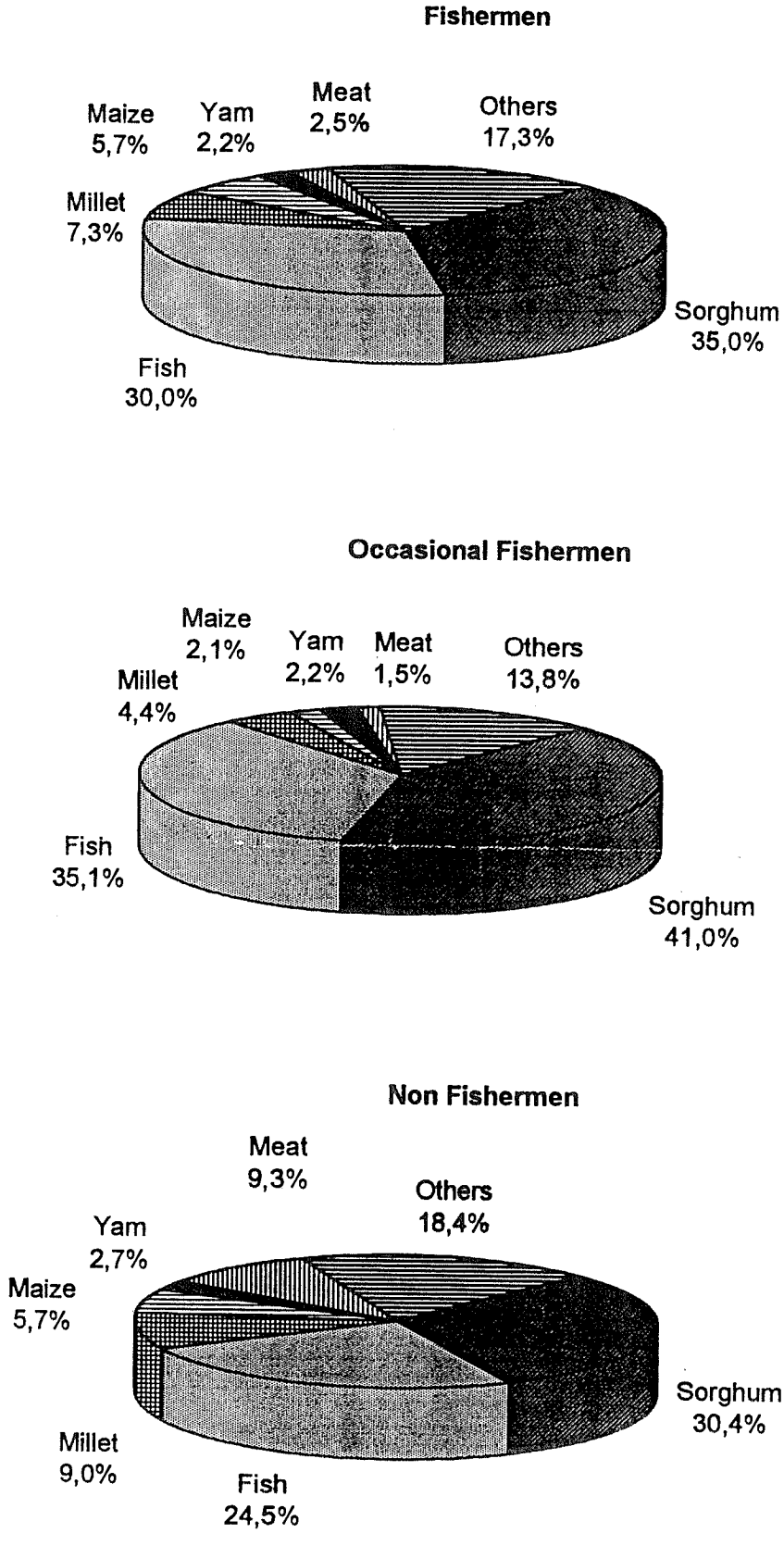
Table 16: Average protein intake per person per day, according to occupational status of households, Kainji Lake area. 1995

Status of Household	Protein (in gram)					
	< 20	20 to < 35	35 to < 50	50 to < 65	65 to < 80	>= 80
fishing						
%	1.2	6.5	18.2	18.6	16.6	32.4
N	3	16	45	46	41	80
occas.fish.						
%	1.2	7.2	16.9	20.5	13.3	37.3
N	1	6	14	17	11	31
non-fishing						
%	1.0	8.0	15.0	17.0	20.0	32.0
N	1	8	15	17	20	32
%	1.2	7.0	17.2	18.6	16.7	33.3
N	5	30	74	80	72	143

The two main sources of protein in the Kainji Lake area were fish and sorghum, which contributed 30 % and 36 % of the overall protein consumption of the Kainji Lake communities. The breakdown according to occupational status of households is shown in Figure 13.

The contribution of meat (beef, poultry, sheep) to overall protein consumption was rather low, indicating that most of the poultry and livestock was not used for own consumption. Protein supply from beans and eggs was below 5% of total protein for all investigated groups.

Figure 13: Sources of protein in the diet, Kainji Lake area, 1995



4.2.3 Fat

Ideally, about 20-35% of the total calories consumed should be provided by fat (King et al, 1992). As such, going by the recommended total daily per caput calorie intake of 2228 kcal for the Kainji Lake communities, 445 to 780 kcal should be derived from fat. This is equivalent to a daily fat consumption of between 50 and 87g. Fat, apart from providing energy and essential fatty acids, makes meals less bulky and is neccessary for the absorption of fat soluable vitamins, such as vitamin A and E. (King et al, p. 15, 1992)

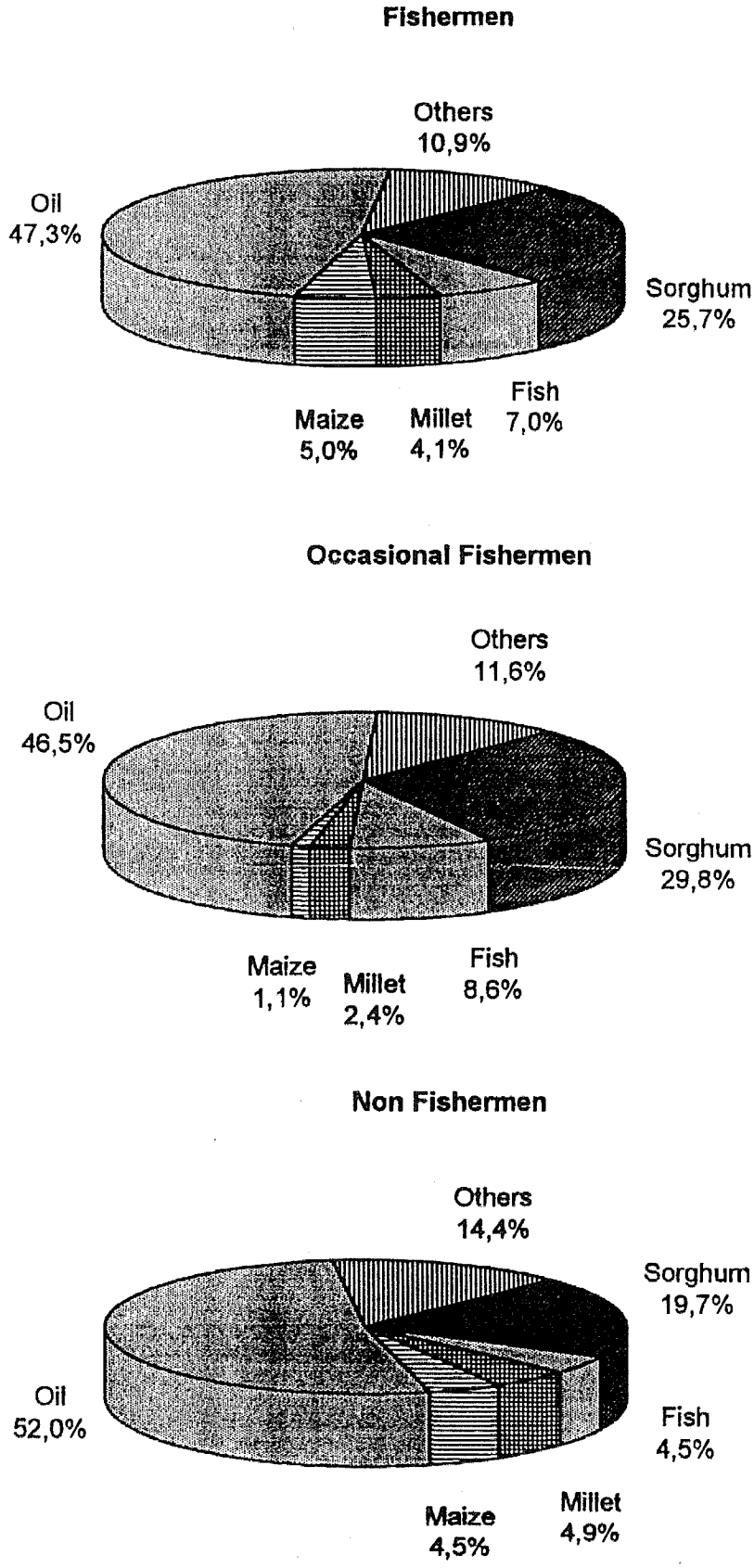
Only 16 % of the households had an average fat consumption lying within the recommended range. The average fat consumption of persons living around Kainji Lake was 35g/person/day. The fishing households had a significantly lower fat intake than the non-fishing households (p= 0.04). The fat intake of occasional fishing households was below that of non-fishing households (p= 0.03).

Table 17: Average fat intake per person per day, according to occupational status of households,
Kainji Lake area, 1995

Status of House-holds	Fat (in gram)							
	< 10	10 to < 20	20 to < 30	30 to < 40	40 to < 50	50 to < 60	60 to < 70	>= 70
fishing								
%	1.6	17.8	29.1	17.8	12.1	8.1	2.0	5.3
N	4	44	72	44	30	20	5	13
occas.fish.								
%	1.2	20.5	27.7	25.3	9.6	3.6	2.4	3.6
N	1	17	23	21	8	3	2	3
non-fishing								
%	2.0	15.0	23.0	18.0	11.0	10.0	1.0	10.0
N	2	15	23	18	11	10	1	10
%	1.6	17.7	27.4	19.3	11.4	7.7	1.9	6.0
N	7	76	118	83	49	33	8	26

The fact that the quantity of fat in the diet of the Kainji Lake population was below the internationaly accepted recommendations makes an investigation into the source of consumed fat the more significant. The most important fat sources were cooking oil, sorghum and fish. Cooking oil accounted for about 49 % of total fat intake for all households, the most commonly used oils being groundnut, palm, and sheabutteroil. Sorghum contributed 26 %, 30% and 20 % to total fat intake for fishing .occasional fishing and non-fishing households respectively. Furthermore, small contributions to the fat intake came from groundnutcake (kulikuli), melon seeds, beancake and milletcake (Figure 14).

Figure 14: Sources of fat in the diet, Kainji Lake area, 1995



The contribution of protein, fat and carbohydrates to the overall daily average calorie consumption of Kainji Lake communities is presented in Table 18.

Table 18: Contribution of main nutrients to total calorie consumption according to occupational status of households, Kainji Lake area, 1995

Status of House-hold	Percent nutrients of total energy		
	Protein	Fat	Carbohydrate
fishing			
Mean	13.8	14.5	71.7
Std.dev.	4.0	5.9	6.5
N	247	247	247
occas.fish.			
Mean	15.7	15.0	69.4
Std.dev.	5.6	5.2	6.9
N	83	83	83
non-fishing			
Mean	13.3	16.3	70.4
Std.dev.	3.4	7.0	7.8
N	100	100	100
Mean	14.0	15.0	71.0
Std.dev.	4.3	6.1	7.0
N	430	430	430

The figures in Table 18 show, taking the population as a whole, that whereas, on the average, 71% of total daily calorie consumption was derived from carbohydrates, protein and fat supplied 15 % and 14 % of total daily calorie intake respectively. As such, the general recommendations, as would result from a balanced diet, of 55-65 % of total daily calorie intake to be derived from cabohydrates, about 30 % from fat and 10-15 % from protein were, in respect of the Kainji Lake communities, met only for protein. A higher than recommended percentage was derived from carbohydrates with a consequent lower than recommended intake of fat.

4.3 Factors affecting nutrient intake

In this chapter, several factors, such as number of participants at meals, income of the head of household, ethnic grouping and geographical location are examined as to their effects on the nutrient intake of Kainji Lake communities.

Corresponding to the decreasing total calorie intake, protein and fat consumption also decreased with increasing number of participants at meals, regardless of the occupational status of the households. The decreasing calorie intake with increasing number of meal members was highly significant (p=0.000) (Table 19).

Table 19: Average calorie, protein and fat intake per person per day, according to occupational status of households and number of meal participants, Kainji Lake area, 1995

Status of Househ.	No. of Persons	Energy Mean (kcal/d)	Energy Std. Dev.	Protein Mean (g/d)	Protein Std. Dev.	Fat Mean (g/d)	Fat Std. Dev.	N
fishing								
	1 - 3	3,275	631	129	46	69	42	19
	4 - 6	2,259	558	88	37	37	14	34
	7 - 9	2,247	643	73	22	41	22	50
	10 - 12	2,067	487	73	25	31	15	51
	13 - 19	1,812	592	60	28	27	12	37
	20 - 39	1,624	447	51	18	22	10	44
	>= 40	1,573	390	49	17	25	13	11
occas.fishing								
	1 - 3	2,629	314	168	46	40	11	5
	4 - 6	2,261	726	86	21	42	21	15
	7 - 9	2,120	639	80	30	33	12	28
	10 - 12	1,800	515	62	32	34	24	11
	13 - 19	1,531	536	58	25	22	9	15
	20 - 39	1,140	316	38	12	17	4	8
	>= 40	2,027	0	52	0	47	0	1
non-fishing								
	1 - 3	2,848	519	103	29	64	30	6
	4 - 6	2,430	668	85	32	47	38	25
	7 - 9	2,189	596	71	19	40	19	28
	10 - 12	1,736	625	57	29	32	16	22
	13 - 19	1,763	507	56	23	30	15	16
	20 - 39	1,708	302	44	4	18	5	3

Table 20: Average number of persons participating in meals according to occupational status of household, Kainji Lake area, 1995

Status of Househ.	Avg. No. of Persons	Std. Dev.	Minimum No. of Persons	Maximum No. of Persons	N
fishing	13.9	10.6	2	65	247
occas.fish	10.5	6.0	2	28	83
non fishing.	9.6	4.9	2	26	100
All Households	12.2	9.0	2	65	430

Neither the ethnic origin nor the income situation of the heads of household had a statistically significant impact on calorie consumption. Also, no significant differences in respect of the calorie consumption on the west and east sides of Kainji Lake could be observed.

4.4 Food consumption pattern

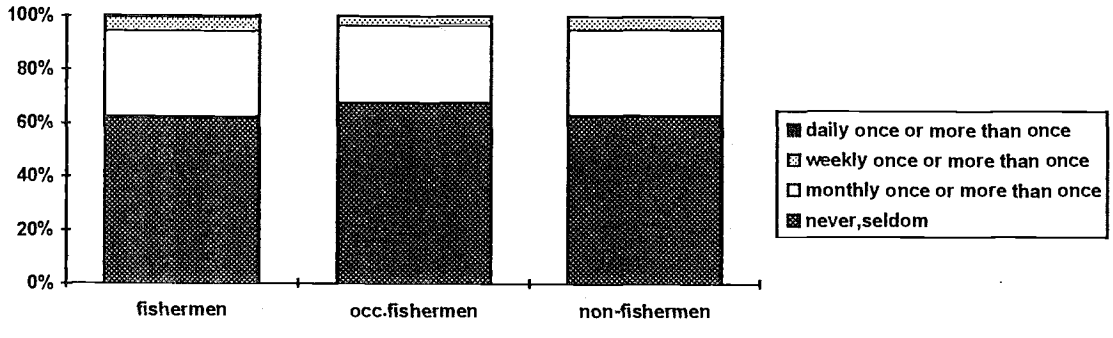
The food preferences of the population as regards different species of fish were of particular interest to the project. The study indicated that fish was a highly prefered food item for fishing households (95 %) as well as for non- fishing households (84 %).

In addition to the 24-h-recall the mothers were asked to state how often (never, seldom,once or more than once monthly, once or more than once weekly, once or more than once daily) they used the proposed food items for preparing the meals.

Consumption frequencies of fish

Figure 15 shows that the Clupeid[2] did not play an important role in the nutrition in the population. More than 60% of all occupational groups never or only seldom ate clupeids, with many of the the interviewed women stating that the Clupeids are too bony. The Clupeids caught in Kainji lake were sold mainly to people from other regions where fish was not so common.

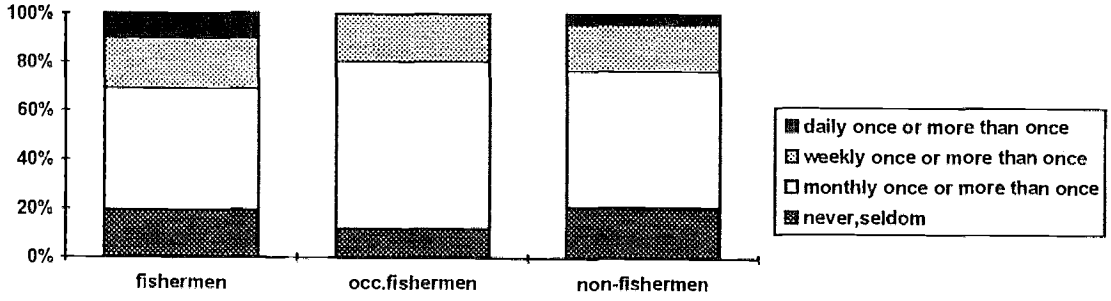
Figure 15: Consumption frequency of Clupeid, Kainji Lake area, 1995



[2]Clupeid, a small fish, is caught mainly in small meshed beach seine that also catch a high proportion of baby fish of other, bigger species.

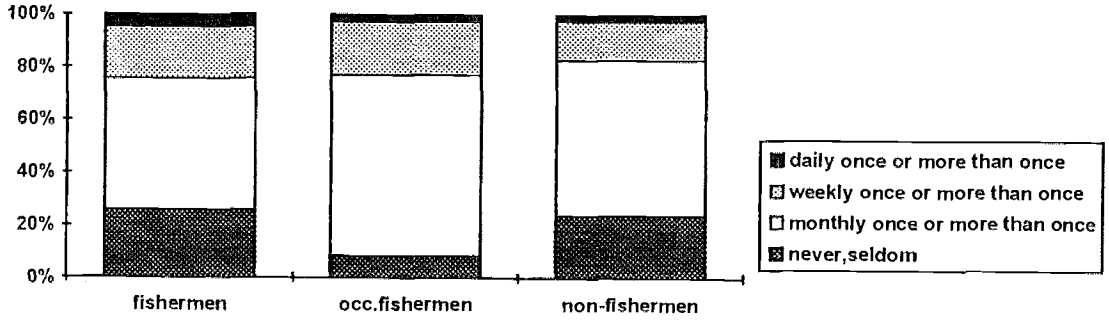
The contribution of Alestes to the nutrition is also rather low (Figure 16), but there was a significant difference between the occupational groups (p=0.0098), with a higher percentage of fishing and non-fishing households never eating this specie.

Figure 16: Consumption frequency of Alestes, Kainji Lake area, 1995



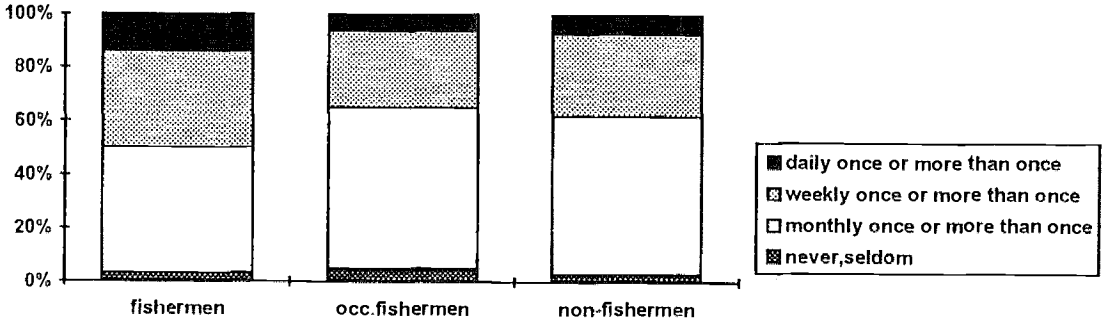
Labeo was also a fish of low preference (Figure 17), because the taste was mentioned to be a little bit bitter. For more than 70% of all households, this fish specie appears seldom or only once or more than once monthly in the diet, with higher percentage of non-fishing households being in this preference group.

Figure 17: Consumption frequency of Labeo, Kainji Lake area, 1995



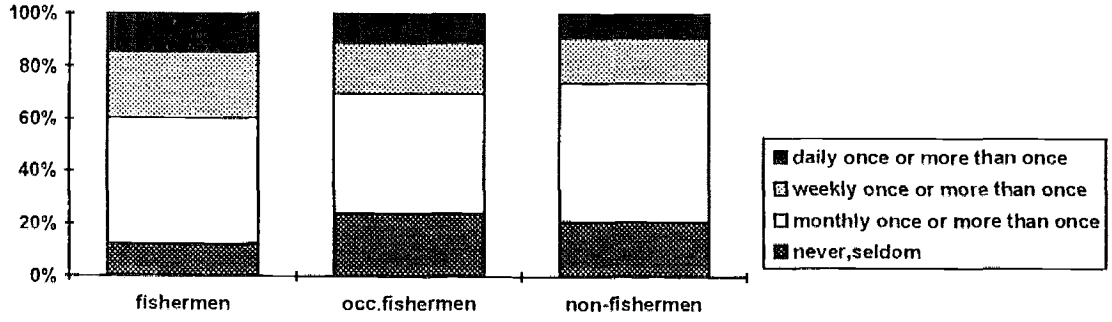
Catfish appears more often in the diet of fishermen households. About 50% of the fishing households ate the Catfish on a weekly or daily basis. In the other two groups, this fish appears in at least 60% of the households only on a monthly basis (Figure 18).

Figure 18: Consumption frequency of Catfish, Kainji Lake area, 1995



Lates is a very delicious fish which can grow very large, with the prices correspondingly high. Figure 19 shows that the bigger part of all groups investigated ate Lates only once or more than once a month, but the figure also shows that a higher percentage of fishing households prepare the Lates on weekly or daily basis, followed by the occasional fishing and the non-fishing households.

Figure 19: Consumption frequency of Lates, Kainji Lake area, 1995



Figures 20, 21 and 22 show that Citharinus, Tilapia and Synodontis were highly preferred fishes, prepared in most households on a weekly or daily basis. There were no significant differences between the groups. It should however be considered that the time of the survey was the season for the Citharinus.

Figure 20: Consumption frequency of Citharinus, Kainji Lake area, 1995

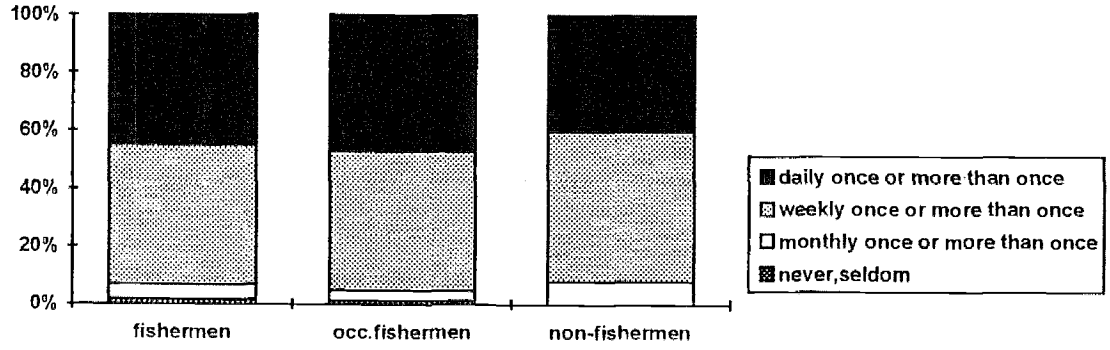


Figure 21: Consumption frequency of Tilapia, Kainji Lake area, 1995

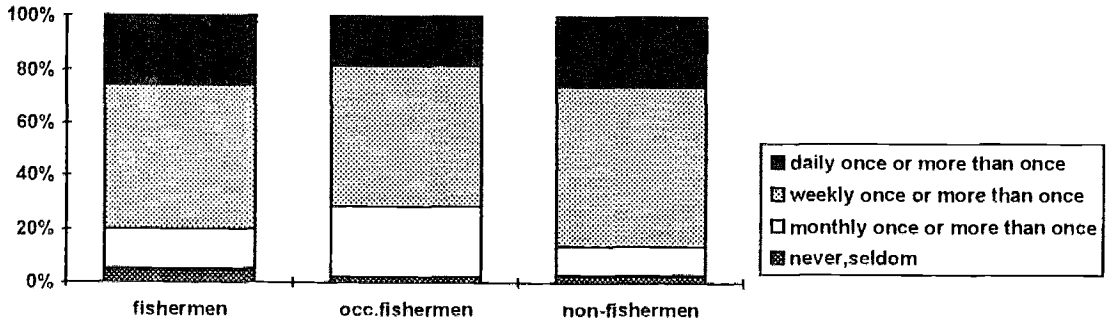
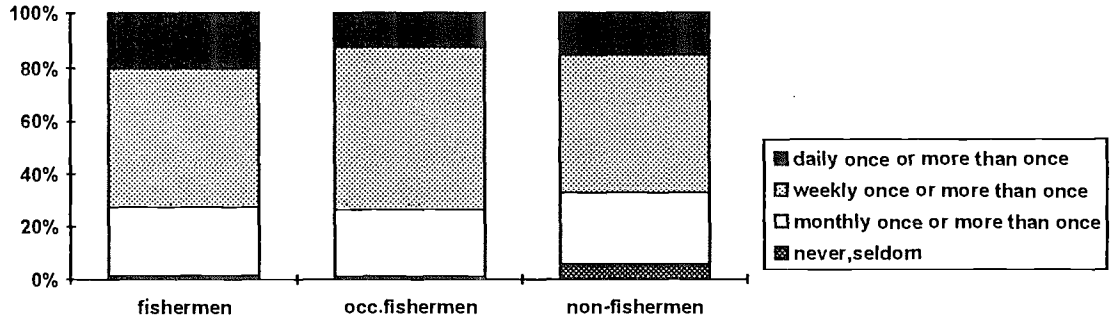


Figure 22: Consumption frequency of Synodontis, Kainji Lake area, 1995



In summary, clupeids, labeos and alestes were the least liked fishes in Kainji Lake area and thus rarely consumed. The most frequently prepared fishes were Citharinus, Tilapia and Synodontis, in decreasing order.

The consumption frequencies correspond to the stated fish preferences. Citharinus was the fish of first choice for 77 %, followed by Tilapia for 65 %, Lates for 62 % and Bagrus for 43 % of all interviewed wives of fishermen. About 96 % of wives of non-fishermen prefered citharinus, followed by Tilapia for 80 %, Synodontis for 41 %, Lates for 40 % and Catfish for 34 %.

Consumption frequencies of meat

Chapter 4.2 showed that meat does not play a significant role in the daily diet. The following figures indicate that there are significant differences between the groups investigated concerning the weekly and monthly consumption of meat. The non-fishing group had the highest percentage of households eating meat once or more than once weekly (68%) followed by the fishing households (55%) and occasional fishing households with only 37%. In more than 60 % of occasional fishing households beef is eaten only on monthly basis or seldom. There was a significance of p=0.0000 between the groups.

Figure 23: Consumption frequency of beef, Kainji Lake area, 1995

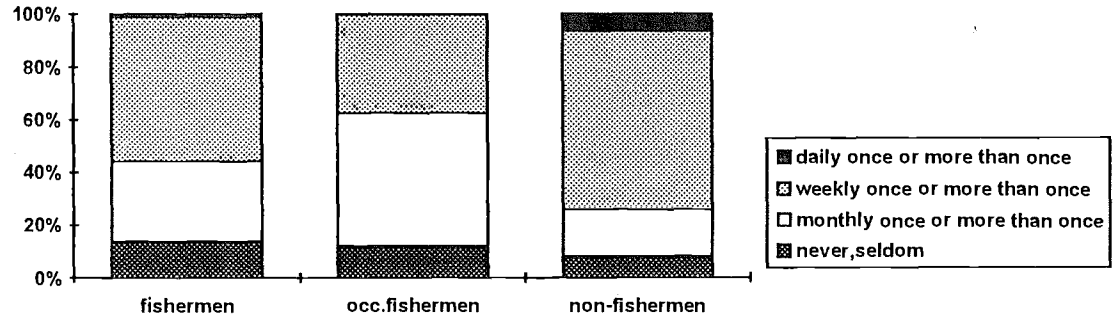
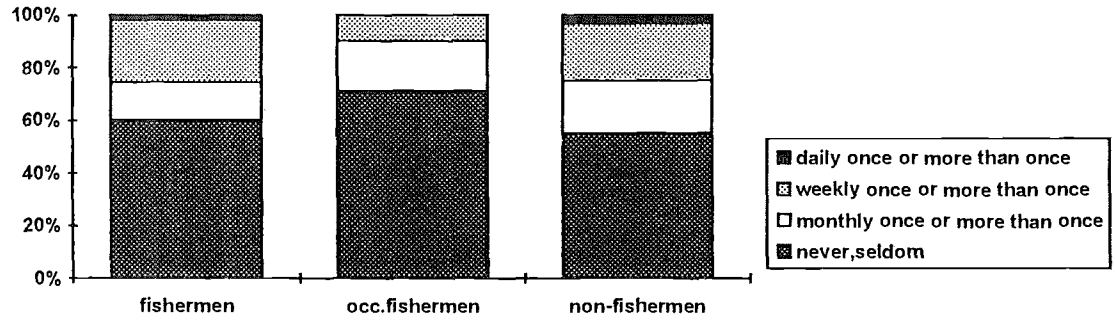


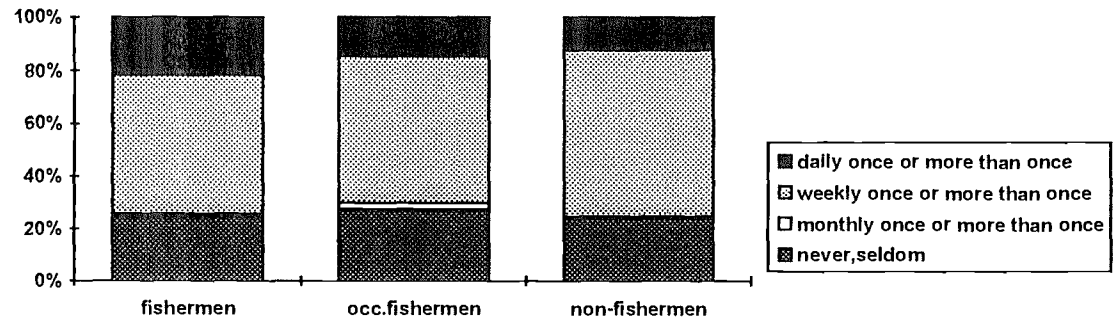
Figure 24: Consumption frequency of sheep, Kainji Lake area, 1995



Consumption frequency for fruits

About 20 % of fishermen, occassional fishermen and non-fishermen households hardly ever ate fruits (Fig. 20 %). More than 50% of households in each group ate fruits once or more than once weekly, with the highest percentage in the non-fishing group (63%).

Figure 25: Consumption frequency of fruits, Kainji Lake area, 1995



4.5 Food taboos

Food avoidances or taboos as part of the prevailing habits may influence distribution of food within the household (Hartog et al, 1983). When dealing with food avoidances in relation to nutrition, it is useful to make a distinction between permanent and temporary food avoidances.

Permanent food avoidance cover whole populations, or a particular section of individuals. A certain food or drink may never be consumed, classic examples being pork and alcohol for muslims. In the villages around Kainji Lake, most people are muslims (Mdaihli & Alamu ,1993). About 30 % of the interviewed women stated that pork, snails and alcohol are forbidden for women as well as for men for religious reasons and as such, were not consumed.

Temporary food avoidances, which apply to individuals during certain periods such as pregnancy, childhood and various diseases were also mentioned. In contrast to the permanent food avoidances, which have little or no significance as regards the supply of essential nutrients, the temporary ones often deprive individuals of certain important nutrients at critical periods of their life. About 52 % of all women avoided certain foods during pregnancy. Sugar was not consumed, because it was believed to cause complications during delivery, and mangos and fresh fish, as they would cause discomfort or affect the child negatively after birth. Further, children having diseases like malaria, measles and cough were also denied certain foods. A child with malaria was not allowed to eat groundnuts, oily food, beans, *Kumkumi* fish and millet cake (fried in groundnut oil), because these foods were believed to increase the severity of malaria or would affect the childs eyes negatively. About 30% of the women observed these taboos. Oily food and

hot food as well as *Kumkumi* fish were not given to a child with measles, as they were thought to worsen the condition, harm the eyes or cause discomfort to the child. These restrictions were observed by 41 % of the women. General restrictions for children, regardless of health status were puffer fish, because of its poison, as well as eggs, which were believed to make the child become a thief, because once the child got used to eating eggs, it would in later life, if not able to afford such, turn to stealing.

4.6 Food preferences

The foods that would be consumed more often in the households, given an additional income for food purchases, are presented in Table 21. Since the pattern is similar for fishing and non-fishing households, the population is examined as a whole.

Table 21: Prefered food items, given additional income for food purchases, Kainji Lake area, 1995

	rice	fish	bread/ tea	vege- tables	meat	beans	milk	eggs	chicken
Households (%)	69	64	56	49	46	36	34	33	21

Most of the above food items, with the exception of rice and bread, fall into the category of protein-rich foods. Rice and bread on the other hand, are percieved by many as a status symbol, showing wealth and sophistication.

4.7 Breast feeding and weaning practices

The health and nutritional condition of children depends a lot on feeding habits, especially during the weaning period, when the child is gradually or abruptly taken off the breast and given other foods. The weaning period is often associated with the overwhelming problems of protein-energy malnutrition and other deficiency diseases (Cameron and Hofvander, 1976). The weaning pattern is described on one hand by the total period of breast feeding, on the other by the time at which supplementary foods are introduced and the quality of these foods. It is advisable to start with weaning food at the age of 4 to 6 month, because as from this stage, most infants need more energy and nutrients than breastmilk alone can provide. Late introduction of weaning foods may cause the infant to stop gaining weight at a healthy rate, and it may become underweight (King et al, 1992). However, too early weaning could increase the incidence of diarrhoea, as weaning foods are often contaminated with bacteria and other contaminants which the infant can not yet effectively combat. Further, early weaning, particularly with foods which may not be of adequate nutritional value, reduces the amount of breastmilk an infant can consume, thus depriving it of essential nutrients. It is not necessary to give water to drink before an infant starts on weaning foods.

As there were no significant differences between the occasional fishing and the non-fishing households, they are subsequently all refered to as non-fishing households..

In Kainji Lake area, breast-feeding is generally practised. There is a virtual absence of infant formulas and dried milk products are rarely available in the villages, in addition to being too expensive for most households.

Of the sample of mothers who had stopped breast-feeding of a child (101 wives of fishermen and 90 wives of non-fishermen) most (68 % of wives of fishermen and 59 % of wives of non-fishermen) had breastfed the child up to the age of 19 to 24 months, which follows recommendations from the Federal Ministry of Health to breastfeed to the age of 13 to 18 months. The percentage of women who stopped breastfeeding a child at 13 to 18 months of age was 24 % and 36 % for wives of fishermen and wives of non-fishermen respectively.

Figure 26 shows that the majority of mothers started giving supplementary foods as from the 6th month of age. Generally, there were more wives of fishermen who introduced supplementary food later, with most of them starting in the 7th month. When the child was at the age of 7 months, 91% of the wives of non-fishermen gave food in addition to breast milk to their child, while 80% of the wives of fishermen had started weaning at this age (Figure 27). The figure also shows that about 18% of wives of fishermen started weaning their children after the age of 9 months.

Figure 26: Weaning pattern, Kainji Lake area, 1995

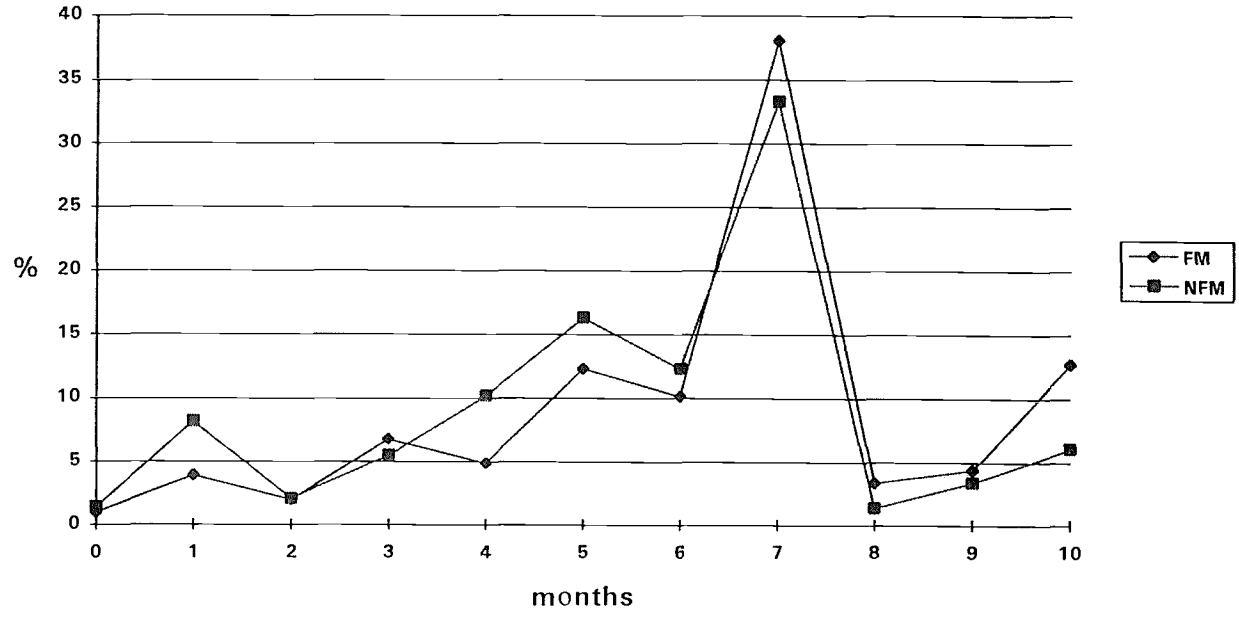
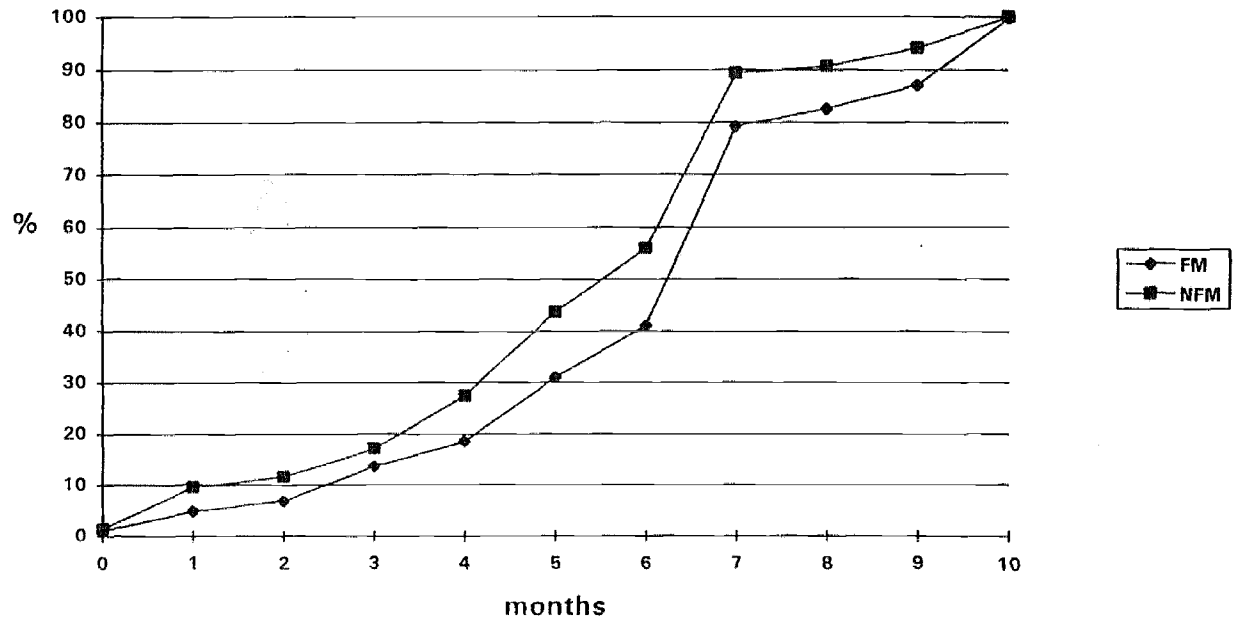


Figure 27: Weaning pattern, cumulated frequency, Kainji Lake area, 1995



The traditional first weaning food given to infants around Kainji Lake was sorghum, millet, maize or rice porridge. Such porridge consists mainly of water (92 - 95%), and is relatively poor in terms of calories (30 - 35 kcal/100 ml), as compared to breast milk with 70 kcal/100 ml (Loosli et al.,1973). There were no significant differences between the fishing and non-fishing households as regards the type of weaning foods given to children.

There were indications that some mothers (18 % and 21 % of wives of fishermen and of non-fishermen respectively) gave herbs diluted in water to their infants, shortly after birth or during the first month, to protect them against malaria. This could be a cause of infection, rapidly leading to malnutrition.

Most mothers (about 43% in each group) gave sorghum porridge as the first weaning food. Millet was used by 17 % of wives of fishermen and 20 % of wives of non-fishermen, while 8% of both occupational groups gave infant formula.

Out of all women weaning mothers, most gave their child 3-5 meals a day, while 30% of mothers gave their child 6 or more meals a day. Considering the fact that most mothers only cooked two or three times a day, the question of if and how food is preserved for infants/children arises, as improperly kept food tends to habour bacteria and can cause diarrhoea (King et al., 1992).

4.8 Prevalence and treatment of diarrhoea

It is well known that infectious diseases affect dietary intake and nutrient utilisation. Diarrhoea is highly interlinked with malnutrition. Diarrhoea ranks as number one cause of admission for children in the hospitals. Most of early childhood diarrhoea is caused by viruses, which can not be eliminated by antibiotics (UNICEF 1990). In 1990, approximately five million children below the age of five died as a consequence of diarrhoeal diseases (Rasmusun et al.,1990, p. 115). An international review team estimated 50,000 to 100,000 under five year old deaths due to diarrhoea in Nigeria for 1989. In a survey of 28, 375 under-fives in 16 LGA's of 8 States in

the four health zones of Nigeria, a diarrhoea prevalence of 16.7% and an average annual number of diarrhoea episodes per child of 4.3 was found. Only 35% of the mothers reported the use of oral rehydration solution (ORS) at home[3].

About 60-70% of diarrhoea death are due to dehydration as a consequence of heavy fluid and electrolyte loss. Infants with low birthweight, and infants and children who are undernourished, tend to have more prolonged and more severe episodes of diarrhoea and are more likely to die from it (Rasmusun et al., 1990, p. 115) Diarrhoea, in turn can cause malnutrition or nutrient wastage through reduced food intake, malabsorption, metabolic wastage and direct losses from the gastro-intestinal tract.

In the survey area, the prevalence of diarrhoea was high. The point prevalence (the day before the interview) of diarrhoea was 40% for children of fishermen and 26% for children of non-fishermen (Table 22), while the period prevalence (during the last 7 days before the interview) was 60 % and 48 % respectively (Table 23).

Table 22: Point prevalence of diarrhoea among children aged 0 to 5 years, Kainji Lake area, 1995

	children, fishermen		**children, non-fishermen**	
diarrhoea	n	%	n	%
yes	88	40.3	39	26.4
no	125	58.7	109	73.6
Total	213	100	148	100

Table 23: Period prevalence of diarrhoea among children aged 0 to 5.years, Kainji Lake area, 1995

	children, fishermen		**children, non-fishermen**	
diarrhoea	n	%	n	%
yes	128	60.1	71	47.97
no	85	39.9	77	50.0
total	213	100	148	100

The prevalence for diarrhoea was significantly higher for children of fishermen than for children of non-fishermen (point prevalence p=0.0034; period prevalence p=0.0000). Apart from the lake water being used to wash dishes, for corporal hygiene as well as for drinking and cooking, many inhabitants also relieved themselves in the lake. It is hardly surprising therefore, that prevalence of water borne diseases and diseases that can be transmitted through improper human waste disposal was high. Boys had a significantly higher period prevalence of diarrhoea than girls (p=0.0055), which, according to informal interviews could be due to more frequent contacts with the lake, particularly for boys of fishermen..

[3]ORS is the fluid usually used to treat dehydration. It can be made from packets of oral rehydration salts, which contain a special mixture of glucose and sodium and potassium salts. Alternatively, ORS can be made by adding 8 level teaspoons of sugar and 1 level teaspoon of salt to 1 litre of clean drinking water (King, Burgess, 1992).

The women were asked to state how they responded to the last diarrhoea episode of their child. The three main ways of treating diarrhoea were giving herbs, buying drugs and taking the child to the hospital (Table 24). About half of the wives of fishermen treated diarrhoea with herbs or did not apply any remedy at all. Wives of non-fishermen prefered buying drugs or bringing the child to the hospital (57%). Only some mothers interviewed (4%) gave their child ORS (home made). Dehydrated children who were not receiving any treatment were observed frequently during the interviews.The knowledge on how to treat diarrhoea with a simple sugar salt solution was found to be very low.

Table 24: Treatment methods of diarrhoea, Lake Kainji area, 1995

	wives of fishermen		**wives of non - fishermen**	
treatment	n	%	n	%
herbs	55	30.5	24	25.0
ORS	7	3.9	5	5.2
buy drugs	56	31.1	43	44.8
give boiled water	-	-	1	1.0
take to hospital	28	15.6	11	11.5
give nothing	32	17.8	12	12.5
other	2	1.1	-	-
Total	180	100	96	100

5 CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

Determinants of the nutritional situation of a community, including nutritional status, habits and consumption patterns are manifold. Climate, natural and economic resources, as well as agricultural skills and priorities all affect the food security (i.e. production) on a national, regional and local level. Food supply is further affected by the level of importation and exportation, and by storage and marketing facilities. The nutritional security (i.e. effective food demand and consumption at the household level) is influenced by economic factors such as prices and household income, by food habits and last but by no means least, the effective utilisation of consumed food by the human body, which is significantly influenced by the health status and vice versa. According to the UNICEF model (UNICEF, 1990), the two key determinants of the nutritional status at the household level are the dietary intake and the health status.

The basic importance of the nutritional well-being of a community for the development of a region, as well as the comprehensiveness of the nutritional status as a reliable indicator for the level of development is gaining increasing attention and recognition amongst policy makers.

The interest shown, and the support given by the Nigeran-German Kainji Lake Fisheries Promotion Project in the collection of information on the nutrition habits and food consumption pattern shows an awareness of the importance of nutrition as a factor in the development of a region.

As the quantity of small fish such as the Clupeids, Alestes and Schilbeids consumed by the communities around Kainji Lake was relatively low, the introduction of new fishing methods or new mesh sizes for an optimal exploitation of fish will not have a negative effect on the nutritional security of the communities around the Lake. However, since Clupeids constitute a considerable income source, care must be taken to compensate any income losses through other sources. As a considerable portion of total expenditures was spent on food, any negative effects on overall income would invarably also affect nutrition security negatively.

The main nutritional problem of the population of Kainji Lake area was the very low consumption of fat-rich foods, such as eggs, groundnuts, and groundnut-derived products such as groundnut oil and groundnutpaste (kulikuli). A rather large part of the population did not grow groundnuts at all. and if so, the greater part of the harvest was sold. The variation of the diet was rather low. Food items such as beans and rice, as well as poultry and cattle were sold in most cases, instead of using them for own consumption. Particularly cattle were seen to be more of a form of investment than a source of nutrients. Going by the relatively low harvests of non-fishermen, there appears to be potential for improvements in harvest quantities, particularly as there was sufficient land available for crop cultivation and for keeping cattle. On the whole, the below daily recommended intake of calories was not primarily as a result of insufficient availability of foods, but rather based on knowledge deficits as to choosing the right foods to make a balanced diet. However, certain groups such as pregnant women, infants and young children, as well as ill persons may run a higher risk of malnourishment due to factors such as uneven intrahousehold food distribution and food taboos. The number of meal participants also affected the calorie consumption significantly.

The high percentage of women who breastfed their children up to the recommended age of 13 to 18 months. and the virtual absence of the use of infant formulas are positive trends which should be maintained. However, the watery traditional weaning porridge and the practise of giving herbs to new-born infants are far from satisfactory. The high prevalence of diarrhoe amongst childern is a further problem which needs to be addressed.

5.2 Recommendations

1) The project should also consider activities to improve supplementary income generating activities of fishermen. such that they become less vulnerable to limitations of fish resources, particularly as regards the income from clupeids. Although the income situation of the fishermen was significantly better than for non-fishermen, it should be taken into account that fishing is a seasonal activity.

The health situation in the survey region needs to be improved for activities in other areas, such as the improvement of food security to have any significant effect.

2) The sinking of additional wells and boreholes by the DFFRI, UNICEF or Middlebelt Programme would greatly improve the hygienic situation of the communities and greatly reduce the incidence of water-borne diseases.

3) Sanitary facilities. such as pit latrines, should be made available in each village around the lake by the health authorities, in conjunction with the Nigerian-German Primary Health Care Project.. Further, hygiene counselling, particularly in the area of water-borne diseases in general and diarrhoea in particular should be carried out by health personnel on a community level. In this respect. the proper treatment of diarrhoea in children through ORS should be propagated.

4) Nutrition counselling for expectant and nursing mothers in particular, but also for heads of households, on topics such as intra-household food distribution and weaning practices should be carried out by the relevant Departments of Health. A general increase in fish consumption is not a nutritional necessity in the communities. Rather, fish and other nutrititious foods should be adequaetly included in the diet of vulnerable groups i.e. children and pregnant women. Further, the households should be advised to use more of their livestock for home consumption. Also, as insufficient protein consumption is often linked to an overall insufficient food consumption, it is expected that the protein requirement will be conveniently met if the calorie supply is sufficient. The nutrition counselling program should include cooking demonstrations, particularly on how to put fish, beans, and groundnuts into powdered form for enrichment of porridge and on using oil to increase the energy density of porridge.

In developing these programmes. it should be considered that many women are not allowed to come out of their compounds. As most of the households posses a radio, messages could also be transmitted via this medium. Considering the high percentage of persons with no formal education, the relevant information must be simple and precise. As mentioned earlier, an emphasis on mothers alone may cause conflicts within families if the father is not in a position to appreciate the importance of specific aspects of nutrition.

5) Growth monitoring should be carried out by public health facilities on a monthly basis, as a way of assessing the nutritional security at the household level. Children between 6 and 24 months of age should be targeted, as they are most vunerable to malnutrition. Growth monitoring is also recommended as a part of the overall monitoring and evaluation system of the project. The inclusion of nutritional status indicators in the project monitoring and

evaluation system will serve to assess the nutritional situation of the target population, to evaluate if and to what extent project activities have contributed to the improvement of the nutritional situation in particular and to the social and economical development within the target communities in general, and to assure that in the planning and implementation of project activities, the nutritional needs of the target population are sufficiently considered.

In this respect, it is recommended that baseline data be gathered twice annualy, preferably during a period of relative shortage as well as one of relative abundance of food.

6) The Department of Agriculture should advice farmers on the diversification of food crops and methods of improving quantity and quality of harvests. Especially during periods of fish shortage, other protein rich foods such as beans and groundnuts should be available in the households. A small project such as the ADP (Agricultural Development Programme) in Minna has had good results through its programme of teaching of improved methods on planting of different crops and at the same time giving modern nutritional advices and cooking demonstration on how to use the different food items to prepare balanced weaning foods, with integration of more beans, oil and fresh fruit. Even soya beans were accepted after cooking demonstrations. There is a need of financial assistance for such projects, especially at the village level.

7) It is suggested that a similar survey on food consumption pattern and availability be carried out during the food shortage period (August-October), as different findings are likely to be made. Food intake of households should be assessed by 24-h-recall. Further, since intra-household food distribution has an important influence on the nutritional status of young children and this aspect was not covered during the survey, it would be beneficial to plan operational research into this area. Also, the high number of children observed to have kwashiorkor emphasises the need for research into the reasons for the high prevalence in the project area.

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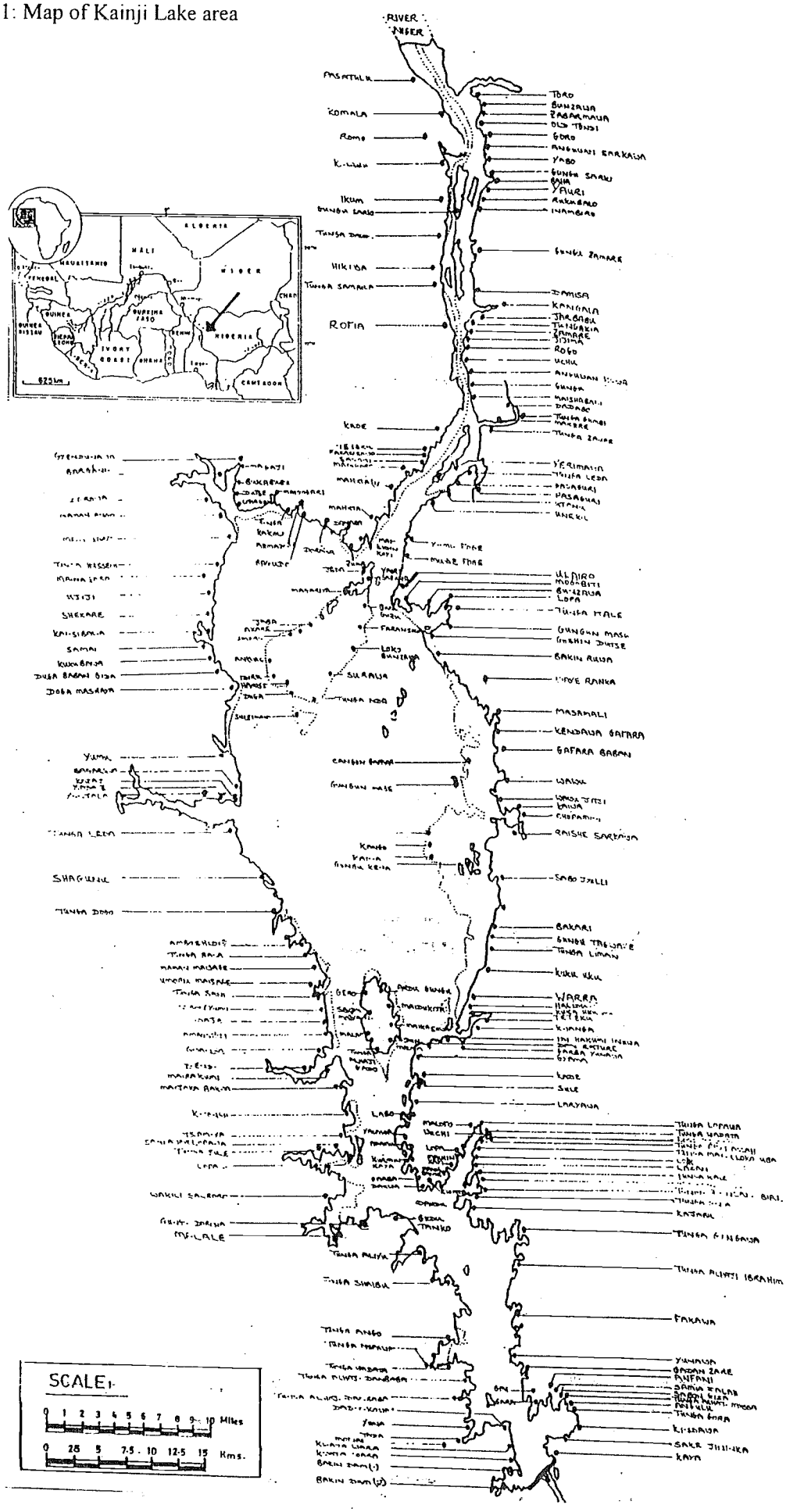
Annex 1: Map of Kainji Lake area



Annex 2: Questionnaires

Adult men questionnaire

Village:_____ Household number: ☐☐☐

Interviewer team: ☐___☐ Interview date:_____
1= Alamu/Hajara/Susanne 2= Rafiu/Hauwa/

Name of head of the household: Time begin interview:_____o'clock
_____ Time ended interview:_____o'clock

1. Are you married? ☐__☐
   1= yes 2=no 3= widowed

2. How many wives do you have? ☐__☐

3. How many children do you have? ☐___☐☐___☐

4. What ethnic group do you belong to? ☐__☐
   Ethnic group: 1= Hausa 2= Lopawa 3= Busawa
   4= Gungawa 5= Nupe 6= others,specify:_____

5. Household listing (permanent members in the last one month)

Relationship to household	Sex 1=Male 2=Female	Age	Education	Main occupation	Other occupation
head of household					

Codes: **Education**
0= none
1= primary, not complete
2= primary complete
3= secondary
4= koranic school
5= adult education

Main occupation
0= none
1= housewife
2= fisherman/woman
3= fisher assistant
4= farmer
5= trader
6= fish processors
7= sell groundnut cakes
77=other

Other occupation
0= none
1= housewife
2= fisherman/woman
3= fisher assistant
4= farmer
5= trader
6= fish processors
7= sell groundnut cakes
77=other

6. Do you own any livestock. 1=yes 2=no ☐☐

7. If yes, what kind and number of livestock do you have and how do you use it?(previous year)

Livestock	Number	Number consumed by family	Number sold	Total cash obtained from sale

Codes:
Livestock: 1= cows 3= sheep 5= chicken
2= goats 4= donkeys 6= ducks 77= others, specify

8. Do you have a farm 1= yes 2= no ☐☐

9. If yes, what is the ownership status of the land ☐☐
1= own land/baught 2= inherited 3= leased land 4= owned and leased land
5= public land 6= given free 7= used with other family members

10. If you work on the farm, what types of crops do you grow,what was the quantity of your last harvest and how much was the total cash obtained?

Crop	Last years harvest (sacks)	Number sold	Total cash obtained

Codes: **Crop:** 1= Rice 2= groundnuts 3= maize
4= sorghum/guineacorn 5= millet 6= cowpeas
7= cassava 8= yam 77= others

11. What is the weekly household cash income? ☐☐
1= 0 - 100 Naira 2= 101 - 500 Naira
3= 501 - 1000 Naira 4= 1001 - 2000 Naira
5= > 2000 Naira 6= none 99= no response

12. State sources of weekly household income and amount from each source

Sources	Amount

Codes : **Sources:**
1= sale of fish
2= sale of farm produce
3= sale of livestock
4= sale of cooked foods
5= sale of handicrafts
6= sale of groundnut cakes
7= sale of kerosene
8= trading
77= others

Amount:
1= 0 - 100 Naira 2= 101 - 500 Naira
3= 501 - 1000 Naira 4= 1001 - 2000 Naira
5= > 2000 Naira 6= none 99= no response

13. If fish is source of income, what is the commonest fish caught now?

1= Citharinus 2=Lates 3=Clupeid 4=Alestes ☐__☐
5= Tilapia 6=Synodontis 7=Labeo 8=Bagros 77=others, specify_____

14. What type of fish fetches most income and what is the season of availability

Type of fish	Season

1= Citharinus 2=Lates 3=Clupeid 4=Alestes
5= Tilapia 6=Synodontis 7=Labeo 8=Bagros 77=others, specify_____

15. Do you have seasonal food shortages? 1= yes 2= no ☐__☐
if yes, when and what type of food?

Time of foodshortage	Type of food

Codes: **Crop:** 1= Rice 2= groundnuts 3= maize
4= sorghum/guineacorn 5= millet 6= cowpeas
7= cassava 8= yam 77= others

16. Do you have seasonal fish shortages? 1= yes 2= no ☐__☐
if yes, when and what type of fish

Time of fishshortage	Type of fish

17. In what months do you have low income?

January	February	March	April	May	June	July	August	September	October	Nov.	Dec.

Code: 1=Yes 2=No

18. What is the amount of the weekly expenditure of your household?
☐_____☐ Naira

19. What is the amount of your weekly expenditure of food for your household?
☐_____☐ Naira

Woman questionnaire

(woman who has cooked for the compound yesterday)

Village:_____ Household number:☐☐☐

Interviewer team: ☐___☐ Interview date:_____
1= Alamu/Hajara/Susanne 2= Rafiu/Hauwa/Falayi

Time begin interview:_____o'clock
Time ended interview:_____o'clock

1. Name of woman:_____ Age: ☐___☐years
   Relation to head of household: ☐__☐
   Codes: 1= 1st wife 2=2nd wife 3=3rd wife 4=single sister 5=mother

2. Marital status ☐__☐
   1=Single 2=Married monogamous
   3=Married polygamous/ one man has more wives 4=Seperated
   5=Widowed

3. How many children have you given birth to? ☐__☐
   How many are still alive ☐__☐

4.. How many persons provide money for the food prepared for the compound? ☐__☐

5. Who provides the money for the food prepared for the household? ☐__☐
   1= husband 2= herself 3= co-wives 4=married children ☐__☐
   5= normally the husband, when it is not enough wives give supplementary ☐__☐

6. Do you like preparing fish for consumption for your household? ☐__☐
   1=yes 2=no 3=sometimes

7. What are your five favored types of fishes you would like preparing for consumption for your household?
   1=_____
   2=_____
   3=_____
   4=_____
   5=_____

8. What are the three favored types of dishes you would like to prepare for consumption for your household?

Dishes	Ingredients
1=	
2=	
3=	

9. State sources of your weekly household income and amount from each source

Sources	Amount

Codes : **Sources:**
1= sale of fish
2= sale of farm produce
3= sale of livestock
4= sale of cooked foods
5= sale of handicrafts
6= sale of groundnut cakes
7= sale of kerosene
8= tradin
77= others

Amount:
1= 0 - 100 Naira
2= 101 - 500 Naira
3= 501 - 1000 Naira
4= 1001 - 2000 Naira
5= > 2000 Naira
6= none
99= no response

10. If you had more money for cooking, what kind of food would you prepare more often for your household?
1=_____
2=_____
3=_____
4=_____

11. Food Frequencies
Which of the following fooods are eaten?

Food	Frequency of Consump-tion
Animal proteins	. . .
Fish	. . .
- Clupeid (Warongi)	
- Alestes (Shemani)	
- Tilapia (Gargaza)	
- Citharinus (Falia)	
- Synodontis (Kurungu)	
- Lates (Giwan ruwa)	
- Bagrus.(Doza)	
- Labeo (Farin Dumi)	
Beef	
Goat	
Sheep	
Chicken	
Egg	
Starches	. . .
Rice	
Millet	
Cassava	
Guineacorn/ Sorghum	
Maize	
Vegetables and fruit	. . .
Spinach	
Occra	
Fruits	

Codes: 0=Never
1=Strongly depent on the season. therefore seldom
2=Monthly once
3=monthly more than once
4=Weekly once
5=Weekly more than once
6=Daily once
7=Daily more than once
8=Celebration/rare times

Food Intake

Please tell me the amount of food you prepared to be eaten by the household members yesterday and what is the source of the food prepared (including the snack)?

Meal	Dish	Ingrediens (food items)	Local measure-ments	Source	Rest (amount)	Number of Membes taken part at the meal	Age (years)
Breakfast							0 - 4
							5 - 15
							> 15
Lunch							0 - 4
							5 - 15
							> 15
Dinner							0 - 4
							5 - 15
							> 15
Snacks							0 - 4
							5 - 15
							> 15

Codes for food source:
1=bought 2=owngrown 3=gift 4= barter

Physical status of the members taking part at the meals:

How many women are pregnant? ☐___☐
How many women breastfeed their child? ☐___☐
How many people are doing hard work? ☐___☐
How many people are sick? ☐___☐

Food avoidances or Taboos

Which foods and drinks may not be consumed by the following categories and why?	**Kinds of food and drink**	**Reason**
Infant during weaning		
Girls		
Boys		
Women during pregnancy		
Women in general		
Men in general		
Sick persons specify illness		
1=malaria		
2=measels		
3=caugh		

Children Questionnaire

Householdnumber:☐☐☐

1. Name of the mother:_____ Age:☐___☐years
   Relationship to head of household: ☐___☐
   Codes: 1= 1st wife 2=2nd wife 3=3rd wife 4=single sister 5=daughter in law

2. Name of the child_____

3. What age is your child? ☐___☐
months

4. Is the child boy or girl? 1=boy 2=girl ☐___☐

5. (If the mother has a child under 5 years) Did your child have more than three ☐___☐
   loose stools in the last 24 hours 1=yes 2=no

6. Has the child suffered from diarrhoea in the last 7 days?☐___☐ 1=yes 2=no

7. How did you treat it ? ☐___☐
   1=herbs 2=ORS 3=buy drugs ☐___☐
   4=give boiled water 5=give not boiled water 6=tea ☐___☐
   7=take to hospital 8=give nothing
   77=other (specify):_____

8. If you treat with ORS, how do you prepare it?_____
   (Ingredients and amount)_____

9. Is your child currently breastfed? ☐___
☐
   1=yes, exclusively 2=yes, and additional food 3=no

10. (If child is not currently breastfed) How long did you breastfeed the child?
    ☐___☐months

11. In case the child receives additional food:at what age did you start giving drinks or
    foods other than breastmilk to the child? ☐___☐months

12. What was the first supplemantary food given to the child? ☐___☐
    1=herbs 2=pap/maize 3=pap/guineacorn 4=pap/millet ☐___☐
    5=infant milk ☐___☐

13. How often did you feed your child yesterday? ☐___☐

14. Which of the food given to the child are prepared/bought specially for the child?☐___☐
    0= nothing 1=porridge 2=boiled fish 3=potatos 4=rice
    5=pap/maize 6=pap/guineacorn 7=pap/millet
    77=others (specifiy):_____

15. What kind of meals did you give your child apart from breast milk yesterday ☐___☐
    0= nothing 1=cow milk 2=adult food 3=tea 4=herbs ☐___☐
    5=pap/maize 6=pap/guineacorn 7=pap/millet 8=rize 9=beans ☐___☐
    77=others (specify):_____

Annex 3: Number of interviews in the sample villages for fishermen, non-fishermen households

Villages	Fishermen	Non Fishermen	Total interviews
Amboshidi		9	9
Anfani	8	21	32
Angulu	7	2	9
Bagaruwa	1		1
Bai Allah	2		2
Bakin Dam	5		5
Dan Bature	1		1
Dan Garje	6		6
Danbaba	8		8
Danladi Biri	8		8
Gungun Kaiwa	10		10
Gyama	3		3
Kango	11		11
Kwanga	18	20	38
Loko Malofo	5	1	6
Lopawa		5	5
Maijaka Bakwai	1	2	3
Miasaje		2	2
Manu Loko Uba	1		1
Raishe Salkawa	15	1	16
Sabon Gari	17		17
Sabon Yuma		9	9
Sani Awaye	8	1	9
Shagunu	11	35	46
Tada	2	1	3
Teteku	1	6	7
Thalidu	3		3
Tugan Giwa	3	3	6
Tugan Gwanda	2		2
Tugan Kada I			
Tugan Kada II			
Tugan Kuka Uku	3		3
Tugan Liman	3		3
Tugan Maje	4	4	8
Tugan Sule	12	8	20
Wara	4	40	44
Wawu and Wawa jaji	25	7	32
Yuna	26	3	29
TOTAL	**247**	**183**	**430**

Annex 4: Markets and market days, Kainji Lake area/Survey time schedule

Wara:	every 4 days
Shagunu:	every Thursday
Malale:	every Friday
Kokali:	every Thursday
Garafani:	every Tuesday
Ngaski:	every Friday

Annex 4.2: Survey time schedule

1 - 5.3 :	Permission/Sample selection
6 -14.3 :	Review of literature,design of questionnaires
15.3. :	Training of enumerators
17.3. :	Questionnaire Pre-Test
18.3. :	Final design of questionnaire
20 - 31 3.:	Field survey
3 - 13.4.	Field survey
19.4-4.5.	Field survey
19.4-27.5	Data entry and cross check
28.5-24.8.:	Analysis and draft report writing
25.8	Seminar with presentation of results

The duration of the interview was on average 20-30 minutes for the interview with the heads of household, and about 40 to 50 minutes for the interview with wives.

Annex 5: Main and supplementary occupations of head of households

	Supplementary occupation					
Main occ.	none	fisher	farmer	traders	others	Total
fisher	3 1,2	0 0,0	235 95.2	7 2,8	2 0,8	247 57,4
farmer	5 3.9	80 62.5	2 1.6	26 20.3	15 11.7	128 29.8
trader	2 9.1	1 4.5	19 86.4			22 5.1
others	1 3.0	2 6.1	27 81.8	2 6.1	1 3.0	33 7.7
Total	11	83	283	35	18	430

Annex 6: Sources of income, fishermen

source of income	n 1	%	amount (Naira)	n	% of FM out of n 1
sale of fish	245	99.2	0 - 100	1	0.4
			101 - 500	17	6.9
			501 - 1000	39	15.9
			1001 - 2000	43	17.6
			> 2000	145	59.2
sale of farm produce	24	9.7	0 - 100	10	41.7
			101 - 500	7	29.2
			501 - 1000	4	16.7
			1001 - 2000	2	8.3
			> 2000	1	4.2
sale of livestock	10	4.1	0 - 100	5	50.0
			101 - 500	3	30.0
			501 - 1000	1	10.0
			1001 - 2000	-	-
			> 2000	1	10.0
sale of handi-crafts	3	1.2	0 - 100	2	66.7
			101 - 500	1	33.3
sale of GN cakes	1	0.4	101 - 500	1	100.0
trading	75	30.4	0 - 100	15	20.0
			101 - 500	32	42.7
			501 - 1000	17	22.7
			1001 - 2000	8	10.7
			> 2000	3	4.0
others	5	2.0	0 - 100	2	40.0
			101 - 500	2	40.0
			> 2000	1	20.0

Annex 7: Sources of income. wives of fishermen

source of income	n 1	%	amount (Naira)	n	% n 1
sale of fish	104	46.2	0 - 100	32	30.8
			101 - 500	48	46.2
			501 - 1000	19	18.3
			1001 - 2000	2	1.9
			> 2000	3	2.9
sale of farm produce	25	11.1	0 - 100	12	48.0
			101 - 500	9	36.0
			501 - 1000	4	16.0
cooked food	63	28.0	0 - 100	38	61.3
			101 - 500	22	35.5
			501 - 1000	2	3.3
sale of groundn.cakes	20	8.9	0 - 100	8	40.0
			101 - 500	10	50.0
			501 - 1000	2	10.0
sale of kerosene	3	1.3	101 - 500	3	100.0
trading	63	28.0	0 - 100	45	71.4
			101 - 500	18	28.6
others	10	4.4	0 - 100	6	60.0
			101 - 500	4	40.0

Annex 8: Sources of income, wives of non-fishermen

source of income	n 1	%	amount (Naira)	n	% n 1
sale of fish	15	8.9	0 - 100	10	66.6
			101 - 500	4	26.7
			501 - 1000	1	6.7
sale of farm produce	32	18.9	0 - 100	8	25.0
			101 - 500	15	46.9
			501 - 1000	7	21.9
			1001 - 2000	2	6.2
sale of cooked food	64	37.9	0 - 100	28	59.3
			101 - 500	24	37.5
			501 - 1000	1	1.6
			> 2000	1	1.6
sale of groundn.cakes	39	23.0	0 - 100	15	38.5
			101 - 500	23	58.9
			501 - 1000	1	2.6
sale of kerosene	3	1.8	0 - 100	2	66.7
			101 - 500	1	33.3
trading	38	22.5	0 - 100	15	39.5
			101 - 500	19	50.0
			501 - 1000	3	7.9
			> 2000	1	2.6
others	13	7.7	0 - 100	9	69.2
			101 - 500	4	30.8