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AGRO-ECONOMIC DATA
BORGOU



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VOLUME 12

AGRO-ECONOMIC DATA

BORGOU

**SOCIO-ECONOMIC PROJECT FOR THE
DEVELOPMENT
OF
ONCHO-FREE AREAS**

**CENTRAL BUREAU FOR PROJECTS
B.P. 2022 - COTONOU
PEOPLE'S REPUBLIC OF BENIN**

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VOLUME 12: AGRO-ECONOMIC DATA

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VOLUME 12

BORGOU

AGRO-ECONOMIC DATA

I. INTRODUCTION

The data presented in this document are the raw results of the agricultural-economic survey conducted between April 1981 and April 1982 in the province of BORGOU in the context of the Socio-economic Study Project for the Development of Areas Free of Onchocerciasis (ATACORA/BORGOU).

The purpose of this survey is to determine the main components of the structures of agricultural family farms. To do that, the following will be identified:

- The make-up of agricultural households,
- The characteristics of the heads of farms,
- The physical features of the farms,
- Agricultural work and labor force utilization,
- Non-agricultural activities,
- Tools and agricultural equipment: farm loans,
- Livestock inventory and animal husbandry management methods,
- Cultivation practices,
- Crop products,
- Main crop surfaces and yields.

The sample on which our survey was conducted was made up on two levels: the villages, and the agricultural households. We selected 60 villages at random in the province and then 12 agricultural households in each village. The essence of our survey base was made up of the results of the 1979 national census. For further details on the methodology employed, please refer to Volume 1.

II. CONCEPTS AND DEFINITIONS

To facilitate the unambiguous interpretation of survey results, we will begin with a presentation of the definitions and the concepts relating to the statistical units employed in this study.

Household

A household is a group of persons generally comprising a man (family head), his wife or wives and his children who work, live, and take their meals together. In the developing countries, such as the People's Republic of Benin, the family may extend to friends or other relatives (brothers, sisters, cousins, etc.). The household may also be reduced to a single person (unmarried person without children and without collateral relatives) or two persons (a couple without children and without collateral relatives).

Agricultural Farm

According to the recommendations of the United Nations Organization for Food and Agriculture (F.A.O.), "a farm is any land used entirely or partly for agricultural production and which is considered an economic unit operated by a single

person or a person accompanied by other persons regardless of the ownership title, the legal system, the size, or the specific location".

Head of Farm

This is a person who takes care of the development of the farm and makes current decisions regarding farm management. For family farms in general, the farm head is often also the head of household.

Persons Active in Agriculture

We considered any person from the age of 15 on up, who exercises an agricultural activity, regardless of whether it is full-time or part-time, to be a person active in agriculture.

Family Manpower

These are members of the household who work on the farm. The family manpower comprises the father (farm head), the wife or wives of the farm head, his children, as well as other relatives or other persons (visitors) who help the farm head during operations on the farm without any compensation, be it in money or in kind.

Wage Labor

This is the manpower that is paid directly in money by the farm head and who furthermore may or may not receive payment in kind, such as meals, etc.

Mutual Aid

This is a form of work organization constituted by an association of young farm workers. The work is done by turns on the fields of each of the association's members. Any members who benefits from this aid must, in turn, put in an equivalent number of working days.

Field

A field is a piece of land belonging to a single owner, included in the same farm and bordered either by a road, a branch channel, or by the field of another farm.

Plot

This is a part of the field with a single crop or combination of crops. In the case of shrub or perennial crops, a plot shall be part of the plantation with trees in the same age bracket.

Concept of Proportional Surface

Difficulties are generally encountered in the evaluation of crop surfaces when it comes to the conversion of surface areas covered by mixed crops into fewer crops. In this document we tried partly to get around the problem by using the so-called "proportional surface" method. This method consists of calculating the percentage in the number of feet of each crop with relation to the total number of feet of mixed crops contained in a crop density square. According to the nature of crops, this square must be sufficiently large to contain at least 30 feet of each kind. We determine the surface pertaining to each crop by means of the distribution of the mixed-crop surface in proportion to each crop.

Ways of Farm Acquisition

The land constituting the entire farm can come from several possible origins. In the context of our study, we selected the following origins:

- Loan
 - Inheritance
 - Purchase
 - Custom-based allocation
 - Metayage (share cropping)
 - Rent
 - Mixed
 - Part-owner.
-
- Loan: when all of the farmland was temporarily ceded to the farmer without any kind of recompense.
 - Inheritance: when all of the farmland was received according to a legacy by any relative.
 - Purchase: when all of the farmland was acquired in return for payment in cash (money) or in kind.
 - Custom-based allocation: when all of the farmland was given either by the village chief or by the farmland head, according to the region's custom.
 - Metayage (sharecropping): when all of the land belongs to another person to whom the farmer must each year turn over a portion of his harvest.
 - Renting: When all of the farmland was temporarily ceded to the farmer without any kind of recompense.

- Mixed: When all of the land is covered by several of the following categories: loan, custom-based allocation, sharecropping, renting.

- Part-owner: When the farmer is the owner of at least a portion of the farm.

III. DATA ANALYSIS

A. General Information on Population of Agricultural Households

1. Farm Population

To keep track of population growth, we made a census of the people in the households surveyed at the beginning and the end of the survey.

As opposed to the results in ATACORA, we can see from Table 1 an increase of 3.0% in the household population at the end of the survey. However, the analysis of the population by category allows us to evidence the following variations:

CATEGORIES (%)	VARIATIONS	VARIATIONS
MEN	-30	-1.7
WOMEN	+50	+2.6
CHILDREN (7 - 14 yrs)	-18	-1.2
CHILDREN (0 - 6 yrs)	+209	+12.3
TOTAL	+211	+3.0

The group of men and children (7 - 14 years) have decreased by 1.7% and 1.2% respectively, meanwhile the categories of women and children (0 - 6 years) have increased by 2.6% and 12.3%.

Leaving aside national factors such as a diminution of the population through mortality, the decrease among the groups of men and children 7 years and over is most likely due to migration. It is furthermore interesting to stress that the decrease of the population affects the active people: men as well as children who can already work.

The increase of the total population is thus due to the increase in the number of housewives most likely through marriage and the number of newborn children.

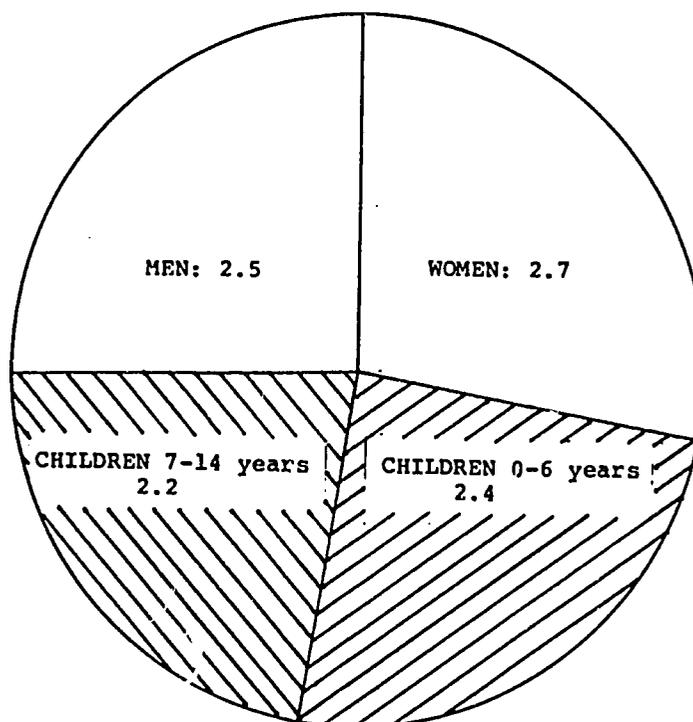
Apart from the districts of KALALE and TCHAOUROU, and the nationalities FON and OTAMMARI, where there is a slight decrease in the population at the end of the survey, the general tendency at the provincial, district and nationality level, is a slight increase of the population. There is no significant difference between districts and between nationalities.

An agricultural household comprises an average of 9.7 persons. It reaches 10 persons at the end of the survey. This average size varies from one district to the next and also according to nationalities. It is 6.7 in the district of SINENDE and it varies up to 15.4 in the district of BEMBEREKE. Looking at the nationalities, the PEULH and BARIBA groups are the strongest population segments, respectively, with 12 and 9.8 persons per household. The OTAMMARI group, has the lowest household size with an average size of 6.6 individuals per household.

2. Makeup of Agricultural Households

The following graph and tables sum up the characteristics relating to the farm population by districts, by nationalities and at the province level.

GRAPHIC ILLUSTRATION OF THE AVERAGE MAKEUP OF FARM HOUSEHOLDS



**MAKEUP OF FARM HOUSEHOLDS
(AVERAGES BY DISTRICT)**

DISTRICTS	MEN		WOMEN		FARM WORKERS		CHILDREN (7-14 yrs)		CHILDREN (0-6 yrs)		MEAN AVERAGE	
	1981	1982	1981	1982	1981	1982	1981	1982	1981	1982	1981	1982
BANIKOARA	2.6	2.7	2.9	3.2	5.5	5.9	2.7	2.7	2.7	3.2	11.0	11.8
BEMBEREKE	3.8	3.7	4.5	4.6	8.3	8.3	3.2	3.1	4.0	4.5	15.4	15.9
GOGOUNOU	2.8	2.8	2.6	2.7	5.4	5.5	2.5	2.4	2.2	2.4	10.1	10.3
KALALE	2.3	2.2	2.3	2.3	4.6	4.5	2.0	1.8	2.2	2.4	8.8	8.6
KANDI	2.4	2.2	2.5	2.6	4.9	4.8	2.7	2.7	2.3	2.6	9.8	10.0
KARIMAMA	1.4	1.4	1.9	1.8	3.3	3.2	1.9	2.0	2.4	2.6	7.5	7.8
MALANVILLE	1.6	1.6	1.9	2.0	3.5	3.6	1.8	1.7	1.8	2.2	7.0	7.5
N'DALI	2.9	2.8	3.2	3.3	6.1	6.1	2.2	2.2	2.5	2.5	10.7	10.7
NIKKI	2.2	2.4	2.5	2.5	4.7	4.9	1.7	1.7	1.9	2.2	8.3	8.8
PARAKOU	2.6	2.6	2.6	2.5	5.2	5.1	1.6	1.6	2.0	2.3	8.8	9.0
PERERE	2.9	2.8	3.2	3.1	6.1	6.0	1.3	1.3	2.5	2.7	9.9	10.0
SEGBANA	1.4	1.4	2.1	2.2	3.5	3.6	1.3	1.3	1.8	2.1	6.7	7.0
SINENDE	3.0	2.8	2.6	2.9	5.6	5.7	2.1	2.1	2.1	2.4	9.9	10.1
TCHAOUROU	1.8	1.6	2.1	2.2	3.9	3.8	2.3	2.1	2.7	2.9	8.9	8.8
PROVINCE												
BORGOU	2.5	2.4	2.7	2.7	5.2	5.1	2.2	2.1	2.4	2.7	9.7	10.0

**MAKEUP OF FARM HOUSEHOLDS
(AVERAGES BY NATIONALITIES)**

NATIONALITIES	MEN		WOMEN		FARM WORKERS		CHILDREN (7-14 yrs)		CHILDREN (0-6 yrs)		MEAN AVERAGE	
	1981	1982	1981	1982	1981	1982	1981	1982	1981	1982	1981	1982
FON	1.0	1.0	2.0	1.7	3.0	2.7	3.0	3.0	2.0	2.0	8.0	7.7
BARIBA	2.6	2.6	2.8	2.8	5.4	5.4	2.1	2.0	2.4	2.7	9.8	10.1
DENDI	1.7	1.7	2.1	2.1	3.8	3.8	2.4	2.5	2.3	2.6	8.5	8.9
PEULH	3.1	3.0	3.2	3.3	6.3	6.3	3.0	2.9	2.6	2.9	12.0	12.1
OTAMMARI	1.9	1.5	1.8	2.0	3.7	3.5	1.8	1.8	0.9	0.9	6.5	6.3
YORUBA	2.2	2.0	1.9	2.0	4.1	4.0	1.7	1.6	1.9	2.3	7.7	7.9
MISC.	2.2	1.6	2.4	2.5	4.6	4.1	2.3	2.2	2.1	2.5	8.6	8.8
PROVINCE BORGOU	2.5	2.4	2.7	2.7	5.2	5.1	2.2	2.1	2.4	2.7	9.7	10.0

Table 1 shows the following distribution of the population by age group:

46.9% of population in households surveyed are under the age of 15. The persons, 15 years of age and older, account for 53.1% of the total population. We note the predominance of women (15 years and over) over men (15 years and over). This difference however is not significant since we record a per-household average of 2.7 women against 2.5 men in the same age group (15 years and over). With the exception of the districts of GOGOUNOU and SINENDE, where there are more men than women, the general tendency is that women are more numerous than men.

3. Active Population

Referring to our definition of active individuals in agriculture, we find that persons (men and women) of 15 years and over represent 53.1% of the population residing in the households surveyed. Here we have an average of 5.2 active individuals per farm household on the provincial level. This average varies from one district to the next and also according to nationalities: it is 3.1 active individuals in the district of KARIMAMA and it varies up to 8.3 in the district of BEMBEREKE. The PEULH and BARIBA groups reveal the strongest averages, with respectively, with 6.3 and 5.4 active individuals per household. We can thus say that the labor supply varies with the family group's makeup. In other words, it is the large-size households that have the highest per-household active individual averages. It must however be noted that the children (boys and girls between 7 and 14) participate or are liable to participate in agricultural activities at one time or another throughout the year and this age group accounts for 22.4% of the population. Pending the availability of more detailed studies on the determination of man equivalent coefficients of the labor force as relating to children in this same age group, we can, tentatively, note that the essential part of the per household labor force potential is made up of 75.5% of the resident population.

4. Other Population Data

a. Population's Water Supply

Generally, the water supply problem exists throughout the province. More than half of the households surveyed (54.7%) declared that they do not have

enough water throughout the year (Table 12). The problem does not come up with the same degree of seriousness from one district to the next. Thus, on the basis of the percentage of households that get enough water or do not get enough water, we divided the districts into two categories:

1. The districts where more than half of the households surveyed get enough water throughout the year are:

SEGBANA	100.0%
KARIMAMA	100.0%
MALANVILLE	97.9%
PERERE	52.8%
KALALE	52.5%

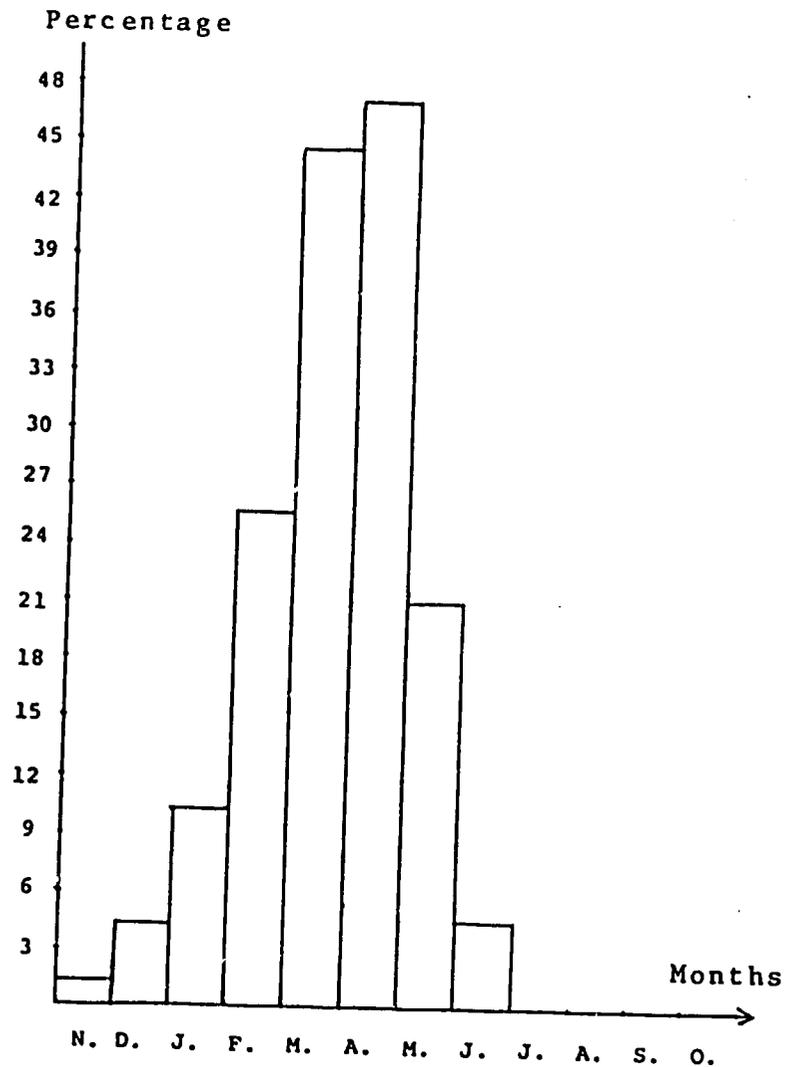
2. The districts where more than half of the households do not get enough water are:

GOGOUNOU	97.9%
SINENDE	77.8%
TCHAOUROU	68.8%
BANIKOARA	66.7%
PARAKOU	64.3%
NIKKI	63.8%
KANDI	59.0%
N'DALI	52.2%
BEMBEREKE	51.1%

The households surveyed suffer from a water shortage, especially during the period between December and May; this period furthermore coincides with the period of the dry season (Table 13). Except for some districts, most of the water supply is of rainfall

origin. The population is very sensitive to the water problem, especially during the months of March and April, as we can see in the following graph.

PERCENTAGE OF HOUSEHOLDS EXPERIENCING WATER SHORTAGE PER MONTHS



b. Distance between Home and Watering Point

Most of the households surveyed are near the watering point. Close to 96% are less than 1 km from the watering point and the average distance to be covered is 0.400 km. There are only a few cases where the distances is more than 1 km (Table 31). We do not note any significant difference between the districts.

c. Distance between Home and Closest Periodic Market

The markets are located in the immediate vicinity of the homes in more than half of the households surveyed (72%). The average distance to be covered is 1.1 km. In the districts of SINENDE and NIKKI, the average distances are greater than the average for the province. In SINENDE, for example, 31% of the households are more than 8 km away from the market (Table 32).

d. Distance between Home and Health Center

Around 67% of the households are located in less than 1 km from the health centers; on the other hand, 27% of those households must cover a distance of between 1 and 4 km. The average distance to be covered is 1.4 km. The situation is somewhat serious in the district of SINENDE where 33% of the households surveyed must cover more than 8 km before gaining access to a health center (Table 34).

e. Distance between Home and District

About 35% of the household are located less than 1 km from the district. However, 50% must cover between 1

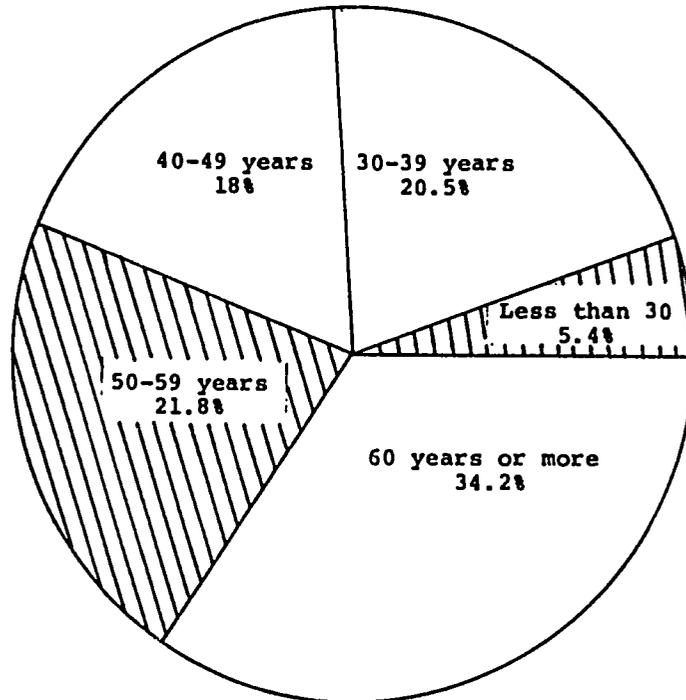
and 5 km to reach the districts. The average distance to be covered is 3.6 km. But some households live very far from the district, and few must cover more than 70 km to reach it.

B. Characteristics of Farm Household Heads

1. Age of Household Heads

The distribution of farm household heads by age groups (Table 6) shows the large share of age groups between 30 and 49 years and 50 years and over, in other words, 38.5% and 56%, respectively. More than half of household heads are over 50 years old and among them 34.2% are over 60. The age group of less than 30 years is relatively small with a share of less than 6%. The mean and mode ages are, respectively, 51.6 years and 60 years.

**RELATIVE IMPORTANCE OF HOUSEHOLD HEADS
BY AGE GROUP**



Among the DENDI group we find the highest proportion of farm heads between the ages of 30 and 49 years (48%). Contrary to what we have observed for ATACORA, it is among the group PEULH that we find the highest percentage in the category 50 years and more (60%) in which 41.5% are more than 60 years old. It is followed by the BARIBA group (56.9%), where 35% belong to the 60 year and over age group. The BARIBA group presents the same characteristics as those observed at the province level: in fact they are the predominant group with 72% of the total population in our sample.

2. School Attendance and Education Level of Farm Household Heads

The majority of farm heads surveyed (93%) did not receive any formal education. As in ATACORA only 7% among them declared that they went to school, including a little less than 3% who attended school between 4 and 6 years. These percentages do not vary in an appreciable fashion and are not significant either from one district to the next, or from one nationality to the next (Table 7).

Concerning literacy, both in French and in national language, we find roughly the same percentage. Thus, 5.9% of the farm household heads know how to read and write in national languages and 6% know how to read and write in French. There are no significant differences either on the district level or on the nationality level (Tables 8 and 9).

3. Origins of Farm Heads

To determine the origin of farm heads, we used the criterion of birthplace when it differed from the district of current residence. As shown in Table 10, the majority of household heads surveyed were born in their district of current residence (82.5%). There is no significant difference between the districts or between the nationalities. However, special mention must be made concerning the districts of MALANVILLE and TCHAOUROU where close to 40% of the farm household heads in each of these districts come from other districts in the province. The two districts thus show the highest percentages of non-natives and can be considered as receiving districts.

The districts of SINENDE, SEGBANA, KANDI and GOGOUNOU show the highest percentages of locally born individuals and certainly constitute areas where immigration is lowest.

Looking at the nationalities, it is the OTAMMARI, DENDI and YORUBA who show the highest degree of mobility. Concerning the FON nationality and the nationalities grouped under the term "OTHERS" (miscellaneous), we cannot deduce anything from the high percentage of non-natives in view of the very small number of observation data. We can assert however that the FON traditionally come from the south. Among the group "OTHERS", 60% are not from BENIN. The following tables give the distribution of household heads according to their origin, by nationalities and by districts.

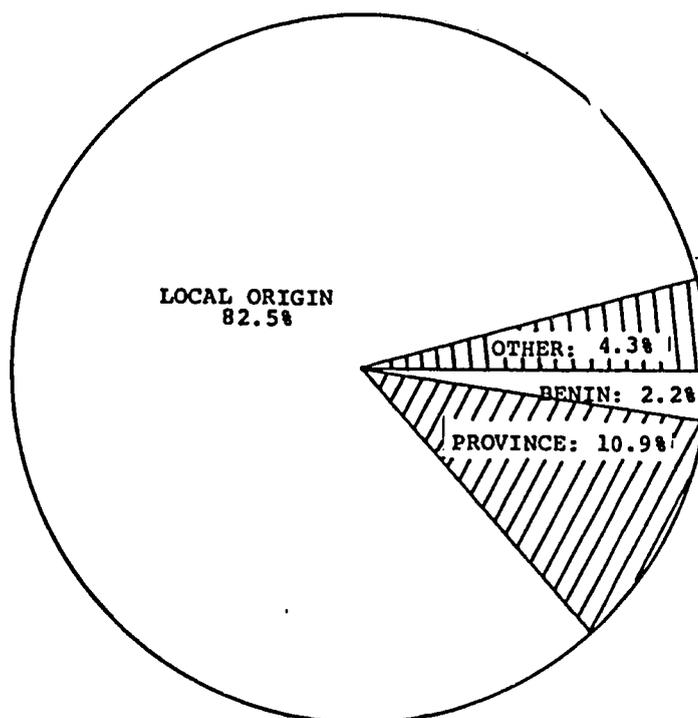
**DISTRIBUTION OF FARM HEADS ACCORDING TO ORIGIN
BY DISTRICT**

DISTRICTS	ORIGINS (%)				TOTAL
	LOCAL	PROVINCE	OTHER REGION OF BENIN	OTHER	
BANIKOARA (n=95)	77.9	20.0	0.0	2.1	100.0
BEMBEREKE (n=48)	77.1	20.8	2.1	0.0	100.0
GOGOUNOU (n=48)	91.7	4.2	0.0	4.2	100.0
KALALE (n=60)	83.3	10.0	0.0	6.7	100.0
KANDI (n=38)	94.0	2.4	0.0	3.6	100.0
KARIMAMA (n=24)	75.0	16.7	4.2	4.2	100.0
MALANVILLE (n=48)	60.4	10.4	2.1	27.1	100.0
N'DALI (n=46)	84.8	8.7	6.5	0.0	100.0
NIKKI (n=48)	89.6	2.1	4.2	4.2	100.0
PARAKOU (n=84)	78.6	19.0	1.2	1.2	100.0
PERERE (n=36)	88.9	11.1	0.0	0.0	100.0
SEGBANA (n=24)	95.8	0.0	4.2	0.0	100.0
SINENDE (n=36)	100.0	0.0	0.0	0.0	100.0
TCHAUROU (n=36)	61.1	13.9	16.7	8.3	100.0
BORGOU	82.5	10.9	2.2	4.3	100.0

**DISTRIBUTION OF FARM HEADS ACCORDING TO ORIGIN
BY NATIONALITY**

NATIONALITIES	ORIGINS (%)				TOTAL
	LOCAL	PROVINCE	OTHER REGION OF BENIN	OTHER	
FON (n=3)	33.3	0.0	66.7	0.0	100.0
BARIBA (n=519)	87.5	11.6	0.8	0.2	100.0
DENDI (n=75)	66.7	12.0	1.4	20.0	100.0
PEULH (n=65)	89.2	6.2	0.0	4.6	100.0
OTAMMARI (n=13)	61.5	7.7	30.8	0.0	100.0
YORUBA (n=23)	69.6	0.0	17.4	13.0	100.0
OTHER (n=16)	20.7	13.3	6.7	60.5	100.0
BORGOU	82.5	10.9	2.2	4.3	100.0

**GRAPHIC REPRESENTATION OF FARM HEADS
ACCORDING TO ORIGIN AT THE PROVINCE LEVEL**



C. Physical Features of Agricultural Farms

Before presenting the survey's results on the physical features of the farm, we think that it is necessary to recall the methodology followed in the particular context of the calculation of surface areas and yields. This will facilitate the effort to combine the results of this survey and those of the surveys conducted earlier in the same zone.

The fields and plots were measured and density squares were laid out according to the methodology used by the Research and Planning Directorate of the Ministry of Rural Development and Cooperative Action.

The farm field inventory was prepared and drawn up in a schematic fashion by means of a sketch which makes it possible to identify these fields with relation to the farm head's residence.

The survey of the fields and the measurement of surface areas involved are a part of the more delicate operations of the survey dealing with the structure of the farms, whose success depends on the farmer's goodwill and on the interviewer's degree of professional ability.

The farmer might not declare all of his fields, either out of distrust or because of the interviewer's poor conduct. It might also happen that the farmer, for reasons of a cultural nature, resists the idea of laying out a yield grid in this field. Due to lack of goodwill, the interviewer might fail to measure the fields that are somewhat further removed from the farmer's domicile. All of these are factors which can affect the validity of the survey results.

To minimize these errors, it is necessary to have a team of conscientious controllers and dynamic supervisors. When we began this survey in March 1981, all arrangements had already been made; the two regional supervisors left the survey to attend a training course in France, unfortunately at the time when the measurement operations began. They were not replaced until 4 months later. During that period of 4 months, the controllers and the interviewers were left to their own devices and supervision was no longer continuous as we wanted it to be. The results regarding the surface areas, which are presented in this document, are not devoid of such errors in the field in spite of the on-the-spot corrections which were made.

Contrary to the Research and Planning Directorate, we converted the mixed crop surface areas into single crop areas according to the proportional surface method which we explained in the paragraph dealing with definitions and concepts.

1. Distribution of Farms According to Their Dimension

Table 15 shows that 23% of the farms have a size smaller than or equal to 1 ha; therefore, 77% of the farms have a size in excess of 1 ha. The average size throughout the province is 2.35 ha.

DISTRIBUTION OF FARM DIMENSIONS, BY DISTRICT (Ha)

DISTRICT	MEAN	MEDIAN	RANGE
BANIKOARA	2.71	1.79	0.14 - 19.07
BEMBEREKE	2.72	1.97	0.48 - 9.06
GOGOUNOU	1.79	1.43	0.10 - 7.85
KALALE	1.91	1.51	0.06 - 12.26
KANDI	3.04	1.77	0.08 - 5.82
KARIMAMA	2.45	2.07	0.49 - 5.82
MALANVILLE	3.73	3.59	0.07 - 7.82
N'DALI	2.59	1.67	0.26 - 12.26
NIKKI	1.56	1.38	0.13 - 4.18
PARAKOU	1.40	1.13	0.29 - 5.69
PERERE	2.13	2.02	0.34 - 5.16
SEGBANA	1.89	1.68	0.52 - 5.71
SINENDE	2.20	1.94	0.28 - 7.80
TCHAOUROU	2.57	2.49	0.46 - 5.67
<hr/>			
BORGOU	2.33	1.72	0.06 - 19.97

The districts of PARAKOU and NIKKI show the lowest average surface area with 1.4 and 1.56 ha respectively. The district of MALANVILLE and KANDI show the highest percentage of farms covering more than 2 ha with 90% and 42.5% respectively. Their average size is much higher than the average at the province level.

DISTRIBUTION OF FARM DIMENSIONS, BY NATIONALITY (Ha)

NATIONALITY	MEAN	MEDIAN	RANGE
BARIBA	2.33	1.69	0.05 - 19.97
DENDI	3.19	2.95	0.35 - 7.82
PEULH	1.88	1.33	0.14 - 12.26
YORUBA	1.32	1.12	0.23 - 2.88
OTHERS	2.01	1.44	0.07 - 5.84

Looking at the nationality breakdown, the YORUBA nationality owns the smallest farms. Contrary to what we have seen in ATACORA, the DENDI and OTAMMARI groups have the highest proportion of farms whose size is in excess of 2 ha (73.3% and 72.7% respectively). Among the BARIBA, who constitutes the dominant nationality, close to 41% of the farms cover more than 2 ha, with an average surface area identical to the average surface area for the province.

2. Distribution of Farm Dimension According to Farm Head's Age

In Table 16, we observe a disproportionate distribution of all of the farm categories among the other age groups.

The 30 - 39 age group has the highest percentage of farms between 3.5 and 4 ha with 40%. The highest percentage of farms in all categories of size is to be found among the age group of 60 and over.

In summary, there does not seem to be a very significant relationship here between the farm head's age and the farm's size. We note that the higher age groups show the largest proportions of large size farms.

3. Farm Size Distribution According to Household Size
(Table 18)

Households comprising between six and ten residents are in the majority in the province. They account for 38.6% of the farms.

Households with one to five persons have the highest percentage of farms with size of .5 to 1 ha (43.2%) and 2 to 2.5 ha (33.0%). Households with 6 to 10 persons have the highest percentage of farms with size of 1 to 2 ha and 2.5 to 10 ha. Households with more than 10 persons have the highest percentage of farms with size of 10 ha or more.

We thus find that the proportion of large-size farms grows with the size of the households. With a few exceptions, these findings are also encountered on the district level and the nationality level.

Households of between one and five persons are the majority in the districts of KALALE and among the OTAMMARI group. Among the PEULH, households with 11 to 15 persons are dominant.

4. Distribution of Farm Size According to Number of Persons Active in Agriculture (Table 19)

Farms with between three and four active individuals predominate (31.5%). They are represented in all size categories and show the highest proportions of farms with sizes between 0.5 and 10 ha. The highest percentages of farms covering 4 ha and more are distributed among farms with more than four active individuals. Here again, the influence of household size and the number of active individuals of the farm reveals that the largest farms are to be found among farms with the largest number of persons active in agriculture.

There is no significant difference on the district and nationality levels. We find that farms with between one and two active individuals predominate in the districts of TCHAOUROU, MALANVILLE and GOGOUNOU. Farms with between 5 and 6 persons are in the majority in the district of PERERE. Among the YORUBA, farms with 1 or 2 persons active in agriculture predominate.

5. Distribution of Farm Size According to Manner of Acquisition (Table 21)

The various origins of farmland observed in the province are as follows: inheritance, custom-based allocation free of charge, loan, sharecropping, and renting. According to Table 21, these origins can be broken down in the following manner:

ALLOCATION	389 farms	or	56.2%
INHERITANCE	188 farms	or	27.2%
PART-OWNER	70 farms	or	10.1%

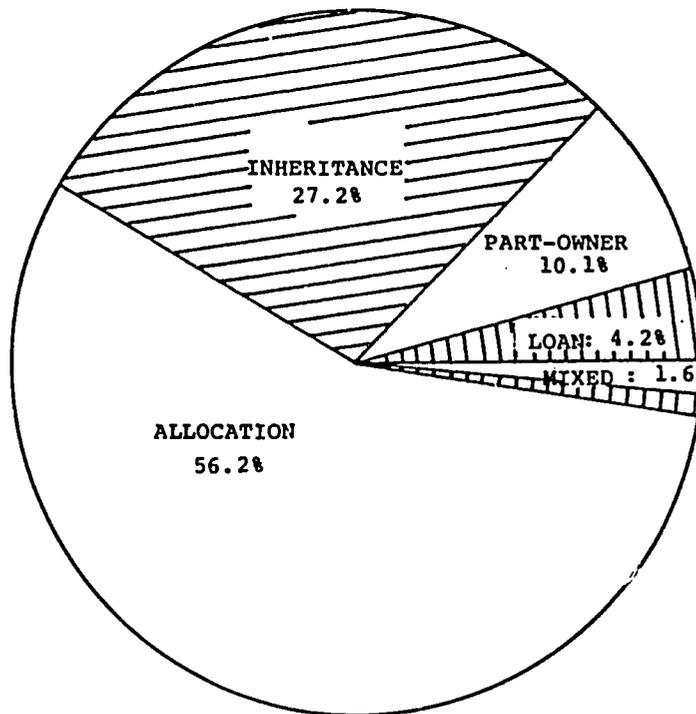
LOAN	29 farms	or	4.2%
MIXED	11 farms	or	1.6%
SHARECROPPING	2 farms	or	0.3%
RENTING	2 farms	or	0.3%
BUYING	1 farm	or	0.1%

There is a very small proportion of temporary entitlements (16.5%). Among permanent rights (83.5%), custom-based allocation is the most frequent manner of acquisition (56.2%), followed by inheritance (27.2%).

Looking to the origin of farms according to their size category, we find that the various methods of acquisition now in existence are roughly represented in all of the size categories. Their percentage breakdown in each category does not seem to be connected to the farm size (Table 22).

With the exception of the districts of PERERE and GOGOUNCÚ where inheritance is the dominant form of acquisition, custom-based allocation is most frequent in the other districts. The graph below shows the relative importance of the mode of the farmland acquisition at a provincial level.

**RELATIVE IMPORTANCE OF THE MODE
OF LAND ACQUISITION**



6. Fields and Plots

a. Distribution of Fields and Plots by Size

The distribution of cultivated fields according to their size (Table 23) shows a concentration of fields in size categories between 0.20 ha and 0.80 ha, and between 1 ha and 2 ha. We note a small proportion of fields with a size of less than 0.2 ha (6.3%). There are no significant differences among the districts or nationalities, as evidenced by the table below.

**DISTRIBUTION OF FIELDS ACCORDING TO SIZE
BY DISTRICT**

DISTRICTS	Ha	0.2	0.4	0.6	0.8	1.0	1.5	2.0	3.0	4.0	5.0 +	TOTAL
	0.2	0.4	0.6	0.8	1.0	1.5	2.0	3.0	4.0	5.0		
BANI KOARA	11	16	10	18	9	26	14	23	11	1	9	148
	7.4	10.8	6.8	12.2	6.1	17.6	9.5	15.5	7.4	0.7	6.1	100.0
BEMBEREKE	0	1	3	2	7	18	16	17	4	2	2	72
	0.0	1.4	4.2	2.8	9.7	25.0	22.2	23.6	5.6	2.8	2.8	100.0
GOGOUNOU	10	17	11	16	9	14	5	3	0	2	2	89
	11.2	19.1	12.4	18.0	10.1	15.7	5.6	3.4	0.0	2.2	2.2	100.0
KALALE	6	15	12	18	16	17	7	7	0	0	3	100
	6.0	15.0	1.20	18.0	16.0	17.0	7.0	7.0	0.0	0.0	3.0	100.0
KANDI	12	10	16	5	8	30	17	1	10	3	7	119
	10.1	8.4	13.4	4.2	6.7	25.2	14.3	0.8	8.4	2.5	5.9	100.0
KARIMAMA	3	7	3	2	3	8	3	3	4	2	1	39
	7.7	17.9	7.7	5.1	7.7	20.5	7.7	7.7	10.3	5.1	2.6	100.0
MALANVILLE	5	10	8	2	1	12	12	11	7	3	11	82
	6.1	12.2	9.8	2.4	1.2	14.6	14.6	13.4	8.5	3.7	13.4	100.0

N'DALI	4	5	10	4	7	17	10	5	8	5	0	75
	5.3	6.7	13.3	5.3	9.3	22.7	13.3	6.7	10.7	6.7	0.0	100.0
NIKKI	13	25	22	21	6	11	7	3	0	0	0	108
	12.0	23.1	20.4	19.4	5.6	10.2	6.5	2.8	0.0	0.0	0.0	100.0
PARAKOU	7	18	24	19	12	23	9	3	2	1	1	119
	5.9	15.1	20.2	16.0	10.1	19.3	7.6	2.5	1.7	0.8	0.8	100.0
PERERE	1	6	5	10	1	16	9	9	2	0	0	59
	1.7	10.2	8.5	16.9	1.7	27.1	15.3	15.3	3.4	0.0	0.0	100.0
SEGBANA	0	0	7	11	2	7	4	3	1	0	1	36
	0.0	0.0	19.4	30.6	5.6	19.4	11.1	8.3	2.8	0.0	2.8	100.0
SINENDE	0	4	1	3	4	7	7	14	3	0	1	44
	0.0	9.1	2.3	6.8	9.1	15.9	15.9	31.8	6.8	0.0	2.3	100.0
TCHAOUROU	0	10	6	7	4	8	3	8	6	4	1	57
	0.0	17.5	10.5	12.3	7.0	14.0	5.3	14.0	10.5	7.0	1.8	100.0
BORGOU	72	144	138	138	89	214	123	110	58	23	39	1147
	6.3	12.6	12.0	12.0	7.8	18.7	10.7	9.6	5.1	2.0	3.4	

DISTRIBUTION OF FIELDS ACCORDING TO SIZE
BY NATIONALITY

Ha NATIONALI- TIES	0.2	0.2	0.4	0.6	0.8	1.0	1.5	2.0	3.0	4.0	5.0	TOTAL
		0.4	0.6	0.8	1.0	1.5	2.0	3.0	4.0	5.0		
BARIBA	54	106	103	109	67	165	91	76	39	16	26	851
	6.3	12.5	12.1	12.8	7.9	19.4	10.7	8.9	4.6	1.9	3.1	100.0

DENDI	11	19	15	7	7	19	12	12	10	5	12	129
	8.5	14.7	11.6	5.4	5.4	14.7	9.3	9.3	7.8	3.9	9.3	100.0
PEULH	2	7	10	14	11	22	13	4	4	0	1	88
	2.3	8.0	11.4	15.9	12.5	25.0	14.8	4.5	4.5	0.0	1.1	100.0
OTAMMARI	0	0	1	2	0	1	8	2	2	0	0	16
	0.0	0.0	0.0	6.3	12.5	0.0	6.3	50.0	12.5	12.5	0.0	100.0
YORUBA	0	8	6	5	2	5	4	3	0	0	0	33
	0.0	24.2	18.2	15.2	6.1	15.2	12.1	9.1	0.0	0.0	0.0	100.0
OTHERS	5	3	2	1	0	2	2	5	2	0	0	22
	22.7	13.6	9.1	4.5	0.0	9.1	9.1	22.7	9.1	0.0	0.0	100.0

DISTRIBUTION OF PLOTS ACCORDING TO SIZE
BY DISTRICT

DISTRICTS	Ha	0.2	0.4	0.6	0.8	1.0	1.5	2.0	3.0	4.0	5.0 +	TOTAL
	0.2	0.4	0.6	0.8	1.0	1.5	2.0	3.0	4.0	5.0		
BANIKOARA	55	78	48	37	19	34	15	10	8	2	6	312
	17.6	29.5	15.4	11.9	6.1	10.9	4.8	3.2	2.6	0.6	1.9	100.0

BEMBEREKE	17	40	43	36	22	24	10	2	1	0	0	195
	8.7	20.5	22.1	18.5	11.3	12.3	5.1	1.0	0.5	0.0	0.0	100.0
GOGOUNOU	39	61	32	23	8	10	2	1	0	0	1	177
	22.0	34.5	18.1	13.0	4.5	5.6	1.1	0.6	0.0	0.0	0.6	100.0
KALALE	19	65	50	30	8	13	1	2	1	1	0	190
	10.0	34.2	26.3	15.8	4.2	6.8	0.5	1.1	0.5	0.5	0.0	100.0
KANDI	39	42	34	23	20	31	13	10	7	1	3	223
	17.5	18.8	15.2	10.3	9.0	13.9	5.8	4.5	3.1	0.4	1.3	100.0
KARIMAMA	7	10	4	3	2	10	4	1	4	3	0	48
	14.6	20.8	8.3	6.3	4.2	20.8	8.3	2.1	8.3	6.3	0.0	100.0
MALANVILLE	6	11	15	7	6	27	22	9	6	4	3	117
	5.1	9.4	12.8	6.0	5.1	23.1	18.8	7.7	5.1	4.3	2.6	100.0
N'DALI	30	42	31	32	19	25	5	3	0	0	0	187
	16.0	22.4	16.6	17.1	10.2	13.4	2.7	2.7	0.0	0.0	0.0	100.0
NIKKI	16	46	39	21	9	6	3	1	0	0	0	141
	11.3	32.6	27.7	14.9	6.4	4.3	2.1	0.7	0.0	0.0	0.0	100.0
PARAKOU	104	83	57	25	8	12	3	1	0	0	0	293
	35.5	28.3	19.4	8.5	2.7	4.1	1.0	0.3	0.0	0.0	0.0	100.0
PERERE	9	8	20	17	7	26	5	1	0	0	0	93
	9.7	8.6	21.5	18.3	7.5	28.0	5.4	1.1	0.0	0.0	0.0	100.0

SEGBANA	0	20	37	18	5	3	0	0	0	0	0	83
	0.0	24.1	44.6	21.7	6.0	3.6	0.0	0.0	0.0	0.0	0.0	100.0
SINENDE	3	20	30	18	19	11	2	5	0	0	0	108
	2.8	18.5	27.8	16.7	17.6	10.2	1.9	3.6	0.0	0.0	0.0	100.0
TCHAUROU	6	47	22	14	10	28	4	3	1	0	0	135
	4.4	34.8	16.3	10.4	7.4	20.7	3.0	2.2	0.7	0.0	0.0	100.0
BORGOU	350	573	462	304	162	260	89	49	28	12	13	2302
	15.2	24.9	20.1	13.2	7.0	11.3	3.9	2.1	1.2	0.6	0.6	100.0

DISTRIBUTION OF PLOTS ACCORDING TO SIZE
BY NATIONALITY

Ha NATIONALI- TIES	0.2	0.2	0.4	0.6	0.8	1.0	1.5	2.0	3.0	4.0	5.0	TOTAL
		0.4	0.6	0.8	1.0	1.5	2.0	3.0	4.0	5.0		
BARIBA	298	464	377	247	129	190	49	34	13	3	10	1814
	16.4	25.6	20.8	13.6	7.1	10.5	2.7	1.9	0.7	0.2	0.6	100.0
DENDI	20	32	27	12	7	35	25	10	8	7	3	186
	10.8	17.2	14.5	6.5	3.8	18.8	13.4	5.4	4.3	3.8	1.6	100.0
PEULH	15	39	37	24	9	17	7	2	4	1	0	155
	9.7	25.2	23.9	15.5	5.8	11.0	4.5	1.3	2.6	0.6	0.0	100.0
OTAMMARI	0	3	1	5	10	7	4	1	1	1	0	33
	0.0	9.1	3.0	15.2	30.3	21.2	12.1	3.0	3.0	3.0	0.0	100.0

YORUBA	8	21	12	11	3	5	1	0	0	0	0	61
	13.1	34.4	19.7	18.0	4.9	8.2	1.6	0.0	0.0	0.0	0.0	100.0
OTHERS	9	6	3	3	3	4	2	2	2	0	0	34
	26.5	17.6	8.8	8.8	8.8	11.8	5.9	5.9	0.0	0.0	0.0	100.0

According to Table 24, there is a concentration of plots in the size category from 0.2 ha to 1.0 ha. The distribution of plots, according to their size, by district and nationality shows that there is no significant difference between the districts and the nationalities.

DISTRIBUTION OF AVERAGE NUMBER OF FIELDS AND PLOTS
BY FARM, BY DISTRICT

DISTRICTS	AVERAGE NUMBER OF FIELDS	AVERAGE NUMBER OF PLOTS	AVERAGE NUMBER OF PLOTS PER FARM
BANIKOARA	1.6	3.3	2.0
BEMBEREKE	1.5	4.0	2.7
GOGOUNOU	1.9	3.8	2.0
KALALE	1.7	3.2	1.9
KANDI	1.7	3.0	1.8
KARIMAMA	1.7	2.0	1.2
MALANVILLE	1.8	2.5	1.4
N'DALI	1.6	4.0	2.5
NIKKI	2.3	3.0	1.3
PARAKOU	1.5	3.6	2.4
PERERE	1.6	2.6	1.6
SEGBANA	1.5	3.5	2.3
SINENDE	1.2	3.0	2.5
TCHAOUROU	1.6	3.8	2.4
PROVINCE BORGOU	1.6	3.3	2.0

DISTRIBUTION OF AVERAGE NUMBER OF FIELDS AND PLOTS
PER FARM ACCORDING TO NATIONALITY

NATIONALITIES	AVERAGE NUMBER OF FIELDS	AVERAGE NUMBER OF PLOTS	AVERAGE NUMBER OF PLOTS PER FARM
BARIBA	1.7	3.4	2
DENDI	1.8	2.7	1.5
PEULH	1.4	2.4	1.7
OTAMMARI	1.0	2.8	2.8
YORUBA	1.4	2.7	1.9
OTHERS	1.6	2.4	1.5
PROVINCE BORGOU	1.6	3.3	2.0

On the average, there are 1.6 fields and 3.3 plots per farms with an average of 2 plots per field. The above tables show that these averages do not vary much from one district to the other and from one nationality to another.

According to Table 27, we find a concentration of high proportions of fields and plots among farms whose size is greater than 1 ha. There is thus a rather significant relationship between farm size and number of fields and the number of plots. We can then conclude that the large-sizes are most heavily broken up.

b. Distribution of Plots According to Crop Type (single crops or mixed crops)

The distribution of plots according to crop type (Table 26) shows a definitely high proportion of plots with single crops: 61.5%.

Contrary to the findings in ATACORA, there is quite a homogeneous distribution of plots with mixed and single crops in every size category. However, 45.3% of plots with single crops fall in the size category of .20 to .60 ha, and 44.2% of plots with mixed crops fall in the same size category. Table 28 shows that the calculation of average surface of single crop plots and mixed crop plots, respectively, gives us 0.73 ha and 0.71 ha. It follows from this table also that 62% of cultivated surface areas contain single crops and that 38% contain mixed crops.

7. Distribution of Distances between Home and Fields

The location of the fields with relation to the farmer's house is important when the time aspect is considered. Several hours of walking or transportation during the manpower shortage can be saved. Table 30 shows the distribution of distances and walking times from the home to the field. We find that close to 74% of the fields on the average are less than 1 km from the residence of the farm heads. The average distance is 1.100 km. Only 4.4% of the fields are more than 5 km away, more than an hour's walk from the farmer's house. The average and modal distances are distributed as follows, by district:

DISTRICT	DISTANCE BETWEEN HOME AND FIELD (km)	
	MEAN	MODE
BANIKOARA	0.7	0.1 0.3
BEMBEREKE	1.3	0.4
GOGOUNOU	0.7	0.5
KALALE	0.8	0.4
KANDI	1.2	0.0
KARIMAMA	0.8	0.1 0.7
MALANVILLE	0.5	0.1 0.2
N'DALI	1.2	0.2
NIKKI	1.7	0.4 0.5
PARAKOU	1.3	0.3
PERERE	1.2	0.2
SEGBANA	0.6	0.1
SINENDE	1.7	0.3
TCHAOUROU	1.2	0.2
PROVINCE BORGOU	1.1	0.2

D. Farm Work and Labor Force Utilization

In the traditional family farm, work is the most essential factor because of its primacy over the other means of production. Moreover, it represents the limiting factor in traditional agriculture since working the soil is based exclusively on human energy. Consequently, the study of work operations is of capital importance to the economy of agricultural production. The broad range of operations to be performed within the context of our survey did not enable us to grasp, in its lesser details, all of the aspects of the problem of utilizing the labor force available on the traditional farms. Hence, it seems highly desirable to contemplate a

complementary survey for an in-depth study of problems relating to the allocation of available manpower to the various crop cultivation activities.

1. Labor Sources

The manpower necessary to accomplish the various agricultural tasks can come from various origins, according to the forms of production organization. We can thus identify, in line with the particular case involved, team labor, mutual aid labor, paid manpower, and family manpower.

a. Team Labor

Two forms of cooperative structures were established as part of the implementation of the agricultural collectivization policy in the People's Republic of Benin: the Revolutionary Groupments with Cooperative Inclination (G.R.V.C.) (Revolutionary Cooperative Group), on the one hand and the Socialist type Experimental Cooperatives (C.A.E.T.S.) (Socialist Experimental Agricultural Co-op), on the other hand.

- The G.R.V.C. is not (properly speaking) a production cooperative but rather a service cooperative whose main purpose is to guarantee:
 - Primary collection of products from its members
 - Supplying materials to members according to production efforts
 - Purchase of collective equipment

- Establishments of crop blocks for the regrouping, in the same site, of the individual plots of each of the members with a view toward making the work of the extension agents more effective.

According to Table 44, only 6% of the farm households surveyed joined a G.R.V.C.. This small proportion of G.R.V.C. membership must be related to the very small number of G.R.V.C. established in the province. According to the annual harvest report (1981 - 1982) of CARDER-ATACORA, there are currently 51 G.R.V.C. with a total number of 1,281 members.

As currently conceived, the G.R.V.C. constitute a transition stage between the individual farm and the collective farm (the C.A.E.T.S.).

- The C.A.E.T.S. constitute real production cooperatives by virtue of the collective character of the means of production, and the production processes.

Initially, all means of production are shared in common but the distribution of the fruits of labor is based on each cooperative member's contribution in terms of material resources and labor supply.

In a second stage, there is total collectivization of all means of production (material resources and labor) but here remuneration is made only as a function of the work done according to the principle "to each according to his work".

As indicated in Table 40, out of the 710 farm households surveyed, there are only 5 households where at least one member belongs to a C.A.E.T.S.. This situation is also due to the slow development of the establishment of C.A.E.T.S. in the province. According to the CARDER farming year report, 10 C.A.E.T.S. with a total of 230 members are in existence at the present time.

b. Mutual Aid Labor

Mutual aid is one of the manpower categories involved in farm work done by individual family farms. The farmers establish work groups in order to assist each other, by turns, in the accomplishment of cultivation operations and sometimes in construction work. This type of work does not require any expenditures in the form of cash; supplying meals remains the only expenditure for any member who receives the work group. Only 5% of the farm households surveyed belong to a mutual aid group. The practice of mutual aid is not widespread in the province of BORGOU (Table 38).

c. Salaried Manpower

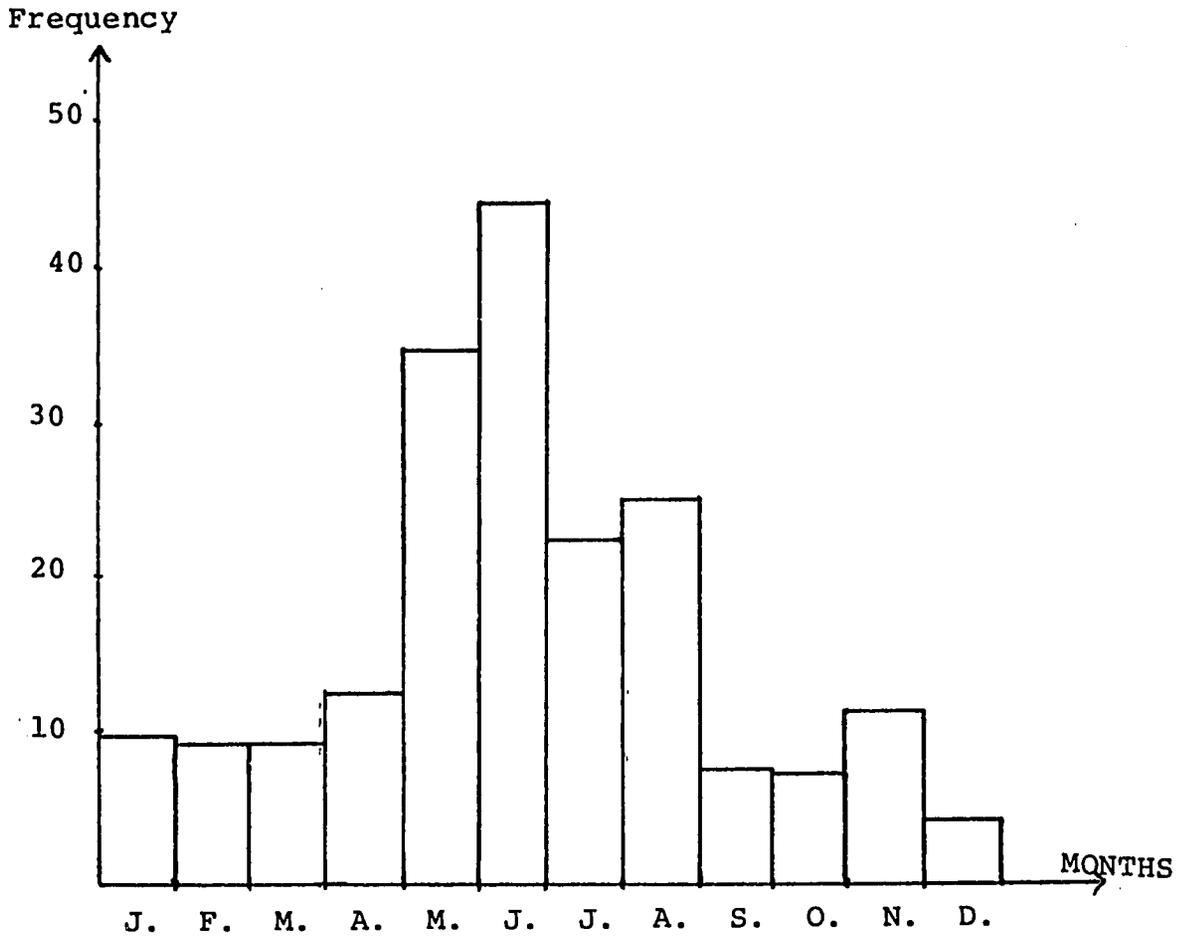
Salaried manpower is seldom used in the province: only 27% (Table 35) of the households surveyed declared that they had used paid labor. The reasons mentioned to explain this situation in ATACORA are also valid for BORGOU: this manpower is not available and is becoming increasingly expensive when compared to the profitability of the crops. The low productivity of farm labor, miscellaneous social and family pressures, and the prospects of finding

sufficient pay elsewhere, lead to major migration movements among the active population, such as the flight from the rural areas to the cities and emigration to neighboring countries.

Among the nationalities, the DENDI group has a tendency to use more paid labor. More than half of the DENDI heads of household (58.1%) declared that they used paid labor during the farming year.

According to Table 37, dealing with the distribution of manpower requirement by months, there seems to be a manpower shortage between May and August. This is the time of full farm employment during which certain work cannot be postponed and must be done. These operations include land reclamation, weeding, fertilizer spreading, plant protection, etc. The peak period comes in the month of May and corresponds to the planting time as shown in the following graph.

**DISTRIBUTION OF MONTHS WITH LABOR PAUCITY
ACCORDING TO FARM HEADS HIRING LABOR**



d. Family Manpower

In traditional agriculture, family manpower constitutes the main source of labor. As we indicated in the preceding chapter, the labor force of family origin consists of 5.2 active individuals (2.7 women and 2.5 men), on the average, per farm. To this we

must add the activities of children of working age (7 - 14 years) who can help the household head on the farm at one time or another throughout the year. We have an average of 2.2 children in this age group, per farm.

It must, however, be emphasized that the consumption unit, represented by the family group does not always correspond to the production unit. In other words, it might happen that certain members of the household do not participate or participate only temporarily in agricultural activities.

2. Labor Force Utilization and Work Time Determination

There are three major manpower categories involved in agricultural work done on individual family farms:

- family manpower
- mutual aid
- salaried manpower.

The work time devoted to each cultivation operation by manpower category was recorded, on a day-by-day basis, with the help of interviews conducted in farm households. To reduce memory lapses an interviewer visited each sample farm once or twice a week throughout the farming year.

Family manpower was subdivided into husband, wife, and child. Paid labor was measured in terms of the work day and the total labor consumption was determined after conversion of working days put in by the women and the children into man-days. To do that we arbitrarily adopted the following coefficients (pending the availability of much more detailed studies on the determination of man-equivalent coefficients).

<u>Type of worker</u>	<u>Age</u>	<u>Coefficient</u>
Men	15 yrs and over	1.00
Women	15 yrs and over	0.75
Children	7 - 14 yrs	0.50
Children	0 - 6 yrs	0.00

However, we attributed one man-equivalent to the woman for all operations having to do with cultivation, maintenance, and harvesting.

a. Labor Force Utilization

Cultivation operations require major manpower contributions; the existence of certain operations that cannot be postponed and the constraint of time lead to labor bottlenecks.

During the current stage of peasant agriculture most of the work is still manual. In most cases very few farmers are using teams of animals for crop cultivation. On the farms observed we recorded an average of 17 work days per farm with animal power and 2.4 work days with tractors throughout the farming year. This represents, respectively, 3.6% and 0.5% of the annual manpower needs of an average farm estimated to an average of 476.8 man-days (Table 50). The labor supply mostly of family origin keeps shrinking as a result of intensive emigration among the active population.

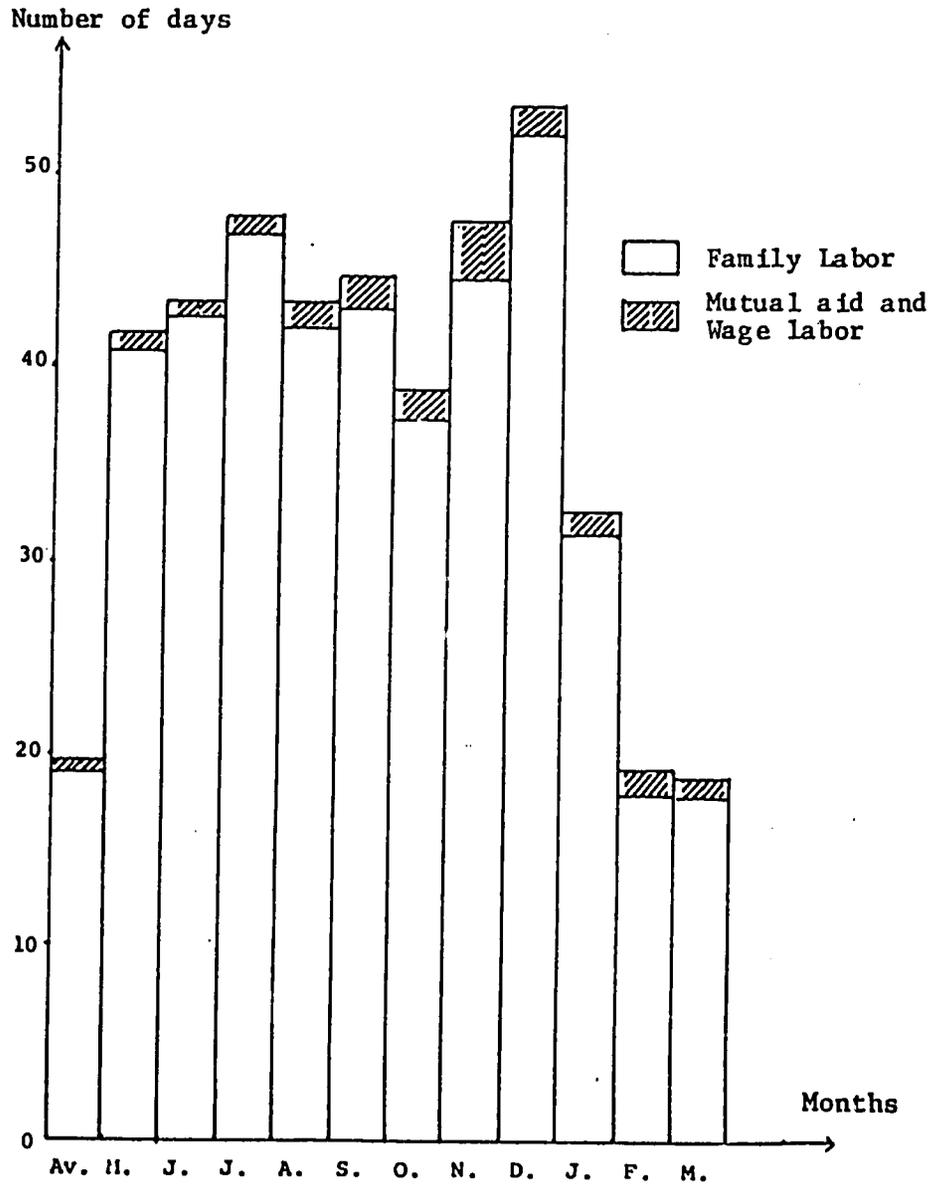
A study of Table 50 shows that more than 93% of the manpower needs are supplied by the family group; 1.5% will come from mutual aid and only 0.5% consists of salaried manpower.

MONTHLY DISTRIBUTION OF NUMBER OF WORK DAYS
BY TYPE OF MANPOWER
(MAN-DAYS PER HOUSEHOLD)

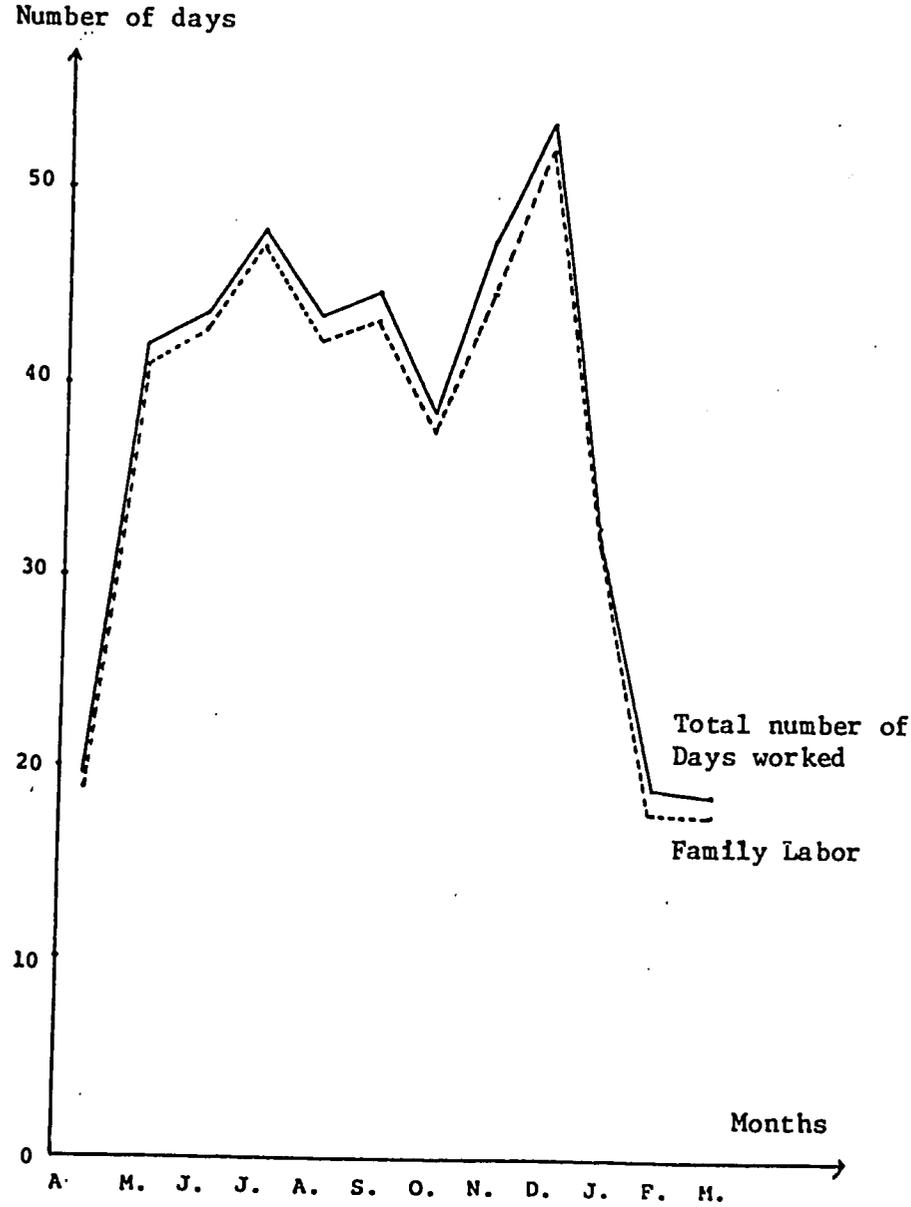
MONTH	TRACTOR	TEAM	FAMILY	MUTUAL AID	SALARIED	TOTAL
JANUARY	1.1	1.3	32.0	0.5	0.2	35.1
	3.1	3.7	91.2	1.4	0.6	100.0%
FEBRUARY	0.0	0.1	19.1	0.4	0.2	19.8
	0.0	0.5	96.5	2.0	1.0	100.0%
MARCH	0.0	0.1	18.3	0.5	0.2	19.1
	0.0	0.5	95.8	2.6	1.1	100.0%
APRIL	0.0	0.2	19.2	0.1	0.5	20.0
	0.0	1.0	96.0	0.5	2.5	100.0%
MAY	0.0	3.3	40.5	0.2	0.7	44.7
	0.0	7.4	90.6	0.5	1.5	100.0%
JUNE	0.0	3.1	43.2	0.4	0.4	47.1
	0.0	6.7	91.7	0.8	0.8	100.0%
JULY	0.0	2.5	47.5	0.3	0.6	50.9
	0.0	4.9	93.3	0.6	1.2	100.0%

AUGUST	1.1	0.7	42.6	0.4	0.7	45.5
	2.4	1.6	93.6	0.8	1.6	100.0%
SEPTEMBER	0.1	3.2	44.3	0.9	0.7	49.2
	0.2	6.5	90.0	1.9	1.4	100.0%
OCTOBER	0.1	2.1	38.4	0.7	0.7	42.0
	0.2	5.0	91.4	1.7	1.7	100.0%
NOVEMBER	0.0	0.2	45.8	1.9	1.3	49.2
	0.0	0.4	93.0	3.9	2.7	100.0%
DECEMBER	0.0	0.1	52.8	1.0	0.3	59.2
	0.0	0.2	97.4	1.8	0.6	100.0%
ANNUAL	2.4	17.0	443.6	7.2	2.3	476.8
	0.5	3.5	93.0	1.5	1.4	100.0%

**MONTHLY DISTRIBUTION OF NUMBER OF WORK DAYS
BY TYPE OF MANPOWER**



GRAPHIC ILLUSTRATION OF NUMBER OF MAN-DAYS
BY TYPE OF MANPOWER



CATEGORIES	NUMBER OF MAN-DAYS	PERCENTAGE
FAMILY MANPOWER	443.6	93.0
ANIMAL TRACTION	17.0	3.6
MUTUAL AID LABOR	7.2	1.5
SALARIED LABOR	6.6	1.4
TRACTOR	2.4	0.5
TOTAL	476.8	100.0

The family manpower reveals the following features regarding participation by household members in agricultural activities.

CATEGORIES	NUMBER OF MAN-DAYS	PERCENTAGE
MEN	315.6	71.1
CHILDREN	83.4	18.8
WOMEN	44.6	10.1
TOTAL	443.6	100.0

We thus find that women supply only 10% of the family manpower; their participation rate is also less than that of the children (7 - 14 years). This percentage however appears low because certain para-agricultural and domestic activities are not taken into account here although they contribute to the survival of the farm and are women's work (processing of products, supply of water, wood, food, child care, etc.).

We find this same trend on the level of the district: there are no significant differences among them. However, in the district of KARIMAMA and PARAKOU, the days worked are slightly different from the average for the province. This is most likely due to errors in collecting the data in these two areas.

Overall, an average farm household spends 476.8 working days per year on the farm, including 443 working days put in by family manpower. Considering that on average there are 2.5 working men per farm household, we can estimate that one working man devotes 125 days per year to agricultural activities. This average is much higher than in ATACORA, where we found only 95 days per year devoted to agricultural activities. Although we must use this figure with discretion, it is nevertheless true that it does represent an indicator for the seasonal under-employment problem on family farms.

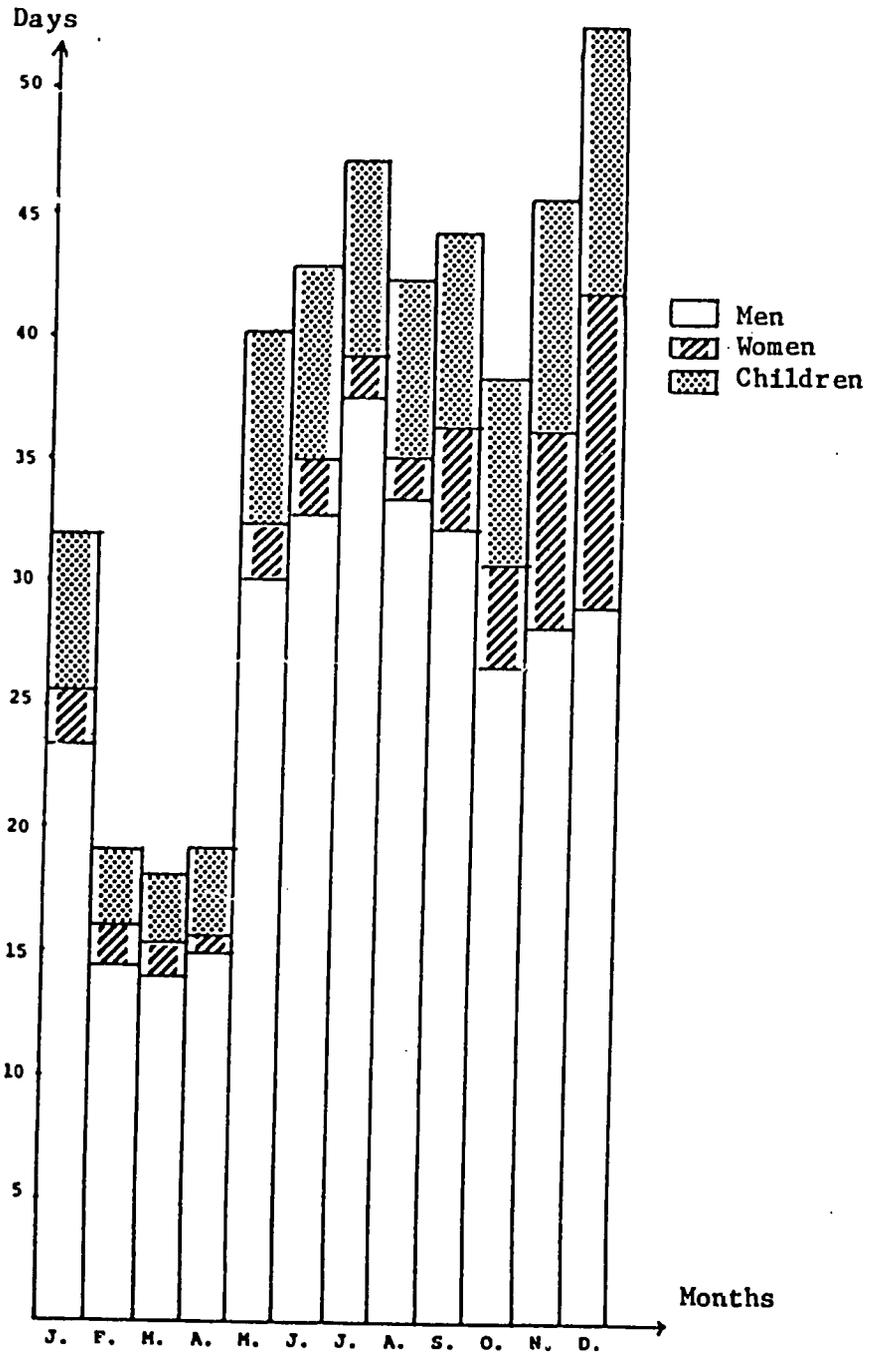
This under-employment is inevitable since there are few non-agricultural employment possibilities in the rural areas.

ANNUAL AVERAGES OF WORK DAYS
PUT IN BY FAMILY MANPOWER
BY CATEGORY AND BY DISTRICT

DISTRICTS TOTAL	MEN	WOMEN	CHILDREN	
	372.3	57.9	59.1	489.3
BANIKOARA	76.1	11.8	12.1	100.0
	322.2	65.9	107.0	495.1
BEMBEREKE	65.1	13.3	21.6	100.0
	296.6	43.5	86.8	426.9
GOGOUNOU	69.5	10.2	20.3	100.0
	326.3	21.4	33.1	380.8
KALALE	85.7	5.6	8.7	100.0
	352.3	66.0	242.1	660.4
KANDI	53.3	10.0	36.7	100.0
	148.0	32.9	39.0	219.9
KARIMAMA	67.3	15.0	17.3	100.0
	176.0	37.5	69.9	283.4
MALANVILLE	62.1	13.2	24.7	100.0

N'DALI	400.8	83.7	108.5	593.0
	67.6	14.1	18.3	100.0
NIKKI	308.7	23.9	41.0	373.6
	82.6	6.4	11.0	100.0
PARAKOU	206.3	17.2	44.6	268.1
	77.0	6.4	16.6	100.0
PERERE	489.9	32.3	83.7	605.9
	80.8	5.4	13.8	100.0
SEGBANA	224.4	52.3	82.1	358.8
	62.5	14.6	22.9	100.0
SINENDE	472.3	46.4	39.3	558.0
	84.6	8.3	7.1	100.0
TCHAOUROU	285.4	46.9	96.3	428.6
	66.6	10.9	22.5	100.0
PROVINCE BORGOU	315.6	44.6	83.4	443.6
	71.1	18.8	10.1	100.0

**MONTHLY DISTRIBUTION OF NUMBER OF WORK DAYS
BY FAMILY MANPOWER, BY CATEGORY**



The following table summarizes the yearly means of work days by family manpower and by districts.

DISTRICTS	YEARLY MEANS			TOTAL
	MEN	WOMEN	CHILDREN	
BANIKOARA	372.3	57.9	59.1	489.3
BEMBEREKE	322.2	65.9	107.0	495.1
GOGOUNOU	296.6	43.5	86.8	426.9
KALALE	326.3	21.4	33.1	380.8
KANDI	352.3	66.0	242.1	660.4
KARIMAMA	148.0	32.9	39.0	219.9
MALANVILLE	176.0	37.5	69.9	283.4
N'DALI	400.8	83.7	108.5	593.0
NIKKI	308.7	23.9	41.0	373.6
PARAKOU	206.3	17.2	44.6	268.1
PERERE	489.9	32.3	83.2	605.4
SEGBANA	224.4	52.3	82.1	358.8
SINENDE	472.3	46.4	39.3	588.0
TCHAUROU	285.4	46.9	96.3	428.6

b. Determination of Work Times

(1) Definition of Periods

Agricultural activities follow the rhythm of seasonal sequences. The crop season lasts about 4 - 6 months.

The graph, prepared on the basis of the distribution of agricultural households according to periods of agricultural work implementation (Table 52), enables us to define the periods within which we find the different

cultivation operations. It is difficult for us precisely to indicate the dates for the start and the end of each period. Data for a single year do not constitute a reliable basis. The definition of the dates that mark the beginning and the end of each period requires a frequential analysis of rainfall over a long period of time. Nevertheless, we did define the periods on the basis of the statements made by the peasants and the observations made in the field.

1st period: preparation of fields and seeding: April to June.

2nd period: maintenance of crops. June to August. Maintenance includes weeding, spreading fertilizer, treatments, earthing up and thinning.

3rd period: harvest: August to December.

4th period: dry season (December to early May). This is the slack season in farm activities. During that period of time however, the following post-harvest operations take place:

- storage
- threshing
- drainage
- winnowing
- repair and construction work

- work to clean fields to be cultivated and clearing work (toward the end of the dry season)
- miscellaneous non-agricultural activities, etc.

It should be noted that, regarding yam and manioc (cassava), field preparation and seeding operations come during the period between October and January; the harvesting starts roughly during the same period of time.

CROP CALENDAR

PRODUCTS	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER	JANUARY	FEBRUARY
B O R G O U												
CORN		Land clearing	Plowing	Planting			Harvesting					
SORGHUM		Land clearing	Plowing	Planting					Harvesting			
MILLET		Land clearing	Plowing	Planting					Harvesting			
RICE		Land clearing	Plowing	Planting				Harvesting				
CASSAVA								Land clearing	Planting	Harvesting		
YAM								Land clearing	Planting	Harvesting		
COTTON		Land clearing	Plowing	Planting				Harvesting				
PEANUTS		Land clearing	Plowing						Harvesting			

	Land clearing		Planting
	Plowing		Harvesting

The seasonal family farm manpower distribution shows critical periods during which we find manpower bottlenecks. In particular we note that the peak extends from May until July and thus coincides with the period of field preparation, cultivation and the start of weeding. On the graph, it appears that another critical period goes from November to December, mainly for yam cultivation, and the harvest of other crops.

(2) Work Time per Cultivation Operation

A working day lasts between 4 and 5.1 hours for seeding and 5.6 to 8 hours for harvest work.

The working day varies according to the period of the season, and according to age and sex, (Tables 48 and 49). The recapitulations of average and modal durations of the working day per season, by sex and by age, can be presented as follows (in terms of hours and tenths of an hour).

PERIOD	MEN		WOMEN		CHILDREN	
	MEAN	MODE	MEAN	MODE	MEAN	MODE
PLANTING	5.1	4.0	4.5	5.0	4.1	2.0
HARVESTING	5.6	8.0	4.9	4.0	4.6	3.0
DRY SEASON	1.9	0.0	0.4	0.0	0.6	0.0

As we can see, the activities are reduced to a minimum on the farm during certain periods of the dry season.

Table 51 give the distribution of work times per hectare, by crop and by operation, for the main crops observed. These average times are as follows, by crop and by operation: (in man-days).

CROPS	SOIL PREPARATION	PLANTING	WEEDING	HARVEST	DECORTICATION	TOTAL
SORGHUM	17.5	14.6	25.6	17.6	-	74.9
MILLET	17.3	9.0	19.6	17.3	-	63.2
RICE	18.9	11.0	21.3	21.5	29.0	101.7
CORN	19.6	13.8	20.2	20.3	-	73.9
PEANUT	20.9	13.6	14.5	23.5	22.8	95.3
COTTON	18.2	11.6	22.0	30.6	-	82.4
YAM	24.7	21.2	23.1	26.1	-	95.1
MANIOC	16.8	20.5	21.0	18.3	-	76.6

Crops such as voandzou and beans do not appear on this table because of insufficient data.

Collecting data on working times is a delicate and very fastidious operation; the figures presented above are not devoid of observation errors. Besides, the data collected during a particular year are specific only for that particular year because they are related to climatic conditions, soil structure, to the type of vegetation, and the physical condition of the workers.

This is why, in an effort to indicate certain guidance figures on manpower utilization on the level of traditional farms, it seems important to conduct supplementary research on the following points:

- In-depth study of cultivation operations.
- Determination of days available and unavailable, month by month.
- Determination of optimum periods for each type of cultivation operation.
- Measurement of work time per cultivation operation and product, then by sex and by age, to indicate the man-equivalent coefficients.

E. Non-Agricultural Activities

During the slack season in agricultural activities and during certain crop cultivation periods, agricultural households also engage in certain para-agricultural activities which contribute to an increase in their money income. These activities may involve small animal husbandry, crafts, commerce, the production of fire wood, hunting, gathering, etc.

The calculation shows that 22.7% of the households surveyed engaged in non-agricultural activities during the farming year. We record the following proportions, by nationality:

BARIBA	24.8%
PEULH	23.1%
YORUBA	13.0%
DENDI	9.3%

As opposed to what was observed for ATACORA, few are engaged in non-agricultural activities: less than one fourth, against more than half for ATACORA. The same observation holds true at the district level. There is no significant difference among the districts.

Table 53 shows the distribution of agricultural households that engaged in non-agricultural activities according to the number of man-days devoted to these activities. We find that the mean and modal durations are, respectively, 29.5 and 2 man-days per household. The distribution of average and modal times of non-agricultural activities broken down by nationality is as follows:

NATIONALITIES	MEAN	MODE
BARIBA	33.6	2.0
DENDI	21.6	3.0
PEULH	3.5	3.0
YORUBA	61.0	-

Concerning the YORUBA group, data are based on only three observations.

Tables 54 and 55 show the distribution of agricultural households according to the number of man-days devoted to

non-agricultural activities and according to the size of the farm, and the size of the household. The study of these tables show that there is a significant relationship between the number of man-days and the size of farm ($r = .23$), than between the number of man-days and the size of the household ($r = .15$). We see most households devoted to non-agricultural activities in farms of size between 1 to 2.5 ha, as shown in the following table.

SIZE OF THE FARM (hectares)		PROPORTION OF HOUSEHOLD (%)
less than	0.5	5.1
0.5	- 1.0	16.6
1.0	- 1.5	22.9
1.5	- 2.0	12.1
2.0	- 2.5	12.7
2.5	- 3.0	5.7
3.0	- 3.5	4.5
3.5	- 4.0	2.5
4.0	- 5.0	7.0
5.0	- 10.0	9.2
10	and over	1.3
TOTAL		100.0

However, we see the inverse relationship between the size of the farm and the proportion of households engaged in non-agricultural activities, from the size category 1 - 1.5 ha into the size category 3.5 - 4.0 ha.

SIZE OF HOUSEHOLD			PROPORTION OF HOUSEHOLD (%)
1	-	5	30.7
6	-	10	33.1
11	-	15	25.2
16	-	20	7.4
20	and	over	3.6
TOTAL			100.0

We also observe the relation that exists between the size of the households and the proportion of the households who work outside; the larger the household, the less they work outside.

Table 56 shows the distribution of agricultural households according to non-agricultural income. A study of this table shows that the highest proportions of households engaged in non-agricultural activities can be found in the income brackets below 10,000 (37.3%) and 10,000 - 40,000 (25.5%). The mean and modal incomes for the whole of the households are 55,596 F and 24,500 F per annum.

The mean and median incomes generated by non-agricultural activities appears in the following table, broken down by nationality (in terms of F. C.F.A. - Francs of the African Financial Community).

NATIONALITIES	MEAN (F.C.F.A.)	MEDIAN
BARIBA	54,372	25,000
PEULH	19,250	3,000

F. Farm Tools and Equipment - Loans

1. Farm Tools and Equipment

The material resources which the peasant devotes to this production are rather rudimentary equipment consisting of small agricultural implements (hoes, machetes, axes, sickles, etc.).

Animal traction is still little developed and the proportion of farmers engaged in animal-team crop cultivation is almost insignificant.

a. Small Material Implements

The Hoe

The hoe is used on all farms. There is an average of 4.4 hoes per farm (Table 57). The largest number of hoes per farm is found in the district of BEMBEREKE and GOGOUNOU with 6.83 and 6.60 hoes, respectively. The breakdown according to farm size shows that almost 60% of the hoes are to be found on farms in the size category of .5 ha to 2.5 ha (Table 58).

The Machete

On the average there are 2.17 machetes per farm (Table 57). The largest proportion of machetes is found in the district of GOGOUNOU with 3.21 machetes per farm. 56.3% of the machetes are found on the farm of size between 0.5 ha and 2.5 ha (Table 58).

The Sickle

The sickle is also used in the farms of BORGOU; there is an average of 1.79 sickle per farm.

The Ax

This is a tool which is important on the farms but which we did not record because it was not specified in our questionnaire. The survey results under Project UNDP/FAO/BEN/73/020 of 1977 counted 2.7 per farm.

b. Storage and Drying Facilities

The survey also looked into storage and drying equipment. We note here that every farm does not have a granary, since we counted on average .88 granary per farm. It is only in the districts of BANIKOARA, KALALE, KARIMAMA, MALANVILLE, SINENDE and TCHAOUROU that we find one granary per farm (Table 57). There are only a few peasants who have silos and permanent drying areas.

c. Draft-team Crop Cultivation Equipment

The practice of draft-team crop cultivation has not yet been developed in the manner necessary in the province. It is in the north of the province that we find the larger proportion of farms with plows. In the south of BORGOU, few farms use draft-team equipment. On the average, we find one draft-ox per farm in the district of BANIKOARA, BEMBEREKE, KANDI and KARIMAMA (Table 57). The distribution of

draft-animals according to the size of farm shows that a higher proportion of draft-oxen are found in the size category 1.5 ha to 2.5 ha (24.8%) and 3.5 to 10 ha (34.9%). In the same manner, the highest proportion of plows is found in the farm size category of 4 - 10 ha, with 39.6%.

2. Loan

Table 62 shows the percentage of farm households that applied for loans during the period covered by the survey; it thus appears that only 21 households, or 2.9% households surveyed, used loans for production purposes.

The very small number of field data undoubtedly does not enable us to come up with a relation between the use of loans and:

- a) the farm's size (Table 63 B)
- b) the farm head's age (Table 63)
- c) the farm head's education level (Table 64).

Table 65 shows the distribution of households that did not use loans, broken down by categories of reasons. Among the reasons given, the most important ones are as follows:

- no need for loan	41.4%
- does not know how to get it	27.9%
- too much trouble	20.3%

It thus appears that 41.4% of the households who did not apply for a loan did not have any need for it; 27.9% did not know how to obtain loans; and 20.3% were discouraged by the conditions connected with the grant of a loan.

We encounter these same conditions on the level of the districts and the nationalities except for the DENDI: 51.4% do not know how to get credit.

These various findings partly derive from the situation prevailing on the level of institutional loan structures. At the start of each farming year, the CARDER grants the peasant a farm year loan in the form of production factors (seeds, fertilizers, draft-team crop cultivation equipment, etc.). However, the difficulties encountered of cash repayment of these means of production apparently led the CARDER to restrict the granting of loans to individual farmers so as to give priority only to cooperative structures (farming year report, CARDER - ATACORA, 1981-1982).

Furthermore, the Regional Mutual Agricultural Loan Fund (C.R.C.A.M.) also makes grants only to cooperative structures.

It thus appears clearly that the individual farmer's possibilities of getting a loan are poor if not entirely non-existent.

The restrictions connected with getting loans will impose severe limitations on technology transfer in a rural environment. The adoption of technical innovations (selected seeds, fertilizer, draft-team crop cultivation, etc.) constitutes financial commitments for the person who often does not want to take the risk of going into debt in this way. We think that the facilities provided in the procurement of these means of production should in part contribute to guaranteeing the upswing of technical innovation on the family farm level.

In summary, within the context of in-kind loan grants, special attention must be given both to the individual farmer and to cooperative structures because of the slow current development of the latter and because of the preponderance of individual farms.

G. Livestock and Animal Husbandry Management Method

1. Livestock

Livestock on the province level is mainly of the following species:

- beef cattle
- goats
- sheep
- hogs
- poultry

Donkeys and horses are rather rare.

a. Beef cattle

According to Table 96, we find that 27.5% of the households surveyed have beef cattle with an average of 12.7 head for each of these farms and 3.5 for all of the households surveyed taken together. This figure seems to be low, considering that in BORGOU, herd raising is relative widespread. However, these findings are close to the results of the SONAGRI survey (1978-79), with 13 head per farm.

We detect that highest proportions of farmers owning beef cattle are in the district of KALALE and KARIMAMA. Among the nationalities, the PEULH group reveals the highest percentage of households owning beef cattle (56.9%, Table 97) with an average of 39.4 head per owning household.

b. Goats

Among agricultural households surveyed, 31.4% own goats with an average of 4.9 goats per household, as against 1.5 goats for all the households surveyed. The highest percentages of households having goats are found in the district of BANIKOARA, KANDI, KARIMAMA and TCHAOUROU. The DENDI nationality shows the highest percentage of farmers owning these animals.

c. Sheep

We find that 36% of the household surveyed own sheep with an average of 5 animals per household as against 1.8 for all of the farms surveyed. The highest percentages of households owning these animals again are found in the districts of BANIKOARA and MALANVILLE. The PEULH and OTAMMARI groups show the highest percentage of households for this species.

d. Hogs

We find hogs among 2.4% of the agricultural households surveyed. Their average distribution comes to 7.4 animals for these households and 0.2 for all of the households surveyed. The frequency

distribution of hogs is very small at the district and nationality level: this is most likely due to the fact that the majority of the population in these areas is Muslim.

e. Poultry

At first sight one might think that all agricultural households have poultry; but this is not at all the case since only 45% of the households surveyed have poultry. Their average distribution shows 9.1 animals per household and 4.0 for all of the households surveyed. The districts where these animals are mostly found are KANDI, MALANVILLE and N'DALI.

The proportions of households owning animals by species are summarized in the tables below, by district and by nationality.

For greater detail, the reader may refer to Tables 96 and 97. The following data are indicated at the bottom of each of these tables:

- (1) in the 1st row, the averages, by species, relative to the total number of households surveyed.
- (2) on the 2nd row, the averages, by species, relative to households owning such animals.

PROPORTIONS OF FARMS OWNING ANIMALS
BY SPECIES, BY DISTRICT (%)

DISTRICTS	BEEF CATTLE	GOATS	SHEEP	HOGS	POULTRY
BANIKOARA	37.5	49.0	48.3	2.1	49.0
BEMBEREKE	35.4	22.9	18.7	0.0	45.8
GOGOUNOU	31.2	37.5	43.7	4.2	39.6
KALALE	47.4	22.8	19.3	0.0	31.6
KANDI	32.1	46.9	44.4	1.2	55.6
KARIMAMA	45.8	45.8	37.5	0.0	37.5
MALANVILLE	29.2	41.7	52.1	0.0	60.4
N'DALI	31.4	11.4	31.4	17.1	51.4
NIKKI	14.9	6.4	27.7	4.3	34.0
PARAKOU	12.0	16.9	20.5	0.0	40.2
PERERE	2.8	11.1	19.4	2.8	27.8
SEGBANA	25.0	20.8	29.2	0.0	33.3
SINENDE	22.2	41.7	41.7	2.8	33.3
TCHAOUROU	8.6	45.7	40.0	5.7	31.4
PROVINCE BORGOU	27.5	31.4	36.0	2.4	45.0

PROPORTIONS OF AGRICULTURAL HOUSEHOLDS OWNING ANIMALS
BY SPECIES ACCORDING TO NATIONALITY (%)

NATIONALITIES	BEEF CATTLE	GOATS	SHEEP	HOGS	POULTRY
BARIBA	24.0	29.2	31.5	2.6	42.7
DENDI	31.1	43.2	52.7	0.0	58.1
PEULH	56.9	33.8	49.2	3.1	50.8
OTAMMARI	23.1	38.5	53.8	7.1	46.2
YORUBA	4.5	27.3	27.3	4.5	40.9

f. Distribution of Animals by Species According to Farm Size

A study of Table 98 shows that the farm size does not seem to influence the size of the livestock herd and more particularly beef cattle. This finding undoubtedly reflects the problem of integrating agriculture and animal husbandry into the traditional production system. Herd management is rarely mixed with farm management.

2. Animal Husbandry Management

Animal husbandry is a secondary activity for the farmers. The methods of managing animal herds differ according to the type of animal husbandry involved.

Goats and sheep are easy to maintain because they can find their fodder for themselves in nature; they also get food waste from the agricultural household as well as harvest gleanings. The only constraints on keeping small animals continue to be the obligation to keep the animals in an enclosure or to tie them up during the crop cultivation period so as to prevent any impairment of crops. During that period of time, the peasant thus is obligated to provide for their feeding. This is sometimes an annoyance for the peasant who is already heavily burdened by agricultural work. In view of these difficulties, some farmers get rid of a portion of their livestock by moving the animals into commercial channels.

While small animal management seems to be associated with farm management, the same is not true of large animals. In most cases, agricultural households entrust the

keeping of beef cattle to PEULH stockmen in return for a certain remuneration. Depending upon the case involved, this remuneration can take several forms:

- supply of milk,
- sum of money, varying according to the size of the herd,
- gift of animals upon calving,
- percentage of sales price at time of commercial sale.

Here again, the fodder consists almost exclusively of natural pasturage. Only 13% of the households surveyed are purchasing fodder for animal husbandry purposes (Table 76). As in ATACORA, the PEULH group displays the greatest inclination toward animal fodder purchase; 40% of the PEULH households surveyed declared that they purchased fodder for their herds. Among the districts, the highest percentage of households purchasing fodder for the animals is found in the district of GOGOUNOU and KARIMAMA.

Animal health is of more concern in BORGOU than in ATACORA. Table 77 shows that 28.5% of the households surveyed purchase veterinary products. Once again, the PEULH group shows the highest percentage of households purchasing veterinary products (52.5%). The following districts have the highest percentage among households buying veterinary products:

- SEGBANA	60.0%
- BEMBEREKE	48.9%
- N'DALI	42.6%
- MALANVILLE	41.7%
- GOGOUNOU	41.3%

Animal husbandry is presented with greater details in Volume 11.

H. Cultivation Practices Employed by Farmers

1. Fertilizer Use

About 30% of the household surveyed declared that they used fertilizer during the farming year covered by the survey. It is among the BARIBA and DENDI groups that we find more households using fertilizers with 34.6% and 32% respectively. Apart from the districts of PARAKOU, PERERE and NIKKI where few households use fertilizers, about 30% of the household in other districts use chemical fertilizers (Table 66).

We find quite generally that there is no significant relationship between the practice of manuring and the size of the farm (Table 67), and the age of the farm head (Table 68). This practice does not seem to be related to the farmer's education level (Table 69).

Table 70 shows the distribution of farmers who did not use fertilizer according to categories of reasons. Among all of the reasons given, we can classify the most essential ones in order of importance:

- Lack of need	43.2%
- Lack of money	24.5%
- Did not know how to obtain	15.4%
- Product not available	10.3%

From the statements above, we can conclude that:

- a) 43.2% of the farmers who do not use fertilizers do not see the need for it since the practice of burning an area where land is not yet a limiting factor enables them to farm without chemical fertilizer.
- b) the ignorance of the distribution network and the paucity of the product are other obstacles to the development of the use of chemical fertilizers.
- c) the use of chemical fertilizers constitutes a financial investment for the farmer who has only limited financial resources.

The dominant reasons for not using chemical fertilizers vary from district to district and from one nationality to the other. We have classified the districts according to the percentage of the main reasons for not using chemical fertilizers. It gives the following:

<u>Lack of need</u>		<u>Lack of money</u>		<u>Not available</u>	
KALALE	85.7%	KARIMAMA	50.0%	GOGOUNOU	53.6%
BANIKOARA	71.2%	MALANVILLE	47.2%	SINENDE	49.9%
KANDI	64.6%	TCHAOUROU	41.7%		

For the district of SEGBANA, 70.6% of the households claimed that they did not know how to obtain chemical fertilizer. Lack of need is the dominant reason for BARIBA (44.6%) not to use them, but for DENDI, it is the lack of money (43.1%).

2. Attitude Toward Yields

As opposed to the findings for ATACORA, 74% of the farmers surveyed expect a good yield from their farms during the farming year investigated (Table 71). In the districts as well as for the nationalities, more than half of the peasants do expect good yields.

An examination of Tables 72, 73, and 74 shows that there is no significant relationship between the achievement of good yields and:

- The farm's size,
- The number of active individuals,
- The farm head's age.

The districts and nationalities do not present any particular difference.

Several causes have been cited in an effort to explain the poor yields expected. The most essential one is the drought (17.3%) (Table 75). The drought is also the main cause for bad yields at the district level.

3. Seed Varieties and Their Supply Sources

a. Cotton Varieties

Table 79 shows that 78.7% of the farms that grew cotton used the selected variety while 21.3% used the local variety.

It must be emphasized that the selected variety of cotton is distributed at the start of each farming year to farmers growing cotton. The 21.3% of the farmers who use the local variety indicated in this table is probably a recording error, unless they did not know that the CARDER distributed them "selected variety".

b. Corn Varieties

Table 80 shows that 84.7% of the farmers who grew corn used the local variety and 15.3% used the selected variety.

The proportion of peasants by source of supply are as follows:

Selected Varieties

CARDER	23 farmers or	29.1%
On the farm	47 farmers or	59.5%
Neighbor's farm	6 farmers or	7.6%
Market	3 farmers or	3.8%
Miscellaneous	<u>0 farmer or</u>	<u>0.0%</u>
TOTAL	79 farmers or	100.0%

Local varieties

On the farm	415 farmers or	95.0%
Neighbor's farm	9 farmers or	2.1%
Market	11 farmers or	2.5%
Miscellaneous	<u>2 farmers or</u>	<u>0.4%</u>
TOTAL	437 farmers or	100.0%

c. Peanut Varieties

According to Table 81, 24.8% of the peasant planted the selected variety and 75.2% planted the local variety.

The proportions of farmers who grew peanuts are distributed as follows according to supply sources:

CARDER	22 farmers or	64.7%
On the farm	8 farmers or	23.5%
Market	4 farmers or	11.8%
Neighbor's farm	0 farmer or	0.0%
Miscellaneous	<u>0 farmer or</u>	<u>0.0%</u>
TOTAL	34 farmers or	100.0%

Local varieties

On the farm	80 farmers or	77.7%
Market	19 farmers or	18.4%
Neighbor's farm	2 farmers or	1.9%
Miscellaneous	<u>2 farmers or</u>	<u>1.9%</u>
TOTAL	103 farmers or	100.0%

d. Sorghum Varieties

In examining Table 82, we find that 91.8% of the farmers who grew sorghum used the local variety and 8.2% used a variety other than the local variety.

Here are the proportions of farmers by supply sources:

Local Varieties

On the farm	474 farmers or	93.9%
Market	23 farmers or	4.6%
Neighbor's farm	7 farmers or	1.4%
CARDER	<u>1 farmer or</u>	<u>0.2%</u>
TOTAL	505 farmers or	100.0%

Variety Other than Local

On the farm	40 farmers or	88.9%
CARDER	2 farmer or	4.4%
Neighbor's farm	2 farmers or	4.4%
Market	<u>1 farmer or</u>	<u>4.4%</u>
TOTAL	45 farmers or	100.0%

e. Rice Varieties

Table 83 shows that 80% of the farmers who planted rice used the local variety and 20% used the selected variety.

Here is the distribution of farmers as a function of supply sources:

Selected Varieties

CARDER	8 farmers or	57.1%
Market	3 farmers or	21.4%
Neighbor's farm	2 farmers or	14.3%
On the farm	<u>1 farmer or</u>	<u>7.2%</u>
TOTAL	14 farmers or	100.0%

Local varieties

On the farm	47 farmers or	83.9%
Market	7 farmers or	12.5%
Neighbor's farm	<u>2 farmers or</u>	<u>3.6%</u>
TOTAL	56 farmers or	100.0%

f. "Miscellaneous" Varieties

Table 84 shows 91.6% of the peasants grew local varieties of seeds grouped under the term "miscellaneous", whereas 8.4% used selected varieties.

The supply sources are distributed as follows:

Local Varieties

On the farm	335 farmers or	95.4%
Neighbor's farm	3 farmers or	0.9%
Market	4 farmers or	1.1%
Miscellaneous	8 farmers or	2.3%
CARDER	<u>1 farmer or</u>	<u>0.3%</u>
TOTAL	351 farmers or	100.0%

Selected Varieties

On the farm	29 farmers or	90.6%
CARDER	2 farmers or	6.3%
Market	<u>1 farmer or</u>	<u>3.1%</u>
TOTAL	32 farmers or	100.0%

In general the majority of the peasants get their seeds from their own harvest. Besides, the use of local varieties is still a dominant practice.

4. Years of Cultivation and Fallow Duration

Under the traditional system, the field is left fallow after 3 or 4 years of cultivation. Fallow period lasts 4 to 6 years.

The average duration of cultivation is longer in the districts of KANDI, KARIMAMA AND BANIKOARA: it is more than 5 years. The longest duration of fallow is found in the districts of PERERE (8.4 years), SEGBANA (7.8 years) and KARIMAMA (7 years). Among the nationalities, it is the YORUBA group which practices the longest period of fallowness with 8.7 years of fallow.

The recapitulative tables below show the distribution of mean and modal durations of fallow, by district and by nationality.

DISTRIBUTION OF MEAN AND MODAL DURATIONS
OF FIELDS RECLAMATION
AND MEAN AND MODAL DURATIONS OF FALLOW
BY DISTRICT

DISTRICTS	CROP DURATION		FALLOW DURATION	
	MEAN	MODE	MEAN	MODE
BANIKOARA	5.2	4.0	4.7	5.0
BEMBEREKE	3.7	4.0	4.5	3.0
GOGOUNOU	3.7	3.0	4.9	3.0
KALALE	3.9	3.0	6.2	3.0
KANDI	5.8	4.0	5.1	4.0
KARIMAMA	5.7	5.0	7.0	7.0
MALANVILLE	4.8	3.0	3.7	3.0
N'DALI	3.6	3.0	6.9	5.0
NIKKI	3.4	3.0	12.0	5.0
PARAKOU	3.5	3.0	4.8	3.0
PERERE	3.6	4.0	8.4	5.0
SEGBANA	4.0	4.0	7.8	3.0
SINENDE	4.7	3.0	5.4	5.0
TCHAOUROU	3.3	3.0	4.8	4.0
PROVINCE BORGOU	4.2	3.0	5.9	3.0

DISTRIBUTION OF AVERAGE AND MODAL DURATIONS
OF FIELD RECLAMATION
AND AVERAGE AND MODAL DURATIONS OF FALLOW
BY NATIONALITY

NATIONALITIES	CROP DURATION		FALLOW DURATION	
	MEAN	MODE	MEAN	MODE
FON (n = 3)	3.0	3.0	8.0	-
BARIBA (n = 506)	4.2	3.0	6.1	3.0
DENDI (n = 67)	5.0	3.0	4.5	3.0
PEULH (n = 55)	4.5	4.0	4.5	3.0
OTAMMARI (n = 13)	4.1	4.0	6.4	5.0 6.0
YORUBA (n = 23)	3.2	3.0	8.7	4.0
OTHERS (n = 13)	3.9	3.0	5.9	4.0

5. Practice of Irrigation

Agriculture is practiced in the form of dry cultivation and there is almost no irrigation. Table 87 shows that only 4.4% of the farmers interviewed stated that they practiced irrigation and this is done for the most part in the case of truck gardening crops. Table 88 shows that in BORGOU, no one practices irrigation for the main crops, but only for the garden (Table 89).

I. Product Gathering

In the course of this survey, we also collected data on the gathering activities of agricultural households. These activities generally took place during the slack season in crop cultivation. Gathering involves several products, the most important ones of which are shea tree nuts, nere seeds and baobab seeds.

Although gathering is not an exclusively female activity, it remains apparent that processing and preparing these products continues to be women's work.

Tables 101, 103, and 105 show the distribution of farm households according to quantities of each production gathered.

1. Shea tree (*Butyrospermum paradoxum*)

The shea tree is a tree which is found in the Sudanese savannas. These trees are of economic importance; the farmers often keep them in place when they lay out their crop fields.

The product supplied by this tree is the shea nut which is an oil crop that gives us "shea butter".

During the harvest period, which extends from June until October, the women go through the forest to collect the fallen fruit.

2. Nere seeds (*Parika biglobosa*)

This is a tree in the same ecological zone as the shea tree. Its fruit is very important in the diet. The pulp which surrounds the seeds is edible. The processed seeds are the subject of commercial transactions.

3. Baobab seeds (*Adansonia digitata*)

This tree of the Sahelian-Sudanese regions has many uses:

- the bark can be used to make ropes,
- the leaves are consumed as a vegetable when they are young.

The fruits, called "monkey bread", yield a very edible flour-like and acidulous pulp. However, it is especially the seeds that are most in demand because they are also the subject of commercial transactions and they play a big role in nutrition during the interim period.

Below we present, for each of these products, the average quantities harvested, sold, and consumed locally, per household, and according to the nationalities (in terms of kg).

MEAN DISTRIBUTION OF QUANTITIES OF SHEA NUTS
 (Butyrospermum paradoxum)
 GATHERED, SOLD, AND LOCALLY CONSUMED
 PER HOUSEHOLD AND PER DISTRICT
 (kg)

DISTRICTS	GATHERED	SOLD	CONSUMED LOCALLY	STOCK
BANIKOARA	265	261	153	(-149)
BEMBEREKE	216	88	125	+ 3
GOGOUNOU	221	197	136	(-112)
KALALE	427	252	306	(-131)
KANDI	40	15	35	(- 10)
KARIMAMA	296	177	220	(-101)
MALANVILLE	190	165	50	(- 25)
N'DALI	653	307	446	(-100)
NIKKI	893	732	261	(-100)
PARAKOU	-	571	-	-
PERERE	320	383	164	(- 63)
SEGBANA	331	40	347	(- 56)
SINENDE	134	125	86	(- 82)
TCHAOUROU	292	277	292	(-277)
BORGOU	443	315	313	(-185)

MEAN DISTRIBUTION OF QUANTITIES OF SHEA NUTS
 (Butyrospermum paradoxum)
 GATHERED, SOLD, AND LOCALLY CONSUMED
 PER HOUSEHOLD AND PER NATIONALITY
 (kg)

NATIONALITIES	GATHERED	SOLD	CONSUMED LOCALLY	STOCK
BARIBA	487	341	348	(-202)
DENDI	267	280	160	(-173)
OTAMMARI	353	235	185	(- 67)
PEULH	333	212	257	(-136)
YORUBA	146	100	74	(- 28)
OTHERS	187	182	109	(-104)

MEAN DISTRIBUTION OF QUANTITIES OF NERE SEEDS
(Parika Biglobosa)
GATHERED, SOLD, AND LOCALLY CONSUMED
BY HOUSEHOLD AND BY DISTRICT
(kg)

DISTRICTS	GATHERED	SOLD	LOCALLY CONSUMED	STOCK
BANIKOARA	320	203	204	(- 87)
BEMBEREKE	146	52	106	(- 12)
GOGOUNOU	154	62	125	(- 33)
KALALE	193	68	191	(- 66)
KANDI	36	14	33	(- 11)
KARIMAMA	68	45	48	(- 35)
MALANVILLE	-	-	-	(-)
N'DALI	144	-	147	(-)
NIKKI	190	131	79.3	(-20.3)
PARAKOU	400	467	905	(-972)
PERERE	99	99	62	(- 62)
SEGBANA	134	-	134	(-)
SINENDE	137	133	125	(-121)
TCHAOUROU	253	215	135	(- 97)
BORGOU	266	179	198	(-111)

AVERAGE DISTRIBUTION OF QUANTITIES OF NERE SEEDS
(Parika Biglobosa)
GATHERED, SOLD, AND LOCALLY CONSUMED
BY HOUSEHOLD AND BY NATIONALITY
(kg)

NATIONALITIES	GATHERED	SOLD	LOCALLY CONSUMED	STOCK
BARIBA	262	178	198	(-114)
DENDI	95	93	66	(- 64)
PEULH	263	66	253	(- 56)
OTAMMARI	880	380	410	(+ 90)
YORUBA	122	33	121	(- 32)
OTHERS	49	-	34	-

As we can see, the sum of quantities sold and consumed locally for each of these products is greater than the average quantity gathered during the farming year covered by the survey. In the course of their statements, the households certainly should have reported stocks from the preceding year.

However, these statistics must not be taken literally as they have not been subjected to a systematic survey and since they were estimated on the basis of statements made by households surveyed. Furthermore, the very small number of field data persuades us not to draw any conclusions as to the districts.

J. Main Crops

The results on the seed plot densities and yields cannot be presented due to a number of difficulties encountered with the computer firm responsible for the analysis of this study. Most of these data have numerous errors resulting from keypunching mistakes.

However, the main crops studied are presented according to surface area and proportion of farms achieving their yield.

The surface areas given are actual areas obtained after calculating the single crop portion of the mixed crop areas using the proportional surface method.

Sorghum

This is the main crop of the province covering 41.7% of the sampling area and is cultivated by 84.4% of households surveyed.

Yam

The yam covers 19.5% of the area studied and is produced by 65.6% of the households surveyed.

Corn

Corn covers 19% of the surveyed areas and it is cultivated by 75.5% of the households surveyed.

Millet

9.9% of households surveyed cultivate millet and cover 6.4% of the sampling area.

Peanut

Peanut is one of the cash crops of the province. 14% of the households cultivate peanuts which cover 5.3% of the areas.

Cassava

In the province, the cassava crop is little developed covering 3.9% of the areas surveyed and is cultivated by 18.9% of the households.

Bean

It is cultivated by 11.6% and covers 2.2% of the area.

Rice

It covers 2% of the surveyed areas and is cultivated by 6% of the households surveyed.

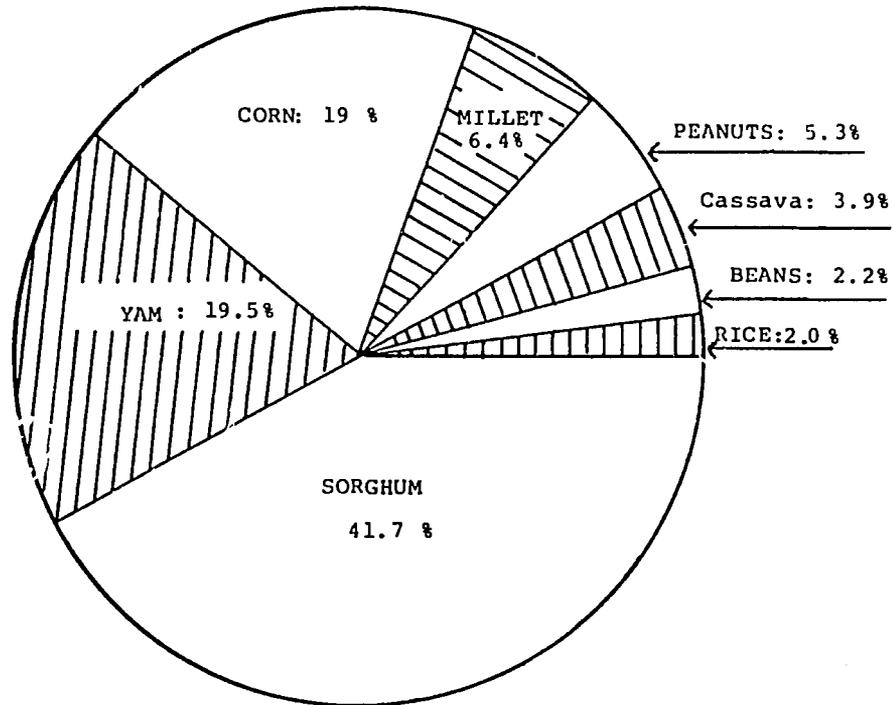
The table below gives a distribution of these various crops according to the proportion of the areas covered.

DISTRIBUTION OF THE MAIN CROPS

CROPS	AREA		FARMS	
	Ha	%	Number	%
SORGHUM	590.06	41.7	606	84.4
YAM	275.11	19.5	471	65.6
CORN	268.29	19.0	542	75.5
MILLET	89.80	6.4	71	9.9
PEANUT	74.49	5.3	101	14.0
CASSAVA	55.66	3.9	136	18.9
BEAN	31.44	2.2	83	11.6
RICE	28.15	2.0	43	6.0
	1413.00	100.0		

The graph below shows the relative importance of the main crops in BORGOU as to cultivated areas and that sorghum prevails over all other crops.

RELATIVE IMPORTANCE OF MAIN CROPS
BY AREA CULTIVATED IN BORGOU



As already mentioned, these are actual surface areas and do not refer to developed surface areas although certain crops are mixed namely corn and sorghum, sorghum and millet, millet and yam, as shown in Table 29 referring to types of mixed crops.