# A SOCIO-ECONOMIC STUDY OF AGRICULTURAL VILLAGES IN GUERA AND BATHA REGIONS, CHAD

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# A Socio-Economic Study of Agricultural Villages in Guera and Batha Regions, Chad

## I. Introduction

This study of four **sous-préfectures** in the Guera and Batha regions of Chad was designed to provide the necessary information to orient and define a major agricultural development project directed toward the poorest of the poor. The principal objectives of the study were to identify resource access and resource use by farm households in these regions. Guera is situated fully within the Sahelian climatic zone of Chad, while Batha represents a transitional zone into the more arid Saharan climate to the north. Thus, only the more Sahelian-like southern part of Batha was include. As a general statement, the study area is characterized by a highly fragile environment subject to rapid desertification.

The populations of the study area are culturally and economically diverse. Some are transhumant pastoralists who manage cattle herds over widespread stretches of rangeland; others are sedentary agriculturalists who maintain complex reciprocal relationships with the herders. In this context of diversity, the study focused on the sedentary populations and their economic survival strategies given an uncertain and often precarious environment. The households included in the sample were seen as owners and managers of basic resources--land, labor, and capital; and the study attempted to determine the amount variation in these resource patterns.

Several major issues comprised the core of the study. The first was the heterogeneity of these rural populations, particularly in regard to access to resources. The survey was structured to identify the poorest segments of the population and to determine whether pronounced economic differences existed within villages and between villages. In this regard, the study looked for variation in wealth--both in land and animals--and in income from agricultural and non-agricultural sources. A second major issue was to identify the local mechanisms by which households gain access to the basic resources. In an agricultural society land is often the primary factor of production. Thus, the study sought to evaluate local perceptions of the quality of land, how land is used, and how a household obtains access to the necessary land to feed its consumers.

A third issue involved the use of household labor. The study attempted, on the one hand, to document how households allocated labor among agricultural (including livestock) and non-agricultural alternatives, and, on the other hand, to estimate the labor needs for the basic agricultural activities. The

extent to which local communities have developed labor institutions, such as exchange or group labor, was also evaluated. With regard to labor use, the division of agricultural and non-agricultural tasks by sex and by age was highlighted. Also of special importance, the study assessed the incidence and dependence on emigration as a major economic strategy open to these households.

A fourth issue focused on the current technological practices, the diversity of cropping patterns, and levels of integration into local and regional markets. The success of development interventions depend on a thorough understanding of existing practices and of constraints on change, and the study strove to identify those constraints at both the village and household levels. Integration into markets was considered in terms of both output markets and household reliance on purchased consumer goods. Also, the availability and use of credit, and the extent of formal and informal cooperation were assessed as possible development strategies.

Finally, the study looks at the two regions in a more dynamic framework in order to identify the coping strategies that rural households have devised to survive the instability imposed by an unpredictable climate and fragile resource base. These strategies involve sharing, exchange, emigration, and other forms of resourcefulness that might be mobilized in a prospective development effort.

In the following chapters, each of these issues is discussed in detail. Both the quantitative patterns from the survey and qualitative information from key interviews provided the empirical basis of the reported results.

## II. Methodology of the Study

The methodology of this study followed a mixed methods approach which combines quantitative survey techniques with more qualitative informal data gathering. The underlying strategy of this approach is not only to determine the empirical patterns of resource access and management, but also to obtain the local interpretation of these patterns; that is to say, the farmer's perspective on the existing situation and opportunities for change.

The fieldwork was carried out in two stages. During the first stage, two members of the research team visited the target area to carry out a rapid rural appraisal. The purposes of this field trip were to create the necessary institutional ties with organizations in Chad; to visit the study area, meet with local residents and determine the logistical requirements of the subsequent survey; and to establish an informational base on the

village populations, particularly with regard to farming systems practices, residential patterns, household structure, local terminology and measures, and village leadership structure. This phase of the research was accomplished in November of 1990 and had been completed at the time of the coup.

The second research stage, the survey, was stalled due, first, to the Chadian change in government, then to the uncertainties in the Gulf. It was carried out in March over a period of about five weeks. A research team comprised of three specialists from the University of Arizona and two Chadian counterparts (one from the Bureau Interministériel des Etudes et Projets and the other from the Ministry of Agriculture's Office National de Développement Rural) implemented the fieldwork in the research area.

Prior information on the target area suggested that inter-village and inter-préfecture variation is greater than intravillage sources of variation. Thus, the sampling strategy was set up to cover the widest geographical range and the largest number of villages. The préfecture is an administrative unit divided into sous-préfectures, cantons, and villages, each with its respective leadership structure. The team randomly selected a village in nearly every canton of the four sous-préfectures, then randomly selected households in each village. The number of households interviewed in each sous-préfecture was designed to reflect the relative population distribution of the target area. In all, fifteen villages and one nomad camp (**ferrique**) were visited, and 223 households were interviewed. Table 1 presents a summary of the villages and households sampled by sous-préfecture and préfecture.

The research team spent one day in each village. Upon arrival, the team approached the village leadership and solicited a general orientation on the social, economic, and infrastructural characteristics of the village. A critical part of the information provided by the leaders involved the amount of diversity among families within the village. Households were selected randomly, after consulting, when available, village lists maintained by the chiefs. Six enumerator teams then visited the selected families.

The questionnaire was designed to capture effectively and efficiently the level of quantitative information that most households can provide: household residents, land use, animals, technology, labor allocation patterns, sources of revenue and major expenditure items. More open-ended questions regarding attitudes, opinions, insights, and interpretations were left to more informal, in-depth interviews. Articulate and willing villagers were chosen for these interviews; that is, residents who seemed best to understand the purpose of the study.

Along with the questionnaire, the research team carried topic outlines to orient the informal interviews. Four specific topics were covered in this fashion--the role of women in agriculture and income generation, local water and soil conservation strategies, crop and livestock interactions, and credit and groupement activities. One team member was assigned primary responsibility for a particular topic, the four of which are discussed in separate sections of this report. Most interviews were conducted in Chadian Arabic and translated into French, although in some instances translations of Chadian ethnic languages were necessary.

There are no known reasons to suspect bias in the sampling procedures nor to question the overall quality of the survey data. Time and resource restrictions, as always, generate feelings of "learning frustration," in the sense that knowledge insidiously feeds a yearning to know more. There were, however, certain knowledge domains where precise information was not possible. In terms of land measurements, farmers were asked to estimate the size of their fields. Since land is generally an abundant resource in the study area and because the topography is generally flat, most fields tend to be rectangular. Thus, farmers were able to estimate meter lengths and widths of fields or to express the area in local measures such as the **corde**, **mettre**, or **mukhamma**. The overall consistency of the land data suggests that this technique was acceptable, but the possibility of measurement error is also acknowledged. The second knowledge domain where imprecision may have arisen is in animal ownership. Animals are eminently important in the target area, and farmers often entrust husbandry activities to Arab transhumants. Also, due to the nature of society, wives may keep animals with their own kin groups (i.e., in their brothers' or fathers' households). These complexities are exacerbated by government attempts to tax animals, the most easily enumerated source of wealth. Overall, the research team feels that reporting on animal ownership, particularly for cattle, may be underestimated. A final difficulty for this study was the same one faced by the local populations year after year. This agricultural campaign encountered widespread drought, as well as insect pests, and in many places, there was either a minimal harvest or none. Thus, information on yields must be interpreted as representative of an especially bad year. Where possible, "normal" yields are provided as a basis of comparison.

These qualifications notwithstanding, the research team is confident about the data's validity. In every village the team was received with consummate hospitality and openness. Although the target area was entering a period of critical shortage, every village made its visitors feel welcome. It was very fortunate that the team included two female interpreter/enumerators who were particularly effective in eliciting the female perspective

on resource use and management, and integrating it into the study's approach to food security issues.

## III. Demographic Characteristics of the Target Area

For the purposes of this study, the household is identified as a residential unit with one or more adult decision-makers managing separate subunits and controlling land, labor, animals, and income. The determination of the household head (**chef de ménage**) was based on self-definition and on responses to questions about the overall management of collective agricultural resources during the past agricultural campaign. The combined impact of war, emigration, and drought has introduced much variation into the household leadership structure. In some cases, elderly relatives have assumed responsibility for families of emigrated men or for families of widows. Consequently, the titular head of the household was not always the main manager.

Polygyny is practiced commonly in the target area. Under the most typical form, polygamous households are comprised of a residential unit for the male household head and separate residential subunits for each wife or for other collateral or lineal adult relatives. All the different residences are enclosed with a fenced area called a **concession** (roughly translated, "compound"). The household head may live alone or with relatives, while each wife resides with her dependents. Thus, the size of the household head's residence tends to be smaller (2.6 members) than that of the other subunits (4.5 to 3.3 members).

The research challenge presented by polygynous households is to determine the intra-household decision-making patterns. Certain resources are pooled within the concession, while other resources are managed by individual subunits. The household head unit, for example, controls the "household" land, the cultivation of which is the responsibility of all household members. On the other hand, each subunit also has its own fields cultivated primarily by that specific residential group. Some marketing decisions are made by the household head, who is generally responsible for the welfare of the concession, while other marketing decisions are controlled at the subunit level.

Usually surrounded by a fence, the concession contains living units, granaries, work areas and animal pens. The fenced areas are often divided by a partial wall that separates distinct units. The concession, typically including the man and his respective wives, may also consist of other arrangements, such as two brothers who constitute separate production units or a married man, a wife and a widowed mother, each woman responsible for her own semi-autonomous production. Even non-relatives, such as students of a **marabout** (Koranic teacher), may form a single

household residence. Again, these variations in household structure represent the range of adaptative economic strategies which allow families either to pool their resources or to pursue individual economic options, as particular situations might dictate.

Households in the target area are patrilineal and patrilocal. This means that all children born to a couple belong to the father's kin group and that wives are often outsiders isolated from their own kin groups. Wives usually depend on their husband's family for access to productive resources, while at the same time they may keep certain personal assets (such as livestock) with their own kin. In general, married sons do not reside with their parents but, at marriage or shortly after, form another compound near the father.

Basic demographic information on the target population is presented in Table 2. For the entire sample of households the average number of current residents was 6.9 persons, with the largest households being found in Ati (8.2 members) and the smallest in Oum-Hadjer (6.3 members). Oum-Hadjer, in Batha, also had the largest percentage of female-headed households and the highest rates of emigration. Because resources are at least partially managed by individual production units within the concession, the demographic information was further disaggregated to examine these subunits. For the target area as a whole, the average concession had approximately two subunits, with 3.4 members per subunit. Only in Oum-Hadjer was there a slightly smaller number of subunits, again reflecting a higher rate of emigration. In Guera at the sous-préfecture level, there is virtually no variation in the number of subunits nor in the average population per subunit. In those concessions with more than one subunit, the primary household subunit tends to have the least number of residents, a demographic feature that has implications for the pooling of household labor from the other subunits.

The overall population structure of the target area is heavily biased toward the younger age categories (Figures 1-4). Seventy-five percent of the sample is 30 years old or less, and almost 50 percent of the population is under 15 years. This pattern probably reflects the combined impact of war, emigration, and, simply, a low average life expectancy due to poor health and nutritional status. The sex ratio (107.5) also demonstrates the larger share of women in the population (52 percent). The population pyramids suggest that, with the exception of Mongo, demographic change in the sex ratio occurs in the age category of 15 to 30 years. This shift is particularly marked in those sous-préfectures where the rate of emigration, primarily a male strategy, is higher. In Oum-Hadjer, for example, 42.7 percent of the households report current emigrants, and the sex ratio is the

**Figure 1. AGE COMPOSITION FOR MONGO**

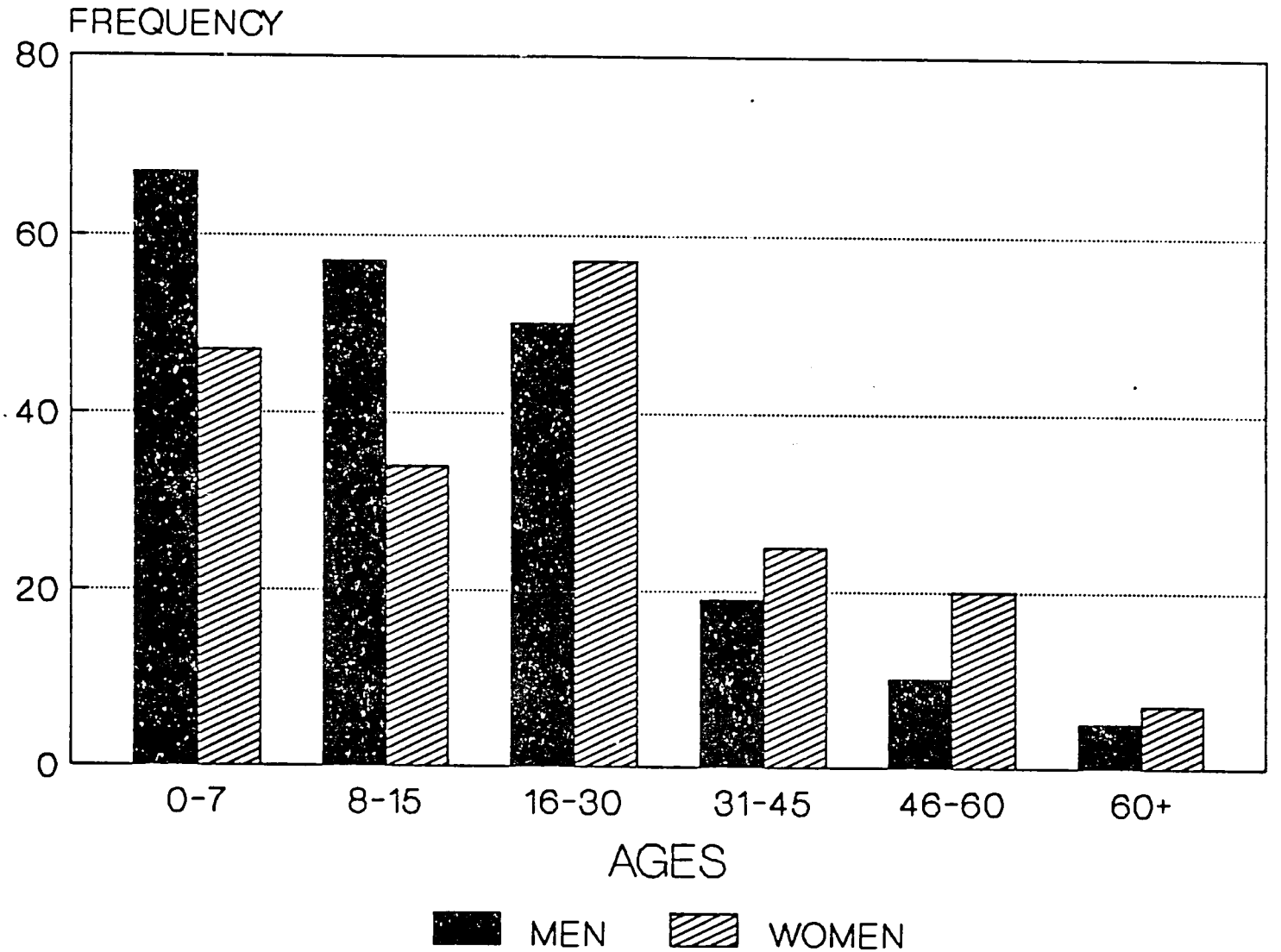


**Figure 2. AGE COMPOSITION FOR BITKINE**

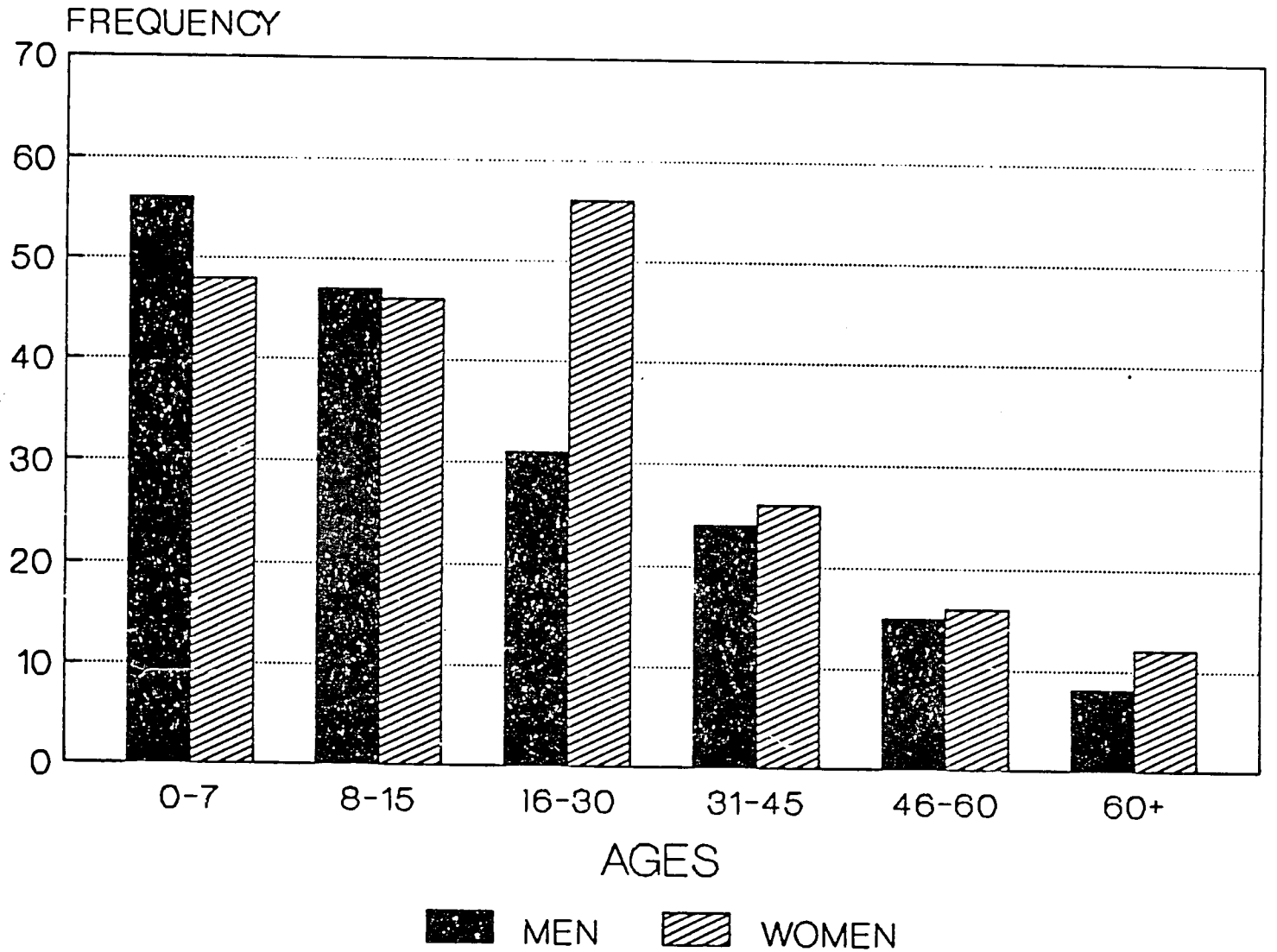


**Figure 3. AGE COMPOSITION FOR ATI**

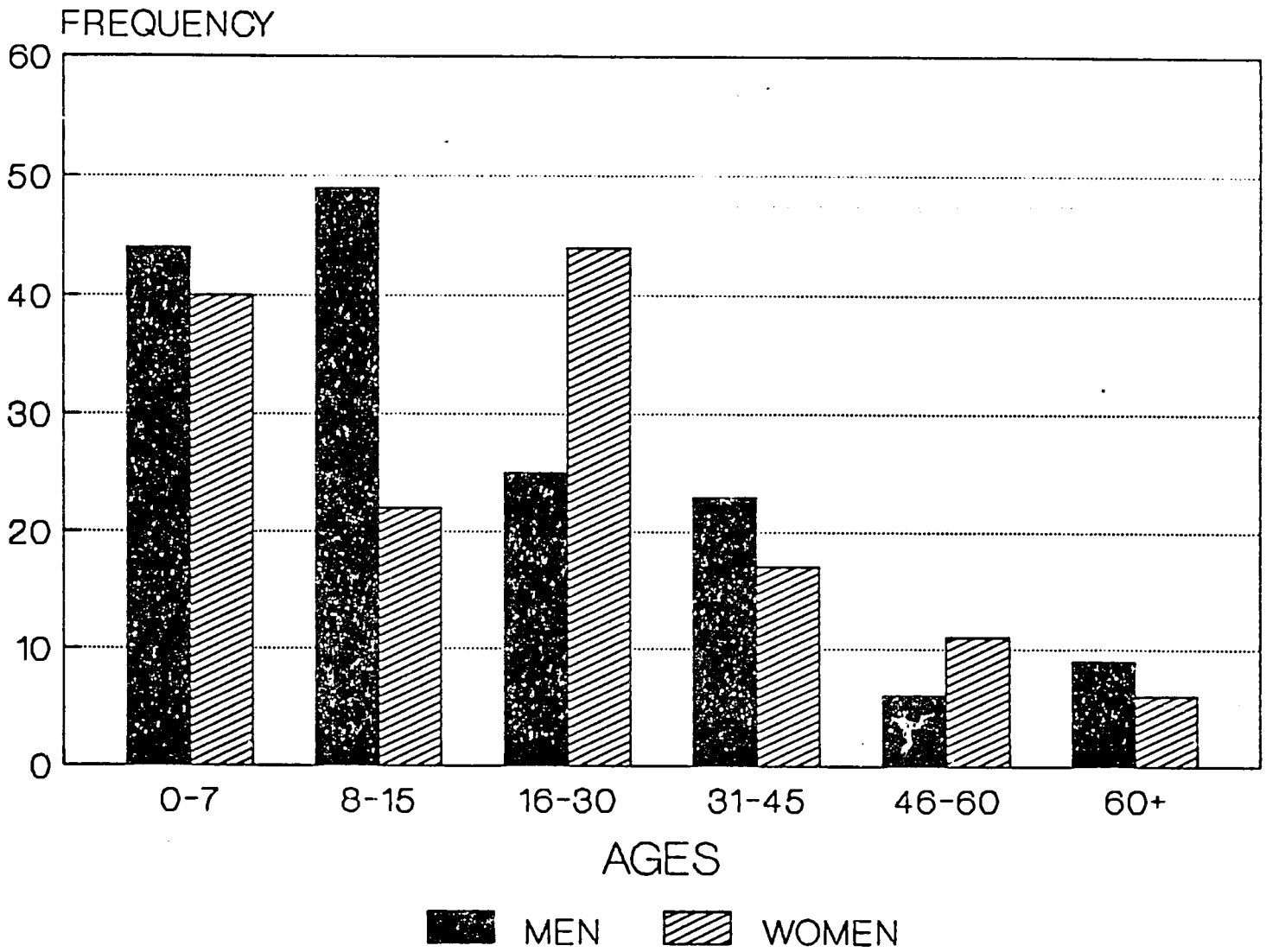
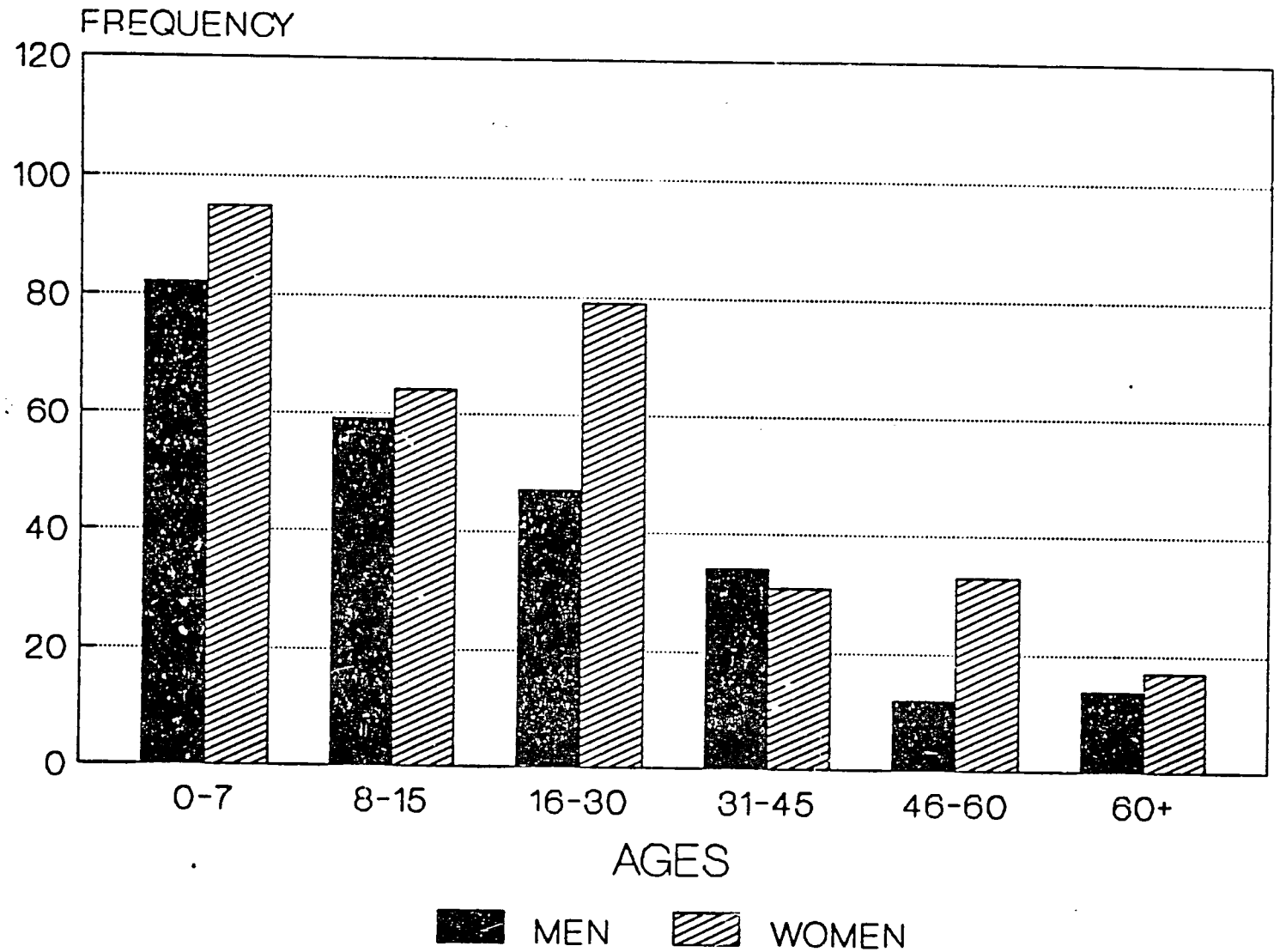


**Figure 4. AGE COMPOSITION FOR OUM-HADJE**



highest (131 women for every 100 men). There, female-headed households are also more prevalent at 32.9 percent of the total.

Out-migration is less common in Guera préfecture because it enjoys distinctly better agricultural conditions than Batha. For the same reason, the percentage of female-headed households there (12.3 percent) is also lower. On the other hand, the relatively high ratio of women to men in Bitkine (122 per 100) is not easily explained and may reflect a differential impact of the war. In general, however, family size and general household structure in terms of subunit composition do not vary significantly between or within the two préfectures.

Education

The prevalence of formal instruction in rural areas can be used as an indicator of the level of integration into wider national systems as well as a measure of the quality of the work force. In Muslim rural Chad, there are two types of schools. Arabic schools teach literacy in the Koran and provide religious instruction; national schools teach basic literacy and mathematical skills in French. The survey collected data on school attendance for all household members over seven years of age. More than half of the total sample (52%) had no access to education, having attended neither French nor Arabic schools.

The results showed significant differences between Guera and Batha and among the sous-préfectures in terms of exposure to education, especially French schooling. The Guera rural populations have generally received more French education: 40 percent of the sample in Bitkine and 26 percent in Mongo. These figures contrast sharply with those for the Batha samples: 16 percent in Ati and 1.3 percent in Oum-Hadjer had attended French schools. When the French and Arabic school data were combined, only about 30 percent of the Mongo sample claimed no education, while about one half the respondents in the other sous-préfectures had never been to school (Table 2).

As a general profile, those who had attended school tended to be young and male. Even so, nearly half the children (43%) between the ages of seven and 15 years did not attend any school, and among those who had gone to French school, only a very small percentage moved beyond the first two years. Females have received significantly less education in French or Arabic schools. Among the group that has never gone to school, females outnumber the males by a factor of 2.5. On the other hand, twice as many males as females were in school, and twice as many males had access to the French system.

## Migration

Migration appears to be both an adaptive strategy employed by households to cope with the negative effects of climatic variation and a seasonal source of income. During village interviews, elders reported high rates of temporary out-migration for male household heads and young unmarried men. Based on information from these interviews, the primary strategy is for young men to leave during the dry season after harvest, then to return at the onset of the rainy season and the beginning of the agricultural cycle. The majority of the migrants go to urban areas, primarily N'Djamena. In the Batha préfecture, some households reported members working in Ati and Oum-Hadjer; in Guera, some migrated to Mongo. Male migrants have also worked in other African countries, such as Nigeria, Camaroon and Sudan. The interviews did not successfully determine the extent to which emigrants remit money or gifts, although village elders did suggest that remittances do not arrive regularly. From time to time they may send clothing, sugar, tea, and other household items. There is a clear advantage to the household, nonetheless, to have one less adult consumer during the dry season or unpredictable years of scarcity.

The profile of the emigrant is, as with the educated villager, young and male. In Bigua (Canton Bidio, Mongo), for example, villagers said that about half of the young men, but only five of the women, had migrated to Mongo or N'Djamena. All were expected to return in the rainy season. Some had sent money and other items through friends to their households. In several villages, complete household units--husbands, wives and children--were reported to have left to find better pastures, better agricultural areas, work as agricultural laborers or opportunities for unskilled employment.

The survey attempted to estimate both current levels of emigration as well as past histories of emigration. For current emigrants, the questionnaire sought household members (i.e., relatives) considered temporarily absent. Households that had migrated as units were not included in the survey. The incidence of migration, both present and past, was greatest among the households in Batha. Forty-three percent of the Oum-Hadjer households had residents with emigration experience and there was a similar percentage of current non-resident emigrants (Table 2). Both irregular rainfall with uncertain harvests and the political situation over the past 25 years have contributed to these high migration figures.

In the Guera, Mongo claimed less than 20 percent of its households with past or present emigration, while Bitkine had a higher percentage of households with past emigrants (28%) and a small number of current migrants (15%). Guera in general has the more reliable resource base and higher levels of agricultural

production. That préfecture is, therefore, better able to support its population without recourse to widespread seasonal or long-term emigration. It must be noted, however, that population pockets within Guera, such as the villages of Chawir and Golonti, do have high rates of temporary migration.

Emigration has an important impact on households. Often a wife will move in with her husband's brother or father when the household head emigrates. Patterns of resource pooling are affected, and the decision-making process becomes more dispersed. The lands of emigrants may continue to be farmed by relatives or by wives. There is, on the other hand, little evidence that emigration constitutes an important source of financial capital or technical knowledge for agricultural improvements.

Female-Headed Households

Emigration and war increase the number of female-headed households. In Guera, about 12 percent of the surveyed households were managed by women, while in Batha more than one in five households are female-headed. It is important to disaggregate this group of households in order to distinguish widows, divorcees, wives of emigrants, and other categories of women, because their resource allocations and labor strategies may vary considerably. In the study area overall, 44 percent of the female-headed households were managed by widows, another 29 percent by divorcees, and about 27 percent by married women with emigrant husbands. Widowed and divorced household managers are particularly vulnerable, given that their access to resources depends on the presence or absence of children old enough to assist them and on the patrimony left by their husbands. It is for precisely this reason, for example, that elderly widows often reside with or near a daughter or a son.

The survey determined that treating female-headed households as a distinct group is necessary for identifying the "poorest of the poor" in the target area. Generally, these households were smaller than male-headed households, had higher percentages of children under 15, and were more likely to have one elderly or middle-aged woman with only one or two dependent children. As further analysis will show, these households face major constraints with regard to access to land and labor.

## IV. Access to Land and Representative Cropping Patterns

Agriculture in the target area depends primarily upon access to land and labor, the two most important factors of production. The agricultural strategies that households have devised throughout the region are intended to maximize the probability of production and survival in the context of high risk and uncertainties. Overall, the target area appears to have abundant

land resources, sufficient to provide all households. Nonetheless, land quality varies widely and, in fact, may be scarce in some parts of the four sous-préfectures. The following section examines land access mechanisms, land use patterns, and differences in the distribution of land.

Landholding and land use patterns in Guera and Batha are very complex. First, access to land is regulated by two systems of tenure--a "traditional" system of village ownership and a "modern" system wherein the state recognizes private property, but retains legal authority over ownership and usufruct rights. The two systems appear to be intricately grafted together. In the isolated villages, the land chief oversees the distribution of lands, but villages closer to the chef lieu of a canton or sous-préfecture are more affected by the modern rules and regulations.

Under the traditional village land tenure system, the village as a collectivity, not any individual, owns agricultural land, and a locally recognized authority--land chief, village chief and/or canton chief--holds custodial control over collective ownership rights. The village chief is the lowest level administrative office in the GOC, whereas the land chief is a nongovernmental office which, according to informants in Guera and Batha, embodies and protects the close relationship between a the village population and its territory. In most of the target area villages, the offices of land chief and village chief were held by different individuals. In about one third of the cases, the village chiefs doubled as the land chief, while in the remainder of the villages, the two offices were occupied by close kinsmen, usually brothers.

The received wisdom on the traditional land tenure system in the Sahelian zone is that private property rights in land do not exist. Thus, there is no land market. This generalization holds true only if private property is equated with completely individualized, totally unrestricted rights of possession, use and usufruct. Clearly, the village retains the full set of totally unrestricted rights in the Guera and Batha préfectures, but individual use and usufruct rights endure as long as the "need" or "desire" to cultivate fields exists. This situation may last for an individual's lifetime and extend to descendants. Consequently, parcels become associated with particular families or specific family members, and those people consider the parcels to "belong" to them. Villagers who cannot or do not want to exercise their land rights can also lend or rent them to others in the village.

Therefore, while no full-fledged form of private property in land exists, it would appear that Guera and Batha villagers exercise a substantial measure of control over parcels. During the survey, there was evidence of a variety of private land

transactions, including inheritance, loans, rental, and sales. Both Guera and Batha villagers reported that, even though fallow periods have steadily decreased over the last 20 to 30 years for a number of reasons, household heads or other members always expect to resume cultivation of their fields at the end of any fallow period.

Informality and flexibility are perhaps the most distinctive features of the village land tenure system. In principle, the system functions to make collectively owned land available to all village household heads and their dependents, as well as to guarantee use and usufruct rights for extended families (usually patrilines of three or four generations) in particular parcels. In this way, all families gain access to the basic subsistence resource that guarantees survival.

Mechanisms of Access to Land

Villagers are entitled by birth to use and usufruct rights on village land. They usually acquire such rights through inheritance, through marriage, or by expending the effort to clear additional land (**défrichage**). These villagers may activate their rights without recourse to any of the above-mentioned traditional authorities who monitor collective ownership. In most villages, persons may also lend usufruct rights without recourse to traditional authorities or land may be rented in exchange for cash or in-kind payment. Normally, villagers only lend or rent land among themselves, although some informants in Guera and Batha noted that such transactions sometimes involve "outsiders" or "strangers" (**étrangers**), especially during bad harvest years like the 1990-91 campaign.

Unlike native villagers, strangers must request permission to clear land from a land chief, village chief, or canton chief. In some villages, informants reported that strangers could acquire usufruct rights in this manner simply by request; in others, it was said that strangers are expected to give the chief a gift after the first harvest. The exception to this norm is the case of in-marrying females from other villages who acquire usufruct rights from their husbands by virtue of marriage.

Inheritance

Inheritance appears to be the predominant type of land transaction through which usufruct rights are acquired in village land. Land rights may be transmitted by inheritance after the death of their holder or when he or she ceases to be economically active in agriculture. Frequently enough, however, rights are transferred before the holder ceases to work or dies. For example, a father may help a son to get a start in life when he marries or when he is simply old enough to shoulder manly responsibilities.

Inheritance is partible but not necessarily equitable. For example, if a woman marries outside her natal village, her share may be smaller or the land poorer. Unmarried women may inherit land, informants in Guera villages reported, if all or most household children are are female, or if a daughter has borne most of the caretaking responsibilities for her aging parent. According to a villager in Batha, widows and divorcees have what might be characterized as a "right of return." In other words, her father or older brother are obliged to take her back into the family landholding and give her access to a plot. Primogeniture, which appears to be an important inheritance rule in both préfectures, offers another example of inequality at inheritance. The eldest son of a sibling group usually gains first access to the concession's land, and he tends to inherit the best land.

Table 3 summarizes the access mechanism for over 1000 parcels sampled in the survey. The data reflect the pervasive influence of the traditional land tenure system. Nearly half the parcels and half the total land area were cleared by the household, and another 42 percent was inherited. The other categories of access are minor and tend to be restricted to "outsiders" who have entered the village (i.e., those who requested land from either a chief or husband).

Land Sales

Although land sales are proscribed by local custom, in both Guera and Batha sales have occurred. It is preferable, villagers say, to sell to a fellow villager, and the land of the extended family concession should remain within the circle of actual kin. While extremely rare, land sales seem to be transacted only with scarce land types, such as recession land suitable for **beréberé** (an especially valuable variety of sorghum) or irrigated land. Land prices were collected where available. While these price data could not be confirmed, they indicate a range from 20,000-25,000 CFA for a beréberé plot measuring 8 mettres by 5 mettres in Alifa (Canton Medogo, Ati) to 10,000-15,000 CFA for the same size millet or sorghum plot. In Djalat (Canton Mesmedje, Oum-Hadjer), the price for a beréberé plot ranged from 25,000 CFA for two mukhammas to 50,000 for five. These observations notwithstanding, the quantity of land sales reported in the survey is negligible.

Land Quality

The survey identified three basic, locally recognized types of land. The most abundant of these is rainfed land, where shifting cultivation is practiced. The more productive flat recession land, largely devoted to beréberé, is cultivated annually. It is more limited in quantity and not all households have access. Finally, some villages have access to irrigated land, either because a relatively shallow water table permits use

of hand-dug wells or because a permanent water source, like a river, is nearby. Irrigated land in the study area is very scarce. Even in those villages near land suitable for recession or irrigated agriculture, not all households have access to it. Likewise, within households, the secondary subunits cultivated by wives and other relatives tend not to have beréberé fields.

Land Access Characteristics

Table 4 summarizes survey data on characteristics of landholdings and land use for 223 households in the target area. The average area of cropland per household in the project zone is 5.3 hectares, with little variation among the four sous-préfectures. It appears that Batha has slightly larger total landholdings and significantly larger holdings per household than Guera. This fact is explained by the superior quality of land in Guera.

The section on demography examined the structure of the multi-unit household, and there is a clear relationship with regard to landholding. As explained above, the primary household unit has land which can be considered household land to the extent that it requires pooled labor and to the extent that, in times of crisis, all concession subunits would lay claim to the product of this land. On the other hand, there are individual plots of land control by the other subunits, which may or may not involved pooled labor. The survey data demonstrate that primary landholdings tend to surpass the subunit holdings by an average factor of three (Table 4), which suggests that the plots managed by the household are cultivated with general household welfare as the major objective.

As in other rural societies that practice high-risk subsistence agriculture, the target area farmers diversify their cropping options. Each production and management unit tends to cultivate different crops in separate fields, and the average number of plots per household is about five, with a higher average in the Guera region, where beréberé land is more abundant. The average plot size is about one hectare, with slightly higher averages for the Batha, where land is more marginal. The high number of plots in part reflects the structure of the household: each individual household production unit will attempt to cultivate a field of beréberé (in Guera), a field of millet or sorghum, a field of sesame, and so on. This strategy responds both to the realities of climate and of market, where price variation may occur.

The residents of the target area generally live in village clusters, where they have easy access to water, markets, and the other amenities of village life. Cultivated fields surround the village. On average, the fields are located about three kilometers away, which implies a concentration of labor around

harvest time when products must be moved to the households for storage.

Two major issues revolve around access to land. One involves cropping patterns and on-farm strategies; that is, how farmers allocate their resources to alternative agricultural activities. The second issue focuses on the equality of land distribution and the factors that affect it. In a rural society where land and labor are the principal factors of production, land distribution patterns may identify the truly disadvantaged, as well as those who have the opportunity to respond to development interventions.

Table 4 summarizes variation in the allocation of cropland throughout the target area. Clearly, the most abundant type of land is rainfed, and the average household cultivates approximately four hectares, which accounts for 80-90 percent of its total available cropland. The rainfed crops are the grains, groundnuts, sesame, and okra. As Table 4 demonstrates, the grains occupy 55-70 percent of the total available land in Guera and more than 80 percent in Batha. Groundnuts are also more important in Guera, and sesame has a relatively higher share of land in Mongo. There is significant inter-village variation in the cultivation of groundnuts and sesame.

Access to berēberé land is much greater in Guera, where it accounts for about 15 percent of total cropland. Recession agriculture is practiced there on large expanses of flat, low-lying plains that flood during the rainy season. The relatively fertile clayish soils retain moisture well, and as the standing water evaporates, farmers sow the area with berēberé. In some places, this variety of sorghum is actually transplanted. Berēberé land is more reliable and, as expected, more scarce. Farms in the Guera, on average, have access to less than one hectare of berēberé land.

Irrigated land is the most desirable and the most scarce. In the Guera, irrigated cultivation occurs in valley bottom where hand-dug wells can reach the shallow aquifer. The possibilities for expansion of these systems are unclear. In the Batha, some villages have access to the Batha River for surface water irrigation. Irrigated crops, such as vegetables or tabacco, tend to be high value. Only about ten percent of the farms in the Guera had access to irrigated land, whereas in Oum-Hadjer (Batha), over forty percent of the households practice irrigated farming. Even where irrigated lands are available, the plot sizes tend to be very small, and the proportions of irrigated land to total cropland are minimal (Table 4).

Land distribution is the second issue revolving around access to land. Table 4 shows that variation in farm size is great throughout the target area. To understand these

differences, it is possible to hypothesize that farm size is directly correlated with household consumption needs or with the available household labor pool. The correlation between resident household population and total cropland is .33 and highly significant. Table 4 also reports the average amount of cropland per resident household member. In Batha the per capita land figures converge, whereas in Guera they remain significantly different. Thus, while variation in family size partially explains differences in access to land, the explanation is not complete.

Since 20 percent of the households are headed by women, it is possible to consider differences in land access by gender. The total cropland area for female-headed households is 3.8 hectares, about 30 percent smaller than the average for all households (Table 4). There are also significant differences among the sous-préfectures. In Mongo, for example, the average cropland area for female-headed households is slightly larger than the average for the sous-préfecture as a whole. By contrast, in Bitkine the average cropland area for female-headed households is less than half the sous-préfecture average. In the Batha sous-préfectures, female-headed households have 60-80 percent of the respective total land averages. However, when the per capita figures are considered, the average amount of land per consumer in female-headed households is equal to or higher than sous-préfecture averages.

In Table 5, land categories were established to examine the distributional patterns. The smallest land size category (one hectare or less) accounts for about 10 percent of the total farms, but represents less than two percent of the total cropland. The majority of farms are concentrated in the next two categories (1-3 hectares and 3-6 hectares), and they range from about 50 to 65 percent of the farms. In Guera, these farms cultivate between 40 percent (Mongo) and 48 percent (Bitkine) of the land. At the upper end of the distribution 11 percent of the farms in Mongo cultivate 44 percent of the cropland, while in Ati 18 percent of the farms control 57 percent of the cropland. These results suggest an unequal distribution unrelated either to labor availability or to gender. Moreover, the per capita land averages for each category uniformly increase in relation to the size category, so that a household consumer on the larger farms has access to a significantly larger amount of land than the consumer on a small farm. If land is in fact a measure of wealth, these results suggest that these rural zones are not homogeneous, and that significant wealth differences exist within Batha and Guera communities.

If the size categories and crop allocation patterns are combined (Table 6), it is possible to consider the composition of typical representative farms in the different sous-préfectures. For example, the small Mongo farm (two hectares) allocates close

to 60 percent of its available resources to rainfed grains, 14 percent to beréberé, and distributes the rest between groundnuts and sesame. The large Mongo farm (7.8 hectares) allocates a greater percentage to rainfed grains, and distributes the remaining cropland in roughly the same proportions as the small or average farm. In Mongo, female-headed farms cultivate a greater share of sesame, while in Bitkine, the female managers cultivate more groundnuts. Generally, farms managed by females have less access to beréberé land in the Guera.

Implications of Land Data for Project Design

The survey results suggest that land abundance is a relative concept in the study area. Although from the village perspective (when talking to an outsider) the availability of land appears unlimited, the data demonstrate that some households are land poor. If the quality of land is taken into consideration, particularly with regard to beréberé and irrigated land, then relative scarcity becomes more apparent. The constraints of time and resources did not allow the study to delve into the reasons for differences in land access, which could be related to such complex social and economic factors as lineage, status, and power. The traditional tenure system does seem to successfully allocate land to all village members; however, the distribution is not equitable.

A development project or intervention component that alters the value of land could have important consequences on the traditional tenure system. The introduction of soil conservation structures (suchs as dikes or bunds), while increasing the productivity of the land, may also increase the scarcity value of the land resource. The possible disruptions which this intervention might incur and foster should be considered. The same caveat applies to the expansion or introduction of irrigation structures.

## V. Labor Allocation Patterns

Households in the target area combine agricultural labor and nonagricultural labor to earn a livelihood. They channel the bulk of their labor to farming, especially grain cultivation, even though they may engage in a variety of income-generating activities in order to meet consumption needs. Both the characteristics of the farming system and the scarcity of alternative rural employment opportunities determine this allocative pattern.

In rainfed agriculture, the availability of labor at critical times is as important as the size of the total labor pool. Tilling and sowing, for example, must be completed promptly

so as to take full advantage of meager rainfall, and fields must be weeded in order to decrease competition for scarce moisture between crops and other plants. Several key informants noted that the number of weedings on millet or peanut fields made the difference between having a poor harvest and having no harvest at all. The age and gender composition of the labor pool also influences management decisions with regard to labor mobilization and allocation.

Households in Guera and Batha have access to three forms of agricultural labor. First, there is household labor comprised of all members of working age. Second, there are traditional labor institutions which provide households with supplementary labor at times of specific bottlenecks in the agricultural cycle. Finally, agricultural wage labor is used, but in negligible quantities in the two prefectures.

Household Labor in Agriculture

The positive correlation between land size and household size suggests that the availability of family labor is an important factor in the household decision to cultivate land. The size and number of fields are constrained primarily by the number of household members who can participate in the activities. Both male and female children begin to contribute to the agricultural enterprise at an early age (around seven years). Both men and women participate fully in the agricultural tasks, following patterns established by custom and by the exigencies of the economic situation.

The allocation of household labor can be examined in terms of internal structure of resource management in the household or in terms of gender and age. As described above, household resources are comprised of fields controlled and managed by the household head and those managed by other household members, such as the wives, an elderly relative, a sister-in-law, and so forth. Under the idealized traditional system (prevalent throughout West Africa), the collective household plots are cultivated with labor pooled from the individual subunits of the concession. The individual plots are worked primarily by subunit members. In the reality of scarcity and precarious welfare levels, it appears that pooling of labor for all plots--individual as well as collective--occurs more than was expected.

There are certain times in the agricultural cycle when labor demand may exceed household supply. To compensate, households can call upon local labor institutions to provide the timely labor needed. These institutions include reciprocal labor exchange groups (nafir), father-in-law work parties (nassabir) or youth groups (amchelé). To benefit from this labor supplement also implies household participation in the same networks; thus,

part of the labor pool is also allocated to non-household fields under these reciprocal arrangements.

Survey data show that households attempt to balance the labor needs of collective household plots against the needs of individual plots. This balance may tip in one direction or the other depending on climatic conditions at the beginning of the cropping season, the relative size of plots, or the gender and age composition of the household, especially the number and ages of co-wives.

The majority of the labor that goes to household plots comes from the 16 to 45 age categories. Those who reported working on the collective plot as their primary agriculture were mostly male (62 percent), while 78 percent of those who primarily worked individual plots were women. Hence, while households tend to devote the bulk of their labor to collective plots, there are important differences between men and women with regard to labor allocation. Men seem to favor pooling labor in the household interest, whereas women either split their labor between the collective and individual plots or they given preference to their own individual plots.

There are also important differences between the Guera and the Batha. The percentages of females reported to work on their own plots as a primary task in the four sous-préfectures are 27.3 for Mongo, 28.5 for Bitkine, 16.7 for Ati and 14.8 for Oum-Hadjer. Assuming that the females worked neither on collective or an individual plots are probably young girls, these figures are significant, since approximately half of the adult females spent more time on individual plots than on the household plot.

In Mongo, about half the female population did no agricultural work. Presumably, the majority of those females were girls or elderly women; that is, under 15 years of age or over 45 years of age. Of the women active in agriculture, about 22 percent considered working the household plot their primary task and about 27 percent spent more time on individual plots. In other words, women who had access to both common and individual plots divided their labor nearly evenly between pooling and concentration. By contrast, only 20 percent of the males in agriculture reported working individual plots as a primary or secondary activity. In Bitkine more than any other sous-préfecture, women concentrated their labor on individual plots. Nearly 65 percent of the sample female population did not work a common plot, while 54 percent did not work an individual plot. Again, it is assumed these were very young or very old women who did no agricultural work.

These data suggest that households seek to balance pooling labor on the collective plot against concentrating it on individual plots. The results also indicate a lack of

reciprocity between male and female household members where labor allocation is concerned. Wives, children, and other dependents contribute to the common plot controlled by male household heads, but wives mostly rely on the labor of their own children (in some cases, only daughters) to manage the individual fields. Moreover, if the male household head works on individual plots at all, he devotes considerably less labor to those plots than his dependents do to the common plot.

Pooling labor to work the common household plot, then, appears to be a major strategy for coping with a disadvantaged natural and economic environment. It is a sound one in years of subaverage rainfall, given that individual plots tend to be smaller and utilized for crops that supplement grain in the diet, notably groundnuts and sesame. Yet, in normal years, it appears that households would devote more labor to individual plots, thereby maximizing production of supplementary foodstuff as well as grain, especially if dependents had access to additional labor.

The sexual division of labor also follows distinct patterns. In principle, tasks requiring greater physical strength and exertion are categorized as "men's work," whereas those requiring less are "women's work." Generally speaking, clearing land (**défrichage**), tilling fields (**labourage**) with the traditional long-handled hoe, and threshing (**battage**) are men's work, whereas winnowing (**vannage**) is women's work, and weeding (**sarclage**) may be done by either gender. In households lacking sufficient adult men or where adult men are altogether absent (especially those headed by widows or divorcees), women may clear and till as well.

Wives, daughters and other female relatives participate in inter-household labor exchange throughout the target area. As is the case for men, labor exchange is a secondary activity for women and one in which they were involved relatively little last year. However, a slightly greater percentage of women than men participated in recriprocal labor everywhere except Bitkine, where only half as many women as men did.

Women market much of the grain and animal products (as opposed to animals) for households in the target area. Women also constitute a majority (55 persons) of the persons who engage in handicraft production for sale, such as mat-making. Also, it is woman's lot to shoulder responsibility for most domestic chores. These include gathering firewood for daily use (as opposed to stocking firewood, which men appear to do more frequently), fetching water, food preparation, cooking, and child care. As expected, females constituted 84 percent of those who reported domestic chores the primary non-agricultural task. Such female household labor was so easily taken for granted in the target area that both men and women were often at a loss to estimate the time certain common domestic chores require.

Informal interviews indicate, however, that the tasks mentioned above consume at least five hours of female labor time per day.

Males are largely responsible for construction and repair work around the homestead, and they sometimes make handicrafts, such as mats or rope for use at home. But, in sharp contrast to "work around the house," men rarely do "domestic chores," such as cooking and cleaning, the responsibility of women. It is noteworthy from the vantage point of food security that in several Guera and Batha villages informants reported that granary construction is a woman's job.

Children under eight years of age are largely free of work responsibilities at the homestead or in the field. Representing nearly 50 percent of the total population, they accounted for the majority of the persons reported not to be involved in the nine tasks surveyed. Yet once children reach age eight, their work responsibilities immediately begin and gradually increase. Aside from helping with cultivation tasks, boys tend livestock for their own households or, in villages where herds are pastured in common, take turns in the rotation of village herders. The age category 8-15 years contained the largest percentage (25 percent) of those who manage the livestock as a primary or secondary task. The four sous-préfectures vary in this regard, in that Mongo and Bitkine had more 8-15 year olds involved in livestock activities.

While girls tend to work in fields less than boys, and except in Arab villages to do little herding, they too are involved in agriculture. In addition, girls and female adolescents assist their mothers to fetch water or firewood and assume some child care duties for their younger siblings.

Labor Exchange Institutions

Each of the three traditional labor sharing institutions are discussed in more detail in the section on groupement. As eminently social traditions, they reflect the value that villagers place on collaboration and cooperation between households. Their existence also indicates that villagers routinely take the initiative to find local solutions for social and economic problems, in this instance, labor bottlenecks. Nevertheless, the organizational features of these networks differ, and their utilization by villagers is subject to economic and social constraints.

The vast majority of the sample population did not engage in group or exchange labor during the 1990/91 campaign. Survey data indicate women tend to participate in labor exchange more than men, except for the case of Bitkine. Age differences are also important. The largest percentage of persons reported to participate in group or exchange labor were in two age categories--16 to 30 years (about 25 percent) and 31 to 45 years

(about 30 percent). This suggests that persons make greater use of extra-household labor during the core years of economic activity, even though the traditional associations were less widely used last year than might be expected.

The cost of traditional associations is one of the major constraints on their use. Although the questionnaire did not disaggregate reports on the use of nafir, nassabir and amchelé, qualitative field methods suggest that, over all, there was considerable difference in the extent to which households used the three traditional associations during 1990/91. The survey data show, for example, that a quarter of the adults in the most economically active age cohorts, 16-30 and 31-40 years, participated in group or exchange labor last year. Based on informal interviews, nafir appears to have been more prevalent than nassabir, while amchelé lagged far behind as a source of agricultural labor.

Agricultural Wage Labor

Wage labor is insignificant as a source of extra hands or of income for the vast majority of households in the proposed project zone. Gender and age made little difference in this regard. Even among the core age categories, the number of cases of wage labor was usually in the single digits, and little more than five percent of the adult males or females in the sample were reported to engage in wage labor as a primary or secondary task. In Banda (Mongo), the going price for hired agricultural labor on a coudée of land (750 square meters) is 250 CFA, whereas in Alifa (Ati) that same sum is a day's pay, unless the farmer and worker negotiate a specific amount-per-area rate. Only the most destitute of villagers in the four sous-préfectures sell their labor to other farmers.

Craftwork

Artisanal craft production, such as mat-making or basket-making, provides certain households in the target area with an important source of dead-season income. A task of secondary importance for most persons reported to engage in it, women are more likely to pursue this activity than men, and its significance as a strategy to overcome harvest shortfalls varies in the four sous-préfectures. Women from Oum-Hadjer are most active in craftwork, and women from Mongo and Bitkine (where agriculture is more productive) has the least participation of women. While the figures for males are not so striking, Oum-Hadjer men are more active in craftwork than those elsewhere.

Marketing

Women market much of the grain and animal products (as opposed to animals) for their households. The marketing data

underscore the subsistence orientation of households in the target area and indicate how bad the 1990/91 agricultural campaign was. Just under 10 percent of the total population was reported to engage in marketing last year. Of the 53 persons who reported that marketing was an important task, nearly 60 percent were women, while some 68 percent of the 108 persons who ranked it a secondary activity were female. Although the percentage of females reported to market products for money as a secondary activity ranged as high as 17 percent in Ati, the numbers of males or females who engaged in marketing as a primary or secondary activity did not exceed 25 in any of the other sous-préfectures.

It is possible female involvement in marketing may be underreported in survey responses for one of two reasons. First, given the last campaign's small crop harvests, many households consumed all of the grain, groundnuts, and sesame they produced. Second, informants did not always distinguish the person who actually markets a product and from the person who is "in charge" of marketing or controls revenues from it--usually a male household head.

In sum, the data from the survey permit several conclusions regarding to labor supplies and patterns of allocation. First, women are critical contributors to the labor pool, not only in terms of quantity of labor they provide but also with regard to the range of tasks they perform. Second, sharp distinctions of tasks--either between collective and subunit responsibilities or in terms of gender and age--become less important when household security is threatened. Third, there are only minor opportunities for income generation outside of agriculture in the target area.

On the side of agricultural demand, the variation in labor applied to given crop activities varies widely according to the climatic conditions of a given year, the crop, and the labor available to the household. While detailed crop budgets were not possible, the survey did provide some information to quantify relative labor inputs for the principal crops. Table 7 summarizes the per hectare labor demands estimates for rainfed grains, berebere, groundnuts, and sesame in the Guera region. The estimates are presented in mandays, womandays, and group days for the individual tasks associated with each crop, and the calculations are based on the most frequently observed quantities.

While somewhat tentative, the results do indicate that rainfed sorghum requires more labor than does the recession crop, particularly for weeding. Since berebere land is under water until the crop is planted, most likely there is less weed competition, and it is more easily controlled. For rainfed crops, however, the weeding, harvest, and battage require large

amounts of labor. These tasks, along with the opening of new lands, commonly have recourse to group labor supplies. The table also indicates that in grain production, men and women appear to contribute similar amounts of labor.

Women, on the other hand, provide more of the labor for groundnut and sesame production. These crops are less labor intensive, although weeding and harvest are again the categories that demand more labor. It is possible that subunits in the household tend to have more fields of these "less critical" crops precisely because the labor demands meet the lower labor supplies available to these units.

## VI. Livestock Ownership and Management in the Target Area

Ownership of livestock is important in both Guera and Batha as a source of income and as an critical component of household food security strategies. Cattle, goats, and sheep are the most valuable animals, but chickens and other poultry provide a needed source of occasional protein. Some households also own donkeys used for transporting goods from field to home and to markets.

Guera and Batha villagers reported that agricultural surplus could be used as a means of building up or reconstituting livestock herds, especially cattle. Animals are regarded both as a savings mechanism and as a symbol of status and wealth within the local social structure. Moreover, animal ownership constitutes a major coping strategy with regard to environmental risks, because animals or animal products can be sold when crops fail or when unforeseen expenses occur.

At the same time, livestock ownership entails certain costs. Pastures are not privately contolled, and the carrying capacity of the environment is low. Consequently, cattle must range over large expanses of land in order to find sufficient forage. Aside from grain residue, farmers neither have the land nor the climatic conditions to grow feed for their animals. Under these conditions, the labor requirements of animal husbandry, and annual variation in pasture production, work to constrain the size of herds that can be maintained locally. The smaller ruminants, on the other hand, are much less exigent in this regard, and poultry are the quintessential kitchen livestock. In part, these factors explain the distribution of animals in the study area.

Table 8 indicates that about one quarter of the sample had cattle, and for this group the average herd was ten animals. More households in Guera than in Batha reported cattle ownership (32% for Mongo and 39% for Bitkine), and Mongo's cattle owners tended to have more animals (13) than Bitkine's (8). In recent years, the Guera has had better harvests and pasture than the Batha, which may partially explain the larger herd. Many of the

cattle-owning households sold one or more animals during the last year for prices that ranged from 40,000 CFA to 60,000 CFA. Therefore, cattle are a desirable source of income and an anti-risk strategy as well as an investment opportunity or status symbol.

In target area villages, both the primary household unit and the individual subunits may own and manage animals. The vast majority of cattle were managed by the primary unit, probably because of high acquisition costs and extensive labor requirements. On the other hand, goats and sheep are raised near the concession and can be more easily managed. As a result, goat and sheep ownership is significantly more accessible than cattle. Fifty percent of the households in Mongo and Bitkine owned goats and about ten percent owned sheep. The average size of the herd for owners was between seven and 10 goats. Sheep ownership was most prevalent in Ati, in Batha prefecture. As goat/sheep ownership is more extensive, subunit control and management is also greater with regard to the small ruminants than with cattle. That is, individual wives or other subunit heads have easier access to goats and sheep. For all the sous-préfectures, households had sold an average of three animals during the past year.

Chickens are the easiest type of the livestock to manage, and close to half households reported owning chickens. Flock size varied between 4 and 13 birds. As a more liquid asset, chickens are sold more frequently than the larger animals, and the turnover of ownership is quicker. Informants reported selling an average of four chickens over the last year, but the principal value of this livestock is the regular protein it provides the household.

Livestock Management Practices

Animals are obtained through inheritance, purchase, or as payment for taking care of herds. Women may receive cattle as part of bridewealth given to the women's family by the husband. After a bountiful harvest, household members may also buy animals with revenues from grain and peanut sales. A variety of strategies may be employed to manage livestock, the selection of one strategy rather than another depending on factors such as the type of animal, herd size and owner confidence. In the case of cattle, a professional herder may care for animals from one or several villages. This herd follows transhumance circuits far from the villages for much of the year and, in essence, is not monitored by its owners. A second strategy is to leave animal care to the youths of the village. Specific observations of livestock management practices were made in 14 of the 16 villages. Four villages in Guera and four in Batha traditionally confide their herds to transhumant Arab herders; another four in Guera and two in Batha managed their cattle locally.

The dependence on transhumant Arab specialists carries mutual benefits. From the sedentary agriculturalist perspective, the "professionalization" of animal care saves critical labor resources needed for farming and protects the fields from wandering animals during the crop season. Transhumance requires a detailed knowledge of the region, knowledge in which the herders are specialized and farmers are not. Herders can take advantage of economies of scale in rangeland and herd management. Moreover, the farmers also benefit from milk production, since some lactating cows are left with their owners. The Arab herders have access and use rights to dairy products, such as milk and butter, and to manure which can be exchanged for forage in the villages along the circuit.

Arabs Bitkine reported that transhumance circuits have shortened because many more people are engaged in agriculture at least part of the year. Women who accompany their husbands on the circuits are responsible for milking the cows and selling dairy products during the rainy season, and they use the proceeds from the sales to buy grain and other foodstuff.

In Guera, animals on transhumance circuits often go toward the Batha, while in Batha itself, the animals begin to descend t rds the south in October, following well-defined routes. As r arises, herders sell cull animals. The herds return to the n:rth about the time of the first rains, taking care to to reach the right bank of the Batha before flooding occurs and cuts them off from their routes.

In those villages with access to pasture and an absence of insect pests, cattle from individual households are grouped into village herds. During the rainy season, the herd grazes in communal pastures some distance away from the village. Each type of animal--cattle, sheep and goats--is managed separately. In the case of a large and important herd, the owner hires a specific village shepherd in exchange for salary and a calf. During the rainy season, smaller herds may be grouped together, under the care of pairs of village youths, who take turns tending the animals. In some villages, animals return in the evening; in others, they stay far from the village. During the dry season, the animals graze on the residue from the harvest and manure the fields for the next farming season. In the evening, each owner puts the animals in an enclosure (Ar. **zeriba**) within the concession.

The pattern of animal care in Bigua (Canton Bidio, Mongo) provides an example of this type of village-based management. Every morning, the animals are grouped into one herd and taken to pasture from early morning to late afternoon. In the evening the cattle are returned to their owners. In the rainy season, water is easily accessible in streams and ponds, but during the dry season, the herd must be watered twice a day at available wells.

Manure is collected from the enclosure in the concession and placed on the fields near to the house.

An alternative management strategy is practiced in the Batha area among basically sendentary agro-pasturalists. It revolves about a fixed farming village with permanent residences and granaries, where the villagers live during the farming season, and a secondary residential unit, the camp (Ar. **ferick**) of semi-nomads, which is occupied during the dry season. Residential units consist of low, skin covered tents, easy to set up and dismantle. During the rainy season, the animals are kept far from the village by youths and do not return until after the farming season. In the dry season, women tend to the calves and young animals near their huts while men take the adult animals to wells far from the ferik.

The ferick exemplifies the situation of agro-pastoralists who live in villages for at least part of the year, but move out of their villages during the dry season. Aiming for flexibility in access to resources, these villagers protect both their capital in land and in livestock. Dry season transhumance circuits are short and villagers in the ferick rarely move outside of the canton, preferring to stay within moderate travelling distance from their home villages.

Small ruminants may also be given to Arab herders for management, but more frequently they are managed by village youths, who generally work in pairs for two days at a time. The animals are herded together into one or several troups, taken out to water and pasture daily, and then returned to the concessions by evening. In the dry season, some households manage their own goats and sheep. Often crop residue is freely available, not only to village herds but to herds owned by nomads passing through the area.

In times of drought, villagers rely on small ruminants not only for their milk products (goat milk is considered especially rich and nutritious for children), but also for their potential sale value. Villagers pointed out the importance of women in the sale of goats to meet the every day needs of the household for tea, sugar, salt, soap, and condiments.

In a year of adequate rainfall, villagers report that there is little conflict over pasture or water holes. Sometimes, however, nomadic herders graze their animals on farmers fields without permission, especially during the crop season, and this leads to farmer-herder conflicts. When such problems occur, they are settled by the village chief and other elders. In some villages, however, farmers do not have sufficient trust in the Arab herders to confide them their livestock. Arab herders are sometimes suspected of misinformation regarding the birth of

calves, or of exchanging good animals for inferior ones, or even of stealing animals given to their care.

Generally, villages on the main transhumance routes, such as Golonti (Canton Yalnas, Mongo), benefit from the presence of Arab herds through mutually fruitful systems of exchange such a barter of milk for cereals, storage of grains by nomadic Arabs in sedentary villages, use of crop residues in exchange for manuring of fields, and renting of donkeys or camels for transport of harvest e.g. in the Batha area. The traditional practice called **parcage** enables farmers to have their fields, especially their valuable beréberé fields, manured over a period of several weeks in return for their leaving the grain straw behind for the cattle to eat. Parcage may take place in the same fields over a period of several years. Farmers also give the herders sugar and tea as further encouragement to leave their animals on specific fields. If the herder the more in need of fodder for his animals than the farmer is of manure, the herder may pay the farmer. In some cases, the same Arabs travel the same routes and regularly stop at the fields of villagers with whom they have previously established a parcage relationship. This system was identified in the Mongo villages of Banda and Chawir as well as in Bitkine village.

Before the arrival of the herds, farmers collect some of the crop residue from the fields to use in making huts or mats and also store some for sale to herders during the dry season. As mutual trust develops between individual herders and farmers, farmers are more likely to entrust their cattle to Arabs for long-term care.

Farmers well understand the importance of manure and use it not only through the system of parcage, but also by taking manure from the compound enclosures and spreading it on the fields near their houses during the month of March. For this reason, the smaller fields near the house appear to have higher productivity.

The survey and the key interviews clearly indicate the value of livestock ownership in the target area. Animal husbandry is an integral parts of in the survival strategies of rural households, and their management is fully integrated into cropping practices as well as into farmer interrelationships with the non-sedentary and partially sedentary groups. As such the distribution of animals may reflect wealth differences within fabric of rural society. Table 9 summarizes two variables of livestock distribution --land size and gender of household head. The table reports the percentages of farms in the one-three hectare category and the average number of animals or birds per owner. The overall pattern is that smaller farms have less access to the cattle and small ruminants, and that larger farms have less interest in poultry. Regardless of size, all farm sizes have more goats/sheep than cattle. Female-headed

households, on the other hand, have fewer animals, which may reflect smaller households, more general poverty, cultural constraints on female animal husbandry, or simply the tendency of women to maintain animals with their respective lineages; that is, with their brothers and fathers.

Livestock distribution among within the household shows that larger animals tend to be pooled within the primary unit, while some goats/sheep or poultry may be managed by the individual subunits. These patterns differ from much of West Africa, and there appear to be two explanations for them in the target area. First, labor costs for managing large animals under conditions of high risk and uncertainty are too high for individual subunits to assume. Second, these households are generally so vulnerable economically that scarce resources must be pooled in order to maximize chances of survival. Simply stated, these households operate at a margin in which individual control over a resource as important as animals is not a feasible strategy.

## VII. Production, Yields, and Technology

It has been stated throughout this study that the principal economic objective local farmers is the sustenance of the family household. These households are partially integrated in the market, in the sense that they offer surplus grain to the market in a good agricultural year. Certain other crops, like groundnuts and vegetables, as well as some livestock, are also partially destined for the market to cover annual cash needs. This section uses survey data to determine how successfully the sampled households were able to fulfill their consumption needs or to generate cash for other necessary expenses. Because the 90/91 agricultural campaign encountered particularly unfavorable climatic conditions, the reported figures are substantially below what an average year might obtain. On the other hand, the variation across the study area--due, again, to micro-climatic differences--might reflect the range of outcomes that farmers throughout the study area experience from year to year.

Table 10 disaggregates the sample by land size and gender categories and summarizes the reported production levels for the principal subsistence/cash crops. Sorghum (rainfed), millet, and berébéré (recession) are the staple grains grown to feed family members. Sesame, grounduts (**arachide**), okra (**gombo**), and vegetables are also consumed domestically, but these products are also used to generate cash when needed. As Table 10 suggests, there was wide variation in production levels during the 90/91 campaign, primarily between the Guera and Batha prefectures. In Mongo and Bitkine, rainfed sorghum production ranged from an average of 126 kilos for female-headed households to 845 kilos for the large farms (6-10 hectares). Berébéré production ranged

from 26 to 547 kilos for the average sized farm (3-6 hectares). When sorghum, beréberé, and millet were combined, the average Mongo household produced around 650 kilos, and the average Bitkine household harvested about 350 kilos By comparison, Ati households averaged a combined grain harvest of 160 kilos, while in Oum-Hadjer, the average production level only reached 17 kilos.

In those regions where some harvest was obtained, the larger farms had more grain production. In Batha, however, land size does not correlate well with production levels, which vary more according to the vicissitudes of climate. In Guera, the grain yields per hectare follow the expected pattern, where smaller farms have a higher productivity than larger farms. The smaller farms tend to be cultivated more intensively with a high labor/land ratio. Grain yields are well below normal levels for the 90/91 campaign, and in Batha, both production and productivity were almost insignificant.

As Table 10 shows, Guera also obtained some production in groundnuts, sesame, and okra. The levels of production and productivity are low and highly variable. In Batha, the only consistent production was in vegetables (tomatoes, peppers, radishes, onions, etc.), where irrigated farming is practiced along the Batha River.

Perhaps a more insightful indicator of local welfare is per capita grain consumption. If it can be assumed that an average per capita household grain requirement is about 100 kilograms per year, based on daily consumption of **la boule**, the thick porridge ball, then only farms in Mongo approached an average minimum level of self-sufficiency (Table 10). Bitkine averaged about 60 percent of the minimum, while the sous-préfectures in Batha found themselves in the most precarious situations with regard to local food security. The female-headed households appear particularly vulnerable. In Mongo, the per capita consumption availability for female-managed farms was about half that of the sous-préfecture as a whole, and in Bitkine, female-managed farms only claimed about 20 percent of the per capita supplies of male-headed households. In the Batha, where food scarcity is widespread, the differences are reduced. However, even the average per capita consumption figures reported in the survey are subject to wide variations, reflected in large standard deviations. Mongo and Bitkine, which enjoyed the largest production in the study area, only have 30 and 15 percent of the households above the self-sufficiency line. Thus, the pervasive differences in micro-climate distribute the success or failure of a given agricultural campaign very unequally among a region's villages.

The survey also examined the internal differences in production among household subunits. As Table 11 indicates, the

subunits within the household tended to produce less in total quantity than the collective household plots. This fact most likely reflects the smaller land size for these fields. On the other hand, the subunits achieve greater productivity per unit of land. This pattern is particularly clear in the Guera, where production was more stable during the last year.

The agricultural technology employed throughout the target area is low-input and labor-intensive. The survey did not identify any use of purchased inputs, such as fertilizer or insectides, and animal traction was not used on the sampled farms, although several assistance programs in the target area currently promote the use of animal power for agricultural activities. Farmers select their own seeds and use animal manure when possible (see section on livestock). On the beréberé lands, some farmers have erected water-channeling structures that tend to maximize the moisture absorption. In general, the major fund of technical knowledge in traditional agriculture consists of a deep and sophisticated knowledge of the environment which determines the timing of agricultural operations. Farmers make critical decisions regarding the fallowing of fields, the appropriate seed for specific land types, the improvement of beréberé lands, and parcage relations with Arab transhumants.

As a later section discusses, none of the sampled farmers used credit for their agricultural operations. It was not clear what constraints keep farmers from credit, although the administrative infrastructure does not appear to be adequate for widespread credit disbursement. Many villages are simply isolated from the bureaucratic mainstream, and participate in wider regional systems in a peripheral way.

## VIII. Consumption and Marketing

The production and yield data from the survey suggest that in less favorable agricutural years, major sections of the target area become subject to severe food security problems. With empty granaries, households must turn to markets to provide the necessary consumption goods. There are well-known periodic markets in the study area (e.g., in Bitkine and Mongo), which serve to distribute regionally produced goods (e.g., foodstuffs and handicrafts) and basic manufactured goods (e.g., soaps, oils, kerosene, etc.), and to assemble foodstuff for channeling out of the region (e.g., surplus grains, groundnuts). As a whole, the marketing system suffers from infrastructural deficiencies, particularly with regard to communication and transportation, which implies a slow movement of goods from food surplus to food deficient areas in the region.

The survey provided some information that could be used to estimate the integration of households in the market system. On

the production side, farmers were first asked yield information for each of their fields, then the destination of that product--either to household consumption, the market, exchange or gifts, and so forth. Although the results to do not allow strict quantification of the products marketed, it was possible to obtain an idea of the percentage of fields from which crops were sold, at least partially. As Table 12 indicates, Mongo and Bitkine appeared to participate more actively in local markets than the sous-préfectures of Batha. Farmers in Mongo, which had the better agricultural year, also sold part of their grain harvests. Within the crop categories, millet was the grain that appeared partially destined for the market, while the major non-grain marketed crops were groundnuts, okra, and vegetables. Sesame was only sold in Mongo.

On the consumption side, the survey data were used to create representative market baskets for the average sized family in the target area. Table 13 presents this information and it divides family expenditures into weekly or frequently recurring costs and those items purchased every six months or a year. There was general uniformity in the standard basket of goods that households purchased from the market. Most families had to buy complementary stores of grain, since production levels were inadequate over the last agricultural year. Each household also purchased salt, sugar, tea, dried fish or meat, and oil on a weekly basis. The level of cash scarcity is so prevalent that households are only able to purchase tiny quantities at any one time. The six to twelve-month expenditures tend to be either for clothing items--veils, robes, shoes, ready-made clothes--or for building costs such as thatch repair.

Price Variation in the Guera

Prices for both outputs and for consumer goods vary substantially throughout the year, reflecting the seasonality of the agricultural cycle. During the 1990/91 campaign, however, prices increased after the harvest, once it became apparent that the supply had been severely affected by the drought. Figures 5-8 illustrate patterns of price variation for the principal crops in the Guera and Batha. As expected, prices are generally higher in Batha where production was insignificant. While virtually all food crop prices increased at the beginning of 1991, animal prices remained stable or decreased. This phenomenon might indicate the coping strategy of those households who were forced to sell animals to obtain cash.

In sum, households in the target area have access to localized, periodic markets, in which they participate to the extent of their cash availability. Agricultural products are also sold to obtain cash, although grains are primarily directed toward household consumption, with only the surplus placed in the

**Figure 5. SEASONAL PRICE VARIATIONS FOR SELECTED PRODUCTS IN MONGO**

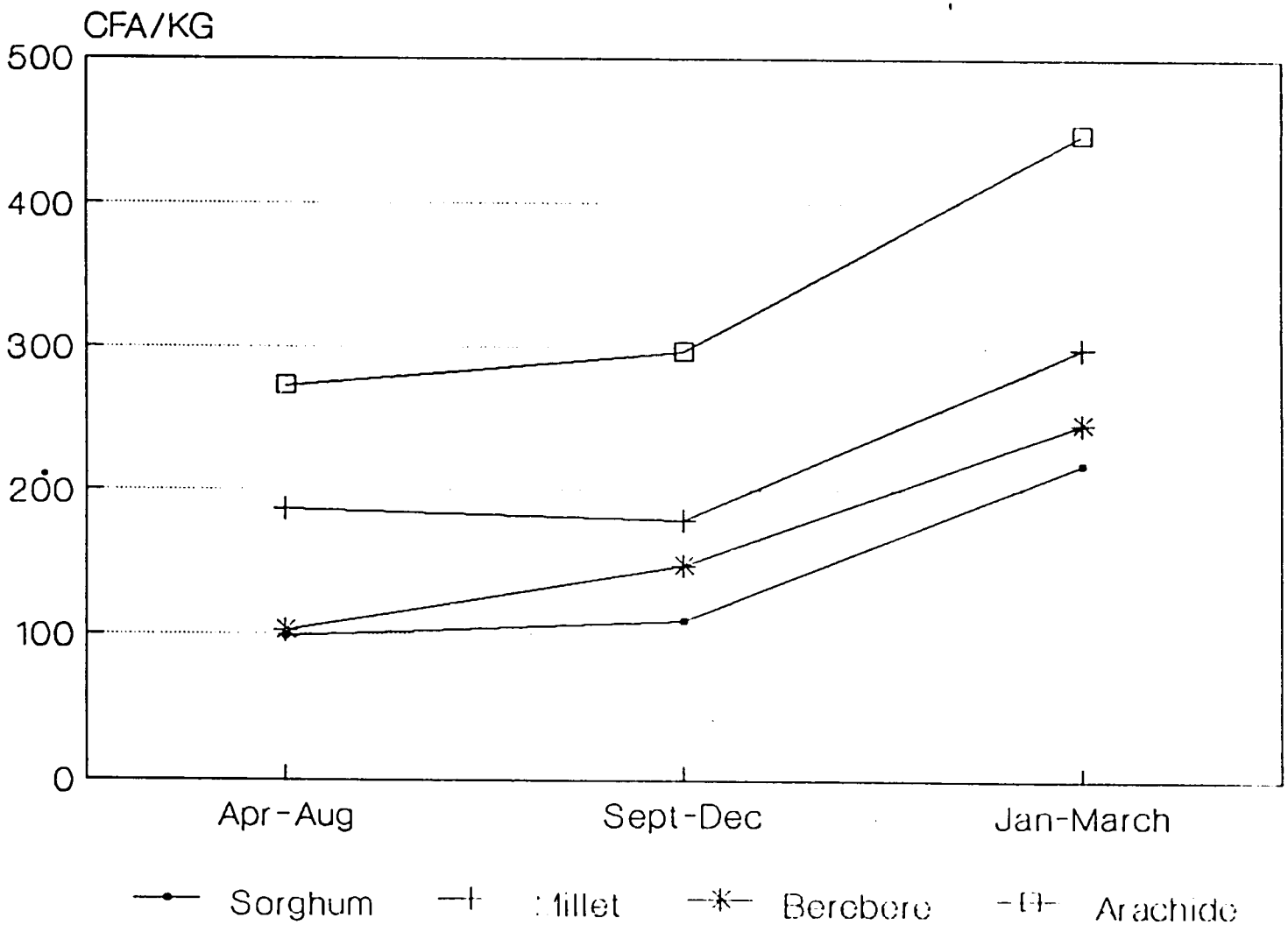


**Figure 6. SEASONAL PRICE VARIATION FOR SELECTED PRODUCTS IN BITKINE**

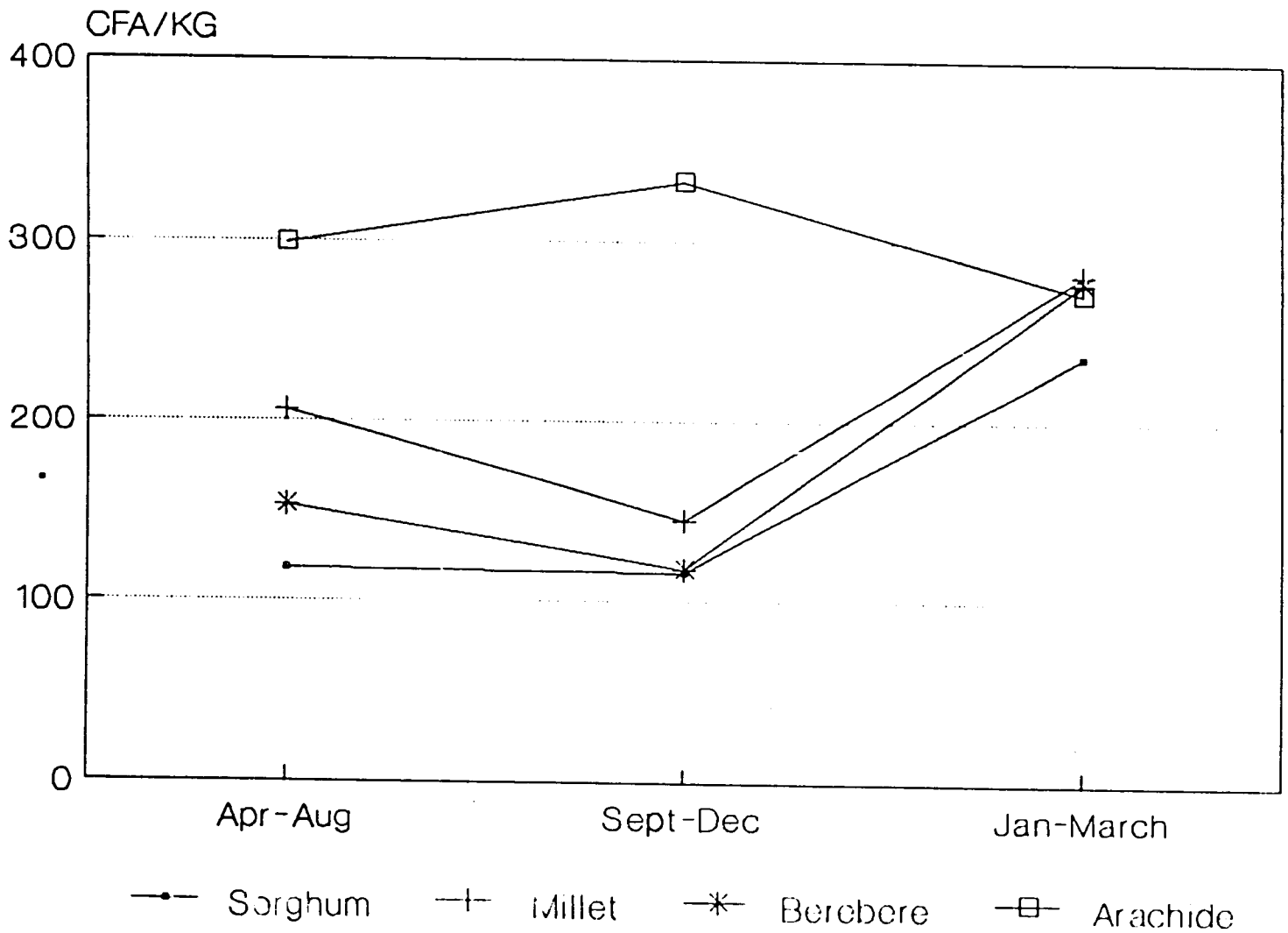


**Figure 7. SEASONAL PRICE VARIATIONS FOR SELECTED PRODUCTS IN ATI**

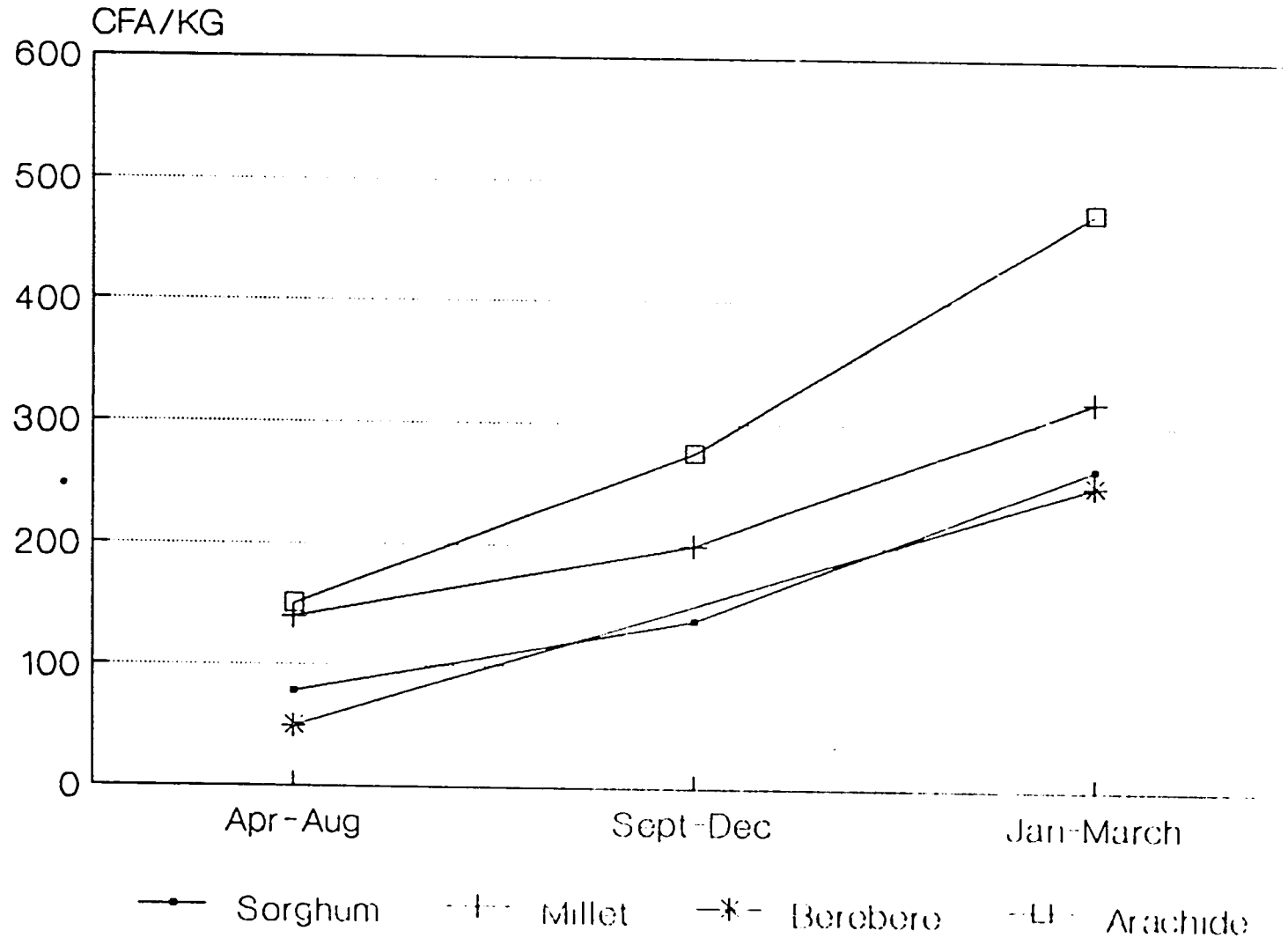
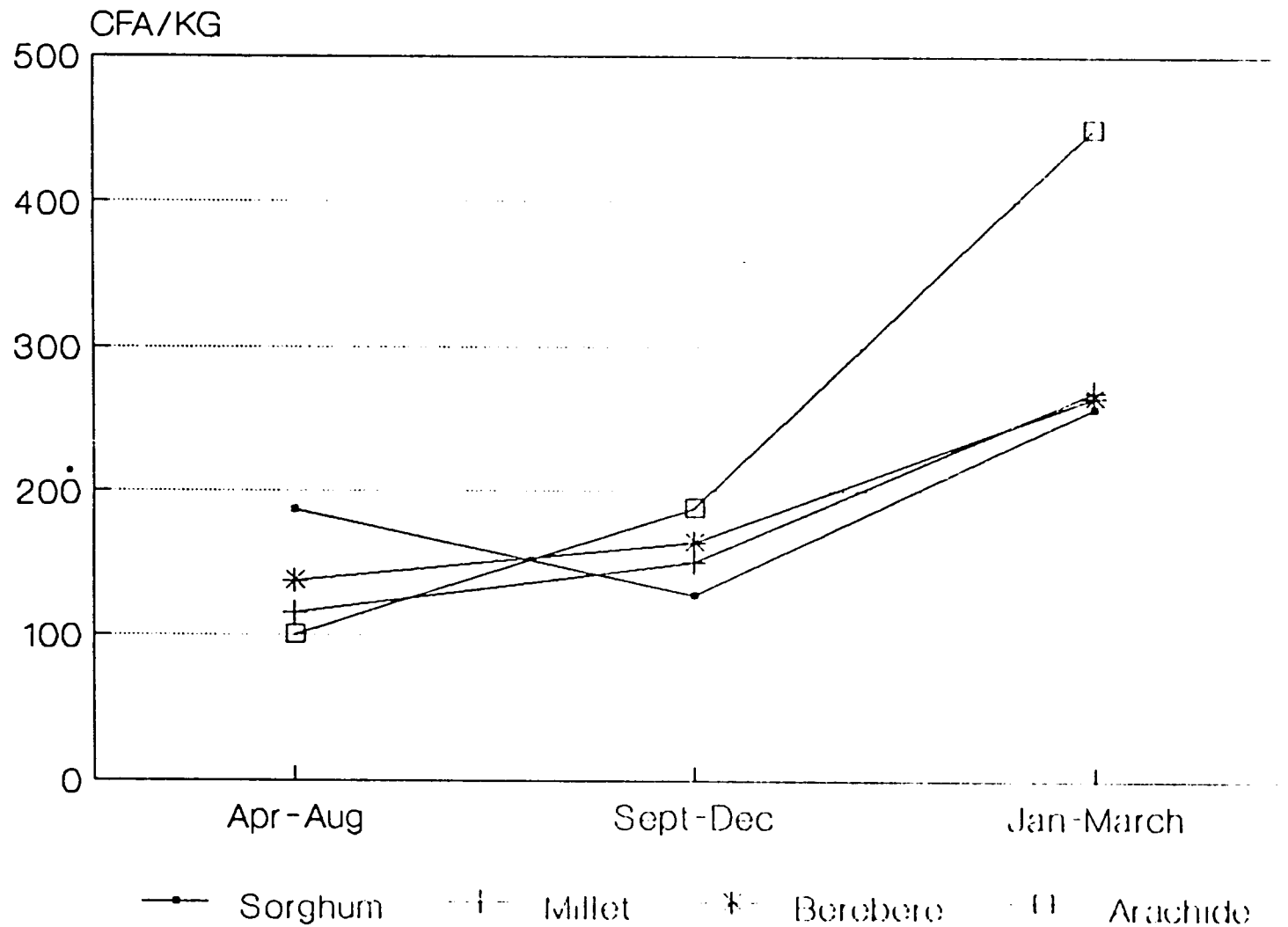


**Figure 8. SEASONAL PRICE VARIATIONS FOR SELECTED PRODUCTS IN OUM-HADJER**



marketplace. Traditional market mechanisms are already established and could be expanded to the extent that the agricultural economy should experience sustained growth.

## IX. Special Development Issues for the Target Region

### A. Groupements

In each of the 15 villages visited, the research team investigated development-oriented groups (**groupements**) and traditional associations, such as reciprocal exchange labor groups (Ar. **nafir**), "father-in-law work parties" (Ar.**nassabir**) and youth groups (Ar. **amchelé**). There were neither groupements nor traditional associations in the small **ferrique** just outside the village of Dalakéna (Canton Zioud, Oum-Hadjer), even though this camp is closely affiliated with that village.

Four methods were employed to elicit information about associations and groupements. Village interviews indicated whether these two kinds of groups existed and provided general information about them; for instance, their number, the gender of their members and their sponsors (i.e., ONDR, SECADEV or AICF). Key interviews were conducted in seven of the 15 villages with officers and/or members of groupements, or with persons who participated in traditional associations. In several villages, key interviews were supplemented by casual conversations with certain heads or members of households randomly selected to complete the socioeconomic survey. The conversations dealt with the structure and organization of existing groupements or associations, as well as how villagers might benefit from collective action in the areas of resource mobilization and conservation, agricultural technology, crop or livestock production and income generation. Finally, the team discussed problems that groupements encounter and the potential of groupements to function as targets or conduits of development assistance. Discussions were held with the personnel of ONDR in the four sous-préfectures (including one counterpart and most interviewer-interpreters), of AICF in Bitkine and of SECADEV in Mongo and N'Djamena. These four methods allowed the research team to collect solid but necessarily incomplete information on groupements and traditional associations.

Groupements

Nine of the 15 villages visited had groupements. The following chart lists those villages and their populations according to village interviews.

Populations of Villages with Groupements

| Village | Population |
|---|---|
| Banda (Canton Dadio I, Mongo) | Unavailable |
| Chawir (Canton Djonkor Aboutelfan, Mongo) | 515 personnes impossables |
| Golonti (Canton Yalnas, Mongo) | 120 HH |
| Barlo (Canton Dangaléat, Bitkine) | Unavailable |
| Sara Kenga (Canton Kenga, Bitkine) | 230 HH |
| Koundjourou (Canton Kouka, Ati) | Unavailable |
| Alifa (Canton Medogo, Ati) | 550 HH |
| Barintché (Canton Adjob Kouka, Oum-Hadjer) | 80 HH |
| Am Djoufour (Canton Massalat, Oum-Hadjer) | 230 HH |

In some of the remaining six villages, people knew about groupements, but were waiting to be contacted by a sponsor in order to establish one. In others, groupements were unknown.

Although the oldest groupement had been established in 1986/87 and most of them had were formed in 1989/90. Yet only seven of the nine villages having groupements could report at least one functioning groupement during 1990/91. In the other two villages, some groupements had been dormant last year as a result of the low rainfall and poor harvest, whereas others had disbanded due to major organizational problems. Among the latter, informants listed members' misunderstanding of the meaning of **esprit de groupement** and their failure to attend meetings or scheduled collective work days.

Survey data indicate that there are 7.5 persons per household in the project zone, of whom 4 are adults (i.e., at least 15 years of age). Thus, assuming that each groupement member represents a different household, villagers participating in groupements constitute extremely small percentages of the total village populations where they exist.

Groupement Membership in Relation to Village Population

| | No. of Gpmnts | | | Membership | | Sponsor |
|---|---|---|---|---|---|---|
| Village/SP | M | F | C | M | F | |
| Banda (M) | 1 | 0 | 0 | 20 | 0 | ONDR |
| Chawir (M) | 3 | 2 | 0 | 30-60 | 20-40 | SEC |
| Golonti (M) | 3 | 0 | 0 | 36 | 0 | ONDR |
| Golonti (M) | 0 | 1 | 0 | 0 | 20 | SEC |
| Barlo (B) | 0 | 4 | 0 | 0 | 56 | SEC |
| Sara Kenga (B) | 4 | 0 | 0 | 38 | 0 | AICF |
| Sara Kenga (B) | 0 | 0 | 1 | 18 | 1 | SEC |
| Koundjourou (A) | ? | ? | ? | ? | ? | ONDR |
| Alifa (A) | 1 | 0 | 0 | 5 | 0 | ONDR |
| Barintché (OH) | 0 | 0 | 1 | 14 | 6 | SEC |
| Am Djoufour (OH) | 1 | 0 | 0 | ? | ? | ONDR |

Single-gender groupements far outnumbered mixed-gender groupements in the five Guera and four Batha villages. Throughout the target area, there were only two groupements that included men and women. In one case, the sole member of the opposite gender was female; in the other there were six women.

Gender segregation was the order of the day, villagers from Chawir (Canton Aboutelfan, Mongo) observed, due to the weight of traditional ideas, values and practices. Villagers in Golonti (Canton Yalnas, Mongo) seconded that observation and elaborated on it. Male jealousy, female shame and the tenets of Islam concerning gender hierarchy and sexual conduct are such, these informants stated, that no married woman should be alone in the presence of men other than their husbands or kinsmen, let alone talk extensively or work with them. Yet other villagers reported that single-gender groupements predominate because of the opportunity offered by a development-oriented group to overcome the handicaps of traditional ideas, values and practices. According to members of a female groupement in Koundjourou (Canton Kouka, Ati), women have a positive economic and political interest in establishing groupements because they, independent of their husbands or kinsmen, could wield authority in the decision-making process that shapes an economic activity and exercise control over finances.

Initial consciousness-raising (**sensibilisation**) and training in administration for the groupements of those nine villages varied according to sponsoring agency, with SECADEV devoting the greatest attention to it, followed by AICF and ONDR. Time devoted to training ranged from a few hours on two separate days to several weeks. In the case of a Golonti groupement, for example, training was limited to an initial contact meeting with

an ONDR agent and one follow up meeting with him several weeks later. By contrast, groupements in Sara Kenga benefitted from a series of bi-weekly or monthly training sessions organized by AICF, whereas SECADEV groupements in Koundjourou benefitted not only from such sessions, but also from trips to compare experiences with groupements in other regions of Chad.

SECADEV appears to be the only one of the three sponsors to have devoted adequate time to animation--a set of nonformal education techniques designed to promote collective reflection and action on the part of villagers, as well as to help sustain their involvement in and commitment to them. A surprising number of sponsoring agency representatives and groupement members failed to distinguish training from animation.

Two forms of administrative structure were found among the groupements, one more elaborate than the other. The simplest structure was that exhibited by groupements with a leader or chief (**chef**) and a body of members. Leaders, usually the persons who had taken the initiative to establish the groupements, were most often selected, rather than elected, by the members. Such leaders cumulate several administrative roles and functions in a single office. It also appears that leaders are responsible for decision-making, even though, according to informants, they always consult with members and seek to establish a consensus about issues facing the group. In Golonti, (Canton Yalnas, Mongo), for example, the leader of one male groupement was solely responsible for choosing its principal economic activity and for establishing the schedule for collective work days and meetings.

The second administrative structure was more elaborate, featuring an allocation of administrative functions and roles to a number of offices. These groupements generally had a president, vice-president, secretary and treasurer as well as a body of members. Officers were generally elected, although often, as in the case of a male groupement in Sara Kenga (Canton Kenga, Bitkine) the current officers and members considered elections to be the work of a more advanced stage of groupement evolution. Decision-making in these groupements appears to be collective, in the sense that principal economic activities are selected after open discussion and that the schedule for both meeting and collective work days is established on the same basis.

It would be premature to conclude that the administrative structures and operating procedures of the groupements studied are wholly inadequate for the achievement of development goals. Nevertheless, it is fair to say that they are weak. The weakness of groupements in these regards must be addressed squarely during the food security project's design phase. For it will mitigate against rapid achievement of a central IFAD objective: to assist

actually existing, or soon to be created, groupements to become self-sufficient and manage their own development autonomously.

According to sponsors, groupements are expected to maintain caisses which pool currency or crops (e.g., grain or groundnuts). Most of the groupements studied did not have a caisse when their villages were visited either because no effort had been made to constitute one or because members had been forced to withdraw cash funds or stocks of grain during the bad harvest year of 1990/91. Sometimes, however, mismanagement was the reason for the absence of a caisse. In Barintché (Canton Kouka, Oum-Hadjer), informants reported that the entire caisse of one ONDR groupement had been stolen by an unscrupulous officer.

Nevertheless, groupements that did maintain caisses seem to have built them up by charging annual membership dues (**parts sociaux**) ranging from 250 to 5,000 CFA and, in some cases, entry fees (**droits d'inscription**) of 1,000 CFA and fines (**amendes**) of 50 CFA for infractions of rules. Groupement officers and members were often unable to explain how the amount of dues that members are obliged to pay was determined. It appears that this issue was decided during the initial contact with sponsors in many cases, even though SECADEV, AICF and ONDR representatives deny that their agencies have any set policy on the matter. Whatever the inspiration of their decisions, groupements in the project zone appear to have sharply contrasting ideas about the role of dues in groupement organization and village development. Two groupements had opted for the 5,000 CFA figure in order to restrict membership to villagers who could make acceptable financial contributions, while one had reduced dues from 5,000 to 1,000 CFA in order to make membership less of a financial hardship and, thus, more accessible to poorer villagers.

Generally speaking, the financial resources of groupements are limited. Among groupements which could provide information on the subject, the male SECADEV groupement in Barintché had the largest cash caisse. Its 20 members had managed to accumulate 100,000 CFA by charging dues of 5,000 CFA per member. One of the four male groupements in Sara Kenga (Canton Kenga, Bitkine) had the next largest cash caisse: 30,000 CFA, each of its 12 members having paid dues of 2500 CFA. In contrast to those two male groupements, the 20 members of the female SECADEV groupement in Golonti had built up a caisse of some 100 koros of peanuts between 1989/90 and 1990/91, but members were forced to withdraw all that they had stored when the 1990/91 harvest failed.

Most of the groupements studied had found it relatively easy to acquire land for collective economic activities by requesting a parcel from the village chief or land chief. The largest land area cultivated by the groupements studied was in Barintché (Canton Adjob-Kouka, Oum-Hadjer), where a mixed-gender groupement cultivates eight mukhammas of **beréberé** and a millet plot of equal

size, a total of eight hectares. Informants throughout the project zone estimated that the average groupement parcel is about one hectare.

Compared to land, groupements had relatively few tools and little equipment. Most of them, including the Barintché groupement mentioned above, had hoes which belong to individual members, rather than the groupements. Two male groupements--one in Banda (Canton Dadio I, Mongo), the other in Sara Kenga (Canton Kenga, Bitkine)--had a plough and/or a cart. Only one female groupement, in Barlo (Canton Dangaléat, Bitkine), had purchased a mill for processing groundnuts to make oil.

Fewer groupements still had access to credit, even though each one interviewed expressed an interest in it. As will be seen below, however, as necessary and potentially beneficial as credit may be to the groupements, it poses a number of thorny problems. Those problems must be tackled squarely if groupements are to benefit economically and organizationally from having access to credit.

Many groupements were engaged in agricultural production, after having acquired land from the village chief or land chief. Most female groupements cultivated peanuts or sesame, but a few, such as the one interviewed in Koundjourou (Canton Kouka, Ati), produced vegetables. Most male groupements cultivated a rainfed grain, although groupements such as the one interviewed in Barintché tried berébéré and a number of other male groupements planted peanuts, because they have a high yield/high sale price ratio and because they are comparatively pest resistant.

Some groupements, for the most part female, combined production with processing (e.g., peanut cultivation and pressing peanut oil). The above-mentioned Koundjourou groupement, which rented a peanut press for 50 CFA per koro is an example. Those same women hire two men at 21,000 CFA per month to water their vegetable garden in the dry season.

Still other groupements were involved in trade, such as buying goats or purchasing tea, sugar and other consumer items for resale. Although these marketing activities are highly attractive to groupements, they seem to have been the least successful economically.

The experience of a mixed-gender SECADEV groupement in Barintché with its goat, handicraft, millet and sugar marketing project is an interesting case in point. Having formed their groupement in 1989/90, these 14 men and 6 women had raised 100,000 CFA for their caisse by collecting dues of 5,000 CFA member. With those funds in hand, the groupement applied for and received an interest-free loan of 300,000 CFA from SECADEV in 1990/91, intending to buy cheap and sell dear, thereby short-

circuiting the merchants of Oum-Hadjer. The project lasted for 10 months. Although the groupement managed to repay the loan, it lost 10,000 CFA on the project, largely because the goats it purchased died of diarrhea. Thus, at the time of the research team's visit, the groupement had 90,000 CFA in its caisse. Apparently unperturbed by last year's setback, however, the groupement has given that entire amount to SECADEV. The plan is to buy beréberé in Am Timan, where the grain sells at a lower price than in Oum-Hadjer, to use a portion of it for seed and to store the remainder for resale later this season.

Traditional Associations

As already noted, there are three kinds of traditional association in the 15 villages studied: **nafir**, **nassabir** and **amchelé**. Although each of these associations reflects the value that villagers place on collaboration and cooperation, their organizational features and the tasks for which villagers utilize them differ.

### Nafir

Nafir are reciprocal labor exchange groups organized by individual farmers to supplement their household labor forces. Composed of anywhere from 5 to 15 people nowadays according to Guera and Batha villagers, nafir perform specific tasks and they usually work for farmers for a limited number of days during the harvest season, often only one day. Thus, they are best characterized as unifunctional, punctual groups.

Participants are relatives, friends or neighbors of their sponsors, who invite persons in these social categories to come to a field at a specific time on a particular day. Depending on the task at hand, they may be single or mixed-gender groups. For example, threshing (**battage**) is done by exclusively male nafir, whereas female or mixed nafir may assist with a field's second or third weeding (**sarclage**), and exclusively female nafir do winnowing (**vannage**).

Invitees provide labor to a farmer on the basis of the expectation that it will be reciprocated when they themselves need a nafir. Their participation also expresses compliance with diffuse obligations of kinship, friendship, or good neighborhood. As one woman in Bigua (Canton Bidio, Mongo) put it, "In this village, we are all one family, so everybody comes to nafir--kinsmen, friends and neighbors." However, a more specific expectation also motivates participants to work. A farmer who assumes the role of nafir sponsor is supposed to provide food and drink. The meal is usually common village fare: a ball of thick, cohesive millet or sorghum porridge (**la boule**) and heavily seasoned, peanut or sesame oil-based sauce, composed of okra and other vegetables. Very sweet tea is the preferred beverage in

Muslim villages, but fermented sorghum water drink, called **l'eau acide** or simply **boisson** in French, is sometimes served. In addition to the beverages just mentioned, millet beer may be served in Christian or animist villages.

Organizing nafir successfully thus poses two major problems for farmers in the project zone. First, at a time when the entire village population is seeking supplementary labor for crop land, each farmer must master the politics of labor exchange. Managerial decisions must also be made: the workload involved in, say, weeding a field of a given size must be estimated; invitations must be extended, hut by hut, to trustworthy people (i.e., those on whom one can rely to show up and work diligently); and the form and timing of reciprocation must be determined. Equally important, farmers must prepare to pay the cost of nafir. Informants in Sara Arabe (Canton Oumar, Bitkine) report that a ten-hand nafir costs, on average, 2,500 CFA. That figure represents two to three koros of grain, and several glasses of tea and sugar, as well as ingredients for the sauce. It does not include the costs of the labor or firewood required to prepare the meal.

The cost of nafir is one of the major constraints on their frequency of use. Female household heads reported that they have an especially difficult time organizing nafir, because as single women they lacked the standing to participate in the politics of nafir reciprocity, or because their cash or grain reserves were insufficient to prepare a meal. Yet male heads of household complain about the high cost of nafir as well. A Christian in his mid-thirties from Barlo (Canton Dangaléat, Bitkine) reported that, even though he has three wives, he would have used nafir in 1990/91 had he had the wherewithal to do so. He was unable to organize one, he explained, because he had neither enough money nor grain to supply the group with food.

The village chief of Sara Arabe underscored the observation that use of nafir has been curtailed by increasing cost constraints. Comparing the situation today with that of two decades ago, he noted that nafir are now used only for heavy work, such as clearing or tilling and weeding large fields. In the past, they were far more widely and variously employed. People used to be able to prepare as much as 10 hectares of land in a single day back then, he recounted, by calling together people from several villages. The chief also remembered the story of a canton chief during his youth who invited four villages to a nafir whose purpose was to till more than 10 hectares. That canton chief paid 60,000 CFA for enough goats, millet, and tea, including a hundred-pound sack of sugar, to feed perhaps as many as 150 people.

## Nassabir

"Father-in-law work parties" seems the most appropriate translation of nassabir. These parties, organized by a man for his wife's father, perform any of the agricultural tasks required to cultivate rainfed, recession land or irrigated crops. Like nafir, nassabir supplement the labor forces available to peasant households. However, unlike nafir, they do so for someone other than their sponsors and they may be used to accomplish a wider variety of tasks.

The sponsor of a nassabir invites male friends to spend a day preparing, tilling, sowing, weeding or, sometimes, harvesting his father-in-law's field. Although the son-in-law takes responsibility for issuing invitations and choosing the work day, the father-in-law provides food and drink for the invitees. By accepting his friends' assistance, the son-in-law implicitly agrees to make himself available should any of them organize nassabir.

No specific cost figures were available for nassabir. Indirect evidence suggests that the cost per hand is roughly 250 CFA, the same as that for nafir. However, they are not always as costly as nafir, some informants maintained, not only because they usually include fewer hands, but also because a man's friends expect less of a show of hospitality when he fulfills this affinal obligation. They also recognize that they themselves will be expected to fulfill similar obligations one day.

This is not to say that the cost of nassabir do not restrict their use to supplement household labor. A father-in-law, it should be noted, gains prestige among his village peers, and demonstrates his superiority to his daughter's husband, by making a work party a good show. Rather, it means that nassabir are insulated from cost restrictions to some extent by their connection with marriage. As the village chief in Sara Kenga put it, regardless of ups and downs in economic circumstances, "You cannot abandon marriage. Nassabir is a matter of marriage, family alliance and honor." Consequently, unlike nafir, it continues to function normally, even during hard times like the 1990/91 season.

Nassabir are thus as much unifunctional, punctual associations as are nafir. More significant, however, is the fact that they are the most exclusively male-oriented of the three kinds of traditional association studied. With the exception of meal preparation, a nassabir is an all male affair: one man sponsors it, others provide labor, and yet another benefits from and pays for it. The exclusively male orientation of nassabir places male household heads in a more favorable position where supplementary labor mobilization is concerned than

females. Nassabir work only on the plot controlled by the household head. Neither the father-in-law's wives, nor the wife of the son-in-law benefit directly from nassabir labor. Despite their male orientation, however, other features of nassabir favor older male household heads over younger ones. The former are more likely to have marriageable daughters and, of course, the greater the number of a man's daughters, the larger the number of nassabir to which he will have access. Thus, all other things being equal, fathers-in-law have a distinct advantage in resource management and food security because they have access to nassabir.

## Amchelé

Amchelé are youth groups which contribute their labor to the completion of social or economic activities. Usually single-gender groups, composed exclusively of unmarried people between 15 and 30 years of age, most of the smaller villages visited, like Barintché (Canton Adjob Kouka, Oum-Hadjer), had one amchelé of each gender. Large villages, like Koundjourou (Canton Kouka, Ati), often had one of each gender per neighborhood (**quartier**).

Youth groups appear to devote much of their time to recreational events designed to raise money for the group. Informants in both Guera and Batha villages mentioned dances as examples. But such events are not the only ways that amchelé raise money, and some of the other ways are quite innovative. A female group in Djalat (Canton Mesmedje, Oum-Hadjer), having stretched a ribbon across the path leading out of the village, charged the research team a fee of 2,000 CFA per vehicle to leave after the day's interviewing was done.

Amchelé also supply more important forms of labor to households. When amchelé work for one of their members, they share the costs of a meal and drinks. They may help with the construction of a house, put up compound enclosures (**sékou**) or assist a member's household with clearing or weeding. They may also be involved in the rotation of herders which tend livestock in villages with common pastures. When a non-member requests the services of an amchelé to perform an agricultural task, however, he or she must compensate the group. The village chief is an exception. He has the authority to request that the group do work deemed to be "for the public good" (**d'utilité publique**) free of charge.

Although nearly all informants thought of amchelé as good examples of the potential for cooperation in the villages, most of them did not consider youth groups a critical source of supplementary labor for households. One man in Ambazira (Canton Djonkor, Bitkine) dismissed amchelé when asked about traditional associations by saying, "That's nothing more than the pastime of youth with no responsibilities." Other informants adopted a

different point of view. A divorced woman in her late forties from Bigua (Canton Bidio, Mongo) reported that she would be happy to use amchelé to overcome her agricultural labor shortage, but she simply could not afford to pay for their services.

As even this brief discussion shows, amchelé are unlike nafir and nassabir organizationally in that they are multifunctional, rather than unifunctional groups. Yet the three forms of traditional association are similar in the sense that their activities are punctual, not continuous. Although not nearly as important a source of supplementary labor for all village households as nafir or nassabir, youth groups may be strategically important for the households from which their members come. Moreover, amchelé may be called upon to help with activities that benefit an entire village, a fact that should not be overlooked when planning turns to intervention in the areas of sanitation, potable water, and construction of schools or dispensaries.

Working with groupements is a logical development strategy on two counts. On the one hand, it facilitates outreach for the project, which could not possibly deal directly with the large number of individual peasants who make up the target beneficiary population. On the other, initiation and continuity of successful development intervention will require collective reflection and action by the villagers themselves. This is all the more true when the objective of intervention is to create autonomous, self-sustaining organizations, which address both the collective as well as individual needs and interests of peasants. Groupements provide an organizational framework for such work.

Groupements in the Guera and Batha are not at present organizations capable of functioning as targets or conduits of technical assistance. While they might be in a position to fulfill these functions in the future, they are now plagued with organizational weaknesses--administrative, financial and managerial--which mitigate against success in this regard. By contrast, the groupements stand to benefit greatly from <u>institutional</u> assistance, particularly if support is channeled to them in the appropriate form.

The groupements require training and animation: training in the meaning and functional requirements of groupements, democratic administration and decision-making, planning of economically viable activities, etc.; animation to promote and help sustain the involvement by villagers in slow, sometimes frustrating, groupement work.

The groupements also lack the financial basis to launch projects which could benefit from project technical assistance. The funds in groupement caisses are small--whether in cash or in crops--because membership is small and because harvests have

fluctuated widely over the last five years. Consequently, members' savings capacity is low. Moreover, when groupements manage to keep currency or crops in their caisses, those funds serve as a kind of disaster insurance. Since funds must be available in times of crisis (the 1990/91 agricultural campaign, for example), they cannot be earmarked for long-term or even medium-term investment. Groupements literally cannot afford to do so.

Financial resource mobilization in itself poses a problem for groupements. Considering cash only, those that have managed to build caisses have done so by charging membership dues and supplementing them with entry fees, fines and voluntary contributions. Given low incomes in the target area, as well as a scarcity of cash, 5,000 CFA in dues would seem to be prohibitive for most households. Although 1,000 CFA is far more reasonable, many households would find even that amount a strain. Note as well that the lower figure would prolong the period of accumulation and limit the amount of money groupements with 20 members could ultimately put into their caisses to finance economically viable projects. In short, decisions about dues may well make groupement membership accessible to the "most disadvantaged villagers," but they may also lengthen the road to peasant autonomy in the planning and execution of development activities.

Any effort to strengthen groupements or to increase their number should build on organizational structures and activities of traditional associations; principally nafir and amchelé, but perhaps also nassabir. The principal objective of that effort would be three-fold: (1) to valorize forms of association already familiar to villagers; (2) to use those associations as a models for collective reflection and action; and (3) to transform them structurally and functionally in order to achieve specific development goals.

Traditional associations tend to be unifunctional and involved in punctual activity. In other words, they do one task and one task only, and perform that task for a relatively brief time period once a year. Transformation of traditional association into development-oriented groupement will not be easy. The difficulties of transformation increase if, in addition to economically viable activity in, say, cereal or livestock production, the project expects groupements to undertake activities in the areas of health, sanitation, literacy, etc.

Several potential pitfalls in groupement formation are to be avoided:

1. Formation of groupements by villagers <u>simply</u> or <u>primarily</u> to receive development assistance (particularly credit). The

idea is for villagers to discover reasons why it would be in their interest to engage in collective action (including, if not savings, then at least some sort of common caisse). Once villagers begin to make progress along that course (achieve a certain maturity as a group), the project would assist them to continue (technical assistance, nonformal education or training, credit, etc.).

2. Mixed gender groupements. Neither traditional customs (religious values and conceptions of gender-specific forms of appropriate conduct) nor the past experience of groupements formed since 1984, suggest that men and women can work effectively within the same groupements. Male disdain for "women's business" is one of the negative circumstances which indicate the need for single-gender groups. One of the positive factors is widespread female interest in independence from fathers, husbands or brothers.

3. Confusion of financial/administrative needs of a specific project with the more generic organizational needs of groupements. There are no shortcuts in the establishment of a groupement movement that weds local initiative to outside assistance. An approach that places short-term bureaucratic interests above the long-term development interests of Guera and Batha villagers is almost certain to fail. Consider a savings-led credit program that identifies groupements as target borrowers:

   a. Separate male and female groupements will have separate caisses, which may not, separately, meet minimum balance or collateral requirements.

   b. Cultural and organizational circumstances of groupements require that groupements remain gender exclusive (i.e., male or female only).

   c. Lending criteria, the application procedure and disbursement policy must be flexible enough to deal, initially, with two "levels" of credit program activity: village (e.g., grand total of money in caisses of male and female groupements combined) and groupement (total funds in the caisse of any single groupement).

   d. Subsequently, the program must address the issues of group versus individual credit, and consumption versus investment credit.

## B. Credit

Almost none of the 223 households in the sample utilized traditional or institutional credit during the 1990/91 campaign. Furthermore, with one or two exceptions, the groupements had never dealt in credit operations since their establishment. The commercial banks in Chad do not lend to small farmers in the project zone, and credit programs operated by GOC service units and NGOs are either very small or still in the planning stage.

The research team's key interviews turned up no evidence of traditional moneylending or rotating credit associations. The only practice discovered which makes resources available to household members is the sale of grain on concession. For example, a young married woman in Koundjourou (Canton Kouka, Ati) reported that, on market days, she and her neighbors take millet, sorghum or beréberé on concession from Koundjourou merchants for resale. The merchants stipulate the price for the volume of grain conceded and the resellers move the grain at the best price the market will bear, keeping the difference between the stipulated price and the actual price. This informant and several others observed that concession sales--not only of grain, but also of vegetables, handicraft items and, although more rarely, livestock--occur in most of the project zone's town and village marketplaces.

Responses to questions about casual lending among villagers suggest that while gifts are often given on a variety of occasions (chiefly, at baptismal, funerary or circumcision ceremonies), loans are rare. As one might expect, few villagers have cash to lend. Women sometimes lend ingredients for the sauce that accompanies the millet or sorghum porridge ball, but they seldom lend grain for meals or for seed. This statement applies to co-wives as well as kin and neighbors. According to several male informants, villagers of either gender may lend small hand tools, animals to transport crops at harvest time and even land. Yet each of these kinds of loans is interest-free and of relatively short duration.

Despite their lack of experience with institutional credit, the majority of household heads and adult members interviewed, as well as nearly all groupements, indicated that having access to credit would benefit them. Generally speaking, the demand for credit varied according to participation in a groupement. Informants who were not groupement members tended to list their credit priorities as seed acquisition, purchasing or renting animals to transport grain from fields to homesteads at harvest time, taking care of consumption needs (e.g., health care and rites of passage) and, finally, purchasing plows or carts in order to engage in animal traction agriculture. In contrast, groupement members tended to list purchasing equipment for animal traction agriculture first and seed acquisition second, before

citing marketing and, finally, consumption needs. Interestingly enough, few informants assigned high credit priority to soil and water conservation techniques.

Regardless of groupement membership, informants who did not share this positive opinion of credit expressed two reasons why it might not be beneficial. Some stated that it is a bad idea, on general principle, to be indebted to people, especially if they are not kinsmen. Others wondered how they would be able to repay the principal and interest of a loan in an environment where yields oscillate so erratically between surplus and deficit.

It is clear that credit--both for production and for investment--could perform an important function in the economy of the villages and households in the project area. Any technological improvement that entails capital outlays will need credit in this cash-scarce society. Yet credit is only a single component of any development intervention. The important question is how to extend credit to villages and households in a manner that will benefit, rather than handicap, them. To answer it, conditions and terms of credit must be considered carefully and be gauged in terms of specific village natural, socioeconomic and technological environments.

The following issues should be considered in the formulation of any credit program:

1) Identification of appropriate target borrowers

   a. Will the credit program target individuals or groups?
   b. If groups are targeted, how will the program accommodate the interests and needs of individuals, and what will become of the objective of spreading benefits to broad segments of village and sous-préfecture populations?

2) Specification of eligibility criteria for group or individual borrowers

   a. Wealth, credit worthiness, status within households, and so forth will have to be considered;
   b. Provision must be made for the facts that female household heads, as well as male heads of small households, will tend to be poorly represented if generalized standards are applied; and that men or women who reside in households as dependents may be "invisible" from the vantage point of household-level criteria.

3) Determination of lending criteria

a. acceptable purposes for loans
b. collateral guarantees
   --are crop land area, size of herds, or amount of savings fair and reasonable guarantees for prospective group or individual borrowers? What are the alternatives?
   --How well are the "poorest of the poor" served by the adopted lending criteria?
c. economic viability of a borrower's proposed activity (i.e., profitability versus development impact)
d. duration of loans and repayment schedule (i.e., as functions of phases, technical difficulty and financial requirements of particular activities).

4) Loan ceilings

a. It is minimally necessary to devise a formula that pegs maximum amount of credit to a borrower's savings and/or the financial requirements of proposed activity.
b. As a rule of thumb, one might consider three times and twice the amount of savings, respectively, for a mature group borrower and an individual borrower.

5) Interest rate

a. Determining what is fair to poor farmers, as against feasible for sound credit program administration, will be a major policy issue.
b. Will loans be interest-free? If not, will the program use a subsidized rate or the market rate? If subsidized, will the rate include points for calamity insurance?
c. Are interest charges expected to cover credit program's loan disbursement and recovery costs, and other operating expenses?

Two general issues are especially noteworthy for planning designed to take characteristics of the local environment into account. One has to do with types of credit; the other with types of economically viable activities.

Consumption credit and investment credit differ in terms of their developmental presuppositions and implications. Consumption needs in villages are influenced by limited rainfall, insect pests, and low-output technology. Under such conditions, villagers may be expected to favor consumption needs over investment needs. Any credit program must address consumption needs, even if it seeks to channel the bulk of its funds to investment. Consequently, a comprehensive credit program might earmark one portion of its credit lines and support services for

consumption credit (e.g., illness, death, socio-religious obligations) and another for investment credit (e.g., improved technology, seed, inputs).

Second, differences among economically viable activities for which credit will be used imply differences in the application of conditions and terms of credit extension. Credit for seed acquisition and storage is not the same credit for the acquisition of equipment such as plows or carts. In addition, the introduction of animal traction, dikes or chemical fertilizer represents a new cultivation technique, which will change both physical and economic conditions. These changes are likely to influence the effectiveness of credit and the efficiency of the loan disbursement/recovery process.

Groupements provide a necessary and useful mechanism--both logistical and institutional--for extending credit to farmers in the target area's villages. But the maturity of groupements is a critical conditioning factor in this regard. Only mature groupements will be in a position to benefit from technical and institutional assistance. Moreover, only mature groupements will be capable of functioning as a conduit that channels assistance to villagers, especially the "poorest of the poor."

A partial inventory of the characteristics of mature groupements might include the following points:

--operational for at least two years prior to credit application;

--initial training in administration, decision-making, and planning of group activities;

--subsequent training in technical aspects of selected group economic activities;

--animation, using the SECADEV approach as a model, for all aspects of groupement operation;

--establishment of a caisse (preferably in cash, but possibly in grain);

--planning and execution of at least one group economic activity (preferably crop or livestock production or marketing).

C. Gender Issues

In this survey relevant gender issues are those that separate male and female members of the population according to access to key productive resources especially agricultural resources. When looking at the relevance of gender to agricultural production and self-sufficiency, we are examining

not only the situation of women-headed households, but also that of female members of male-headed households.

Women Headed Households

Women-headed households can be divided into two major groups i.e. de jure, those in which the woman is the legal head, as in situations of widowhood and divorce, and de facto, those in which the woman takes the role of the head in the absence the male head of household. In Chad, and in the Sahel in general, women-headed households and women as individual members of households do not have the same degree of access to and control of key agricultural resources of land, livestock, labor and revenue nor the same degree of freedom to migrate that men do. Because of these limitations which are related to general cultural and religious proscriptions, women-headed households are found among the poorest of the poor. Indeed a major strategy for women is to be part of a larger household productive unit and not to be part of a women-headed household. In our survey, more widows and divorced women had joined male-headed households than had formed independent units.

Slightly less than half of the female-headed households were headed by widows, the other half being made up almost equally of divorced women and women whose husbands were absent. Female-headed households are on the average, smaller than male-headed households, contain higher percentages of children under 15, and suffer a scarcity of adult male workers.

Unlike male household heads who can recruit new members by marrying additional wives and, over an extended period of time, enlarge their family through the births of children to several wives, female heads are limited to their own children, and it is difficult for them to recruit young adults in the key productive years of 15-20 to their households. Parents do, however, sometimes send their children to live with aged grandparents and assist them in their domestic and agricultural tasks.

Female household-heads with absent husbands, are less disadvantaged than those with widowed or divorced heads if the husband returns to participate in the agricultural cycle. In the Batha area, household expenditures data indicate that remittances are an important source of support to about one third of the women-headed households. Most women do not report receiving regular remittances from husbands working outside the region, even when they are absent for a number of years.

In our survey, Bitkine, an area of relatively high productivity and low levels of male migration, had fewer women-headed households while Oum-Hadjer, the most vulnerable region and heavy male migration, had the highest number of women-headed households. Our data suggest that in the more

prosperous areas, dependent females are more likely to be absorbed as a sub-unit of a larger, male-headed household than in those areas with scarcer resources.

Access to Education

High fertility rates in Chad correlate with the low level of education for women. Although half of the total population had received neither formal education in French or Arabic, the number of women of women who have never gone to school is two and a half times greater than that for men. Lack of minimal literacy limits women's opportunities to benefit from new technologies or job opportunities outside of agriculture.

Access to Land

Most women obtain land by being married or born into a village. When they want land, the simply clear it. Women also inherit access rights to recession and rainfed land, though they do not inherit the same quality and quality of land as do men. Divorced women usually return to their natal villages and access land through their living parents or through inheritance. Widowed women with children, especially, male children, tend to stay in the village to which they were married. Childless widows, or those with only daughters, often move to the villages into which their daughters have married. This presents a specially precarious situation if the daughter then is divorced or widowed and lacks children of the productive labor range.

Household land is divided into two categories, collective fields, managed by the head of household and individual plots farmed by women and other dependents. More women in Guera than in Batha claim to farm individual plots in addition to working on the collective fields. Individual plots, though smaller in size than collective household fields are very important since women do not have easy access to the collective plot until it is "opened by the husband". Women in the Ati sous-prefecture reported that husbands wait to open their fields until the wives have used the produce of their individual fields for household consumption.

Although women-headed households had smaller total acreage than male-headed households, when per capita figures are examined, female and male heads of household had approximately equal land holdings. While women do not have difficulty in obtaining rainfed land, they have less access to the more productive recession and irrigated land than do men. Several women in the Oum-Hadjer area, however, said they had access to garden land either through clearing it themselves as members of the village by marriage, or, in the case of a divorced women, being given access by the chief. A serious constraint to

gardening for women with young children is the amount of time spent away from the household.

Access to Labor

In both Guera and Batha, women said they worked from 2-3 days helping their husbands and the rest of the week they concentrated on their individual plots. Due to domestic tasks of gathering wood and water, cooking and childcare, they have less time available for work in the fields. Young girls do, however, take over a number of these tasks, permitting their mothers to concentrate on agricultural production or income generating crafts.

During key interviews, women often asserted that they give highest priority to their own individual plots, rather than to the household plot. Survey data support this contention, since about half of the women who had individual plots said they gave them their primary attention. Pooling efforts on the household plot are greater in Batha, a lower resource area, and higher in Guera where there is greater agricultural production. Production from individual plots, though primarily used in household consumption, is managed by the farmer, herself.

While pooling of labor on collective household fields is an important strategy in this risk-filled environment, it is important to recognize that women value the time spend on their individual fields and fear investing too much labor on collective fields the produce of which is entirely controlled by the husband. While a man's economic strategy may be to expand agricultural production by taking on a new wife, his current wives often see the new wife as meaning less food for them and their children. They do not wish to contribute to the bridewealth for another wife through their work on the collective field.

Children are a major source of labor for women's individual fields, though husbands assist with millet harvests on wives' plots. Co-wives generally farm independently, sometimes assisting one another at weeding, especially with peanuts. Women report that threshing is the most difficult task since it requires a large number of workers in a short period of time. Co-wives rarely assist one another in gathering firewood or water. Children of co-wives assist only their own mothers.

In most of the area, except Bitkine, women contributed slightly more to traditional exchange labor than did men. Because of the costs for feeding the workers, most women-headed households are unable to draw on exchange labor. Women also contribute the majority of the labor in the marketing of food products and in the production and marketing of crafts such as mats. Especially in Oum-Hadjer, mat-making is an essential

survival strategy which enables households to earn money to buy grain when there is a poor harvest.

Livestock Production

A minority of women own goats, sheep, and chickens, though some also have cows that they received at marriage. Widows leave their cattle with male relatives as do some married women who are uncertain of the stability of their marriages. In our survey, the only women-headed households with cattle were in Bitkine and Ati, and none reported more than four animals. In male-headed households, few subunits managed by women held cattle and in all cases more cattle were managed by the husband than by any of the wives or other dependents.

Few women-headed households own the lesser expensive sheep and goats. While more women in male-headed households owned goats than cattle or sheep, and goat milk was valued as a rich food source for children as well as an important commercial product, distribution of small ruminants within household sub-units was not widespread. Even with fowl ownership, male heads of households far surpassed female heads and female-managed sub-units of a household. Because of their low need for care and their low cost,however, more fowl than any other animal, were owned by women.

Agricultural Production

While a woman works on grain fields of her husbands, and farms smaller areas in millet and sorghum, she expects that her husband will provide her with sufficient grain for boule, not only for him, but for herself and her children. Materials for the sauce are ideally provided from the women's own farmed produced, such as peanuts, gombo, sesame or from the sale of these products. Women also rely on gathering leaves, wild fruits and roots, and scavaging grain from termite hills to meet food needs in times of shortage.

Women farmers store the crops they have grown on their individual fields in granaries which they have constructed. In case of divorce, women take the crops stored in their own granaries, but they do not receive a part of the grain from the husband's collective fields. If a woman has no granaries of her own, the husband is expected to divide his major crop granary in three parts and give one part to her.

Women say they prefer to plant peanuts or sesame since both crops provide oil for cooking. Some women say that peanuts take more work than sesame since they are planted closer together and are harder to weed with a hoe without damaging the plants. Women in Guera said they were especially interested in sesame since the

crop did not demand alot of water, and only required two weedings.

Women-headed households in Mongo and Bitkine diversify their production on small fields. Yields for grain were drastically lower than those for male-headed households, while those for peanuts were relatively high. In Bitkine, women concentrated their production on peanuts. Women-headed households in Ati had strong yields in gombo, while overall production in Oum-Hadjer was almost non-existant, except for vegetables from irrigated gardens.

Yields for female-headed households were generally below those for male-headed households as was per capita consumption of grains. On the other hand, women farming individual sub- units within male-headed households had significantly higher grain yields than did women heads of households. Explanations for the low production by women-headed households may lie in the age composition of these households where children below 15 or the middle-aged to elderly predominate, in gender differences in land inheritance patterns and access to prime agricultural areas, and in access to other resources, including political influence.

Access to Revenue

Major sources of income for women-headed households were generally similar in the two prefectures, but there were some regional differences in emphasis. In Batha, especialy in Oum-Hadjer, mat making was critical to household survival during this poor production year; remittances, agricultural work for pay, petty commerce in agricultural and livestock products, and sale of wood were also mentioned frequently.

In the Guera region more women mentioned commerce in agricultural and livestock products and in alcoholic and non-alcoholic drinks. Making mats, gathering wild products for sale, as well as agricultural labor, were also mentioned. Since total kilograms of grain per capita were lower for women-headed households, women in such households are especially constrained in gaining money by the sale of agricultural produce.

By comparing female and male-headed questionnaire responses concerning weekly expenditures and six to twelve month expenditures, certain observations can be made regarding differential access to revenues. It must be noted, however, that our lists of expenditures are based on averages and do not reveal the significant differences in wealth that exist among women-headed as well as male-headed households in our sample.

Looking at weekly expenditures, in most cases, male-headed households spend more money per capita than do female-headed, but

the differences are not great, ranging from a four to one advantage for male-headed households in Ati to a two to one advantage in Mongo for female headed households. Neither male nor female-headed households represented in our composite expenditure lists spent more than 750 CFA per capita weekly.

Major differences lie in expenditures in the six month to 12 month category, i.e. those irregular expenditures on clothing, animals, bulk food purchases, and household items. Here our general sample (largely composed of male-headed households) spends, at a minimum, five times and at a maximum 20 times as much as female-headed households in the same sous-prefectures.

These expenditure figures demonstrate the extremely limited financial base of most women-headed households and are relevant for donor agencies intending to integrate women into credit and group schemes. Clearly, it is very difficult for women-headed households to pay entrance fees to collective farming groups and equally difficult for groups largely composed of female heads to build up cash reserves to use as collateral for credit. These women lack ready financial assets to invest in the new technologies, such as oil presses and plows, which they desire. Thus, we have a situation where a major segment of the poorest of the poor are unable to take advantage of needed economic development opportunities. Such groups need in-kind gifts or low interest interest loans for inputs, such as seeds, carts, or donkeys to increase their productivity. Village-based training by local women would be an important component of such an initiative. Programs such as these are currently proving effective in a number of other African countries.

## X. Conclusions: Coping Stategies and Food Security in the Target Region

This study has attempted to identify and describe the reality of agriculture in the target area of Guera and Batha. This effort has focused on households as resource management units operating in a highly unpredictable and uncertain physical environment. These households devise sets of strategies based on alternative resource allocations in order to meet their consumption needs, and the study has examined the patterns of variation in terms of access to resources, use of resources, and the integration of these households into wider regional and national systems. At every turn, the research team strove to incorporate the perspective of the rural household in both the data-gathering and the data analysis. The one overriding conclusion that this study permits, especially being implemented during a period of severe duress, is that target area households have developed an extensive set of strategies designed to meet

worst case scenarios--"coping strategies", as the more recent development literature calls them.

At the agricultural production level, a major set of coping strategy revolves around crop diversification. Agricultural activities are spread over different qualities of land and different types or varieties of crops in the expectation that an uncertain climate does not affect the region uniformly. The second set of coping strategies involves the household allocation of labor. Rural households in the target area have an established tradition of temporary emigration during the dry season. This out-migration appears somewhat different from the case of other West African societies in that the economic opportunities afforded by the capital N'Djamena are not great. The important feature of out-migration in Chad is that it reduces the consumption load in rural households, rather than providing a significant source of off-farm income. At times of unusual stress, more household members may leave, and during the survey, reseachers observed that entire families had left their villages in search of employment or better land. The second labor-based coping strategy involves an increased reliance on off-farm income sources or on non-agricultural activities, such as handicraft production, fuelwood gathering, and so on. Villagers may make straw mats, pots, or other items for sale in local markets. Nonetheless, non-farm employment is rare, and these economic activities tend not so much to be skill specializations as adhoc strategies to meet the existing crises.

The third set of coping strategies is devised around livestock ownership. Animals are savings units in this rural society, and when major crises occur, households can either sell part of the herd or increase sales of animal products. This strategy is considered drastic, insofar as animals represent the capital stock of the farm. Those households which have animals in the hands of Arab transhumants may negotiate an arrangement to obtain part of the milk (or dairy products) in order to overcome family consumption deficiencies.

In the most dire of situations, families have to seriously reduce their consumption levels over certain periods of time. The research team observed villages where native plants, not normally used, were now incorporated into the diet. Also, women were digging up ant hills to obtain the seeds of grain stored there. These gestures reflect a certain level of desperation and uncertainty as to what the next day may bring.

In the context of these coping strategies, it is possible to make several generalizations about food security in the target area. First of all, while the region as a whole must be considered vulnerable in a food security sense, there were important differences between villages and within villages at the time of the survey. These differences can be characterized in

terms of access to land and alternative income sources and, consequently, in terms of welfare levels. The results of the survey suggest that there is but a small segment of the population able to achieve self-sufficiency during a poor year and most likely a large segment that experiences some basic scarcity even during a normal year. The study further suggests that land and livestock ownership are two criterion variables that might help define the poorest of the poor in the target area.

A final characteristic that emerges from the analysis is the high level of isolation that the target area villages endure. Access to basic services at the village level is very limited, and there are few economic opportunities available to the population. Formal schooling has not served as a mechanism for socio-economic mobility, health care is unpredictable, and the transportation and communication infrastructure virutally non-existent. These conditions severely constrain the process of change and development throughout the region.

**Table 1. Sample Characteristics of the Study Area by Prefecture, Sous-Prefecture, and Village.**

| PREFECTURE | SOUS-PREFECTURE | VILLAGE | HOUSE-HOLDS | TOTAL SAMPLE |
|---|---|---|---|---|
| Guera | Mongo | Banda | 8 | 68 |
| | | Bigua | 13 | 105 |
| | | Chawir | 10 | 94 |
| | | Golonti | 13 | 84 |
| | | Katch | 10 | 57 |
| Guera | Bitkine | Ambazira | 7 | 46 |
| | | Barlo | 15 | 122 |
| | | Sara Kenga | 17 | 127 |
| | | Sara Arabe | 13 | 92 |
| Batha | Ati | Alifa | 18 | 145 |
| | | Koundjourou | 17 | 155 |
| Batha | Oum-Hadjer | Am Djoufour | 20 | 159 |
| | | Barintche | 17 | 134 |
| | | Djalat | 17 | 106 |
| | | Ferik | 9 | 64 |
| | | Kiezi | 19 | 110 |
| TOTALS | 4 | 16 | 223 | 1168 |

**Table 2. Demographic Characteristics of the Resident Target Population, by Region and Sous-Prefecture.**

| REGION/SOUS-PREFECTURE | FAMILY SIZE (N) | INDIVIDUAL HH UNITS | PERSONS PER HH UNIT | SEX RATIO (F/M) | FEMALE HH HEAD (%) | NO. MEMBERS < 15 YEARS (% OF HH) | NO. MEMBERS > 65 YEARS (% OF HH) | NO EDUCATION (% OVER 7 YEARS) | EMIGRATION (% OF HHs) | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | PAST | CURRENT |
| GUERA | 7.0 | 2.1 | 3.3 | 109.9 | 12.3 | 46.1 | 4.3 | 52.2 | 22.6 | 16.0 |
| MONGO | 7.0 | 2.1 | 3.4 | 105.4 | 14.8 | 46.7 | 3.1 | 29.3 | 18.5 | 18.5 |
| BITKINE | 6.9 | 2.2 | 3.2 | 114.9 | 9.6 | 45.4 | 5.3 | 55.2 | 27.8 | 15.4 |
| BATNA | 6.9 | 1.9 | 3.6 | 122.4 | 27.6 | 47.8 | 4.1 | 52.8 | 41.0 | 42.7 |
| ATI | 8.2 | 2.2 | 3.6 | 93.2 | 14.3 | 46.7 | 2.7 | 45.3 | 34.3 | 42.9 |
| OUM-HADJER | 6.3 | 1.8 | 3.6 | 142.7 | 32.9 | 48.3 | 4.7 | 56.9 | 42.7 | 42.7 |
| TOTALS | 6.9 | 2.0 | 3.4 | 116.3 | 20.9 | 47.0 | 4.1 | 52.5 | 32.3 | 28.7 |

## Table 3. Patterns of Land Access by Sous-Prefecture

| SOUS-PREFECTURE | CHARACTERISTIC | TYPE OF ACCESS TO LAND | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | CHIEFS | CLEARING | HUSBAND | INHERIT | RELATIVE | GIFT | BOUGHT |
| MONGO | % OF PARCELS | 0.0 | 52.9 | 16.1 | 28.7 | 1.5 | 0.9 | 0.0 |
| | % OF TOTAL LAND | 0.0 | 52.9 | 8.5 | 37.8 | 0.1 | 0.7 | 0.0 |
| BITKINE | % OF PARCELS | 3.2 | 52.6 | 21.1 | 39.0 | 0.0 | 0.0 | 0.0 |
| | % OF TOTAL LAND | 1.8 | 52.4 | 11.8 | 34.0 | 0.0 | 0.0 | 0.0 |
| ATI | % OF PARCELS | 7.5 | 24.6 | 12.7 | 53.0 | 0.0 | 2.2 | 0.0 |
| | % OF TOTAL LAND | 0.7 | 49.5 | 4.0 | 41.5 | 0.0 | 4.3 | 0.0 |
| OUM-HADJER | % OF PARCELS | 8.5 | 36.0 | 9.2 | 44.5 | 0.0 | 0.0 | 1.1 |
| | % OF TOTAL LAND | 6.0 | 33.6 | 7.7 | 50.3 | 0.0 | 0.0 | 0.8 |
| TOTAL | % OF PARCELS | 4.2 | 44.4 | 15.0 | 35.0 | 0.5 | 0.8 | 0.3 |
| | % OF TOTAL LAND | 2.6 | 45.4 | 8.0 | 42.1 | 0.0 | 1.3 | 0.0 |

## Table 4. Land Characteristics and Land Use, by Region and Sous-Prefecture.

| Land Characteristics | Guera Prefecture | | Batha Prefecture | | Totals |
|---|---|---|---|---|---|
| | Mongo | Bitkine | Ati | Oum-Hadjer | |
| Total Cropland Per Household (ha) | 5.0 | 4.5 | 6.8 | 5.3 | 5.3 |
| Total Cropland in Household Plots (ha) | 3.8 | 3.3 | 5.1 | 3.7 | 3.8 |
| Total Cropland in Individual Plots (ha) | 0.9 | 1.1 | 1.8 | 1.1 | 1.1 |
| Average Plot Number | 6.7 | 5.1 | 3.9 | 3.9 | 4.9 |
| Average Plot Size (ha) | 0.8 | 1.0 | 1.8 | 1.5 | 1.2 |
| Average Distance (km) | 2.7 | 3.6 | 4.4 | 3.2 | 3.4 |
| Total Land Per Household Member ($m^2$) | 7369 | 6425 | 9341 | 9593 | 8234 |
| Average Cropland in Decrue (ha) | 0.8 | 0.7 | 0.2 | 0.2 | 0.5 |
| Average Cropland in Rainfed (ha) | 4.1 | 3.6 | 6.4 | 4.4 | 4.4 |
| Average Cropland in Irrigated Land (ha) | 0.04 | 0.03 | 0.01 | 0.2 | 0.09 |
| Percentage of Farms with Irrigated | 13.0 | 7.7 | 5.7 | 41.5 | 21.1 |
| Total Cropland for Female Heads (ha) | 5.5 | 1.9 | 5.3 | 3.2 | 3.8 |
| Percentage Total Land in Berbere Per HH | 15.4 | 12.7 | 3.1 | 6.3 | 9.6 |
| Percentage Total Land in Rainfed Grains | 55.0 | 69.8 | 83.5 | 83.0 | 79.2 |
| Percentage of Total Land in Groundnuts | 13.1 | 11.4 | 5.2 | 2.7 | 7.8 |
| Percentage of Total Land in Sesame | 13.9 | 1.7 | 2.6 | 4.1 | 5.7 |
| Percentage of Total Land in Irrigated Crops | 1.8 | 1.9 | 2.5 | 3.3 | 2.5 |

## Table 5. Land Distribution Among Households, by Sous-Prefecture

| SOUS-PREFECTURE | LAND SIZE CATEGORIES | | | | | |
|---|---|---|---|---|---|---|
| | 0 TO 1 HA | 1 TO 3 HA | 3 TO 6 HA | 6 TO 10 HA | MORE THAN 10 HA | TOTAL |
| MONGO | | | | | | |
| N. of farms | 6 | 23 | 13 | 5 | 6 | 53 |
| % of farms | 11.3 | 43.4 | 24.5 | 9.4 | 11.3 | 100 |
| % of cropland | 1.5 | 17.6 | 22.1 | 14.7 | 44.1 | 100 |
| BITKINE | | | | | | |
| N. of farms | 7 | 23 | 12 | 6 | 3 | 51 |
| % of farms | 13.7 | 45.1 | 23.5 | 11.8 | 5.9 | 100 |
| % of cropland | 1.9 | 22.1 | 25.8 | 18.8 | 23.8 | 100 |
| ATI | | | | | | |
| N. of farms | 7 | 7 | 9 | 5 | 6 | 34 |
| % of farms | 20.5 | 20.5 | 26.5 | 14.7 | 17.6 | 100 |
| % of cropland | 1.3 | 6.5 | 16.2 | 19.2 | 56.7 | 100 |
| OUM-HADJER | | | | | | |
| N. of farms | 3 | 16 | 33 | 15 | 7 | 74 |
| % of farms | 4.1 | 21.6 | 44.6 | 20.3 | 9.5 | 100 |
| % of cropland | 0.5 | 8.6 | 37.2 | 30.0 | 23.8 | 100 |
| TOTALS | | | | | | |
| N. of farms | 23 | 69 | 67 | 31 | 22 | 212 |
| % of farms | 10.8 | 32.5 | 31.6 | 14.6 | 10.4 | 100 |
| % of cropland | 12.2 | 13.0 | 26.9 | 21.9 | 40.0 | 100 |

## Table 6. Cropping Patterns by Sous-Prefecture and Size of Landholding.

| SOUS-PREFECTURE/ LAND SIZE CATEGORY | AVERAGE SIZE (ha) | RAINFED SORGHUM MILLET (%) | BEREBERE (%) | SESAME (%) | GROUND NUTS (%) | OKRA (%) | VEGETABLES (%) |
|---|---|---|---|---|---|---|---|
| MONGO | 5.0 | 54.0 | 15.1 | 13.6 | 12.8 | 0.7 | 1.8 |
| MONGO: SMALL | 2.0 | 56.9 | 13.6 | 14.7 | 12.1 | 0.0 | 0.8 |
| MONGO: LARGE | 7.8 | 66.5 | 12.5 | 8.6 | 11.9 | 0.0 | 1.2 |
| MONGO: FEMALE | 5.5 | 55.3 | 6.7 | 18.9 | 6.2 | 0.0 | 0.4 |
| BITKINE | 4.5 | 68.5 | 12.5 | 1.6 | 11.2 | 2.5 | 1.8 |
| BITKINE: SMALL | 2.2 | 70.9 | 9.9 | 1.2 | 12.5 | 3.6 | 1.2 |
| BITKINE: LARGE | 7.1 | 72.0 | 11.2 | 4.7 | 8.8 | 0.1 | 3.3 |
| BITKINE: FEMALE | 1.9 | 59.8 | 0.0 | 0.0 | 15.1 | 5.1 | 0.0 |
| ATI | 6.8 | 81.1 | 3.0 | 2.5 | 5.1 | 1.9 | 2.4 |
| ATI: SMALL | 2.2 | 87.0 | 4.5 | 1.5 | 2.2 | 2.2 | 0.0 |
| ATI: LARGE | 9.0 | 77.3 | 1.7 | 3.0 | 6.5 | 0.7 | 10.9 |
| ATI: FEMALE | 5.3 | 72.0 | 0.0 | 4.0 | 0.0 | 4.0 | 0.0 |
| OUM-HADJER | 5.3 | 74.9 | 5.7 | 3.7 | 2.4 | 0.3 | 3.0 |
| OUM-HADJER: SMALL | 2.1 | 86.1 | 1.7 | 5.3 | 4.7 | 0.0 | 2.1 |
| OUM-HADJER: LARGE | 7.9 | 88.0 | 2.0 | 3.8 | 2.8 | 0.1 | 2.8 |
| OUM-HADJER: FEMALE | 3.2 | 74.0 | 5.6 | 3.9 | 2.7 | 0.6 | 1.6 |

## Table 7. Labor Needs in Agriculture, by Activity and Crop.

| AGRICULTURAL ACTIVITY (person/days per hectare) 1/ | BITKINE | | | | | | | | MONGO | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | SORGHO/MILLET | | | | BEREBERE | | | | GROUNDNUTS | | | | SESSAME | | | |
| | MD | WD | GD | TOT | MD | WD | GD | TOT | MD | WD | GD | TOT | MD | WD | GD | TOT |
| Defrichment | 7 | | | 7 | 15 | | | 15 | 2 | | | 2 | 4 | 4 | | 8 |
| Brulage | 4 | | | 4 | 10 | | | 10 | | | | | 2 | | | 2 |
| Semence | 2 | 4 | | 6 | 6 | 2 | | 8 | | 7 | | 7 | | 15 | | 15 |
| 1er Sarclage | 20 | 20 | | 40 | 40 | 20 | | 60 | 6 | 3 | | 9 | | 15 | | 15 |
| 2eme Sarclage | 30 | 30 | | 60 | 30 | 15 | | 45 | | 7 | | 7 | | 15 | | 15 |
| 3eme Sarclage | | | | | | | | | | | | | | | | |
| Gardiennage | 30 | 30 | | 60 | 30 | | | 30 | | | | | | | | |
| Recolte | 5 | 10 | | 15 | 1 | 1 | | 2 | 6 | 3 | | 9 | 7 | 7 | | 14 |
| Battage | 2 | 4 | | 6 | 1 | | | 1 | | | | | | | | |
| Mise en Grenier | | | | | | | | | | 6 | | 6 | | | | |
| Transport | 2 | 4 | | 6 | 1 | | | 1 | 10 | 5 | | 15 | 4 | 2 | | 6 |
| TOTALS | 102 | 102 | 0 | 204 | 134 | 38 | | 172 | 24 | 31 | | 55 | 17 | 58 | | 75 |

1/ MD = Man Day WD = Woman Day GD = Group or Exchange Day

Table 8. Animal Ownership, by Sous-Prefecture

| Animal Ownership and Sales | Guera Prefecture | | Batha Prefecture | | Totals |
|---|---|---|---|---|---|
| | MONGO | BITKINE | ATI | OUM-HADJER | |
| CATTLE: % of HHs | 31.5 | 38.5 | 20.0 | 12.5 | 23.8 |
| Animals/HH | 12.6 | 7.6 | 7.3 | 10.5 | 9.7 |
| Animals Sold | 1.2 | 1.5 | 0.9 | 1.4 | 1.3 |
| GOATS: % of HHs | 50.0 | 50.0 | 31.4 | 36.6 | 42.2 |
| Animals/HH | 9.7 | 7.0 | 9.5 | 19.2 | 12.0 |
| Animals Sold | 2.0 | 1.3 | 2.1 | 5.3 | 2.8 |
| SHEEP: % of HHs | 9.3 | 13.5 | 28.6 | 7.3 | 12.6 |
| Animals/HH | 12.6 | 5.3 | 5.7 | 7.2 | 7.1 |
| Animals Sold | 2.2 | 3.0 | 2.8 | 2.2 | 2.6 |
| FOWL: % of HHs | 42.6 | 55.8 | 45.7 | 34.1 | 43.0 |
| Animals/HH | 10.0 | 8.9 | 13.3 | 4.4 | 8.6 |
| Animals Sold | 3.8 | 2.6 | 5.5 | 3.5 | 3.6 |

**Table 9. Animal Ownership by Representative Farm and by Sous-Prefecture.**

| SOUS-PREFECTURE/ OWNERSHIP CHARACTERISTICS | | | REPRESENTATIVE FARM TYPES | | | |
|---|---|---|---|---|---|---|
| | | | (1-3 HA) SMALL | (3-6 HA) AVERAGE | (6-10 HA) LARGE | FEMALE-HEADED |
| MONGO | CATTLE | % HHs | 30.4 | 46.2 | 60.0 | 0.0 |
| | | ANIMALS | 10.7 | 12.7 | 15.8 | 0.0 |
| | GOATS/ SHEEP | % HHs | 60.9 | 69.2 | 80.0 | 20.0 |
| | | ANIMALS | 11.0 | 9.2 | 8.5 | 12.0 |
| | FOWL | % HHs | 43.5 | 58.3 | 60.0 | 0.0 |
| | | BIRDS | 7.1 | 16.1 | 10.3 | 0.0 |
| BITKINE | CATTLE | % HHs | 34.8 | 41.7 | 100.0 | 40.0 |
| | | ANIMALS | 3.4 | 15.0 | 7.7 | 10.5 |
| | GOATS/ SHEEP | % HHs | 47.8 | 47.8 | 66.7 | 40.0 |
| | | ANIMALS | 6.8 | 5.4 | 6.5 | 6.0 |
| | FOWL | % HHs | 60.9 | 66.7 | 20.0 | 20.0 |
| | | BIRDS | 4.2 | 8.4 | 4.0 | 2.0 |
| ATI | CATTLE | % HHs | 28.6 | 44.4 | 0.0 | 20.0 |
| | | ANIMALS | 6.5 | 5.8 | 0.0 | 15.0 |
| | GOATS/ SHEEP | % HHS | 57.1 | 55.6 | 40.0 | 0.0 |
| | | ANIMALS | 10.5 | 9.6 | 11.5 | 0.0 |
| | FOWL | % HHs | 57.5 | 77.8 | 40.0 | 0.0 |
| | | BIRDS | 16.0 | 12.1 | 19.5 | 0.0 |
| OUM-HADJER | CATTLE | % HHs | 6.3 | 9.1 | 20.0 | 7.5 |
| | | ANIMALS | 5.0 | 14.0 | 11.7 | 5.5 |
| | GOATS/ SHEEP | % HHs | 31.3 | 27.3 | 46.7 | 14.8 |
| | | ANIMALS | 15.6 | 32.8 | 14.6 | 13.0 |
| | FOWL | % HHs | 37.5 | 36.4 | 20.0 | 37.0 |
| | | BIRDS | 4.0 | 5.6 | 3.7 | 3.6 |

**Table 10. Production and Yield Characteristics for the Study Area, by Sous-Prefecture and Representative Farm Type.**

| SOUS-PREFECTURE/ REPRESENTATIVE FARMS | | PRINCIPAL HOUSEHOLD CROPS/LEVELS OF PRODUCTION AND YIELDS/PER HECTARE | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | SORGHUM | | MILLET | | BEREBERE | | TOTAL GRAINS | ARACHIDE | | SESAME | | GOMBO | | VEGE-TABLES |
| | | KGS | KGS/HA | KGS | KGS/HA | KGS | KGS/HA | KGS/ PERCAPITA | KGS | KGS/HA | KGS | KGS/HA | KGS | KGS/HA | KGS | KGS/HA |
| MONGO: | SMALL | 493 | 434 | 0 | 0 | 345 | 894 | 98 | 81 | 284 | 26 | 97 | 0 | 0 | 69 | 458 |
| | AVERAGE | 640 | 446 | 0 | 0 | 547 | 364 | 121 | 154 | 286 | 89 | 83 | 204 | 368 | 200 | 400 |
| | LARGE | 845 | 414 | 0 | 0 | 169 | 54 | 108 | 199 | 692 | 136 | 217 | 0 | 0 | 100 | 397 |
| | FEMALE-HEADED | 126 | 95 | 409 | 4 | 26 | 16 | 50 | 24 | 250 | 68 | 54 | 0 | 0 | 0 | 0 |
| BITIKINE: | SMALL | 371 | 465 | 59 | 91 | 68 | 106 | 63 | 73 | 481 | 0 | 0 | 42 | 283 | 30 | 375 |
| | AVERAGE | 246 | 206 | 157 | 149 | 117 | 61 | 60 | 184 | 421 | 0 | 0 | 54 | 134 | 0 | 0 |
| | LARGE | 289 | 86 | 82 | 28 | 53 | 12 | 44 | 120 | 244 | 2 | 8 | 100 | 2105 | 0 | 0 |
| | FEMALE-HEADED | 3 | 18 | 32 | 39 | 0 | 0 | 9 | 179 | 653 | 0 | 0 | 4 | 21 | 0 | 0 |
| ATI: | SMALL | 112 | 40 | 11 | 36 | 0 | 0 | 8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | AVERAGE | 122 | 79 | 1 | 0 | 0 | 0 | 12 | 67 | 86 | 8 | 23 | 0 | 0 | 0 | 0 |
| | LARGE | 118 | 55 | 50 | 14 | 200 | 278 | 24 | 79 | 76 | 5 | 3 | 0 | 0 | 0 | 0 |
| | FEMALE-HEADED | 8 | 9 | 29 | 1057 | 0 | 0 | 7 | 0 | 0 | 0 | 625 | 200 | 8333 | 0 | 0 |
| OUM-HADJER: | SMALL | 40 | [illegible] | 4 | 5 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 225 | 900 |
| | AVERAGE | 2 | 5 | 38 | 21 | 4 | 3 | 9 | 0 | 0 | 0 | 0 | 81 | 3746 | 60 | 297 |
| | LARGE | 0 | 0 | 3 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 5 | 36 | 318 | 107 | 214 |
| | FEMALE-HEADED | 0 | 0 | 14 | 12 | 4 | 3 | 8 | 0 | 0 | 0 | 0 | 0 | 0 | 66 | 560 |

## Table 11. Production and Yield Characteristics for the Study Area, by Sous-Prefecture, Gender, and Household Subunit.

| SOUS-PREFECTURE/ FARMS TYPES/ HOUSEHOLD SUBUNITS | | PRINCIPAL HOUSEHOLD CROPS/LEVELS OF PRODUCTION AND YIELDS/PER HECTARE | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | TOTAL GRAIN | | ARACHIDE | | SESAME | | OKRA | | VEGETABLES | |
| | | KGS | KGS/HA | KGS | KGS/HA | KGS | KGS/HA | KGS | KGS/HA | KGS | KGS/HA |
| MONGO: | HH PLOT | 261 | 374 | 49 | 308 | 41 | 121 | 40 | 80 | 99 | 598 |
| | SUBUNIT PLOT | 81 | 396 | 56 | 405 | 25 | 166 | 164 | 656 | 105 | 1375 |
| BITIKINE: | HH PLOT | 130 | 142 | 93 | 430 | 0 | 0 | 52 | 237 | 0 | 0 |
| | SUBUNIT PLOT | 88 | 302 | 69 | 442 | 0 | 0 | 22 | 294 | 90 | 1125 |
| ATI: | HH PLOT | 62 | 149 | 49 | 82 | 39 | 123 | 72 | 2792 | 610 | 11296 |
| | SUBUNIT PLOT | 42 | 57 | 52 | 80 | 12 | 42 | 0 | 0 | 64 | 3555 |
| OUM-HADJER | HH PLOT | 25 | 11 | 0 | 0 | 0 | 0 | 59 | 2031 | 50 | 244 |
| | SUBUNIT PLOT | 1 | 3 | 0 | 0 | 1 | 3 | 0 | 0 | 0 | 0 |

**Table 12. Fields with Reported Sales, by Sous-Prefecture.**

| CROPS | PERCENTAGE OF FIELDS WITH REPORTED SALES BY SOUS-PREFECTURE | | | |
|---|---|---|---|---|
| | MONGO | BITKINE | ATI | OUM-HADJER |
| RAINFED SORGHUM | 6 | 8 | 0 | 0 |
| BEREBERE | 12 | 0 | 0 | 0 |
| MILLET | 10 | 7 | 2 | 2 |
| GROUNDNUTS | 15 | 23 | 13 | 0 |
| GOMBO | 80 | 32 | 33 | 14 |
| VEGETABLES | 31 | 20 | 40 | 49 |
| SESAME | 13 | 0 | 0 | 0 |

Table 13. Estimated Expenditures for Representative Household in the Target Area

**BITKINE HOUSEHOLD EXPENDITURES** (household size = 7)

WEEKLY EXPENDITURES

| Item | Amount Paid | Quantity |
|---|---|---|
| Grain | | |
| Sorghum | 375 CFA | 1.5 koro |
| Millet | 350 CFA | 1 koro |
| Total | 725 CFA | 2.5 koro |
| Non-locally produced items | | |
| Sugar | 150 CFA | 3 verres |
| Tea | 100 CFA | 2 verres |
| Salt | 50 CFA | 2 verres |
| Soap | 200 CFA | 1 boule |
| Total | 500 CFA | |
| Local condiments | | |
| Tomato | 100 CFA | 10 calabashes |
| Piment | 50 CFA | 2 verres |
| Gombo | 100 CFA | 2 tas gombo |
| Oil | 450 CFA | 1 litre |
| Total | 700 CFA | |
| meat | 250 CFA | 1 tas dry meat |
| fish | 25 CFA | 1 piece dry fish |
| Total | 275 CFA | |
| Bitkine Total Weekly | 2,200 CFA | |

Table 13 (cont.)

**BITKINE**

SIX-TWELVE MONTH EXPENDITURES

Livestock

| | | | |
|---|---|---|---|
| chevre | 2,500 | CFA | 1 |
| mouton | 4,000 | CFA | 1 |
| chicken | 300 | CFA | 1 |
| Total | 6,800 | CFA | 3 |

Clothing

| | | | |
|---|---|---|---|
| voile | 6,000 | CFA | 1 |
| pagne | 2,400 | CFA | 2 |
| boubou | 3,000 | CFA | 1 |
| habits | 4,500 | CFA | |
| complet | 2,500 | CFA | 1 |
| robe | 2,000 | CFA | 1 |
| culotte | 425 | CFA | 1 |
| chaussure | 600 | CFA | 2 |
| Total | 21,425 | CFA | |

Household Items

| | | |
|---|---|---|
| mat | 240 | CFA |

Bitkine Total 6-12 mos. 28,465 CFA

Table 13 (cont.)

MONGO HOUSEHOLD EXPENDITURES (household size = 7.5)

WEEKLY EXPENDITURES

| Item | Amount Paid | Quantity |
|---|---|---|
| Grains | | |
| Sorghum | 450 CFA | 2 koro |
| Millet | 250 CFA | 1 koro |
| Total | 700 CFA | 3 koro |
| Non-locally produced items | | |
| Sugar | 175 CFA | 3.5 verres |
| Tea | 125 CFA | 5 verres |
| Salt | 75 CFA | 3 verres |
| Soap | 300 CFA | 1 boule |
| Total | 675 CFA | |
| Local Condiments | | |
| Piment | 25 CFA | 1 tas |
| Onion | 50 CFA | 1 tas |
| Garlic | 50 CFA | 1 tas |
| Gombo | 100 CFA | 2 tas |
| Oil | 275 CFA | .75 litre |
| Total | 500 CFA | |
| Dried Meat | 100 CFA | 1 tas |
| Mongo Total Weekly | 1975 CFA | |

Table 13 (cont.)

MONGO

SIX-TWELVE MONTH EXPENDITURES

| Item | Amount Paid | Quantity |
|---|---|---|
| Clothing | | |
| voile | 4,000 CFA | 1 |
| pagne | 2,500 CFA | 2 |
| boubou | 4,000 CFA | 1 |
| habits | 10,000 CFA | |
| complet | 3,500 CFA | |
| culotte | 500 CFA | |
| chemise | 600 CFA | |
| pantalon | 1,500 CFA | |
| chassure | 600 CFA | |
| Total | 27,200 CFA | |
| Household Items | | |
| marmite | 1,500 CFA | |
| mat | 500 CFA | |
| Total | 2,000 CFA | |
| Total Mongo 6-12 month expenses | 29,200 CFA | |

Table 13 (cont.)

**ATI HOUSEHOLD EXPENDITURES** (household size = 8.5)

WEEKLY EXPENDITURES

| Item | Amount Paid | Quantity |
|---|---|---|
| Grain | | |
| Sorghum | 690 CFA | 2.5 koro |
| Penicilaire | 1,400 CFA | 4 koro |
| Total | 2,090 CFA | |
| Other Staples | | |
| Peanuts | 100 CFA | 1 verre |
| Non-locally produced items | | |
| Sugar | 675 CFA | 2.5 koro |
| Tea | 200 CFA | 4 verres |
| Salt | 65 CFA | 2.5 verres |
| Total | 940 CFA | |
| Local condiments | | |
| Tomato | 100 CFA | 2 verres |
| Gombo | 100 CFA | 2 tas |
| Oil | 100 CFA | |
| Kawa | 25 CFA | .5 koro |
| Courge | 75 CFA | 1 koro |
| Total | 400 CFA | |
| Dry meat | 100 CFA | 1 tas |
| Ati Total Weekly | 3,630 CFA | |

Table 13 (cont.)

**ATI**

SIX-TWELVE MONTH EXPENDITURES

| Item | Amount Paid | Quantity |
|---|---|---|
| Clothing | | |
| voile | 6,000 CFA | 1 |
| pagne | 2,000 CFA | 2 |
| boubou | 4,200 CFA | 1 |
| pantalon | 500 CFA | |
| robe | 3,500 CFA | |
| chaussure | 500 CFA | |
| Total | 16,700 CFA | |

Total Ati 6-12 month expenses 16,700 CFA

Table 13 (cont.)

**OUM-HADJER HOUSEHOLD EXPENDITURES** (household size = 7)

WEEKLY EXPENDITURES

| Item | Amount Paid | Quantity |
|---|---|---|
| Grain | | |
| Sorghum | 730 CFA | 3 koro |
| Millet | 750 CFA | 3 koro |
| Penicilaire | 2,240 CFA | 8 koro |
| Beréberé | 500 CFA | 2 koro |
| Total | 4,220 CFA | |
| Non-locally produced items | | |
| Sugar | 150 CFA | 3 verres |
| Tea | 100 CFA | 2 verres |
| Salt | 40 CFA | 1.5 verre |
| Soap | 150 CFA | 1 boule |
| Total | 440 CFA | |
| Local Condiments | | |
| Tomato | 20 CFA | 1 verre (powder) |
| Piment | 20 CFA | 1 tas |
| Onion | 25 CFA | 1 tas |
| Garlic | 2 CFA | 1 tas |
| Gombo | 50 CFA | 1 tas |
| Courge | 75 CFA | 1 koro |
| Oil | 350 CFA | .75 litre |
| Total | 542 CFA | |
| Oum Hadjer Total Weekly | 5,202 CFA | |

Table 13 (cont.)

**OUM-HADJEI**

SIX-TWELVE MONTH EXPENDITURES

| Item | Amount Paid | Quantity |
|---|---|---|
| Clothing | | |
| voile | 4,000 CFA | 1 |
| pagne | 1,500 CFA | 1 |
| boubou | 2,500 CFA | 1 |
| complet | 6,000 CFA | 2 |
| robe | 2,500 CFA | 1 |
| jupon | 500 CFA | 1 |
| culotte | 500 CFA | 1 |
| habits enfant | 3,000 CFA | |
| chaussure | 1,100 CFA | 4 pairs |
| Total | 21,600 CFA | |

Oum-Hadjer 6-12 Month Expenses 21,600 CFA

Table 13 (cont.)

**AVERAGE EXPENDITURES FOR WOMEN-HEADED HOUSEHOLD IN BITKINE**
(household size = 2)

WEEKLY EXPENDITURES

| Item | Average Amount Paid |
|---|---|
| Grains | 225 CFA |
| Non-locally produced items | |
| Salt | 30 CFA |
| Natron | 10 CFA |
| Tea | 100 CFA |
| Sugar | 100 CFA |
| Total | 240 CFA |
| Local Condiments | |
| Piment | 25 CFA |
| Tomato | 45 CFA |
| Gombo | 10 CFA |
| Oil | 40 CFA |
| Butter | 10 CFA |
| Total | 130 CFA |
| Meat/Fish | 30 CFA |
| Bitkine Total Weekly | 625 CFA |

SIX-TWELVE MONTH EXPENDITURES

| | |
|---|---|
| Clothing | 480 CFA |

Bitkine Total 6-12 months: 480 CFA

Table 13 (cont.)

**AVERAGE EXPENDITURES FOR WOMEN-HEADED HOUSEHOLDS IN MONGO**
(household size = 4)

WEEKLY EXPENDITURES

| Item | Amount Paid |
|---|---|
| Grain | 1884 CFA |
| Non-locally produced items | |
| Salt | 64 CFA |
| Tea | 4 CFA |
| Sugar | 12 CFA |
| Total | 80 CFA |
| Local Condiments | |
| Miscellaneous | 68 CFA |
| Gombo | 25 CFA |
| Oil | 6 CFA |
| Total | 100 CFA |
| Meat/Fish | 0 |
| Mongo Total Weekly | 2,064 CFA |

SIX-TWELVE MONTH TOTAL EXPENDITURES

| | |
|---|---|
| Goat | 250 CFA |
| Clothing | |
| traditonal | 319 CFA |
| non-traditional | 2168 CFA |
| Total | 2,168 CFA |
| Household Items | 56 CFA |
| Total 6-12 Month Expenses | 2,793 CFA |

Table 13 (cont.)

**AVERAGE EXPENDITURES FOR WOMEN-HEADED HOUSEHOLDS IN ATI**
(household size = 7)

WEEKLY EXPENDITURES

| Item | Average Amount Paid |
|---|---|
| Grain | 415 CFA |
| Other Staples | 10 CFA |
| Non-locally produced items | |
| Salt | 25 CFA |
| Tea | 25 CFA |
| Sugar | 75 CFA |
| Total | 125 CFA |
| Local Condiments | |
| Bisne | 100 CFA |
| Piment | 25 CFA |
| Gombo | 45 CFA |
| Total | 170 CFA |
| Meat/Fish | 0 |
| Total Weekly | 720 CFA |

SIX-TWELVE MONTH EXPENDITURES

| | |
|---|---|
| Clothing | |
| traditional | 2,200 CFA |
| non-traditional | 540 CFA |
| Total | 2,740 CFA |

Ati Total 6-12 Month Expenses 3,460 CFA

Table 13 (cont.)

**AVERAGE EXPENDITURES FOR WOMEN-HEADED HOUSEHOLDS IN OUM-HADJER**
(household size = 4)

| Item | Amount Paid |
|---|---|
| Grains | 331 CFA |
| Pasteque | 31 CFA |
| Total | 662 CFA |
| Non-locally produced items | |
| Salt | 7 CFA |
| Tea | 18 CFA |
| Sugar | 34 CFA |
| Total | 69 CFA |
| Local Condiments | |
| Miscellaneous | 34 CFA |
| Piment | 3 CFA |
| Gombo | 6 CFA |
| Kirep | 19 CFA |
| Oil | 7 CFA |
| Total | 69 CFA |
| Meat/Fish | 141 CFA |
| Total Weekly Oum-Hadjer | 611 CFA |

6-12 MONTH TOTAL EXPENDITURES

| | |
|---|---|
| Clothing | |
| traditional | 493 CFA |
| non-traditional | 596 CFA |
| Total 6-12 Month Expenses | 1089 CFA |