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THE IMPACT OF THE SEMRY I IRRIGATED RICE PRODUCTION PROJECT
ON THE ORGANIZATION OF PRODUCTION AND CONSUMPTION
AT THE INTRAHOUSEHOLD LEVEL

Christine W. Jones
Harvard University

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SECTION 1. OVERVIEW

Policymakers usually assume that a project which benefits the household as a unit benefits each member of the household. This assumption reflects the key assumption on which the neoclassical model of the household is based: namely, that the household is a joint decision-making unit which allocates its resources and spends its income according to a mutually agreed upon, and therefore identical, set of priorities. Recent scholarship, however, challenges the view that household members have identical preferences (Dwyer, 1983). Indeed, if household members' preferences do not always coincide, then a new model of household economic behavior is called for.

Bargaining models have been proposed as an alternative to the joint household utility function model of the household (Manser and Brown, 1979 and 1980; McElroy and Horney, 1981; Folbre, forthcoming). Bargaining models recognize that household members may have conflicting as well as complementary interests. The "weight" attached to an individual household member's preferences depends on his or her bargaining power. Thus, a bargaining model of the household forces one to pay attention to those variables which give some household members greater leverage in determining the household resource allocation and expenditure pattern.

The saliency of the bargaining approach to household economic behavior and its implications for policymaking are brought out in this case study. It analyzes the impact of an irrigated rice production project in Cameroon on women's labor allocation, intrahousehold income distribution, and the intrahousehold division of responsibility for food

provision. Its aim is (1) to delineate the factors which determine women's access to cash-cropping resources and the terms under which their labor is mobilized by their husbands, and (2) to analyze the impact of the intrahousehold incentive structure on the efficiency of resource allocation. The major conclusion the study is that, despite the fact that rice cultivation appears to have benefitted women, they allocate their labor inefficiently because of intrahousehold conflict over the distribution of rice income. The costs of ignoring or assuming away such conflicts at the project design stage are high if they contribute to the failure of projects to achieve their welfare and production objectives.

The analytical framework for the study is based on the following set of questions, which are addressed to the extent permitted by the data available:

- To what extent is women's labor mobilized for cash crop production?
- What activities have they forgone on account of cash-cropping?
For example, have they forgone childcare, food preparation, leisure, or income-generating activities?
- Has anyone else in the household taken on the responsibility for the domestic labor activities women forwent?
- What was the opportunity cost of forgoing these activities?
- How much income have women forgone from their own income-generating activities on account of cash crop production?
- Are they compensated for their cash-cropping labor? How does the intrahousehold rate of compensation influence women's labor allocation pattern?

--If women's incomes have decreased or increased on account of cash-cropping, how have they readjusted their expenditure pattern, what are the welfare costs of these readjustments and by whom are they borne?

--How have other household members' expenditure patterns shifted in response to alterations in women's expenditure pattern?

--If women do not directly control the income generated by their labor in the new activity, how would the household expenditure pattern differ if they did control the income and what would the likely impact on household welfare be?

As these questions demonstrate, the relevant issue is not whether cash-cropping increases women's agricultural labor, but how it alters their labor allocation pattern in conjunction with the intrahousehold income distribution and household expenditure patterns. Shifts in all the economic dimensions open to intrahousehold negotiation must be factored into any assessment of the impact of cash-cropping on women.

The study is organized as follows. Background information on the selection of villages, sample and household structure is presented in Section 2. Section 3 describes the organization of sorghum production, the traditional subsistence crop, and the organization of rice production, a recently introduced crop controlled by a semi-autonomous government authority, SEMRY. It concludes with a discussion of the agricultural calendar to indicate the periods of the year during which the two crops compete for labor. In the area of North Cameroon in which this study was conducted, labor is the scarce resource; additional land for both sorghum and rice production can generally be obtained by

farmers in the project area.

Women's labor is mobilized by their husbands for irrigated rice production at the expense of sorghum production and other income-generating activities. Section 4 relates the amount of compensation that women receive from their husbands in return for their labor on rice production to the opportunity cost of their labor in nonrice income-generating activities. The data indicate that women are compensated at a rate greater than the opportunity cost of their labor. Moreover, the increase in their incomes is real. An analysis of the changes in the food provision pattern suggest that rice cultivation has not increased women's responsibility for the provision of food. Despite the increase in their real income, however, they do not allocate their labor efficiently, as a comparison of the labor allocation pattern of women whose husbands control the disposition of income from rice production and women who control the disposition themselves shows. A bargaining model of the household, which does not assume that household members' preferences coincide, is proposed as an explanation for the inefficient pattern of resource allocation.

Section 5 draws on comparative material from elsewhere in Africa to place this case study in context. Using the perspective afforded by a bargaining model of the household, it examines the factors which influence the extent to which women are able to capture a share of the gains from cash crop production. In particular, it argues that account must be taken of how the structural position of women, within their households and the wider society, influences the degree to which they exercise control over resources, the terms under which their labor is mobilized, and the categories of household maintenance needs for which

they are responsible. As Section 5 points out, the impact of cash-cropping on women has been by no means been uniform, because of the variation in women's bargaining power and the particular circumstances surrounding the introduction of a cash crop in a given area.

Section 6 concludes with a brief discussion of the policy implications of the bargaining approach to household decision-making, particularly with respect to women. To a certain extent, policymaking in the area of "women in development" has been hampered by the lack of an alternative to the neoclassical household decision-making model. Under the assumption that an increase in household income is translated into an increase in individual household member welfare, the neoclassical perspective rarely concerns itself with the distribution of benefits within the household. A bargaining model, however, is based on the recognition that household members have different preferences and that, due to their differential bargaining power, some members' preferences have greater weight than other members' in determining the household pattern of resource allocation and income distribution. Thus, the challenge for policymakers is first, to understand the conflicts in household members' preferences and second, to find a means of increasing the bargaining power of the household member whose preferences are most closely identified with the goal of the policymaker. Since preferences and bargaining power are socially constructed along the lines of gender as well as other variables, the failure to take gender into account in the design of policy may result in inefficiencies and inequities neither foreseen nor desired by the policymaker.

SECTION 2. THE SETTING OF THE STUDY

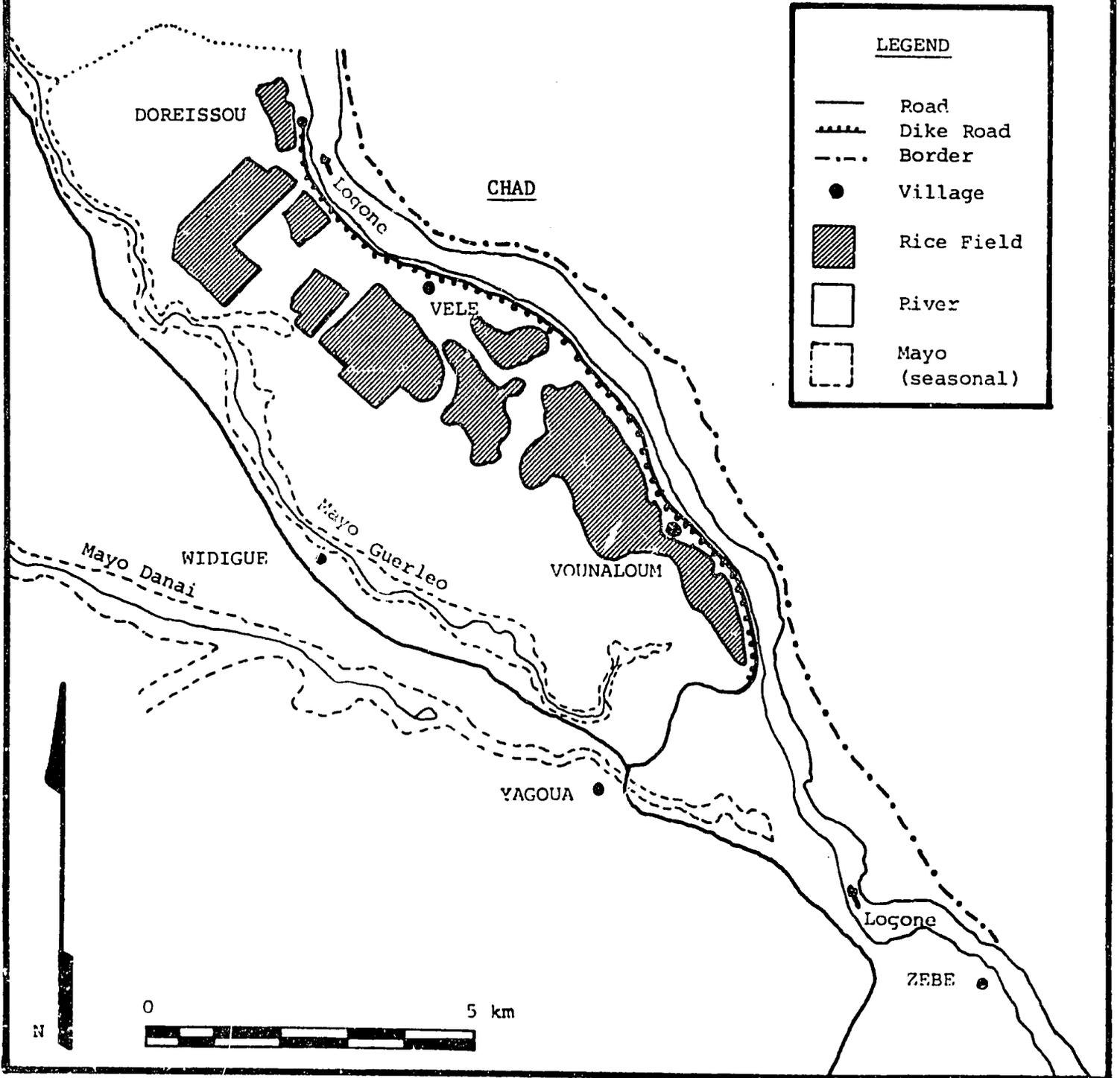
2.1. Selection of villages

Formal survey work was carried out in three villages, which were selected according to their relative degree of involvement in rice cultivation.¹ Two villages bordering the project area were chosen to be representative of rice-cultivating villages, and one village was chosen from outside the project area to serve as a control. Location vis-a-vis the rice fields is the major factor which distinguishes villages in the project area. The SEMRY I project area extends northward from the town of Yagoua, where SEMRY's headquarters are located, along the western bank of the Logone River which forms the border with Chad.

Villages located on the eastern side of the project perimeter are confined to a relatively narrow piece of land bounded on one side by the Logone River and on the other by the rice fields (see Map 2.1). Farmers from Vele, the village which was chosen to be representative of villages on the eastern side, are at most about a half-hour's walk from their rice fields. Because of the proximity of the rice fields, and the difficulty of extensifying sorghum cultivation, virtually all households located along the eastern perimeter (and particularly those in the southern half of the perimeter closest to Yagoua where population density is higher) cultivate some rice in addition to sorghum.

However, many households on the western side of the perimeter choose not to cultivate rice. They are daunted by the long and arduous walk in the rainy season through mud and hip-deep water and attracted by the possibilities of extensifying their sorghum cultivation and growing

SEMRY I PROJECT AREA: YAGOUA, CAMEROON



cotton. For all these reasons, only about 19% of the compounds in Widigue, the village chosen to be representative of those on the western side of the project perimeter, cultivated rice in 1980 (Sisson and Ahlers, 1981). The remaining households could have cultivated rice if they had chosen to, since each year many fields remain uncultivated due to lack of farmer interest. The compounds in Widigue which do cultivate rice are generally those located closest to the rice fields and furthest from the village's cotton fields.

Zebe, the third village, located outside the project area, was selected as a control. Like Vele, it is located along the Logone River but it is southwest of Yagoua.

The three villages are similar in many respects. They are ethnically quite homogeneous. Although there is a small quarter in each village which is inhabited by the Fulbe, the rest of the population identify themselves as Massa. Virtually all the rice cultivators in approximately the southernmost three-quarters of the project area are Massa.

Almost without exception, every compound in each of the three villages surveyed cultivates sorghum, which is the mainstay of the diet. Millet is also cultivated on the sandier soils found in Zebe and on the western side of Widigue. In general, soils in Zebe are much poorer than in the other two villages, and as a consequence sorghum yields are much lower. According to the 1980 and 1981 farm management surveys (Sisson and Ahlers, 1981; Bikoi, 1982), the average sorghum yield in Zebe were 310 kg/ha in 1980 and 401 kg/ha in 1981. In contrast, the average sorghum yield in Widigue was 988 kg/ha in 1980 and 806 kg/ha in 1981.

Vounaloum, a village bordering along the Logone about 10 km upriver from Vele, reported yields were 360 kg/ha in 1980 and 1034 kg/ha in 1981. Sorghum yields in Vele were apparently exceptionally good in 1981--1616 kg/ha. While it is certainly not inconceivable that some Vele farmers obtained sorghum yields of that magnitude, a comparison with the yields obtained in Vounaloum, which is quite similar to Vele both in soil type and labor allocation patterns, suggests that the average yields reported for Vele may be overstated.

In the last thirty years the Massa to the north of Yagoua have adopted a variety of transplanted dry season white sorghum, dongolonga, long cultivated by those to the south of Yagoua and by the populations of the Diamare plain of North Cameroon (de Garine, 1964:66). Dongolonga can only be cultivated in fields which are flooded during the rainy season. These fields are in short supply in the project area. At the end of the rainy season, the young seedlings are transplanted into ten-inch-deep holes into which a cup of water is poured. They flourish throughout the dry season on only this water and the retained moisture in the soil, which has a high clay content. Yields average about .9 t/ha.

It is not entirely clear what the impetus was for the adoption of dongolonga. Increasing population pressure and the loss of soil fertility may have been two factors that made its cultivation attractive. Also, increasing contact with the Toupouri and the Fulbe (some young Massa men migrate seasonally to work on the dongolonga fields of the Fulbe) may have played a part. In addition, compounds which found it expedient to abandon some of their rainy season sorghum

fields to undertake rice cultivation may have taken up dongolonga as a substitute for red sorghum. The resistance to dongolonga cultivation long manifested by the Massa broke down once irrigated rice cultivation was introduced. Not every compound has access to dongolonga fields, however, since many compounds lost their existing or potential fields when the land was taken over by SEMRY for rice cultivation.

Cotton is an option only for farmers in Widigue, because the parastatal responsible for cotton production does not operate in villages along the eastern perimeter of the rice fields where sorghum land is limited nor in the villages to the southwest of Yagoua along the Logone River. Aside from rice and cotton, the major agricultural difference between the three villages is the extent to which tobacco, a dry season crop, is grown. In Zebe there is a stream bed that dries up several months after the rains end. The soil is very propitious to the cultivation of tobacco, and it is easy to dig shallow wells in the stream bed to obtain water for irrigation. In Vele and Widigue, tobacco is cultivated on a much smaller scale, mostly for home consumption. All women (and several men) in Zebe grow tobacco to obtain cash in order to purchase enough grain to make up the substantial deficit in grain they face each year. Virtually all households in Widigue (rice and nonrice-cultivating alike) and most households in Vele, however, produced enough grain in the 1980 rainy and dry season to meet their subsistence needs.

Commercial opportunities are probably the best for households in Zebe, since it is only about 11 km from Yagoua. In addition to the small weekly market in Zebe, villagers can take advantage of the large weekly market in Yagoua which draws people in from all the surrounding

villages. There is also a daily market in Yagoua. Only at the height of the fishing season, however, do women from Zebe who sell fish walk to the Yagoua market each day. In general, people from Zebe attend the Yagoua market at most once a week.

Walking from Vele to Yagoua takes considerably more time, since Vele is about 25 km from Yagoua. However, there is a very small market which operates daily in Vele where fresh fish can often be bought. The weekly market in Vele is the largest in any village along the eastern perimeter. After the rice harvest, however, villagers find their way to the Yagoua market.

Of the three villages, Widigue is the most disadvantaged commercially. There are two small weekly markets in Widigue as well as one in the town north of Widigue which attract traders from Yagoua. Many of those from Widigue walk the 17 km to Yagoua in the dry season to sell their surplus grain. There is less opportunity to purchase fresh fish in Widigue.

Some basic agricultural information on the three villages is presented in Table 2.1. The results for Widigue and Zebe were taken from the census carried out in conjunction with a farm management survey done in 1980 (Sisson and Ahlers, 1981), and information for Vele was obtained from a census taken in 1981 (Bikoi, 1982).

Table 2.1

Agricultural Characteristics of the
Three Villages Selected for the Survey

	Zebe	Widigue	Vele
Number of Compounds	126	320	201
Crops Grown			
Rainy season rice	3%	19%	98%
<u>Dongolonga</u>	38%	70%	47%
Millet	98%	47%	0%
Tobacco	100%	37%	57%

There are small differences in the social amenities found in the three villages. Vele has a primary school built out of cement, Zebe is constructing one, and Widigue began a primary school, which is built out of mud and thatch, several years ago at the initiative of parents. Few of the children in any of the villages go to the secondary school located in Yagoua. It is rare to find a man who speaks more than a few words of French in any of the villages, and even rarer to find a woman who does. There is a well-established Catholic mission in Vele, but both Protestant and Catholic church services are held in the other villages as well. Few of the villagers have converted to Islam, and strong support for the Protestant and Catholic religions is not widespread.

Medical services in the villages are limited to a small (and quite ill-equipped) dispensary in Vele. For serious medical problems some villagers seek attention in Yagoua, but many others rely on traditional remedies. It is difficult for villagers to obtain even anti-malarial pills.

Little money is invested in housing. Only several of the huts of the compound heads in the three villages had tin roofs. Grain is stored in granaries built out of mud and covered with thatch which are raised above the ground, but even so there is some loss of grain due to insect damage. The low level of scholarization, the infant mortality rate² and the overall standard of living suggest that the Massa are relatively disadvantaged when compared to other ethnic groups in Cameroon.

2.2. Selection of the Sample

After a census was taken in the three villages, a sample of 102 women was selected for the labor allocation and food expenditure survey. Table 2.2 shows the composition of the final sample. A random stratified sample of compounds was chosen using an interval selection process based on the number of adult workers in the compound. The sample was stratified to obtain a sufficient number of cases for intravillage comparisons on the basis of marital status and/or agricultural activities. Women were then randomly chosen from compounds within each stratum. The selection procedure is described in more detail in the Appendix.

Table 2.2		Composition of the Sample of Women	
Zebe	married women		16
	widowed women		14
Widigue	rice cultivators		16
	nonrice cultivators		14
Vele	married women who work on the fields of other household members		26
	married women who work on their own fields		5
	widows		11

2.3 Data Collection

Two formal surveys were conducted, one a survey of women's labor allocation to agricultural activities and the other a survey of household food expenditures and women's earned income. The labor allocation survey began in mid-May with the rains and continued until the end of the rainy season rice harvest in late December. The information gathered was basic. Women were asked what crop they worked on, what activity they performed, whose field they worked on, when they left their compound to go work on the field and when they returned to their compound, and what kind of and how much remuneration they received, if any.³ Rice cultivators were interviewed every other day at the end of the day about that day's and the previous day's agricultural activities from the middle of May to the end of December. Nonrice cultivators, due to budgetary reasons, were interviewed only during the period of peak labor demand, mid-May through the end of August. The

short recall period was chosen to yield high quality data to compensate for the small sample size.

All the sorghum and millet fields of the women in the sample were measured. The size of a household's rice fields and the weight of the paddy sold were indicated on the slip it received from SEMRY for the sale of its paddy. Data on total yield and quantity of paddy retained by the household for consumption and in-kind payments were obtained from interviews with household members. The average returns to rice and sorghum labor were calculated using aggregate data from the farm management survey. The data on women's labor allocation were to have been supplemented by the gender-specific data on labor inputs to all household agricultural enterprises collected in the 1981 farm management survey. However, those data are not yet available. This unfortunately limits the comparisons which can be made between men's and women's labor allocation patterns.

No data were collected on the allocation of women's time to nonagricultural activities. The decision to forgo the collection of these data was based on financial, time, and managerial constraints. Obviously, in assessing the impact of a project on women, changes in their domestic labor allocation pattern are important because of their potential impact on household welfare. However, I did interview women about whether rice cultivation had altered their domestic labor allocation pattern. Women in Widigue reported that the long walk to the rice fields, and hence their late return in the day, sometimes after dark, left them too tired on occasion to prepare dinner. On the other hand, women frequently prepared porridges of rice, particularly in the

morning. Often the porridges were made with grains of rice, rather than rice ground into flour, the method used to prepare porridges of sorghum. Not having to grind grain into flour saves women a considerable amount of time and drudgery. It should also be noted that the survey results (see Section 3.3) indicate that rice cultivation substitutes for, rather than adds to, sorghum labor during the period of peak labor demand.

Data on household food expenditures were also collected at five points during the year for a two-week period, using a two-day recall interval. The expenditure survey is described in more detail in Section 4. It was designed to determine how rice cultivation has affected the intrahousehold food expenditure pattern. The decision to limit the questionnaire to expenditures on food reflected a desire to simplify the questionnaire to the extent possible given the frequent interview schedule. It also reflects the assumption that any shift in the household expenditure pattern in women's disfavor would in all likelihood be most pronounced in the category of food expenditure, since most of women's income is spent on food. No new category of expenditure appears to have been introduced concurrently with rice production; households spend little money on schooling, health care, or their dwellings. A questionnaire was also administered on women's earned income simultaneously with the food expenditure survey. The income questionnaire was designed to determine the magnitude and sources of women's income, particularly from sales of grain, and also to acquire some sense of the returns to women's labor from nonagricultural activities.

2.4. The Domestic Unit

Villages extend for four or five kilometers along a road and another two kilometers or so on each side of the road. Compounds tend to be widely dispersed throughout the village. Within each village (which is basically an administrative unit established by the colonial state), there are small territorially-based groups of compounds which are composed of agnates descended from a common ancestor several generations back. Rights to the land surrounding their compounds is vested in these small descent groups. Marriages are prohibited between members of the same descent group.

The basic residential unit of the Massa is the zina, or compound. Zina refers to the collection of huts, kitchens, granaries, etc., which are arranged in a circle around a central granary controlled by the head of the compound, and also by extension to the people who reside in the compound. The male head of the compound, if there is one, is called the bum zina. He resides in the compound with his wives and their unmarried children. In many instances one or more of his married sons or his younger brothers and their wives and children also reside in the compound.

A very small percentage of compounds are headed by women, all of whom are widows. Upon her husband's death, a widow is usually incorporated in the household of another male. Most frequently, she is inherited by one of her husband's junior agnates; the Massa practice levirate. If her son resides in the compound, however, a woman past childbearing age will often remain with him, whether or not she is inherited. A few childless widows work for many years to accumulate

enough cattle to return their bridewealth to their husband's family so that they can return to their natal village. Thus, a woman becomes a compound head only if she is past childbearing age and does not have a son who resides in the same compound.

Throughout this study the word "household" will be used to refer to the group composed of a married man and his wives and their children or the rare case of a widow-headed household. However, there is no word in Massa which refers to the conjugal unit. Compound members refer to themselves as belonging to a certain zina. The part of the zina which is a woman's personal domain, her hut, kitchen and granary, is denoted by the word digulligna. There is no part of the compound, however, that in some sense belongs to the household. Each wife cooks for herself and her children, takes turns cooking for her husband, fetches her own water, and does her own laundry. Sorghum fields are cultivated either individually or by the compound as a unit. The grain that a woman prepares may come from either her own field, the field of her husband, or the collective sorghum field, depending on the time of year. Thus, members of a conjugal household can not be said to eat out of the same pot, i.e., eating grain from a common household field. A husband and wife (or wives) constitute neither a unit of production nor a unit of consumption. The major exception to this is rice cultivation, where a husband and wife (or wives) work on the same fields together. The differences in the organization of sorghum and rice production are discussed in Section 3.

Table 2.3 indicates the number of compounds headed by men and women in Vele. Vele was the only village censused in its entirety in

Women in the villages tend to marry at a very early age, generally by sixteen at the latest. Given the high bridewealth which is required, however, men tend to marry much later than women. Most men would prefer to be polygynous though some of the young men who have converted to Christianity are choosing not to be. As Table 2.5 shows, the majority of married men in Vele have only one wife, usually because they have not yet accumulated enough cattle to marry another. Still, a substantial minority have more than one wife.

Table 2.5 Number of Wives of Married Men in Vele

No. of married men with:

one wife	248	(70%)
two wives	83	(23%)
three wives	16	(5%)
four or more	7	(2%)

What is interesting is that the percentage of men with more than one wife is almost identical to the one cited by the first ethnographer of the Massa twenty-five years ago. In a small sample of compounds from the village immediately to the north of Vele, De Garine (1964:159) found that 72% of the married men had one wife, 21% had two, 5% had three wives and only 1% had four or more wives.

Evidently it seems to be as difficult to acquire a wife today as it was twenty-five years ago, despite the inflow of cash from rice production into the economy. Although the number of cattle (usually ten) required for bridewealth has not increased in the past century (de Garine, 1964:151), the price of cattle has. Even if men's real incomes have increased as a

result of rice cultivation, it would probably be many years before an increase in the rate of polygyny would become apparent, since the bridewealth payment is so high relative to men's income. The proceeds of about ten seasons of rice cultivation are required to buy the cattle necessary for bridewealth payment. Farmers in Vele, for example, have been cultivating rice for only about eight years, and they certainly have not spent their entire earnings on cattle. Thus, it is highly unlikely that rice cultivation has had a significant impact on the rate of polygyny to date.

SECTION 3. THE ORGANIZATION OF SORGHUM AND RICE PRODUCTION

This section describes the organization of sorghum and rice production. Despite major differences between the two crops in the organization of production--unlike sorghum production, rice production is controlled by a semi-autonomous government authority, SEMRY--the two crops have one feature in common. The major constraint to increased production of both crops in the rainy season is not land, but labor. It is important, therefore to understand the factors which determine the set of constraints, opportunities, and incentives faced by particular categories of producers--men, women, elders, juniors--with respect to the two crops.

Section 3.1 describes the mobilization of land and labor for sorghum production. Section 3.2 focuses on the structure imposed by SEMRY on the production and commercialization of rice. Section 3.3 discusses the constraints on labor allocation imposed by the agricultural calendar. Section 4 takes up the issue of the intrahousehold relations of production and distribution and their effect on women's labor allocation.

3.1. The Organization of Sorghum Production

Land. The Massa distinguish two categories of fields: those in the vicinity of the compound which are inherited by the bum zina, the head of the compound, belong to his descent group and cannot be alienated, and those which individuals in the compound clear in unoccupied territory beyond the immediate compound and are alienable.

The land that surrounds the compound is controlled by the bum zina. It is usually divided into one large field, sinema ngolla, which is collectively worked under his direction, and into smaller fields which are individually worked.

When one of the junior men in the compound marries, the compound head gives him a field usually in the vicinity of the compound for the use of his household, which he then divides up between his wife and himself. If land is in short supply so that a married man cannot maintain his household, he might move his household to a locale where there is sufficient land for compound fields and install himself as bum zina. Alternatively, members of his household might decide to clear uncultivated land, sinema fulla. These fields are generally located at some distance from the compound and do not benefit from manuring in the dry season by the constant passage of the compound's cattle. Both men and women can establish sinema fulla, although the right to alienate the field remains with a woman's husband. Still another strategy which is employed is for a man to ask his wife's parents for a field which she then returns home to cultivate at various times throughout the rainy season.¹

In general, sorghum land is available, albeit at some distance from the compound. Construction of the dike along the Logone River increased the area which could be put under sorghum cultivation and reduced the variation in yields by controlling flooding. However, villagers along the eastern perimeter have the least opportunity to intensify their sorghum cultivation.

At present, no land market has developed, even in villages along

the eastern perimeter of the rice fields. Occasionally, a field is lent when its proprietor is unable to cultivate it (in the case of illness, for example), or when a compound ceases to exist. In these cases, recognition of the proprietor's (or the lineage's) claim to the field is made by a token offering of grain or a small cash payment after the harvest. Except in the very rare case of an outright sale of a sinema fulla, the field can be reclaimed in the future by the proprietor.

Labor. With the exception of the collective field to which every member of the compound is expected to contribute several days' work of planting, weeding and harvesting, sorghum fields are generally cultivated on an individual basis. However, variants of the typical pattern do exist. The unmarried sons of the bum zina usually cultivate the collective field with him if it is sufficiently large. Otherwise, they clear their own fields. Sometimes married men also cultivate with the bum zina, but they usually have their own fields. Rarely does a man cultivate a sorghum field with his wife. The exceptional case of joint cultivation is usually due to extenuating circumstances such as illness or childbirth which forces one spouse to take on the responsibility for the field of the other spouse during part of the agricultural season. If a man has more than one wife, each wife (except perhaps in the first year of her marriage) will have at least one field of her own, generally in the vicinity of the compound.

In Vele, however, unlike Widigue or Zebe, there were several compounds that had anomalous patterns of cultivation which are not explainable by the extenuating circumstances described above. Of the thirty-six compounds from which women were chosen, seventeen of the

compounds were composed of only one conjugal household and the other nineteen of more than one. Among the former group, only one exception to the general pattern was observed: that of a husband who had no sorghum field himself but aided his two wives in the cultivation of theirs. He had his own granary, in which he stored purchased sorghum.

Among the nineteen multi-household compounds, there were seven that had no collective field on which all compound members worked. There are several factors which explain why some of these compounds did not have collective fields. In one case the compound head was old and nearly blind, and his brother only slightly less so, so that each of their wives cultivated a portion of the compound's fields. Another case was a large compound composed of five households with relatively little sorghum land. They cultivated rice more intensively than almost any other compound in the village. Several of the women's husbands in this compound did not have their own sorghum fields and worked instead on the fields of their wives. In four other cases, the junior household in the compound was headed by a cousin of the compound head. The more distant relationship between the two heads of households may have contributed to the relative independence of the two households. Or alternatively, rice cultivation may be responsible for the formation of multi-household compounds that would otherwise not have formed given the lack of a close relationship.

These cases also suggest that another result of intensive rice cultivation may be a reduction in the importance placed on the collective sorghum field and on the ultimate responsibility of the compound head for insuring that an adequate supply of sorghum is

available. Sorghum from the collective field is stored in the granary belonging to the compound head. The sorghum is distributed to all the households in the compound in the months immediately preceding the sorghum harvest. However, rice production has diminished the need for the distribution of sorghum from the collective field and hence the need for the collective field since households which have deficits in sorghum can usually retain enough paddy to cover their grain needs.

Furthermore, collective fields may be becoming less important since junior men have less incentive to work on them now that they have the opportunity to cultivate rice. Since rice cultivation provides men with cash that they use to purchase cattle for their own bridewealth payments, a junior man might not be forced to work (or would work less) on the collective field of the compound head in return for the compound head's assistance with the payment of bridewealth. Thus there may be a breakdown in the reciprocal obligations between junior and senior men: the junior has less of an obligation to work on the collective field of the senior because he is no longer as dependent on the senior for bridewealth.

Except for the work done on the collective field, most of the work done by a compound member is on his or her own sorghum field. As Table 3.1 shows, the overwhelming proportion of the time women spent cultivating sorghum is on their own fields. Women from rice-cultivating households in Widigue and Vele spent proportionately less time on their own fields than women from Zebe or from nonrice-cultivating households in Widigue because the labor allocation data for the latter do not include sorghum harvesting activities. Only about half the time Vele

and Widigue rice-cultivating women spent harvesting was on their own fields, which lowered the percentage of time overall that they spent cultivating their own fields. Since there are few other agricultural activities competing for women's labor during the period of sorghum harvesting, women have more time available to "help out" other compound and family members.

Table 3.1 Percentage of Time Women Spend Cultivating Sorghum According to Field Proprietorship

Proprietor of Field on which Woman Worked	Zebe*	Widigue* nonrice cultivators	Widigue rice cultivators	Vele
1. Woman's own field	94%	95%	86%	86%
2. Collective/husband	6%	5%	9%	9%
3. Other compound	<1%	0%	2%	1%
4. Woman's family	<1%	<1%	2%	4%
5. Other noncompound	<1%	0%	1%	<1%

* Labor allocation data were collected in Zebe and Widigue (nonrice) only until the end of the sorghum weeding period. Thus, percentages for those villages do not take account of harvesting time.

Except for the one day one woman participated in a work party, all the work that women did on the fields of other compound members was considered to be goutna, which refers to labor which is freely given without any expectation of return, or at least immediate return, especially in cash. For the work that a woman does on her own family's

fields, she often receives some grain at the end of the harvest.

Occasionally a person asks one of his or her friends or kinsmen to organize a work party if there is a particularly urgent task to be done which for reasons of illness, for example, he or she has not been able to accomplish. No money is paid for this sort of work but at the end of the work day the proprietor is expected to slaughter an animal and provide a big meal. This kind of aid is called depma. Villagers report that this practice is becoming much less common since people would rather work for cash, a practice which has become widespread with the advent of rice cultivation. Women as well as men can call or participate in work parties, but out of the entire sample of women only one worked on a friend's sorghum field for a single day as depma.

Several instances were encountered where labor was hired for a cash wage for sorghum cultivation. Labor which is remunerated in cash, usually at the end of the work day, is called kerena. People hire kerena labor only when there is pressing work to be done. Several of the older widows in Zebe reported hiring kerena for planting or weeding their sorghum fields, but none of the women surveyed worked as kerena on sorghum.

Capital. There is little capital investment in sorghum production. Biological and chemical fertilizers are hardly ever purchased, though fertilizer sold to farmers for cotton production is reportedly diverted to sorghum fields on occasion. The tools employed are rudimentary. Seed is usually saved from the previous harvest. A few households own or rent animal traction to plow their cotton fields,

and more rarely, their sorghum fields. In any event, the use of animal traction is minimal at the present time.

3.2. The Organization of Rice Production

The installation of SEMRY. Rice cultivation for industrial purposes began in the Yagoua area in the early 1950s under the direction of the SAP (la Societe Africaine de la Prevoyance). SAP was given responsibility for the production, milling and marketing of rice grown in the area. However, when more ambitious plans were formulated which called for a large capital investment in irrigation works, the responsibility for rice production was vested in a project authority, SEMRY, le Secteur Experimental de Modernisation de la Riziculture de Yagoua. Under SEMRY's auspices, a dike was constructed along the Logone River to control flooding and about 2000 hectares of land were developed for gravity-fed irrigated rice production by the late 1950s.

Developing new land and irrigation works and rehabilitating the old was an easy task for SEMRY compared to convincing the inhabitants of the region to grow rice. The Massa had little interest in cultivating rice. The village chiefs, who were installed by colonial authorities following the pacification of the region in the early 1900s, were charged with assuring that every taxable man cultivated a "piquet," a half hectare of rice, and that he cultivated it acceptably. The chiefs seemed to have benefitted most from rice cultivation; de Garine states that in 1958 the chief in Doreissou (the village immediately to the north of Vele) had 27 piquets which villages were obliged to cultivate (1964:94). Farmers were also fined for failing to cultivate with

appropriate dispatch. De Garine (1964:109), on the other hand, attributes the lack of interest manifested by the Massa in rice cultivation to the fact that they had sources of income, such as fishing, which were more remunerative and far less demanding than rice cultivation, and furthermore were beyond the purview of the village chiefs.

SEMRY's current problems. Twenty-five years later, however, SEMRY is still having trouble attracting farmers despite an extensive investment program and a good record of high yields. With a loan from the IBRD, a major program of construction of new irrigation works, development of new fields and rehabilitation of the old was undertaken in the early 1970s. In its present incarnation SEMRY (reconstituted in 1971 as the Societe d'Expansion et Modernisation de la Riziculture de Yagoua) is a semi-autonomous government corporation which oversees the management of about 5400 hectares of pump-irrigated rice fields. Farmers' yields have increased from about 1 t/ha in the 1960s to the present level of about 4.3 t/ha in the rainy season and 5.5 t/ha in the dry season. The increase is due to better control over the supply of water, the adoption of transplanting instead of broadcasting and farmers' increased interest in rice cultivation.

Despite these advances, every year many fields go uncultivated for lack of farmer interest. The best rainy season to date was in 1977 when 3925 hectares were cultivated out of a possible 5019. In the 1981 rainy season, however, only 3228 hectares were cultivated, despite the increase in the producer price in 1980.

To attract more farmers, the producer price of paddy was raised

by 45% in late 1980, although the fixed charges were raised by 57%. The net gain for the producer was positive, however.² SEMRY has little room to maneuver in raising the producer price any further. Assuming that the consumer price of milled rice remained fixed, an increase in the producer price would reduce the profit margin on milled rice. It is not clear that the higher producer price would generate enough of a supply response, given producer response to date, to compensate for the smaller profit margin. SEMRY is constrained from raising the consumer price of rice. Even at present its price is not competitive with that of imported rice in the southern part of Cameroon. SEMRY rice competes with imported rice in the North only because it is protected by the high cost of transporting imported rice from the port of Douala. Despite its small price advantage in the North, SEMRY has had trouble in the past clearing the milled rice out of its warehouse. Recently, however, there has been an increase in consumer demand from Chad (due to dislocation caused by the war) and from Nigeria (due to exchange rate fluctuations between the two countries).

At present, SEMRY's revenues are not sufficient to cover both operating costs and amortization. A recent study commissioned by SEMRY (S.E.M.R.Y., 1981) concluded that if SEMRY is to become profitable over the long term it must not only maintain its record of high yields, but that it must also put all the land which has been developed under cultivation in the rainy season. This implies a 55% increase in the area transplanted from the 1981 rainy season level. The study recommends the formation of mutual guarantee groups which, over the long run, would progressively be given responsibility for planting the

nurseries, distributing fertilizer and sacks, assuring payment of the group's fixed charges and delivery of paddy, and maintaining the small irrigation works. Mutual guarantee groups would presumably prevent disputes over water rights from reaching serious levels (in 1980 there was a dispute over water rights which ended in the death of one of the disputants) and would encourage farmers to work harder. Evidently, if SEMRY can make such groups responsible for the fixed charges of all its members, and in addition take over some of the task which SEMRY presently pays farmers to do, SEMRY would stand to profit. Such measures would clearly be in SEMRY's interest, but it is not made explicit what forms of persuasion will be employed to convince farmers that organizing collective work groups and taking on the responsibility for planting seedbeds, for example, is in their own interest. Even if these measures were successfully instituted, it is questionable whether SEMRY can ever be financially self-sufficient, given the record of other rice-producing projects in West Africa.³

SEMRY is also considering how to better enforce the contract between cultivator and SEMRY as another means of increasing profits. At present, cultivators sign up for fields every season with SEMRY (although they retain the same fields year after year). They agree to reimburse SEMRY in kind at the time of sale of their paddy for the services that SEMRY provides, namely, mechanized plowing and the provision of seedlings, fertilizer, insecticide, water, extension services and sacks. The charge for these services is 55,000 CFA per piquet which farmers pay in paddy at the end of the harvest. At the current producer price of 55 CFA/kg this amounts to a fixed charge of

1000 kg of paddy, almost half of the average yield per piquet. Farmers agree to deliver all but 10% of their total production to SEMRY, which they are permitted to keep for home consumption. In reality households retain about 17% of their paddy.⁴ The current paddy producer price is 55 CFA/kg, so a farmer whose piquet yields 4.3 t/ha would net about 55,000 CFA per piquet (assuming hired labor and paddy transport charges of about 15,000 CFA/ha). In comparison, a bicycle costs 40,000 CFA, a head of cattle in the range of 40,000 CFA and up, the least expensive six-yard piece of cloth about 2,000 CFA, and a kilogram of sorghum about 75 CFA in the post-harvest period in 1981.

One of SEMRY's major concerns is collecting the fixed charge it levies on farmers.⁵ A farmer whose harvest is poor will frequently not sell his or her paddy directly to SEMRY. Instead the paddy will be given to a friend to be sold to SEMRY along with the friend's. By not delivering the paddy directly to SEMRY, the farmer avoids having the fixed charge deducted for SEMRY's services. The farmer usually receives the established producer price of 55 CFA/kg from his or her friend--the friend does not materially benefit from the transaction. Alternatively, a farmer whose harvest is poor will retain all of his or her paddy and sell most of it on the parallel market, where paddy prices are about 10-20% greater than the official SEMRY producer price. SEMRY attempts to stop illegal sales; at harvest time in 1981, as in other years, the police were mobilized at roadblocks to check whether paddy was being illegally transported.

Farmers who do not pay their fixed charges are then indebted to SEMRY the following year. To avoid paying their debts, they will

relinquish control over their piquets and cultivate a friend's or relative's, or they will get their wife or son to sign up for a new piquet. Some farmers reportedly change their names and sign up for new piquets. Improving the system of farmer identification and registration of piquets is one area to which SEMRY is currently paying considerable attention.

Present organization of rice production. At present, SEMRY controls the dates during which seedlings can be transplanted and paddy harvested, which varieties are transplanted, the levels of fertilizer and insecticide use, the allocation of piquets, the water supply and the producer price of paddy. About the only aspect of rice cultivation SEMRY does not control, somewhat to its dismay, is the decision farmers make of how much and whose labor to allocate to rice production.

In contrast to sorghum fields which are for the most part cultivated individually, most rice piquets are cultivated jointly by members of the conjugal household, irrespective of whose name the piquet is registered in. Women are permitted to and in fact do register for piquets in their own names; in Vele about 20% of the married women had a piquet in their own names. A fair number of these piquets were registered in women's names, I think, for reasons of past indebtedness of other household members or as a means of risk-spreading.

Even if a piquet is registered in a woman's name and she receives the money from the sale of her paddy to SEMRY, her husband expects her to turn over all the income from her field to him. He then returns part of the income to her (see Section 4). It is difficult for her to hide from him how much she receives; the paddy is weighed in

public and the producer is given a slip which records the quantity sold and the price received. Besides, farmers know approximately how much a sack of paddy is worth. A woman's husband has the right to any income that she earns above and beyond the small sums she is allowed to retain for her daily food purchases. Rice cultivation is analogous to women's cultivation of tobacco, in that a woman must turn over the proceeds from the sale of her tobacco if they are greater than the small sums she needs for daily food expenditures.

In the few cases where men do cultivate tobacco (observed in Zebe where tobacco is avidly pursued as a cash crop), they cultivate separately from their wives. This reflects two factors. First, tobacco fields are quite small (about .01 or .02 ha) and are cultivated quite intensively. Second, tobacco production has traditionally been exclusively a woman's crop.

In contrast, rice cultivation is a joint household activity. Even in cases where a household cultivates more than one piquet a husband and wife usually work the piquets together. One piquet may not be ready quite as soon as another for transplanting, for example, so it makes sense to finish transplanting one before beginning the next. Also, should one spouse fall ill before work starts on the second piquet, then the second piquet could be abandoned and the household would not be liable for the fixed charges. The fact that rice cultivation is a joint household activity may in part be a reflection of the scale on which it is carried out; the basic field size is one piquet (0.5 ha), although it is possible to cultivate half-piquets.

Unlike sorghum cultivation, no cases were encountered of piquets

worked collectively by a multi-household compound. Although occasionally one compound member will come to the aid of another, there is no expectation that all compound members should work on a collective piquet under the direction of the compound head. The compound head has rights to the labor of his married sons and their wives only for the cultivation of the collective sorghum field which produces grain that is distributed to the entire compound. He has no right to the income otherwise produced by his married sons or their wives. Since rice production is largely a commercial rather than a subsistence activity, there would be no precedent for establishing a collective rice field. Thus, the rice fields of compound heads are not functionally equivalent to the collective sorghum field in that they do not produce grain which is eaten as a last resort when supplies from individual fields are exhausted. Nor are they symbolically equivalent in the sense that the land surrounding the compound, unlike the land on which rice is cultivated, is part of the compound's patrimony which cannot be alienated and under the ritual control of the bum nagata (head of the lineage's land).

Most of a household member's time is spent, therefore, cultivating the piquets belonging to his or her household. Table 3.2 indicates the percentage of time women spent cultivating rice broken down by the proprietorship of the piquet. In contrast to sorghum production, a greater percentage of women's rice cultivation was spent cultivating the fields of people unrelated to them.

**Table 3.2 Allocation of Women's Rice Labor
According to Field Proprietorship**

Proprietor of Field on which Woman Worked	Vele	Widigue
Household	88%	93%
Other Compound	1%	2%
Woman's Family	1%	1%
Other Noncompound	10%	4%

However, a substantial part of the time women spent cultivating the rice fields of people unrelated to them was remunerated in cash (kerena). Table 3.3 shows how women were remunerated for the labor they contributed to fields not belonging to their households. Unlike sorghum, in a number of cases women actually worked as kerena on other compound members' fields or even on fields of their own families, although the majority of the labor to their natal families was goutna.

Table 3.3 Remuneration of Women's Nonhousehold Rice Labor

Proprietor of Field on which Woman Worked	Type of Remuneration	Vele	Widigue
A. Other compound	goutna	87%	94%
	depma	3%	0%
	kerena	10%	6%
B. Woman's Family	goutna	81%	100%
	depma	0%	0%
	kerena	19%	0%
C. Other noncompound	goutna	32%	9%
	depma	2%	0%
	kerena	66%	91%

Note: Goutna is aid freely given, sometimes remunerated in rice, depma is a work party, remunerated in food, and kerena is hired labor remunerated in cash.

A substantial percentage of the work women did on noncompound fields was kerena. In particular, most of the transplanting and all of the weeding that they did on noncompound fields was kerena, whereas about half of the noncompound harvesting and threshing labor they

performed was goutna. The percentages are given in Table 3.4. The reason that a much higher percentage of labor at harvesting and threshing time is goutna and not kerena is that women who thresh as goutna receive several kilos at the end of the work day. It is not considered kerena labor, however, because they do not receive cash, and also because there is no exact expectation as to the amount of grain which should be received for a day's labor.

Table 3.4 Type of Remuneration of Vele Women's Other
Noncompound Rice Labor According to Activity

Type of Labor	transplanting*	weeding	harvesting and threshing
goutna	9%	0%	49%
depma	2%	0%	3%
kerena	88%	100%	48%

* Does not sum to 100% due to rounding errors.

Summary of the major differences between sorghum and rice production. The major difference between sorghum and rice production not directly attributable to SEMRY's control over rice production is the unit of production: in most cases rice fields are cultivated by the conjugal household while sorghum is cultivated individually and collectively by the compound. Furthermore, in contrast to sorghum production, women spend more time working on the fields of noncompound members and are remunerated in cash for a substantial part of their

noncompound labor. The differences in the pattern of labor organization reflect the difference in the use to which the two crops are put.

Most sorghum is destined for subsistence, rather than as a means of accumulating wealth. Even though sorghum is primarily produced by compound members working on their individual fields, they do not have complete control over the disposition of the sorghum harvest. There is a complex set of norms about how sorghum is stored, whose sorghum is eaten first, and rights to dispose of surplus production (see Section 4.2). Most sorghum production is individually produced because there is very little to be gained by one household member mobilizing the labor of another. As De Garine points out, even before rice production was introduced, the privileged position of a polygynist was not based on his capacity to mobilize his wives' labor for surplus sorghum production, but rather on his ability to mobilize the surplus they generated from activities such as beer-brewing and tobacco cultivation (1964:131).⁶

The mobilization of women's labor by their husbands for rice production is an extension, therefore, of a husband's customary right to the surplus generated by his wife's non-subsistence crop labor. As one might expect, then, the conflict between husband and wife is not over his right to mobilize her labor per se, but rather over the disposition of the surplus from rice production, that is, the income remaining once subsistence needs have been met.

3.3. The Agricultural Calendar

SEMR₁ determines the date on which transplanting can begin by when it makes seedlings available to farmers. God or the rains, for in

the Massa language they are one and the same, determines when sorghum planting begins. In 1981, the rains were quite erratic at the beginning of the season. A promising beginning in early May was followed by a disappointing five-week drought. It was not until the last week of June that the rains finally began with any regularity. A comparison of the 1981 rainfall and the thirty-year mean rainfall presented in Table 3.5 shows that in fact June was unusually dry.

Table 3.5 Rainfall in the Yagoua Area, 1981

	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Total
Yagoua station			82	37	163	199	204	6	692
Average monthly rainfall 1934-65	4	19	59	117	181	272	131	31	814

The late arrival of the rains effectively limited sorghum planting to a three week period from about June 24 to July 14. However, the rice seedlings were also available for transplanting at the end of June. Nevertheless, most people chose to finish planting their sorghum fields before beginning transplanting. Thus, transplanting did not get seriously underway until about the middle of July. The major conflict between rice and sorghum occurred in late July and early August, when farmers were forced to choose between weeding their sorghum fields and transplanting their rice piquets. Rice weeding, attaching of sorghum (tying several stalks of sorghum together to protect them from wind damage and lodging) and, for those households with access to dongolonga fields (primarily rice-cultivating households in Widigue), field

preparation and transplanting of dongolonga overlapped in September and early October. Sorghum was harvested in October and rice was harvested in November and December.

The rainy season agricultural cycle has been divided up into seven periods, each one encompassing the great majority of time spent on a sorghum or rice activity. The 1981 labor calendar is summarized in Table 3.6. The figures which follow each activity refer to the percentage of the total number of days that women spent on that activity that fell in the particular period under question. For example, from July 15 to July 31, 36% of the rice transplanting done by women in Vele was accomplished. There is only one major difference in the labor allocation pattern among the three groups of women. Vele women apparently weeded a greater percentage of their sorghum crop earlier than the women in Widigue. In part, this is due to the fact that they spent less time weeding overall. However, they also spent more total hours weeding in late June and early July period, possibly because they finished planting earlier and did some weeding before starting transplanting. Part of the difference may also be attributable to coding errors or to errors in responses.

Although the sequencing of activities was quite similar in the two rice-cultivating villages, rice-cultivating women in Widigue and Vele allocated their time quite differently between sorghum and rice as a comparison of Table 3.7 and Table 3.8 shows. The most pronounced difference is that Vele women spent almost twice as much time weeding their rice fields as Widigue women. Since the number of piquets per worker cultivated by the households to which the women belonged was

Table 3.6

Cropping Calendar

Period	Activity	Percentage of Activity Accomplished in Period		
		Vele	Widigue Rice Farmers	Widigue Nonrice Farmers
May 15-June 22	harvest of dry season rice crop	100%	100%	
	sorghum planting	37%	29%	38%
June 23-July 14	sorghum planting	61%	68%	58%
	1st sorghum weeding	26%	2%	5%
	rice transplanting	12%	16%	
July 15-July 31	1st sorghum weeding	54%	58%	58%
	2nd sorghum weeding	8%	6%	4%
	rice transplanting	36%	38%	
Aug. 1-Aug. 27	1st sorghum weeding	21%	39%	37%
	2nd sorghum weeding	91%	88%	96%
	rice transplanting	47%	41%	
Aug. 28-Oct. 10	rice weeding	83%	76%	
	sorghum attaching	100%	100%	
	dongolonga field prep. & trans.	51%	63%	
Oct. 11-Nov. 2	sorghum harvest	76%	86%	
	dongolonga field prep & trans.	49%	37%	
Nov. 3-Dec. 31	rice harvesting and threshing	93%	96%	

Table 3.7

Days Worked by Vele Women, 1981

All Fields	5/15 to 6/22	6/23 to 7/14	7/15 to 7/31	8/1 to 8/27	8/28 to 10/2	10/3 to 11/2	11/3 to 12/31	Total
<u>DRY SEASON RICE</u>	11.9							11.9
<u>SORGHUM</u>								
planting	5.1	8.4	.2					13.7
weeding		1.8	4.1	4.9				10.9
attach & harv.					2.1	3.6		5.7
<u>RAINY SEASON RICE</u>								
transplant		2.2	6.7	8.6	1.0			18.6
weeding			<.1	2.1	11.3	.2		13.5
harv. & thresh						1.8	25.8	27.6
<u>DONGOLONGA</u>					1.8	1.7	.3	3.8
<u>TOTAL SORGHUM</u>	5.1	10.2	4.4	4.9	2.1	3.6		30.3
<u>TOTAL RAINY SEASON RICE</u>		2.2	6.8	10.7	12.2	2.0	25.8	59.7
<u>TOTAL (hours/day)</u>	16.9 4.3	12.5 5.7	11.1 6.5	15.6 5.8	16.2 4.5	7.5 2.4	26.1 4.4	106.0 4.6

Table 3.8

Days Worked by Widigue Rice-Cultivating Women, 1981

All Fields	5/15 to 6/22	6/23 to 7/14	7/15 to 7/31	8/1 to 8/27	8/28 to 10/2	10/3 to 11/2	11/3 to 12/31	Total
<u>DRY SEASON RICE</u>	5.9							5.9
<u>SORGHUM</u>								
planting	4.7	11.1	.6					16.4
weeding	.1	.2	5.3	7.0				12.6
attach & harv.					2.2	3.2	.5	6.0
<u>RAINY SEASON RICE</u>								
transplant		3.0	7.2	7.7	1.0			18.8
weeding			.1	1.6	5.4	.1		7.1
harv. & thresh						1.1	24.4	25.5
<u>DONGOLONGA</u>				.1	12.6	7.3	2.2	22.2
<u>TOTAL SORGHUM</u>	4.8	11.3	5.9	7.0	2.2	3.2	.5	34.8
<u>TOTAL RAINY SEASON RICE</u>		3.0	7.2	9.3	6.4	1.2	24.4	51.5
<u>TOTAL (hours/day)</u>	10.8 2.8	14.3 6.5	13.2 7.8	16.4 6.1	21.3 5.9	11.6 3.7	27.4 4.6	114.9 5.0

virtually the same, the difference in the amount of time spent weeding suggests that Widigue households weeded their rice less intensively than Vele households. Instead of weeding rice, however, they were transplanting dongolonga. In fact, Widigue women spent 500% more time than Vele women cultivating dongolonga. Not all households in Vele have access to dongolonga land and the fields of those which do tend to be smaller on average.

Widigue rice-cultivating women also spent several more days planting and weeding their sorghum fields than Vele women, although women in both villages spent the same amount of time transplanting rice. Because sorghum land is readily available in Widigue and no other equally remunerative income-generating activities exist, Widigue women spent several more days than Vele women on agricultural activities during the period of peak labor demand. They earn most of their income from sales of surplus grain. In contrast, Vele women, whose access to sorghum land is more limited, have better opportunities to work as hired labor on rice production throughout the year and a bigger market for their sorghum beer (made in virtually all cases from purchased sorghum). Thus, they are less dependent on grain production as a means of generating cash for purchases of sauce ingredients.

Trade-offs between sorghum and rice cultivation. Since no baseline data on women's labor allocation are available, one cannot determine what activities women actually forwent in order to take on rice cultivation. It would be useful to know what combination of childcare, food preparation, leisure, farming, other income generating activities, etc. women forwent, since the welfare consequences of

reducing the amount of time spent on one or more of these activities for a woman and her household depends on the particular activity which is actually forgone. In the absence of baseline data, inferences about changes in women's labor allocation must be based on qualitative evidence as well as cross-sectional data. The labor allocation patterns of women from rice and nonrice-cultivating households in the same village, Widigue, are compared. The data were collected during the period of peak labor demand, from the middle of May when the rains started to the end of August when women finished weeding their sorghum fields. They are summarized in Table 3.9.

A comparison of the total number of hours spent on agricultural work by Widigue nonrice and rice-cultivating women during the period of rice transplanting, from the end of June until the end of August, shows that rice cultivators did not work significantly more time in total than nonrice cultivators--about two days more over a nine and a half week period.⁷ This suggests that in the period of peak labor demand rice cultivation has substituted for, not added to, women's other agricultural activities. Indeed, some of the rice cultivators in Widigue reported that they had given up cultivating one of their sorghum fields in order to take up rice cultivation. The following regression, based on the labor inputs of all Widigue and Vele women (n=72), shows that women make a one-to-one tradeoff between the number of days they work on rice and sorghum cultivation during the peak transplanting period (7/15-8/27):

$$(3.1) \quad \text{DAYS RICE} = 28.57 - 1.04 (\text{DAYS SORGHUM}) \quad R^2 = .77$$

$$\quad \quad \quad (t\text{-ratios}) \quad (26.94) \quad (15.20) \quad F = 230.93$$

Table 3.9

Days Worked by Women from Widigue Rice
and Nonrice-Cultivating Households, 1981

	5/15- 6/22	6/23- 7/14	7/15- 7/31	8/1- 8/27	Total
ALL CROPS (all fields)					
Rice	10.8	14.3	13.2	16.4	54.6
Nonrice	10.3 (.72)	14.5 (.73)	12.3 (.15)	15.2 (.36)	52.3 (.45)
SORGHUM (all fields)					
Rice	4.0	11.3	5.9	7.0	29.2
Nonrice	8.2 (.00)	14.2 (.01)	11.8 (.00)	13.4 (.00)	48.8 (.00)
RICE (all fields)					
Rice	5.9	3.0	7.2	9.3	25.4
Nonrice	1.4 (.01)	.1 (.00)	.1 (.00)	.3 (.00)	1.9 (.00)
SORGHUM PLANTING (own field)					
Rice	4.0	10.2	.5		14.7
Nonrice	8.0 (.00)	13.3 (.00)	.9 (.36)		22.2 (.00)
SORGHUM WEEDING (own field)					
Rice	.0	.2	4.8	6.8	11.8
Nonrice	.2 (.31)	.9 (.04)	10.4 (.00)	13.1 (.12)	24.5 (.00)
SORGHUM 1ST WEEDING (own field)					
Rice	.0	.2	4.6	3.3	8.0
Nonrice	.2 (.31)	.9 (.05)	10.1 (.00)	5.8 (.12)	16.9 (.00)
SORGHUM 2ND WEEDING (own field)					
Rice			.3	3.4	3.8
Nonrice			.3 (.40)	7.3 (.00)	7.6 (.00)

Note: The figures in parentheses are the probabilities associated with the two-tailed t-test used to test the hypothesis that the means of the two groups are equal.

It is not surprising that women would make a tradeoff between transplanting rice and weeding sorghum, since the agricultural workload of women who cultivate only sorghum is already quite heavy. On average, they spent six to seven hours a day, seven days a week from the end of June to the end of August cultivating. In addition, they spent about another three hours a day on domestic labor activities, threshing grain, grinding it, finding ingredients for the sauce, preparing meals, fetching water, bathing children, etc., all of which are essential to the maintenance of their households.

Thus, women who undertake rice cultivation have no choice but to give up some of the time they spend cultivating sorghum. It is important to note, however, that rice cultivation has increased women's agricultural workload only in terms of the number of days worked annually and not in terms of the number of hours worked per day on average during the period of peak of labor demand. The increase in the amount of time women spend on agricultural activities is not necessarily to their detriment, provided that they receive a corresponding increase in real income. This issue is taken up in the next section.

SECTION 4. THE ALLOCATION OF WOMEN'S LABOR TO RICE PRODUCTION

This section examines the relationship between the amount of compensation women receive from their husbands for their labor on rice production and how they allocate their labor between rice and sorghum production. Section 4.1 establishes that the amount of compensation women receive is related to the number of days they work. It then considers whether the amount of compensation women receive for their work on rice production is greater than the income they forgo. Section 4.2 examines whether, with the introduction of irrigated rice cultivation, the share of food women are expected to provide has increased. If so, then the real value of the compensation they receive from their husbands is less than the nominal value. However, the evidence indicates that rice cultivation has increased women's real income.

Given this apparent incentive, Section 4.3 examines the allocation of women's labor between sorghum and rice production. It compares the labor allocation pattern of women who control the disposition of rice income with the labor allocation pattern of women whose husbands control the disposition of income from rice production. Even though women in the latter group receive more income from rice production than they forgo on account of rice cultivation, they do not allocate their labor efficiently relative to the former. This conclusion is the basis for an alternative approach to intrahousehold resource allocation and income distribution based on bargaining theory. This approach is outlined in the fourth section. From the perspective

of a bargaining model of household decision-making, Section 4.4 speculates on the factors that differentiate the allocatively efficient married households from the allocatively inefficient ones.

4.1. The Remuneration of Women's Rice Cultivation Labor

The money and paddy which women receive from their husbands after the rice harvest is perceived by them to be compensation for the work which they do on their husbands' fields. It is given to them "in return for their sweat." A woman receives about 7,700 CFA in cash and about 9,200 CFA worth of paddy from her husband after the harvest, or about 16,900 CFA in total.¹ This is less than a quarter of the net returns from rice production--about 70,000 CFA. Valued at the market wage rates (see below), a woman's labor contribution is worth about 31,200 CFA, so her husband makes a profit of about 14,300 CFA from her labor.

If a woman receives what she considers to be an insultingly small sum of money, or no money at all, she is likely to become quite angry with her husband and most unenthusiastic about participating in rice production the following year. Husbands are quite aware that their wives' continued participation depends on their own generosity. Of the thirty-five married women in the sample from Vele and Widigue whose husbands controlled the distribution of income from rice production, only three women did not receive any cash at all.

In one case, the husband received no cash from the sale of paddy since the harvest had been very poor. In the other two cases, however, the women were very angry at not receiving any cash. One woman's

husband offered her 1,000 CFA which she refused to take. A fight ensued. I visited the other woman several days after the rice harvest. At that time she was waiting for her husband to decide how much money he was going to give her. I went back to see her about two weeks later and found out that she was at her parent's compound where she was recuperating from a severe beating by her husband. Her co-wife explained that their husband had beaten her because he was angry that she hadn't prepared food for him for two days. This is one of the most effective ways women have of making their displeasure with their husbands known. The fact that almost all women did receive cash (except in the case where there were extenuating circumstances) and that there was considerable conflict in the two cases where they did not indicate that women do have some claim on the money which is earned from rice cultivation.

The following regression is estimated to establish that there is a significant relationship between the amount of compensation women receive from their husbands and the number of days they worked on their husbands rice fields:²

$$(4.1) \quad \text{COMPENSATION} = -1922 + 358 (\text{DAYS}) \quad R^2 = .70$$

(t-ratios) (.82) (8.21) F=67.36

The rate at which they are compensated by their husbands, 358 CFA per day, is significantly less than the the average returns to labor from rice cultivation which are about 600 CFA/day³ and is also significantly less than the average wage of 600 CFA/day which women would have received had they been compensated for their labor on rice production at the market wage rates. The average wage rates paid to Vele women for

transplanting, weeding and harvesting were 805 CFA/day (n=55), 523 CFA/day (n=26), and 501 CFA/day (n=67) respectively. Households generally hire labor to replace ill household members, when they want to finish a task quickly or when they find they cannot complete an activity. However, as one would expect in a land surplus area, hired labor comprises only about 10% of the total labor input. About 90% of the hired labor is female.⁴

One might wonder why women continue to work for their husbands if the rate at which they are compensated is so low relative to what they could earn working as hired labor. In principle, married women are expected to work on their husband's fields if they are not working on their own. If they refuse to work on their husbands' fields, they risk a beating. Thus, most women work as hired labor no more than several days out of the entire agricultural season, most often when their need for cash (usually to purchase food) is urgent. In order to profit from their wives' labor, husbands must restrict their wives' opportunities to work as hired labor.

However, several of the married women worked more than several days as hired labor. Five of the fifteen married women in Vele who worked as hired labor accounted for 67% of the total number of days worked by the group of twenty-four married women whose husbands controlled the disposition of the income from rice production. All five women received less than the average rate of compensation from their husbands. In fact, the woman who worked the most days as hired labor (22% of the total days worked) was the one who received no cash from her husband at the end of the harvest and was later severely beaten by him.

It is possible that husbands reduce the amount of income they give to their wives after the rice harvest to express their displeasure with their wives' choice to work as hired labor instead of working for them. However, it is also possible that the causality also goes in the opposite direction: women who spend more than several days working as hired labor may do so in order to express their displeasure with the amount of compensation they have received in the past from their husbands. In fact, several women told me that if a woman is not adequately compensated for her labor by her husband, then she will spend more time working as hired labor the following year. Even so, women may stagger the days that they work as hired labor or do their work in the harvesting season so as not to unduly provoke their husbands. The woman who worked the most days as hired labor only spent several days working as hired labor during the transplanting and weeding period. She spent very little time transplanting and weeding her husband's rice field. Most of the days that she worked as hired labor were during the harvesting period, since harvesting was quickly accomplished on her household rice field because it had been only partially transplanted.

Opportunity cost of women's labor. Thus, unless they are willing to provoke a serious conflict, women have little choice but to work for their husbands in order to profit from the higher returns to labor afforded by rice cultivation. The issue is whether they earn more income from working for their husbands than they could earn from their own income-generating activities. To determine if rice cultivation has increased their incomes, the rate at which they are compensated by their husbands needs to be compared to the opportunity cost of their labor.

However, the opportunity cost of their labor varies throughout the agricultural season.

The discussion of the agricultural calendar in Section 3.3 indicates that rice transplanting competes with sorghum planting and weeding labor. The average returns to labor and the hired wage rates can be used to establish the opportunity cost of sorghum planting and weeding labor. Labor is occasionally hired for sorghum planting or weeding in villages that are located at some distance from the rice fields. People from those villages have little incentive to take advantage of the higher wage rate paid for transplanting because of the time required to walk to the fields. The wage rate paid for sorghum planting and first weeding labor are in the range of 450-550 CFA/day.⁵ The returns to sorghum labor also fall in this range.⁶

However, rice weeding and harvesting do not compete with sorghum for labor. Thus, if women did not weed or harvest their husbands' rice fields, they would otherwise most likely be earning income from beer-brewing, fabrication of clay pots, petty commerce, etc. The survey of women's earnings in various periods throughout the year indicates that women rarely earn more than the equivalent of about 100 CFA/day even in relatively slack agricultural periods. This is true even in Zebe, where women's earnings from sales of tobacco and fish are considerable. Thus, 100 CFA/day can safely be taken as the upper limit on the opportunity cost of women's nonagricultural labor.⁷

To determine how much additional income Vele women actually earned by working on their husbands' rice fields instead of pursuing their own activities, the number of days women spent transplanting,

weeding and harvesting their husbands' rice fields, 16.6, 13.3 and 21.8 days respectively, are multiplied by the opportunity cost of that labor, 550, 100 and 100 CFA/day, to obtain 12,640 CFA. Vele women received on average 16,900 CFA from their husbands. Thus, women received 4,260 CFA more by working on their husbands rice fields than if they had engaged in their own income-generating activities.⁸ This should be contrasted to the difference of 14,300 CFA between the market value of women's household rice labor and the amount of cash they receive from their husbands. Thus, even though women have captured less than a quarter of the net increase in household income generated by their labor on rice cultivation, it is, nonetheless, a net increase in their income.

4.2. The Intrahousehold Responsibility for Food Provision

The last section established that women are compensated for their labor on rice production at a rate which is greater than the opportunity cost of their time. If, however, they are expected to use the cash they receive to purchase food which their husbands otherwise would have provided or purchased before rice cultivation was adopted, then the real value of their compensation is reduced. It has been alleged (see Section 5) that cash crop production puts a greater burden on women to provide food. Essentially, the argument is that men withdraw their labor from food production and use the income they receive from cash crop production for nonfood expenditures. This section considers the question of whether rice cultivation has altered the division of responsibility for providing food. It begins by describing the Massa diet, which is based primarily on a cereal dish

accompanied by a sauce which often contains a small quantity of fish. It then considers whether rice cultivation has resulted in a decreased supply of grain available for home consumption. Finally, it considers whether there have been any shifts in the division of responsibility for purchasing sauce ingredients.

The data on food expenditures were collected during five different periods of the year to take account of the seasonal variation in food expenditures. The survey was conducted 1) in early May, before the dry season rice harvest, 2) in early July, after the dry season rice harvest, 3) in late August, before the sorghum harvest, 4) in November, after the sorghum harvest, and 5) in early January, after the rainy season rice harvest. Women were interviewed every other day for two weeks during each of these periods about the amount they and other members of their households spent on grain and ingredients for the sauce. In addition, the amount of income women earned, as well as its source, were also ascertained.

In the first two rounds of the expenditure survey, women were asked how much they and other members of their households spent on food. Expenditures were broken down into expenditures on sauce ingredients, sorghum and rice. However, women were not asked if they had earned the money they used to purchase food or if the money was a transfer payment from someone else. After the second round of the survey, however, the questionnaire was revised and women were asked for the source of the income they used to buy food. If a husband gave his wife money for the express purpose of buying food, for example, then he was considered to have made the purchase. However, the lump cash sum a woman received

from her husband for her labor on rice cultivation was considered to be her own earned income, since the money was given in return for her labor without stipulation on how it should be spent. Thus, in the first two survey rounds purchases were differentiated according to the transactor of the purchase, whereas in the last three survey rounds purchases were differentiated not only by transactor, but also by the household member who provided the income for the purchase.

The Massa diet. The typical meal consists of funa, a cereal dish prepared by grinding sorghum (and even rice) between two stones into a flour which is stirred into boiling water until it is of a dough-like consistency. Pieces of funa are dipped into a sauce, dafna. Sauces often contain some fish, preferably fresh, but often dried, and are usually based on some kind of vegetable, such as okra or leaves, which are gathered by women. Only on rare occasions is meat purchased or are animals slaughtered, usually for a celebration or to feed a work party. Fish and okra are the most common items purchased for the sauce, although they are also frequently home-supplied. Condiments, such as onions, garlic, and red pepper, are rarely purchased or even employed. Even oil for the sauce or sugar for the porridges (which are made out of sorghum or rice flour, leftover pieces of funa, or the crusts which stick to the side of the cooking pot after the preparation of funa) are considered luxuries. No purchases of tea or coffee were ever recorded, though people do buy kola nuts. Thus, most of the diet is home-produced.

The majority of calories are provided by funa. A food consumption survey carried out in the late 1950s (before irrigated rice

production was introduced) found that the Massa consumed about 700 grams of sorghum a day except during the period immediately preceding the sorghum harvest when the average cereal consumption dropped to about 500 grams per day per adult (de Garine, 1964:9 and 1977:45) In addition, they consumed about 100 grams of fish and milk a day. The adult caloric intake averaged about 3000 cal/day.

Unfortunately, it was not possible to undertake a food consumption survey to determine how the food consumption pattern has altered over the past twenty-five years. However, some educated guesses can be made based a number of interviews that were conducted. People frequently remarked that the fish population in the Logone River has declined over the last ten to fifteen years. It is not clear what effect, if any, pumping water out of the Logone to irrigate the rice fields has had on the fish population. In any event, the decline in the fish population makes it more difficult for people to catch fish using their traditional traps. Thus, they are forced to rely more on purchased fish caught by men who fish on an extended basis using nylon nets. This has increased the need for cash to purchase fish and perhaps resulted in a decrease in the amount of fish consumed. In addition, some people also stated that grazing land was appropriated for rice production. As a result, people in villages along the Logone, particularly towards Yagoua, keep part of their cattle herd with kin who live in villages where grazing land is more readily available. However, it is not clear to what extent this has reduced the number of cattle kept in rice-cultivating villages, and therefore the supply of milk. The other major change in the food consumption pattern is that rice has

been substituted to some extent for sorghum. However, rice cultivation does not seem to have reduced the quantity of grain available for household consumption. The issue is taken up in the next subsection.

Responsibility for providing grain. Only in the best of years would the Massa who lived along the floodplain of the Logone have produced enough sorghum to meet household subsistence needs before the introduction of rice cultivation (de Garine, 1964:87). Given the frequent flooding of the Logone before the dike was built, sorghum harvests were often poor. Deficits were made up with income from sales of fish, tobacco, or livestock. When there was a serious shortage, the compound head sold cattle.

The first sorghum which is consumed by the household is usually that which a woman harvests from her own field. Most married women have their own granary. However, in monogamous households, it is not uncommon for husband and wife to store their grain together. If a man has more than one wife, he often divides up the grain between them. In a multi-household compound, the compound head stores the grain from the collective sorghum field in a central granary. This grain is saved until the hungry season, when it is distributed among the women of the compound to tide the compound over until the harvest. The fact that men and women often store their grain together, particularly in monogamous households in villages which do not regularly produce surpluses of sorghum, indicates that husband and wife share the responsibility to produce and contribute grain for family subsistence needs.

On occasion, both men and women sell small quantities of grain when there is a surplus. Before a household member sells a significant

amount of grain (say, more than 20 or 30 kilos), he or she discusses the matter with his or her spouse. As one man said, he would never sell grain to buy a calf without his wife's approval because the calf would not be happy in the compound under those circumstances. This is indicative of the tension that a unilateral decision to sell grain would engender. Thus, women appear to have a strong voice as far as the disposition of the sorghum harvest is concerned.

The introduction of rice production does not seem to have resulted in men abdicating their responsibility to provide grain for their households. Households in the project area retain as much rice as the sorghum production which is forgone on account of cultivating rice. Ideally, one would like to have time series data, but they do not exist. Thus, cross-sectional data from one village, Widigue, are used to determine what impact rice cultivation has had on the availability of grain for household consumption.

The quantity of sorghum forgone by rice-cultivating women in Widigue can be approximated by comparing the difference in the size of rice-cultivating and nonrice-cultivating women's sorghum fields. Since rice and nonrice cultivators planted and weeded their sorghum fields at approximately the same intensity (planting: rice cultivators 64 days/ha, nonrice cultivators 50 days/ha, $t=.93$; weeding: rice cultivators 53 days/ha, nonrice cultivators 54 days/ha, $t=.00$), the difference between the two groups is primarily extensive rather than intensive. Nonrice-cultivating women planted .54 ha in sorghum, and rice cultivators planted .32 ha. However, 38% of the time nonrice cultivators spent planting and 29% of the time rice cultivators spent planting was during

the dry season rice harvest. Assuming a linear relationship between planting time and field size, nonrice cultivators would have planted .34 ha of sorghum in the rainy season rice transplanting period and rice cultivators .23 ha. Thus, nonrice-cultivating women planted .11 ha more of sorghum in the rice transplanting period. Assuming a yield of 1.0 t/ha, Widigue rice cultivating women therefore forwent about 111 kilos of sorghum, valued at 8,325 CFA at the post-rainy season rice harvest price of sorghum. Widigue rice-cultivating household retained about 17,500 CFA worth of paddy which is about 160 kg of paddy or about 106 kg of hand-pounded rice per active household member.

Another method of calculating the amount of sorghum women forwent on account of rice cultivation is to value their rice labor by the average returns to sorghum labor. Assuming that the only trade-off rice cultivators are forced to make between sorghum and rainy season rice cultivation is during the period of rice transplanting, the opportunity cost of women's transplanting labor can be valued by the wage rate for sorghum planting and weeding labor, 500 CFA/day. Since rice-cultivating women spent 17.3 days transplanting the rice fields of their households in the sorghum planting and weeding period, they would have forgone about 8,650 worth of sorghum, about 115 kg. This calculation is virtually identical to the one based on the area planted.

Thus, women's share of paddy, assumed to be half of the paddy retained by a monogamous household, is equal to the sorghum production she forgoes. The question is whether men's share (the other half) is equal to the sorghum production which men forwent that would have been available to their wives for household consumption purposes. Data from

farm management survey indicates that rice-cultivating compounds cultivate about .27 ha per active compound member, compared to the .32 ha per woman calculated on the basis of the women in my sample (Bikoi 1982). The similarity between these figures, particularly since they are based on two different random samples, indicates that men's fields were roughly the same size as women's.⁹ Thus, men's share of the paddy which was retained almost certainly corresponds to the sorghum production they forwent on account of rice.

The issue of who buys grain to make up any deficits in household production is moot in Widigue, since virtually all households, rice-cultivating and nonrice-cultivating alike, produce enough grain to meet their annual subsistence needs. When both groups of women in Widigue were interviewed at the end of the hungry season immediately prior to the sorghum harvest, they reported that they had had a sufficient amount of sorghum to meet household grain needs and had not had to buy grain. Indeed, Widigue women consistently sold grain over the course of year, reflecting large surpluses. Thus, women did not have to use any of the cash they received for their rice labor to purchase grain. In fact, husbands in Widigue could have retained less paddy without compromising household food supply. However, this would have reduced the amount of surplus grain women had available for sale and women, therefore, would have had little incentive to cultivate rice. Furthermore, men have an interest in ensuring that women have a certain quantity of grain available for sale, since income from the sale of grain is primarily used to purchase ingredients for the sauce consumed by both men and women.

Unfortunately, it is not possible to compare the amount of grain retained by rice and nonrice cultivators in Vele, since virtually all households in Vele cultivate rice. There is some historical evidence, however, that provides an indication of the extent to which rice cultivation reduced the area under sorghum cultivation in the villages bordering on the Logone River. In 1958 de Garine surveyed a small sample of compounds in Doreissou, the village to the north of Vele, and found that compounds cultivated on average 0.2 ha of sorghum per active compound worker (1964:85). In 1981, the average sorghum area under cultivation was .13 ha per active worker (Bikoi, 1982).¹⁰ If this is any indication of the magnitude of the reduction in the size of household sorghum fields, then the amount of sorghum production forgone on account of rice cultivation would certainly be less than the 106 kg. of hand-pounded rice that Vele households retained per active household worker.

Furthermore, if husbands are selling off their paddy to acquire cash to the detriment of their households' subsistence needs, one would expect that households in which women control the disposition of paddy would retain more paddy than male-headed households on a consumer equivalent basis. However, this is not the case. Households in which women controlled the disposition of rice income retained only 167 kg of paddy per adult compared to the 165 kg of paddy retained by households in which the disposition was determined by men.

This leaves the question of how rice cultivation has altered the responsibility for purchasing grain when the home-produced supply is exhausted. With what they retain from rainy season rice production,

most households in Vele cannot meet their subsistence requirements from rainy season sorghum and rice production alone. The average sorghum area cultivated per consumer equivalent is .09 ha. which at 1 t/ha would yield about 90 kg of sorghum.¹¹ The additional 70 kg of hand-pounded rice retained would total 160 kg of grain per consumer equivalent.¹² This amounts to amounts to 438 g/day of grain per consumer equivalent, about 15% less than the minimum level of 500 g/day cited by de Garine. (If the average sorghum yield is assumed to be 1.6 t/ha, the ration per consumer equivalent would be 586 g/day).

However, households also depend on their dry season rice production. Those households whose fields are not irrigated in the dry season work as hired labor or work for their kin in exchange for a sack or two of paddy at the end of the dry season rice harvest. In addition, 47% of the households in Vele also have dongolonga fields. These dry season activities significantly reduce the potential grain deficit faced by most households.

Nonetheless, about a third of the households surveyed in Vele (female and male-controlled alike) reported purchasing some grain during the rainy season to tide them over until the sorghum harvest. In August, the households in which women controlled the disposition of rice production purchased 154 CFA of grain (about 2 kg of sorghum), and those in which men controlled the disposition of income from rice production purchased 133 CFA of grain over a two-week period, respectively. However, in both cases average sales of grain outweighed purchases, which indicates that some households were in surplus and others were in deficit (in addition, some households were also speculating in grain).

In any event, the quantities of grain bought and sold were not large in any case, particularly when compared to purchases of grain in Zebe, where about two-thirds of the households ran out of grain well before August (again, same percentage of male and female headed households). In May, Zebe households spent 1,114 CFA on grain (approximately 13 kg of sorghum) over a two-week period; in July 253 CFA and in August 1,050 CFA.¹³ In Zebe, particularly during the hungry season, women bought the majority of grain using income from the sale of their tobacco production. This demonstrates that, where necessary, women have played and continue to play a critical role in ensuring the adequacy of the household grain supply through their (nonsorghum) income-generating activities. This casts further doubt on the hypothesis that rice cultivation has placed a bigger burden on women to supply grain to meet household subsistence needs.

It is difficult to ascertain how responsibility for meeting grain deficits would have been divided up between husband and wife in the past in Vele. At present, however, men make a major contribution by cultivating dry season rice and dongolonga. In addition men in several households borrowed money or, more often, rice which they paid back after the rice harvest with interest. Even in such cases women were still compensated for their labor on rainy season rice production. Thus, it seems that men continue to fulfill their traditional responsibility to provide grain for their households.

Changes in the division of responsibility for sauce ingredients.

Unlike grain, most of the burden of cultivating and purchasing ingredients for the sauce has traditionally fallen on women, though men

do provide cash for the purchase of sauce ingredients occasionally. In August, I conducted an informal survey of the married women in the sample to determine what women's perceptions were of their husbands' contributions. When asked if their husbands purchased ingredients for the sauce, about two-thirds of the women replied affirmatively. However, about half of these women then proceeded to qualify their responses by adding a proviso to the effect, "when he has the money," or in several cases, "when he sees that I don't have any money." Some of the women who said that their husbands did not provide money for food explained that their husbands were sick or didn't do any work (i.e. participate in any income-generating activities other than agricultural work) and thus had no cash.

The impression gained from the informal survey, therefore, was that men's contributions are neither sufficiently regular nor large to have significantly lessened the year-round burden on women to provide sauce ingredients. This was confirmed by the results of the last three rounds of the expenditure survey, which asked for detailed information on who actually purchased food and who provided the money which was used to make the purchase. Women's perceptions of the regularity of their husbands' contributions were reasonably accurate. Of the forty-one women who said that their husbands purchased food, twenty-one received money from their husbands (or their husbands actually purchased food) in at least two out of the three survey rounds. Twenty women, however, received money in only one of the survey periods, and one woman received no money at all from her husband. On the twenty-two who said that their husbands did not contribute, only four received money in least two out

of the three survey periods. The husbands of the other eighteen contributed in only one of the three periods (six husbands) or not at all (twelve husbands). The results are summarized for each village in Table 4.1. As it confirms, there are a substantial number of husbands, both rice and nonrice-cultivating alike, who contribute seldom if ever to the purchase of sauce ingredients.

Table 4.2 shows the percentages of husbands' and wives' contributions to food expenditures in August, November and January. There is considerable variation between months and between villages. Husbands' contributions are highest in Zebe, in general, because of the extensive purchases of grain, which require both men's and women's incomes. Expenditures on food in Widigue are low relative to the other villages, and husbands' contributions are also generally quite low. This reflects the greater availability of home-produced ingredients for the sauce in Widigue (because of the larger sorghum fields, the production of intercropped sauce crops is greater), as well as the relative scarcity of fish available for purchase. Vele husbands may purchase more fish than Widigue husbands simply because fish is more readily available and because their wives incomes' are not sufficient to cover additional food expenditures.

Table 4.1 Wives' Perceptions of Frequency of Husbands' Food Purchases
Compared to Observed Frequency of Husbands' Food Purchases

	yes	yes, qualified	no
<u>All Villages</u>			
A. Number of women who responded:	<u>25</u>	<u>16</u>	<u>22</u>
B. Number of husbands who purchased food in three or two survey periods:	13	8	4
C. Number of husbands who purchased food in one or no survey period:	12	8	18
<u>Vele</u>			
A. Number of women who responded:	<u>11</u>	<u>10</u>	<u>7</u>
B. Number of husbands who purchased food in three or two survey periods:	7	6	2
C. Number of husbands who purchased food in one or no survey period:	4	4	5
<u>Zebe</u>			
A. Number of women who responded:	<u>6</u>	<u>2</u>	<u>6</u>
B. Number of husbands who purchased food in three or two survey periods:	5	1	0
C. Number of husbands who purchased food in one or no survey periods:	1	1	6
<u>Widigue rice cultivators</u>			
A. Number of women who responded:	<u>7</u>	<u>3</u>	<u>4</u>
B. Number of husbands who purchased food in three or two survey periods:	0	1	0
C. Number of husbands who purchased food in one or no survey periods:	7	2	4
<u>Widigue non-rice cultivators</u>			
A. Number of women who responded:	<u>1</u>	<u>1</u>	<u>5</u>
B. Number of husbands who purchased food in three or two survey periods:	1	0	2
C. Number of husbands who purchased food in one or no survey period:	0	1	3

Table 4.2

Food Expenditures by Husbands and Wives

	August	November	January
	pre-sorghum harvest	post-sorghum harvest	post-rice harvest
<u>Vebe</u>			
wife	1798 (82%)	655 (65%)	1045 (60%)
husband	<u>389</u> (18%)	<u>358</u> (35%)	<u>654</u> (40%)
	2187	1013	1699
<u>Zebe</u>			
wife	1478 (74%)	1703 (92%)	1432 (52%)
husband	<u>525</u> (26%)	<u>146</u> (8%)	<u>1334</u> (48%)
	2003	1849	2766
<u>Widigue</u> <u>Rice Cultivators</u>			
wife	839 (90%)	400 (95%)	1003 (90%)
husband	<u>82</u> (10%)	<u>23</u> (5%)	<u>115</u> (10%)
	921	423	1118
<u>Widigue</u> <u>Nonrice Cultivators</u>			
wife	465 (84%)	669 (63%)	981 (77%)
husband	<u>88</u> (16%)	<u>400</u> (37%)	<u>289</u> (23%)
	551	1069	1270

Without baseline data, it is not possible to determine whether rice cultivation has increased or decreased the magnitude of men's contribution to sauce ingredients. However, there is evidence indicating that women would not purchase more sauce ingredients if they controlled more of the income from rice production. Table 4.3 compares expenditures on sauce ingredients of households in which women controlled the disposition of income from rice production with households in which men controlled the disposition. The difference in women's expenditures on sauce ingredients between the two groups is especially striking in January, after the rice harvest. However, when the contribution of husbands who controlled the disposition of income from the rice harvest are factored in, the gap between the two sets of households is dramatically reduced and becomes statistically insignificant. This suggests that the two sets of households have similar preferences regarding food expenditures. Thus, the gender of the person who controls the disposition of income from rice production does not have a significant effect on the amount of income which is spent on sauce ingredients.¹⁴

Husbands' willingness to purchase ingredients for the sauce essentially gives women latitude to spend their income on nonfood items without compromising the desired level of food expenditure (relative to what women who control the disposition of income from rice production would spend). In fact, about two weeks after they had been given cash by their husbands for their labor on rice production, women had already spent 65% of the money on "big ticket" consumption items--mostly cloth and shoes and in several cases, enamelware as well. This does

Table 4.3

Food Expenditures of Independent
and Married Women's Households

	August	November	January
	pre-sorghum harvest	post-sorghum harvest	post-rice harvest
<u>Women's Expenditures on Sauce Ingredients</u>			
Independent	1729	1042	1788
Married	1699 [*] (.92)	633 (.21)	937 (.01)
<u>Household Expenditures on Sauce Ingredients</u>			
Independent	1810	1158	1813
Married	2143 (.32)	1042 (.77)	1678 (.71)
<u>Household Expenditures on Sauce Ingredients</u> (per consumer equivalent) ^{**}			
Independent	775	468	843
Married	799 (.87)	448 (.90)	622 (.34)

* Note: Figures in parentheses are the probabilities associated with two-tailed t-tests. See note to Table 3.9.

** See note 11 for a definition of consumer equivalent.

not include what they spent on their children's clothing. Only a few women reported having spent a thousand or so CFA, out of the seven or eight thousand CFA they received, on sauce ingredients. Indeed, as women themselves say, rice production has provided them with the opportunity to purchase such items. Thus, it appears that the cash women receive from their husbands represents a real increase in their income, in that they have more money available to spend on consumer goods without forgoing expenditures on food. While it is possible that women may carry a bigger burden of the responsibility for purchasing sauce ingredients, their real incomes have nevertheless increased.

4.3. Allocation of Labor Between Sorghum and Rice Production

Comparison of married and independent women's labor allocation.

It would seem, therefore, that once some minimum quantity of sorghum is produced, women would have sufficient incentive to allocate the remainder of their labor time to their husbands' rice production. However, the following comparison of the labor allocation pattern of married women who cultivate for their husbands with that of women who cultivate for themselves suggests otherwise. Out of the sample of forty-two^a women from Vele, thirty-six were included in the comparison. One woman was excluded because she actually worked on the piquet of her co-wife (their husband was unable to cultivate), and the other four were dropped because they were older widows who were only able to help their sons cultivate their piquets (contrary to what they had stated when the census was taken). The fifth was not included because she decided not to cultivate rainy season rice after her husband fell ill.

Of the thirty-six remaining women, twelve controlled the distribution of the income from the sale of their paddy. Seven of these were widows who cultivated their own piquets. The other five were women who had their own piquets and whose husbands were too sick or too old to cultivate rice. These women hired their own labor and controlled the distribution of the proceeds received from the sale of their paddy. The other twenty-four were married women whose husbands, all of whom cultivated rice, controlled the distribution of the income derived from the sale of the paddy, which was cultivated jointly by the household. For the sake of rhetorical simplicity, these two groups of women will be referred to as independent and married women, although the group of independent women does contain several married women.

Table 4.4 compares the labor inputs of married and independent women to sorghum and rice cultivation throughout the rainy season. As Table 4.4 shows, there is a major difference in the amount of time they allocate to sorghum and rice production. The difference becomes quite pronounced in August during the latter half of the transplanting period, when married women spent far less time transplanting rice and far more time weeding sorghum than independent women. Married women continued to spend less time on rice and more time on sorghum than independent women throughout the rest of the season.

Several factors might account for the difference in the labor allocation patterns of the two groups. The number of children a woman has to feed might influence how much time she allocates to sorghum and rice. Since sorghum is the preferred cereal, a woman might decide to cultivate as much sorghum land as is necessary (or to cultivate that

Table 4.4: Days Worked by Vele Independent Women and Married Women, 1981

All Fields	5/15 to 6/22	6/23 to 7/14	7/15 to 7/31	8/1 to 8/27	8/28 to 10/2	10/3 to 11/2	11/3 to 12/31	Total
SORGHUM								
<u>Planting</u>								
Independent	4.6	7.7						12.3
Married	5.8	8.6	.2					14.6
	(.55)	(.39)	(.22)					(.36)
<u>Weeding</u>								
Independent		1.8	3.6	2.2				7.6
Married		1.9	4.0	5.1				11.0
		(.87)	(.70)	(.04)				(.19)
<u>Attach & Harv.</u>								
Independent					1.3	2.1		3.4
Married					2.1	3.8		5.9
					(.21)	(.04)		(.04)
<u>Total Sorghum</u>								
Independent	4.6	9.5	3.6	2.2	1.3	2.1		23.4
Married	5.8	10.5	4.2	5.1	2.1	3.8		31.5
	(.55)	(.47)	(.58)	(.04)	(.21)	(.04)		(.14)
RAINY SEASON RICE								
<u>Transplanting</u>								
Independent		2.9	8.4	13.4	.8			25.5
Married		2.4	7.0	8.1	.7			18.2
		(.57)	(.31)	(.01)	(.84)			(.03)
<u>Weeding</u>								
Independent				2.0	15.5	.9		18.4
Married				2.3	11.8	.2		14.3
				(.75)	(.08)	(.17)		(.04)
<u>Harv. & Thresh</u>								
Independent						1.8	29.0	30.8
Married						2.0	25.0	27.0
						(.83)	(.06)	(.08)
<u>Total R. S. Rice</u>								
Independent		2.9	8.4	15.4	16.3	2.7	29.0	74.7
Married		2.4	7.0	10.4	12.5	2.1	25.0	59.4
		(.57)	(.32)	(.01)	(.08)	(.40)	(.06)	(.01)
TOTAL ALL CROPS								
Independent	17.1	12.4	12.0	17.8	19.1	7.5	29.1	114.9
Married	16.7	13.0	11.2	15.5	15.9	7.4	25.3	104.8
	(.78)	(.70)	(.44)	(.08)	(.08)	(.92)	(.06)	(.06)

Note: Figures in parentheses are the probabilities associated with two-tailed t-tests. See note to Table 3.9.

land which is readily accessible to her as intensively as is necessary) to produce enough sorghum to meet her household's basic subsistence needs, no matter how great the returns to her labor from rice cultivation might be. Thus, the more children a woman has, the more time she might be inclined to spend on sorghum production. On the other hand, since rice is also home-consumed, a woman with more children might decide to forgo cultivating some of her sorghum land (or cultivate it less intensively), if rice cultivation is more profitable and/or less risky than sorghum cultivation to reduce the risk of not having enough grain to meet household food needs.

The presence of young children might also influence how a woman chooses to allocate her labor between sorghum and rice production to some degree. If her sorghum field is closer to the compound, a woman might prefer to work nearby her children if they are left in the compound. However, it should be noted that it is not unusual for women in Vele to have a sorghum field located at some distance from their compounds. Furthermore, the presence of very young children probably has a greater influence on the total amount of time she spends on agricultural activities. Women with very young infants do not usually cultivate either rice or sorghum. However, these women were deliberately excluded from the sample in order to focus on the economic determinants of women's labor allocation to rice production.

Another factor which might influence the amount of time a woman allocates to sorghum production is the amount of sorghum land to which she has ready access. The rate at which the returns to sorghum planting or weeding labor diminish depends not only on the amount of time which

is spent planting or weeding, but also on the size of the field. The smaller the field, the more quickly the point of rapidly diminishing marginal returns is reached. Thus, a woman with a very small sorghum field might take up rice transplanting sooner than a woman with a larger field unless, of course, the desire to produce a certain amount of sorghum causes the former to compensate for the small size of her field such that she spends even more time cultivating sorghum than the latter.

The above factors might account for some of the variation that is observed in women's labor allocation to sorghum and rice. However, they would not account for the difference which is observed between the groups of married and independent women unless, for example, one group had more children or greater access to sorghum land. Although on average the group of independent women had more children present in their households than the group of married women, 1.6 and 1.4 children respectively, the difference was not significant ($t=.34$). Furthermore, the difference in the amount of sorghum land they cultivated was not significant: the group of married women cultivated on average .19 ha and the group of independent women cultivated .18 ha ($t=.23$). Nevertheless, as an additional check one can control for these factors to determine whether the difference in the amount of time they spent on sorghum weeding and rice transplanting is significant.

Controlling then for the number of children, the following regression shows that there is not a significant difference in the number of days which the two groups spent preparing and sowing their sorghum fields in the rice transplanting period, 6/23 - 8/27 (where GROUP is a dummy variable equal to one for the independent group of

women, CHILD is the number of children in the household, and the figures in parentheses are the t-ratios):

$$(4.2) \text{ SORG PLANTING} = 9.7 - 0.7 (\text{CHILD}) - 0.8 (\text{GROUP}) \quad R^2 = .08$$

$$(11.00) \quad (1.51) \quad (.72) \quad F = 1.30$$

As one would expect, the inclusion of a variable for the size of the sorghum field which was actually planted significantly increases the explanatory power of the regression:

$$(4.3) \text{ SORG PLANTING} = 6.9 - 0.6 (\text{CHILD}) - 0.6 (\text{GROUP}) \quad R^2 = .32$$

$$(6.04) \quad (1.46) \quad (.66) \quad F = 4.79$$

$$+ 14.3 (\text{LAND})$$

$$(3.31)$$

The reason that the addition of a variable for sorghum field size does not explain even more of the variance in planting time is that some of the field preparation and sowing had to be repeated after the drought. The insignificant difference in the amount of time the two groups spent planting is consistent with the similarity in the average size of their sorghum fields.

However, the difference in the amount of time which the two groups spent weeding sorghum in the rice transplanting period (6/23 - 8/27), even after field size and the number of children are controlled for, is more significant:

$$(4.4) \text{ SORG WEEDING} = 9.6 - 2.3 (\text{CHILD}) - 2.9 (\text{GROUP}) + 24.5 (\text{LAND})$$

$$(3.35) \quad (2.17) \quad (1.28) \quad (2.27)$$

$$R^2 = .28$$

$$F = 4.03$$

As Table 4.4 indicates, married women spent approximately 50% more time

weeding sorghum than independent women in this period. The difference is most pronounced in the second half of the rice transplanting period (8/1-8/27).¹⁵ The following regressions also indicate a similar pattern:

$$(4.5) \quad \text{SORG WEEDING} = 4.1 - 0.9 (\text{CHILD}) - 0.1 (\text{GROUP}) + 17.0 (\text{LAND})$$

$$(6/23 - 7/31) \quad (2.47) \quad (1.54) \quad (.05) \quad (2.76)$$

$$R^2 = .26$$

$$F = 3.57$$

$$(4.6) \quad \text{SORG WEEDING} = 5.6 - 1.4 (\text{CHILD}) - 2.9 (\text{GROUP}) + 7.5 (\text{LAND})$$

$$(8/1 - 8/27) \quad (3.35) \quad (2.23) \quad (2.16) \quad (1.20)$$

$$R^2 = .26$$

$$F = 3.65$$

The GROUP dummy variable is not significant in the regression for the first half of the weeding period, when the amount of time a woman spent weeding was related to the size of her field and the number of her children. In the second half of the transplanting period, there is a significant difference in the amount of time expended by the two groups on weeding. As Table 4.4 shows, married women spent more than twice as much time weeding as independent women in August.

Conversely, independent women allocated more labor than married women to rice transplanting, as the following regression shows:

$$(4.7) \quad \text{RICE TRANSPLANTING} = 12.9 + 2.2 (\text{CHILD}) + 9.5 (\text{GROUP})$$

$$(6/23 - 8/27) \quad (5.25) \quad (1.64) \quad (3.27)$$

$$R^2 = .28$$

$$F = 6.24$$

The group of independent women spent 24.7 days transplanting their household rice fields compared to married women's 16.4 days ($t=2.64$). The difference is reflected in the area transplanted. Independent women's households cultivated almost one piquet per adult worker (.47

ha) while married women's households transplanted on average slightly more than one half-piquet (.31 ha) per adult worker.

As with sorghum weeding, however, the difference in the amount of time the two groups spent transplanting is highly significant only in August, as the following regressions show:

$$(4.8) \text{ RICE TRANSPLANTING} = 8.3 + 0.2 (\text{CHILD}) + 3.1 (\text{GROUP}) \quad R^2 = .08 \\ (6/23 - 7/31) \quad (5.17) \quad (.20) \quad (1.66) \quad F=1.38$$

$$(4.9) \text{ RICE TRANSPLANTING} = 4.6 + 2.0 (\text{CHILD}) + 6.4 (\text{GROUP}) \quad R^2 = .33 \\ (8/1 - 8/27) \quad (2.90) \quad (2.33) \quad (3.38) \quad F=7.74$$

Independent women spent 13.0 days transplanting their household rice fields in August, while married women spent only 7.4 days ($t=2.95$).

The difference in the amount of time they spent transplanting was reflected in the differences in the amount of time they spent weeding and harvesting. Independent women spent 17.7 days weeding and 27.7 days harvesting their household rice fields, compared to married women, who spent 13.1 days weeding and 21.8 days harvesting. Yields of independent and married women's rice fields were not significantly different: independent women 4270 kg/ha and married women 4336 kg/ha, ($t=.16$).

Allocative Inefficiency. On the basis of the above comparison, married women's households can be said to be less allocatively efficient than independent women's households. Both groups of women spent approximately the same amount of time planting and doing the first weeding of their sorghum fields. The small amount of sorghum production that married women would have sacrificed by not doing the second weeding of their sorghum fields could have easily been made up by retaining a slightly greater amount of paddy. In the rice transplanting period,

independent women spent 3.3 days less than married women, who spent 9.1 days, weeding their sorghum fields.¹⁶ Valued at 550 CFA per day, this labor is worth 1,815 CFA, or about 33 kg of paddy. To accomplish their transplanting independent women also spent 3.1 days more on agricultural labor than married women in the peak transplanting period; thus, to have taken on more transplanting, married women would have had to forgo some of their nonagricultural activities. The difference in the total amount of time spent on agricultural production cannot be attributed to different childcare demands, since the the difference in the amount of time they spend on agricultural production is significant even when the number and age of children are accounted for.¹⁷

Married women's underallocation of time to transplanting (relative to the labor allocation of independent women) cost their households a significant amount of income. One method of calculating the loss in income from women's underallocation of labor to rice production is to take the difference between the returns to the additional labor independent women spent on rice cultivation and the opportunity cost of that time for married women, assuming that rice cultivation is not an option. Independent women spent 7.3 days transplanting, 4.1 days weeding and 4.1 days harvesting more than married women; in total they spent 15.5 days more cultivating rice (on all fields) than married women.¹⁸ If the labor is valued at the hired wage rate, then independent women earned about 10,075 CFA more than married women (or rather, their households). However, married women spent 5.9 days more cultivating sorghum in the rice cultivation period for a return of 3245 CFA, if each day is valued at 550 CFA.

In total, then, independent women spent 9.6 days more on agricultural labor than married women. However, the possibility that married women were engaging in nonagricultural income-generating activities during these 9.6 days cannot be ignored. If they did so, they would have earned 960 CFA, assuming that the returns to their labor were 100 CFA/day. In total, then, independent women earned $10,075 - (3,245 + 960) = 5870$ CFA more than married women (or, more accurately, their households). This is not a trivial loss of income--it represents about 6% of household income from rainy season sorghum and rice production, or about 12% of the returns to women's rainy season agricultural labor.¹⁹

What needs to be explained, therefore, is why married women's households are less allocatively efficient than independent women's households. One hypothesis is suggested by dividing the married women into two groups on the basis of whether their households cultivated as much rice land per active household worker as the group of independent women's households. As the following regression shows, married women whose households cultivated as much rice land as the group of widows (and spent the same amount of time cultivating rice) received a higher rate of compensation from their husbands than those whose households cultivated half as much rice land on average:²⁰

$$(4.11) \quad \text{COMPENSATION} = -1758 + 262 (\text{DAYS}) + 65 (\text{DUMMY}) \quad R^2 = .74$$

(t-ratios) (.62) (4.27) (2.11) F=39.91

(where DUMMY is a dummy variable for the number of days worked by women whose household cultivated as much rice land as the widowed groups). The difference between their rates of compensation suggests that if married women received a higher rate of compensation, they would allocate more time

to rice production. Thus, while the majority of married women are compensated at a rate greater than the opportunity cost of their labor, it is apparently not a sufficient inducement for them to take on the cultivation of an additional rice field.

4.4. A Bargaining Approach to Household Resource Allocation

As became apparent through interviews with men and women and observation, there is frequent and sometimes pronounced conflict between men and women over the division of income from rice production. Men have traditionally had the right to appropriate any income earned by their wives. On one hand, men have an interest in using their wives' income, especially to purchase livestock for bridewealth payments. On the other, their interest conflicts at the margin with women's interests in using the income to purchase consumer goods which have become increasingly more available and socially necessary since the advent of rice cultivation. The conflict between husband and wife over the amount of remuneration women receive for their labor on their husbands' crops is not unique to the SEMRY area (see Section Five).

Thus, in such situations, it seems most appropriate to model the intrahousehold conflict over the division of income as the outcome of a bargaining process. In many areas of Africa women do not have independent access to the resources necessary for cash crop production. Although they have independent access to other income-generating resources, the returns to their labor are often lower than the returns to labor from cash-cropping. Both husbands and wives can benefit, therefore, if women cooperate with their husbands on cash crop production as long as the share

of the profits women receive is greater than the opportunity cost of their labor and less than the returns to their labor from cash crop production. In short, under such circumstances the agricultural household can be conceptualized as a bilateral monopoly in which the indeterminacy problem associated with the division of the gains is resolved by bargaining.

The traditional model of the household assumes that household members do not have conflicting interests over the allocation of time and income (or if they do, that such conflicts are resolved by the imposition of one household member's preferences). This assumption implies that joint rationality will always prevail when the household is presented with new economic opportunities.²¹ A bargaining model, on the other hand, predicts that resources will be efficiently allocated only when household members cannot rationally (i.e., according to the mutually observed bargaining rule) expect other members to make further concessions. A bargaining perspective suggests that the majority of married rice-cultivating Massa women may be allocating their labor inefficiently because they are holding out-- "striking" as it were--for a higher rate of compensation.

However, some households have apparently been able to compromise on a sufficiently high rate of compensation that allocative efficiency obtains. I can only speculate at this point about some of the factors that may be responsible for inducing certain households, or women in those households, to cultivate additional piquets of rice. Men may not wish to take on the cultivation of an additional piquet because of the opportunities to earn income from other sources, for example, fishing. In addition, men who have a number of cattle may prefer to spend their time managing their cattle affairs (children do the actual herding).²²

Obviously, it is important to understand the factors which influence the labor allocation pattern of men, but that is an issue beyond the scope of this study.²³

Junior married men in multi-household compounds appear to be overrepresented in the more extensive group of household cultivators. It is unlikely that these men have significant cattle herds; most likely any cattle which they had managed to accumulate would have been used for bridewealth payments, and they would not likely have inherited any cattle given their junior status in the compound. Conflict between junior men and the compound head over the compound head's obligation to provide cattle for the bridewealth payment of the junior men (particularly if there are still cattle outstanding) may in part be responsible for junior men's greater effort to accumulate cattle. Disputes between the compound head and junior men over whether the compound head uses his cattle to acquire another wife or whether he aids the junior man to obtain his first wife are often the root cause of the most serious of intrahousehold conflicts. A husband of one of the women in the sample moved out of his father's compound (with his mother and his younger brother) and set up his own compound alongside his father's because of a dispute over his father's refusal to complete his bridewealth payment. If a man still owes cattle to his wife's family, he would be under considerable pressure to work as hard as possible to discharge the debt quickly. In such a case, he can ill-afford to dispute his wife's right to compensation, since he needs the additional income that he receives from his wife's labor on a second rice field.

However, even if a man is not interested in cultivating a second piquet, his wife could still take on the cultivation of an additional

half-piquet of her own. Very few married women do so, however. Several examples were encountered of married women, all first wives, who had their own piquets which they cultivated independently of the rest of their households. Their husbands cultivated rice with their junior co-wives. These households were the exceptions to the usual practice of joint household rice cultivation. In some cases women were permitted to keep all the income from their field; in other cases their husbands doubled the amount of compensation they received for their labor relative to what their co-wives received. Further research is required to determine the factors that influence whether a woman is permitted to have her own piquet and the degree of control over the income from that piquet. It may be that a senior wife whose many years of labor have aided her husband to accumulate enough cattle to marry two or three other women is permitted to accumulate wealth in her own right to a greater extent. Other variables which may be important are: whether she has an adult son in the compound (since she could leave with him if he decided to establish his own compound); whether she has a daughter of a marriageable age (in which case her family would probably not be required to return the bridewealth payment in the event of divorce); and whether she is inherited. Inherited wives appear to enjoy somewhat greater economic autonomy. For example, one of the married women in Widigue sample who controlled the income from her own piquet was inherited by her husband. Another inherited wife in Vele did not even live in her husband's compound; instead, she lived with her deceased husband's older brother in his compound and cultivated her own piquet independently of him. Other inherited wives cultivate rice with their adult sons rather than with their husbands.

Thus, there may be structural factors which essentially place some women in a better bargaining position. In general, however, a husband may be reluctant to have his wife take on the cultivation of her piquet because it might mean that she would be in a stronger position to challenge his right to her income. In addition, there is the possibility that women themselves may be reluctant to take on additional piquets, either with or independently of their husbands. If a woman is opposed to her husband taking a second wife, as some (but not all) women are, then she would have little incentive to help him accumulate cattle--unless he made it worth her while in the short run.

If households are increasing the number of piquets they cultivate as they gain greater familiarity with rice cultivation and knowledge of how the returns to their labor from rice compare to sorghum, then it is possible that in the future farmers will allocate more labor to rice production with little prompting from SEMRY. But if the small number of households which cultivate additional piquets do so because of structural factors such as the ones outlined above, then farmer participation in rice cultivation will probably not increase dramatically, ceterbis paribus. Since SEMRY's financial viability depends on increasing the area which farmers transplant in the rainy season by 50%, it behooves SEMRY to understand why women allocate as much--or as little--labor as they do to rice production and to consider ways of inducing women to participate to a greater degree. For example, SEMRY could invest in grain mills and pumps to reduce the amount of time women spend on domestic labor, but in the presence of ongoing conflict between husband and wife over the division of the proceeds, it is unclear whether additional female labor for rice

production would be forthcoming. If the intrahousehold conflict over income is a significant factor in depressing the amount of labor allocated to rice production, then SEMRY's long-term financial position depends on a quick resolution of the conflict.

SECTION 5. A COMPARATIVE PERSPECTIVE

Section 4 examined how the introduction of the SEMRY irrigated rice production project altered women's labor allocation and the household's food provision pattern. It reached the following conclusions. Even though women's husbands do not allow them access to rice land on their own account, women have nevertheless managed to secure a share of the income from rice production by working for their husbands. Furthermore, the compensation they receive is greater than the income they forgo on account of rice cultivation. This increase in income is real; rice cultivation does not appear to have increased the share of household subsistence needs for which women are responsible. Rice production has offered women increased opportunities for employment at higher rates of remuneration. It substitutes for income-generating activities which are less remunerative than the rate at which women are compensated for their labor on rice production. As was pointed out, the intrahousehold rate of compensation is below the market wage rate. If women could cultivate rice in their own right, they would earn more income. Nonetheless, it is important not to lose sight of the fact that rice cultivation has improved their material position.

As was pointed out, the rate at which they are compensated does not necessarily indicate the benefits they receive from rice cultivation; women may derive benefit from their husbands' expenditures made as well as from their own. However, the comparison of married and independent women's labor allocation patterns suggests that there is a conflict at the margin over the use of income from rice production.

Most married women allocate their labor inefficiently relative to independent women. The small percentage of married women who allocated their labor as efficiently as independent women were compensated at a higher rate by their husbands. A bargaining approach explains why women, even those who efficiently allocate their labor, receive a relatively small portion of the net returns to their labor from rice production. It also suggests that the majority of married women, despite the fact that they are compensated at a rate greater than the opportunity cost of their labor, are allocating their labor inefficiently because of the conflict with their husbands over the intrahousehold distribution of rice income. The intrahousehold conflict, therefore, depresses total rice production, threatening the financial viability of SEMRY.

This chapter draws on comparative material from elsewhere in Africa to place these findings in perspective. Its principal concern is to show how the structural position of women within their households and the wider economy mediates their access to resources and control over the disposition of household income. The extent to which women control critical resources, the allocation of their labor, and the income from that labor has an important bearing on their ability to protect their interests, which do not always coincide with their husbands'. In the context of the bargaining approach outlined in the last chapter, this chapter addresses three issues: 1) women's control over income-generating assets; 2) given, in many cases, their relatively weak control over productive resources, the terms under which their labor is mobilized by their husbands and 3) changes in the intrahousehold

allocation of responsibility for household maintenance expenditures. One could also consider shifts in the assignment of responsibility for domestic labor tasks (childcare, cooking, laundry, etc.) but this seems to be the area least open to negotiation at present.¹

This approach is taken in deliberate contrast to the perspective presented by Boserup (1970) in Women's Role in Economic Development. Boserup argues that the deterioration of the status in African women is due to the uninformed, culturally biased policies of agricultural development authorities who extended labor-saving agricultural technology and "modern commercial agricultural practices" to men (1970:54). In Boserup's view, the monopolization of labor-saving technologies by men creates a labor productivity gap between male and female labor which in turn increases men's status relative to women's: "the corollary of the relative decline in women's labour productivity is a decline in their relative status within agriculture, and, as a further result, women will want either to abandon cultivation and retire to domestic life, or leave for the town" (1970:53). Thus, to Boserup, technology is the "key" variable (Quinn, 1978:182) that determines women's relative status, irrespective of the particular socioeconomic structure in which it is embedded (Beneria and Sen, 1981).

As Tosh (1981) points out, the "cash crop revolution" in Africa depended in relatively few instances on the introduction of labor-saving technology or "modern commercial agricultural practices." Rather, it was most often a result of a reallocation and intensification of labor in response to new cropping opportunities or the demands of the colonial state. Thus, the decline in African women's status (where it has

declined) cannot be attributed to the monopolization of labor-saving technologies by men as a result of the gender-biased policies of the colonial state.

This is not to imply, however, that women have had access to the resources necessary for cash crop production, be they land, labor draft-powered technology, improved seeds, fertilizer, etc., on the same terms as men, or that the policies of the colonial state were gender-neutral, e.g. with respect to land ownership. However, it must be recognized that men were often structurally better placed to take advantage of the policies and actions of the colonial state (or to make women bear a greater burden of the costs of those policies) even when the policies were nominally gender-neutral. The critical question is how men were able to exploit the opportunities afforded by cash crop production to strengthen their control over critical resources and the income from those resources to pursue their own strategies of accumulation (Guyer, 1983). In turn, the greater control that men were often able to exercise over the resources necessary for cash crop production created, in many instances, the conditions for the mobilization of women's labor for cash crop production or the intensification of their labor in subsistence production.

5.1. Control over Income-Generating Resources

To deliver inputs to women, it is necessary to understand how the social organization of production influences their access to resources. As the analysis of the SEMRY project showed, women are not discriminated against by project authorities; rather it is the social organization of production and distribution which denies them independent access to rice fields and control over the product of their labor.

Similar phenomena have been documented elsewhere in Africa. The establishment of cocoa farms in Nigeria and Cameroon was undertaken by farmers largely on their own initiative with little direct involvement of colonial authorities. Thus it is difficult to attribute men's control over cocoa farming, as Guyer says, "entirely to the machinations of the colonial government" (1980b:364). She observes that in the case of the Yoruba, cocoa farming was an extension of men's predominant role in food farming, and that among the Beti, cocoa production was controlled by men because

its technical characteristics as a crop meant that it was planted in newly cleared forest fields using men's agricultural techniques. It also constituted a form of permanent occupation of the land in societies in which land ownership rights, as opposed to limited rights of usufruct, were vested in men. (1980b:364).

In addition, as Berry (1975) and Hill (1963a) have pointed out, in many areas cocoa farms were established primarily by migrants who not only had to have sufficient capital to acquire land where necessary and mobilize laborers to help them clear the forest land but also had to maintain their households until the cocoa farms matured. Migrant cocoa farmers also relied on indigenous social and economic institutions to provide them with

support during the early years of their cocoa farms. Women did not have the ability to mobilize these resources in the same way that men did. In addition, their labor was often a critical factor in establishing the cocoa farms and especially in growing food necessary to meet household subsistence needs, thus preventing them from undertaking cocoa cultivation in their own right. Even in the case of the Yoruba, the wives of migrant cocoa farmers devoted a great deal of time to food farming until the cocoa farms matured (Berry, 1975:164-165).

Interestingly, however, it seems that in certain matrilineal, uxori-local societies in southern Ghana and Ivory Coast, many of the cocoa farms owned by nonmigrant farmers were established by women and inherited by their daughters (Hill, 1963b and 1975). However, there is little information on how women established these farms (i.e. to what extent did they rely on the help of their sons or hired labor), whether women first had to help their husbands to establish their cocoa farms before they could establish their own farms, how they continued to meet the subsistence needs of their households and grow cocoa at the same time, and how they established ownership and the right of their daughters to inherit their cocoa farms. Hill reports that women's farms were smaller than men's on average, which suggests that women's responsibilities for providing food kept them from cultivating larger farms (1963b:216-217). It seems that women were able to manipulate the post-marriage residence pattern and inheritance system to their own advantage, unlike women in many patrilineal, virilocal systems.² This case emphasizes the importance of the social organization of production in determining women's degree of access to cash-cropping resources. Furthermore, it demonstrates that the

impact of cash-cropping on women is by no means uniform.

More generally, however, where women's labor is critical to the process of cash crop capital formation or to the production of cash crops, men would obviously have an interest in denying women independent access to the resources, especially land, needed for cash crop production in order to secure access to women's labor. Bukh (1979) makes this point in her analysis of how men use the land tenure system to their own advantage in a cocoa-growing region of Ghana:

Access to land can be a very serious problem for women. The control of the tenure system is a tool in the hands of men in the face of competition with women for economic resources. The men may prefer the women to work on the common plot rather than have them work on their own plots, because the men decide upon the use of the surplus from the common plot but have no say over the use of the yields from the women's own plots. One of the ways men can enforce the former is through their monopoly over family land (55-56).

Furthermore, if the inputs necessary for cash crop production are in short supply relative to demand, men would have an even stronger interest in excluding women from access to critical resources. These points are brought out in Muntemba's (1982) analysis of the effect of agricultural change on Zambian women. She observes that in the 1960s

a number of men resented their wives' cultivation of their own fields, which they feared might make it more difficult to control their labor. In more mechanized households, where female participation in agriculture had decreased, there was always a fear of breakdowns of implements, necessitating greater reliance on family labor. In less mechanized households, men wanted to mobilize family labor.... Thus, men became less willing to secure land for their wives. As land became scarce in some parts of the region, particularly in the Southern Province, women's access to land in virilocal villages was curtailed further (99).

A similar situation arose in the Gambian village studied by Dey, where the land developed for irrigated rice production under the direction of the government was in very short supply. Even though women are responsible for rainy season swamp rice cultivation, they have not been able to acquire land for dry season irrigated rice plots because

...they were pushed aside by more aggressive men who controlled the institutions of power in the village and who were determined to monopolise the new cash crop which they would control. This is partly because of the shortage of irrigable land and partly because men needed female labor to cultivate the irrigated rice land and could only be sure of controlling this labor if they prevented women from owning the land and cultivating it on their own account. They have since institutionalised an inheritance system whereby irrigated land is kept under male control (364-365).

In fact, the distribution of the rice land even among men is skewed; 66 out of 121 household heads had no irrigated rice land at all, and four household heads had over 4 acres while most of the other men had less than 1.5 acres. Given the scarcity of rice land and its uneven distribution among men, it is not surprising that women are effectively excluded from owning it. Even if the project authorities had encouraged women to clear the irrigated rice land for themselves, it is not certain that women would have been able to maintain access to the land or that their daughters would have been permitted to inherit it as they do the swamp rice fields which their mothers cleared and established. As the above examples point out, inheritance systems can be manipulated to strengthen men's control over critical resources.

5.2. Mobilization of Women's Labor

Appropriating the land to which women had usufructory rights or denying women access to cash-cropping resources may be a precondition to the mobilization of their labor for cash crop production, but it is no guarantee that their labor will be forthcoming. As the discussion of the SEMRY irrigated rice project showed, a husband's ability to mobilize his wife's labor is contingent on the remuneration he offers her. I quote a number of sources to indicate that the practice of compensating women for their labor is not unique to the Massa:

[Mandinka rice farmers] In order to secure female labor, men have been forced to pay village women cash wages. They are also obliged to pay their own wives' wages unless they substitute these for presents of the loan of an irrigated plot on which women can grow a crop of their own. (Dey, 1981:119)

[Hausa] Other examples are: the harvesting of beans by non-secluded women, who are rewarded for a morning's work for their husbands by being permitted to retain all they can pick in the afternoon--which they may later resell to their husbands; and the winnowing of groundnuts, the daily rate of pay for wives being about 2s. (Hill, 1969:406, n. 29)

[secluded Hausa women] Just as the economic relationship between fathers and sons (and between brothers) often involves cash transactions identical to those between non-kin, so it is between husband and wives: thus, to take two examples, fathers pay their married sons in gandu for evening work on the farms, this being outside the range of their customary duties, and a husband will pay his wife at (or near) the standard rate for 'threshing' groundnuts, her obligations being confined to domestic duties, mainly cooking. (Hill, 1969:398)

In both cases [Beti and Yoruba] women's indigenous obligation to supply harvest, processing and transport labour was extended to include cocoa without changes in the definitions of the division of labour. This is not to say that women necessarily accepted the extra work without some implicit bargaining about remuneration. (Guyer, 1980b:364)

[Yoruba cocoa growers]...his wives will not, unless the farmer exercises his full authority to command them and in addition makes it worth their while by paying over to them a substantial part of the proceeds, abandon their habitual ways of making their incomes. (Galletti et al., 1956:291)

...in many societies, including rural Fanteland, it is (as it were) no part of the marriage contract that wives should work unrewarded on their husband's farms or when marketing the crops. In Fanteland, the wife's share of the proceeds may take three main forms. First, in return for weeding and harvesting a farm plot cleared by her husband she may be permitted to sell on her own account the crops from a certain demarcated portion; second, she invariably demands a commission (such as 40% of the cash proceeds) on the marketing she does for her husband; third, she had the full opportunity of 'cheating' her husband when selling the crops and buying wares with the proceeds--as the husband well knows. (Hill 1978:222)

To the extent that women's work on their husbands' crops is remunerated, it is misleading to view women as unpaid family labor. Richards' (forthcoming) observation that cash crop production, rather than having "domesticated" women, "proletarianized" them is apt in this regard. Depending on the level of remuneration received, it is possible (as seems to be the case in the SEMRY project) that women receive more income from working for their husbands than they could earn if they pursued their own income-generating activities. Indeed, one might hypothesize that women's labor would not be forthcoming unless they were compensated at a rate greater than the opportunity cost of their time.

Nevertheless, it might be argued that even if women are compensated at a rate greater than the opportunity cost of their time, that they are worse off in the sense that they have moved from a position of economic independence to one of dependence. This requires a careful assessment of

the pre-cash crop "conjugal contract" (Whitehead, 1981). Even before the growth of export crop production in the colonial period, men's and women's agricultural labor was often complementary, with either a division of labor by crop, field, or task (Guyer, 1980a and 1983; Etienne, 1977). Where women were independent producers, they did not necessarily have absolute control over the disposition of their production. In some cases the "conjugal contract" was altered to incorporate the cultivation of a new crop without a significant change in the terms of contract and in others there was a significant shift in the intrahousehold terms of exchange. More attention needs to be paid to the factors which determine the nature of the new bargains that were struck.

It is important, therefore, to understand how the rates of compensation are negotiated not only to assess the impact of cash cropping on women's welfare, but also to determine whether women have sufficient incentive to allocate their labor efficiently. Several observations are in order. First, women are likely to be in a much worse bargaining position if cash crop production appropriates the resource base they use for their own agricultural activities, as the case of the Baule women described by Etienne (1977) illustrates. Cash crop production has resulted in a reduction in the size of household yam plots to the minimum area required for subsistence production and the amount of land, therefore, that women have available for intercropping. It has also alienated women's rights to the second year use of the yam fields for their own cotton production, which was taken over by men when the colonial state became interested in cotton production. In order to earn income, a woman has little choice but to work for her husband, in return for

cash or cloth in amounts which she considers to be arbitrary and which do in fact very much depend on the man's 'generosity.' Abusively low retribution is facilitated by the man's knowledge that the woman cannot reciprocate, as she could when she too controlled essential products (59).

In areas, however, where sufficient land is still available, Baule women have their own peanut fields, prepared with the help of wage labor or their husbands or sons, which provide them with good revenue. Etienne does not discuss how much remuneration women receive for their labor on their husband's crops in such circumstances, but is likely that they are in a better position to demand a higher rate of compensation (in cash or in labor services) than women who have no land and thus no way of earning income except by working for their husbands.

Second, it seems that in cases where the cash crop does not threaten women's control over their resource base, women's rights to compensation, or ability to resist the mobilization of their labor without compensation, derive in many cases from the pre-cash crop "conjugal contract." Guyer (1980b:364), for example, remarks that the harvest of the egusi melon was the likely paradigm for the mobilization of women's labor for the harvest of the cocoa crop. Dey (1981) states that women traditionally had no obligation to cultivate their husbands' personal groundnut fields, and thus refused to help them cultivate their irrigated dry season rice fields unless they were compensated.

Third, women's ties with their natal families often give them greater control over the terms under which their labor is mobilized by their husbands. Where women have access to productive resources through extra-domestic links, they may be in a stronger position to resist the mobilization of their labor for what they believe is an inadequate

amount of compensation. As Muntemba (1982) remarks:

Some women expressed their discontent by withdrawing their labor from household fields, particularly at peak labor periods. Local women utilized this most effectively. During the rainy season they went back to their matrikin villages, where they had access to land in their own right. At harvest time, they went away again. This practice was greatly resented by men, who had to either increase women's share of income or sue for divorce if the pattern was frequently repeated

(1982)

Little (forthcoming) observes that brother-sister links among a group of East African pastoral women place them in a stonger bargaining position vis-a-vis their husbands. Loans of cattle from her brother reduce a women's economic dependence on her husband, since they provide her with an independent source of income.³ As a result, women who are loaned a number of cattle have more control over the disposition of the livestock allocated to them by their husbands at marriage, and also over their labor, with more time available to spend on their own agricultural activities.

There are other instances reported in the literature of women's resistance to their husband's attempts to mobilize their resources for cash crop production. Chambers cites an example of women refusing to work on the pyrethrum crop after men gained control of the income from pyrethrum sales when marketing was chanelled through cooperatives (1974:123). Van Ouden remarks that Bamileke women in the area he studied in Cameroon occassionally destroyed coffee plants men planted in their food fields and regularly cut the roots so that the bushes would remain small to have more space for intercropping (1980:52). Winter claims that Amba women are reluctant to work on their husbands' coffee trees because they will have nothing to show for their labor in the

event of divorce while their husbands will be left with an income-producing asset created by their labor (1955:15). Their reluctance generates further conflict, thus increasing the likelihood of a divorce, which makes women even less likely to allocate their labor to coffee production. Where divorce or serial monogamy is prevalent, women may prefer to pursue strategies which protect their own economic interests, rather than "household strategies" (Dwyer, 1983:8).

Neoclassical household economists attribute such instances of resistance to women being tradition-bound (Cleave, 1974). According to the neoclassical model they should be willing to allocate their labor to the activities that maximize the returns to their labor. From the perspective of a bargaining model, however, women's resistance would be explained as an attempt to maintain or attain a stronger bargaining position to protect their own interests and accumulate wealth in their own right. Conflict over the terms of exchange is likely to result in an inefficient allocation of household resources.

Furthermore, it seems that one of the possible outcomes of conflict between husband and wife over the remuneration of women's labor is a higher frequency of unmarried (either never married, divorced, or widows refusing to remarry) women. The economic cost of intrahousehold conflict may be high where unmarried women cannot mobilize land or labor on the same terms as married households.⁴ In the food-farming villages she studied, Hill (1978) remarked on the reluctance of widowed Fante women to remarry. She suggests that it results in less efficient farming, since women do not have access to male labor needed to clear land. Unfortunately, she does not address the question of whether the

returns to unmarried women's labor (whose land rights, according to Hill, are potentially superior to married women's) are greater than the compensation a married women can receive from her husband for her work on his food farm.

Similarly, Etienne (1977 and 1981) observes that Baule women are increasingly refusing to marry because marriage puts them in a position of extreme dependency on their husband. Thus, they work as wage labor or enter the informal urban labor market, earning more or hoping to earn more than they could if they worked for their husbands. Such employment in the informal sector, however, may well be less remunerative than the returns to their labor in agricultural production (most of which they do not receive).

Thus, an economist interested in predicting how households will respond to new economic opportunities can ill afford to ignore the dynamics of bargaining process. As these cases show, conflict between spouses can result in suboptimal labor allocation relative to what a joint household decision-making model would predict. It is essential to be able to predict the time span over which the bargaining process takes place, and to know what types of interventions, acting in conjunction with what types of intrahousehold relations of production and distribution, result in a protracted conflict over the intrahousehold terms of exchange.

On one hand, interventions that essentially require households to behave as a joint decisionmaking unit, such as many resettlement projects, place women in the worst bargaining position. For example, in the Mwea rice growing project in Kenya women had access to only a very

small piece of land on which to grow food crops (Hanger and Moris, 1974). In addition rice cultivation increased the demands on their labor leaving them with less time to cultivate their food crops. Thus, they were reduced to a state of virtual dependence on their husbands for money for household expenditures. In fact, many women deserted their husbands. In the AVV project in Upper Volta, households are allocated plots on which to grow sorghum and cotton according to the number of workers in the household (Conti, 1979). Because of the compulsory credit which is extended, households have little choice but to cultivate their plots, leaving women with little time to pursue their own income-generating activities. Such projects might be an effective means of mobilizing women's labor for cash crop production--at least in the short run, but they are likely to lead to a significant decline in women's welfare since they reduce women's bargaining position and the control, therefore, that they can exercise over household resource allocation and expenditures.

On the other hand, interventions such as the SEMRY project, which do not appropriate women's traditional resource base, leave them in a better bargaining position. However, due to the unresolved conflict over the division of the income from rice production, women's labor has not been forthcoming to the degree that was assumed at appraisal and that is critical to the success of the project. Thus, economists need to take into the account the dynamics of the intrahousehold bargaining process from the standpoint of its impact on both equity and efficiency.

5.3 Allocation of Responsibility for Household Maintenance

The amount of compensation a woman receives from her husband for her labor on cash crop production must be evaluated not only in terms of the amount of labor she allocates to cash crop production, but also in terms of the division of financial responsibility for household maintenance. For example, if women are expected to use their compensation to meet a bigger proportion of household food expenditures, then the real value of that remuneration is decreased. The division of responsibility for different categories of household maintenance expenditure are also open to negotiation and cannot be separated from a consideration of the terms under which women's labor is mobilized for cash crop production.

In the case of the Massa, there is no evidence which suggests that women's responsibility for household food expenditure has increased as a result of irrigated rice production. Households retain as much for home consumption as the amount of sorghum which is forgone on account of rice production. This suggests that in cases where women are in a relatively strong bargaining position, men cannot shift their share of the responsibility for household food provision onto women without compromising their access to women's labor.

However, if women's labor is not essential to cash crop production, men may find it easier to shift the responsibility of providing food onto women as they, men, take up cash crop production. Dey (1980:206), for example, notes that occasionally men would insist that women use their own personal stores of rice to meet household subsistence needs, rather than using their own revenues from groundnut

production to buy rice (usually rice from women's personal fields) as they are traditionally expected to. This effectively reduces the amount of income which women have available to meet their personal needs. However, Dey offers no data which would provide an indication of how frequently this practice occurs, whether the husbands who do so have irrigated dry season rice fields which require their wives' labor, and how a husband's shirking of his traditional duties affects his wife's willingness to work (or the rate she demands) on his irrigated rice field the following season.

Haswell (1975:132) observed that the opening of additional swamps for rice production led to an increase in the acreage of swamp rice cultivated by women and a concomitant decrease in the acreage of sorghum cultivated by men who reallocated their labor to groundnut production. Thus, rice displaced sorghum in the diet. It should be noted, however, that even before the causeways were built that opened up more swamp fields, rice comprised 80% of the total food grain supply by weight (1975:42). In addition, men supplied labor at the critical bottleneck period which enabled women to take advantage of the newly accessible rice fields. Whitehead (1981) observed a similar situation in Ghana, where men apparently increased their groundnuts fields at the expense of their sorghum fields, thereby forcing women to use the revenues obtained from sales of groundnuts from their personal fields to purchase food in the rainy season, when handouts from the central granary diminished. Unfortunately, Whitehead does not address the question of what effect men's withdrawal from the food economy had on women's customary obligation to supply labor for the cultivation of

their husband's personal groundnut fields.

In contrast to the situation described by Whitehead, Venema (1980) claims that the adoption of groundnuts--and the adoption of the plow--by one group of Wolof in Senegal has not worsened women's material position. Husbands continue to fulfill their responsibility for providing grain, leaving their wives free to use the income acquired from their personal groundnut fields to purchase relishes for the meals and provide a sixth of the bridewealth of their sons. Ideology may explain part of the difference: Whitehead observes that among the Kusasi, the prevailing ideology, that a "strong" woman does not let her children starve, leads to women's income being used for food provision. On the other hand, The Wolof, who are Moslem, place a much greater emphasis on the husband's responsibility to provide food for the household.

Thus, although there is some evidence which suggests that cash crop production has put a greater burden on women to provide food for their households, the shifts are not related to shifts in intrahousehold transfers of labor, income, or responsibility for other categories of household expenditures. Without quantitative data it is difficult to determine if researchers are reporting isolated cases or real shifts in responsibility over time. Furthermore, as the data from Massa households showed, there is likely to be considerable variation in the amount of food husbands provide. This variation makes it difficult to assess whether a shift has occurred.

Even if there are real shifts in responsibility for household food provision, they are most often not examined within the context of

changes in the entire household expenditure pattern. In many areas, cash crop production has often been accompanied by the introduction of new categories of expenditure, especially education, and substantial increases in the real prices of others, e.g., bridewealth (Guyer, 1982). Income spent by a woman's husband on a son's or daughter's education is obviously of some benefit to her as well. In turn, she may take on greater responsibility for food expenditures so that husbands can afford the school fees. In addition, some expenditures which seem to fall into the category of personal consumption, such as drink, if investigated more carefully, may actually have important repercussions on the ability of the household to mobilize resources at some later date depending on the social context in which the drinking takes place. This example highlights the problem of determining the extent to which one household member's expenditures benefit other household members. It is clearly erroneous to assume that benefits which result from a purchase flow only to the transactor of the purchase.

In addition, it has been claimed that where husbands and wives do not pool incomes and have obligations for specific categories of household maintenance expenditures, they therefore have different expenditure preferences. Simply because women make the majority of food expenditures, for example, in a given society does not necessarily mean they value food consumption more highly than men.⁵ Indeed, in the case of the Massa, households in which women controlled the disposition of income from rice production spent the same amount of income on food as households in which men controlled the income from rice production--the shortfall in women's expenditures compensated for by their husbands'.

Thus, it does not necessarily follow that if women controlled a greater share of the returns to their labor from cash crop production or household income, food expenditures would be increased. Obviously, far more evidence needs to be gathered before one can determine the structural conditions under which such a result is likely to obtain. However, the evidence from this case study does point out the fallacy of making predictions about gender-specific income elasticities of food demand solely on the basis of the household expenditure pattern.

This is not to imply that men and women have identical preferences. For example, it has been argued that in many cases women place a higher priority on the need of their children. This is not because women are innately more altruistic than men, but because women's relative lack of access to resources and low earning potential makes them more dependent on their children for economic support and access to productive resources in their old age or widowhood (Dwyer, 1983). The struggle to exercise greater control over resources documented in this chapter is evidence enough that preferences do differ, though the particular arenas of conflict may vary. By focusing on the content and boundaries of the struggle, the areas of conflict and complementarity can be discerned.

Finally, it is important to recognize that even where household members do not pool their incomes, they often do not spend their incomes autonomously of each other. They are linked through implicitly or explicitly determined "bargains" about whose income is used for different categories of expenditure--a bargain open to renegotiation when relative incomes, prices or household needs change (Guyer, 1982).

To predict how a change in price, income or preference will affect the household expenditure pattern, account must be taken of differential bargaining power of household members, and their ability, therefore, to exploit the opportunities to renegotiate a more favorable expenditure pattern or division of income.

SECTION 6. POLICY IMPLICATIONS

Good policy requires good models. Part of the explanation for the resistance manifested by some policymakers towards interventions directed specifically at women no doubt stems from their reliance on the neoclassical model of the household. The neoclassical model assumes away any possibility of conflict between household members over the allocation of household resources and the use of household income. Resources are allocated to maximize household income and income is spent to maximize household utility. From the neoclassical perspective, therefore, it makes no sense to target income-generating interventions at one household member as opposed to another since household income is fungible; income earned by one person has the same impact on the household expenditure pattern as income earned by another household member. Furthermore, the fungibility of household income obviates any possibility of an inefficient allocation of resources, since all household members have an interest in maximizing household income. Thus, policy interventions can be directed to increasing household income by whatever means possible.

The growing body of cross-disciplinary feminist research challenges many of the assumptions underlying the neoclassical model of the household. In particular, it highlights the variety of strategies household members employ to strengthen their control over resources and income to further their own self-interests. The literature cited in Section 5 documents patterns of conflict as well as cooperation in African households, though of course these patterns are not limited to

African households. In economic terms, the literature illustrates that households are neither composed of autonomous production and consumption subunits maximizing their individual utility functions, nor are they homogenous decision-making units.

As Section 4 suggested, bargaining theory provides the theoretical underpinnings for a utility-maximizing model of household economic behavior that incorporates the insights of feminist scholarship. The allocation of resources and the distribution of goods is determined according to the complementary and conflicting interests of household members on the basis of their differential bargaining power. Since gender is one of the key variables in determining how preferences are constructed and control over resources exercised, it must be incorporated into analyses of household response to new incentives.

Many policy interventions are directed at altering the household resource allocation or expenditure pattern to achieve some goal of interest to the policymaker--for example, increasing agricultural output, lowering fertility, improving nutritional, health, or educational status, etc. The problem, therefore, is how to design an intervention which will bring about the desired change in the household resource allocation and/or expenditure pattern. Changes in the resource allocation or expenditure patterns could come through a rearrangement of the current patterns or by an increase in the total amount of income or time available to the household. A rearrangement of the current pattern of time allocation or expenditure may or may not be desirable from the standpoint of the policymaker, depending on the nature of the trade-offs

involved. The total amount of time available to the household can be increased by the introduction of labor-saving technologies, for example, for essential domestic tasks. Thus, it would be possible for the household to allocate more time to the activity of interest to the policymaker. Similarly, an increase in total household income would enable the household to spend more on the category of goods of interest to the policymaker without forgoing any of its current expenditures. The challenge, from the standpoint of a bargaining model of household economic behavior, is to design an intervention which enhances the bargaining power of the household member who places the largest relative weight on the activity or category of expenditure of interest to the policymaker.

For example, suppose a policymaker's goal is to increase food consumption through an increase in household food expenditures. If an intervention increases household income and the bargaining power of the household members who place a low value on increasing food expenditures, then this increase in household income will have a very small (or even negative) impact on household expenditures. On the other hand, the impact would obviously be much larger if the increase in household income were accompanied by an increase in the bargaining power of the household member with the strongest interest in food expenditures.

In order to design interventions that alter the household resource allocation and expenditure pattern in the manner desired by the policymaker, the differential bargaining power of household members must be taken into account. This requires an analysis of how household members' access to resources, control over income and use of income are

mediated by their structural position within the household as well as in the wider economy. A household member's structural position is the basis of his or her bargaining power; it determines how changes in the economic environment can be exploited to renegotiate rights to resources and control over the disposition of the product of those resources.

There is little point in channeling resources to women if they have no means of protecting their control over those resources. Increasing the returns to women's labor on a crop over which they have a high degree of control would have little impact on their incomes if the crop is taken over by their husbands. Such shifts do occur: amongst the Tiv, rice was primarily a women's cash crop in 1949 but by 1952 it had been taken over by men (Bohannon and Bohannon, 1968:55). Even if women retain control over productive resources, increases in their income can be undercut if responsibility for additional categories of expenditure is shifted onto women. In such cases women would have little or no additional income available to spend on the category of expenditure of interest to the policymaker.

Such shifts highlight the importance of considering the impact of an intervention on all the areas of household economic behavior open to negotiation. Shifts in one area may be accompanied by shifts in other areas as well. An intervention can result in a shift in control over a resource base that results in the loss of income from that base. However, there may be compensating shifts in the intrahousehold pattern of income distribution, division of responsibility for household expenditures, or division of domestic labor tasks. The loss of income can be compensated by intrahousehold transfers of income. Or it can be

can be compensated by intrahousehold transfers of income. Or it can be compensated by a shift in responsibility for certain categories of household expenditures. Or it can be compensated by a shift in responsibility for certain domestic labor tasks, thus increasing the time available for other activities. Furthermore, the dimension of time must also be factored in. A young woman may help her husband establish a farm; in later years he may advance her the capital necessary to begin her own trading business.

These examples suggest that any changes adverse to women in any one of these dimensions may be mitigated by favorable changes in other dimensions. Of course, the reverse can also be true. The impact of an intervention on women (or any other category of household member) can only be inferred from an examination of the shifts which occur in all the arenas of intrahousehold negotiation--resource control, income distribution, responsibility for expenditure, and responsibility for household maintenance activities. Since a negative shift in one category can undermine a positive shift in another, policymakers need to consider the combined impact that an intervention has on all the economic domains open to negotiation.

The likelihood of a favorable (from the standpoint of the policymaker) aggregate shift in the household resource allocation and expenditure pattern is increased if the intervention enhances the bargaining power of the targeted household member. To enhance an individual's bargaining power, however, the policymaker must have some knowledge of what the sources of an individual's bargaining power are. This knowledge can then be applied to the design of the intervention.

For example, there are a number of factors that are likely to have an important bearing on women's ability to secure a share, or a greater share, of the benefits from an intervention. If the intervention alters the use to which a woman's current resource base is put—for example, the introduction of a profitable new cash crop—then her control over the resource base is likely to be diminished if other household members with greater bargaining power take advantage of the opportunity to renegotiate rights to the resource base. The security of a woman's control over her own earned income is also of major concern. Rights to dispose of income are often contingent on the magnitude of the flows involved. If an intervention increases her income significantly, will she be able to exercise control over that increase, or, indeed, her entire income? In this respect, it is important to know if women can accumulate wealth. Wealth often aids women in securing access to resources and maintaining control over their income streams. For example, in some cases it gives them access to labor services so that they are not forced to depend on their husbands to clear or plow their fields. Another factor which may be important in determining the impact of an intervention on women's bargaining position is whether they have any pre-existing rights to compensation for labor mobilized by their husbands. Provided their control over their resource base is not loosened, they may be in a better position to negotiate compensation for labor which is mobilized on account of the intervention. In addition, the more valuable their labor is to other household members, the better able they may be to negotiate favorable terms of remuneration.

Interventions which provide income to women in kind (livestock,

grain, jewelry for example) may increase women's bargaining power if it is less accessible to other household members than income in more liquid forms. Inputs or payments channelled through women's saving associations or cooperatives may be less easily appropriated by other household members than those which are given directly to women. Certain income-generating interventions may require accompanying policy actions to enhance women's bargaining power. Profitable new agricultural initiatives directed at women may fail to have the desired impact on the household expenditure pattern unless women's inheritance or land tenure rights are strengthened through policy action. Such actions may be more feasible in situations where customary forms of land tenure are being changed, either through legislative means or as a consequence of changes in land use patterns.

Another important factor in determining women's bargaining power is the set of options open to a woman if her husband refuses to compensate her. For example, can she divorce her husband? At what economic and social cost? As a divorced woman can she secure land in her natal village? Can her children accompany her if she leaves her husband? Some of the Massa women, for example, spoke of their reluctance to leave their husbands for fear that their children, who remain with their father unless they are very young, would not be adequately nourished by their co-wives. Does a woman's bargaining power increase if she is the senior wife? Does it increase if she has given birth? To male children or female children? Does it increase if she has an adult son? A careful reading of the anthropological literature would enable one to elaborate on the factors which increase women's

bargaining power and to understand, moreover, why they give women greater bargaining power within the context of a particular social system. It is also necessary to determine the set of policy actions that can be undertaken in specific social and political contexts to increase women's bargaining power in the above areas--for example, securing women's rights to property in the event of divorce, child custody rights, etc.

As the above discussion suggests, it is also important to recognize that even within a given social system, not all women have equal bargaining power. Bargaining power is also a function of age, marital status, social status, class, and other variables which interact with gender. One must be careful to distinguish among categories of women when analyzing women's bargaining power (Peters, 1983). The task is to recognize when the targeted individuals do not have sufficient bargaining power to capture the benefits from an intervention to the extent intended by the policymaker and then to build upon and exploit the factors which enhance the targeted individuals' bargaining power.

There remains the problem of determining how household members' preferences differ in order to target the appropriate member. Expenditure preferences cannot be deduced solely from an examination of the present pattern of expenditure since expenditure categories can be reallocated from one household member to another in response to an increase or decrease in one member's income. There is clearly a place here for further empirical work using carefully controlled comparisons of the impact of increases in different categories of household members' incomes on the household expenditure pattern. Such studies would enable

policymakers to generalize with greater confidence about the likely impact of different types of interventions on the household resource allocation and expenditure pattern for different types of production and distribution relations within the household. Equally important to the determination of the appropriate household member to target would be a careful analysis of the nature of existing conflicts over resource allocation and use of income. An analysis of the patterns of conflict would indicate how different categories of household members would spend household income or allocate resources if their bargaining power were increased. This type of analysis would probably best be accomplished using the methodologies developed by anthropologists.

An understanding of the nature of conflicts over resource control and use of income in the particular social system of interest to the policymaker is also essential to an analysis of the dynamics of the bargaining process. To make reliable predictions about how the intrahousehold resource allocation and distribution of benefits will shift in response to economic change, some idea is needed of the time horizon over which the negotiating process takes place. Bargains are not struck overnight. If protracted conflict is likely, it could be very costly in both efficiency and equity terms. This requires an understanding of factors which influence the rate at which the process of convergence to the equilibrium terms of exchange takes place. Such information is of critical importance to a planner interested in predicting how households will respond to economic interventions.

In summary, a bargaining approach to household decision-making provides a theoretical framework to explain household economic behavior

which incorporates the possibility that household members may have conflicting as well as complementary interests. It shows why it may be necessary to target interventions at certain categories of household members to achieve certain goals. This requires an assessment of the likely impact of the intervention on the bargaining power of the household members in question. Bargaining models also highlight the need to take into account the possibility that shifts may occur in several dimensions of resource allocation and control over income open to intrahousehold negotiation. The policymaker must be able to assess the combined impact on the policy variable in question. The dimension of time must also be factored into an analysis of the bargaining process. It is essential to recognize that the process of negotiation over the intrahousehold terms of exchange is not always quick. Conflicts over how increases in household should be spent or over the distribution of effort (or the sharing of leisure) may result in suboptimal resource allocation patterns as individuals negotiate the terms under which they will cooperate. Successful policies are likely to be those which recognize that household members' preferences do not always coincide and that the terms of the negotiated compromise depend on the intrahousehold relations of power. Indeed, as I have tried to show, the most successful policies may well be those which take advantage of the different structural positions of household members to achieve their goals.

APPENDIX. SELECTION OF THE SAMPLE

A sample of 102 women was selected from three villages, Vele, Widigue and Zebe. The salient characteristics of these villages are described in Section 2. Two of the three villages, Widigue and Zebe, were included in the 1980 farm management study. The sample and selection procedure are described by Sisson and Ahlers (1981). Only the households which had been included in the 1980 farm management survey were recensused in 1981. The purpose of continuing to work with the 1980 farm management sample was to build upon the rapport which had been established between interviewers and farmers. The third village, Vele, was not included in the 1980 farm management survey. Thus, in 1981, all households in Vele were censused and the sample was drawn from the all the households in Vele. The sampling procedure for each of the three villages is described below. Unless stated otherwise, all data reported in the text are based on interviews with the sample of agriculturally active women selected from the three villages and weighted by the appropriate sampling fractions.

Zebe. The 1980 farm management survey sample consisted of 62 compounds, about half of the Massa compounds in the village. These compounds were recensused in 1981 to determine which ones were still extant. Six compounds had ceased to exist due to death, relocation or incorporation into other compounds. A sample of 30 women was then drawn from the population of married and widowed women (essentially any woman over the age of 16) residing in the remaining 56 compounds.

The sample was stratified on the basis of marital status to

obtain a sufficient number of cases to permit a comparison of the labor allocation and expenditure patterns of married and widowed women cultivators. All compounds containing at least one married woman were ordered by the number of working adults present in the compound in order to insure that the sample would be representative of large as well as small compounds. Individual married women were then chosen according to the principle of interval selection. The same procedure was followed in selecting the fourteen widowed women. The composition of the Zebe sample is as follows:

Table A.1		Composition of Zebe Sample	
Stratum	Number Selected	Number in Population	
Married Women	16	93	
Widowed Women	14	16	
Total Women	30	109	

It should be noted, however, that only 3 out of the 16 widows are compound heads. The others reside with their married or, in several cases, unmarried sons. Thus, out of the 56 compounds in Zebe recensused in 1981, only 5% are female-headed.

Widigue. The sample of women from Widigue was selected from the 100 compounds which were included in the 1980 farm management sample. These compounds were rencensused before the start of the rainy season regarding their intentions to grow cotton or rice. All households that intended to grow cotton or use animal traction were eliminated from the sample, as well as those few which identified themselves as Fulbe. The Fulbe households were not included because of the cultural norm that Fulbe women do not do agricultural work.

The sample of women was stratified on the basis of whether or not the household cultivated rice to obtain enough cases to investigate the impact of rice cultivation on women's agricultural workload and household food expenditure. There were 26 compounds containing at least one household which indicated an intention to grow rice (and not cotton). Out of the total of 51 agriculturally active women in those households, 16 were selected according to the procedure described for Zebe. Only one of the fifty-one women was a compound head. The husband of another woman selected in the sample migrated for the entire agricultural season to work on a sugar cane plantation, but she resided in his father's compound. Two of the sixteen controlled the disposition of income from rice production, one because her husband was ill and did not work on rice production and the other because she was inherited. One of the sixteen was an elderly women who helped her son cultivated rice since her husband was too old to cultivate himself. The other eleven were married women whose husbands controlled the disposition of income from rice production.

Fourteen women were chosen from the thirteen compounds which

indicated that they intended to cultivate neither rice nor cotton, nor use animal traction. Three of the women chosen were widowed compound heads. An additional four were also widows.

Because cotton growers were excluded, any estimate based on only the rice and nonrice-cultivating population of women would not be representative of the village as a whole. Hence no village-level estimates are calculated. The sample of rice and nonrice cultivators is representative, however, of those particular subgroups within Widiqie. As it turned out, however, one of the rice-cultivating and two of the nonrice-cultivating women's husbands did decide to grow cotton.

Vele. Vele was included in the 1981 farm management survey because only a third of compounds in the village cultivated rice in both the rainy and the dry season. The survey that I conducted in Vele was to designed to address the issue of how the labor allocation and the expenditure patterns of women differed according to the degree of control they have over the income generated by their labor on rice production. Women were divided into six strata: widowed women who had rice fields registered in their names, married women who had rice fields registered in their names and whose husbands did not cultivate rice, married women whose husbands did cultivate rice and who had fields registered in their names and married women whose husbands cultivated rice and who did not have rice fields in their names. These groups were broken down further according to whether they were one or two season rice cultivators. A sample of women was chosen from each stratum according to the procedure described for Zebe. The following table

gives the breakdown of the sample:

Table A.2		Composition of Vele Sample	
Stratum	Number of Women in Sample	Number of Women in Population	
Widows	11	14	
Married women whose husbands do not cultivate rice	5	16	
Married women with piquets registered in their names whose husbands cultivate rice	12	80	
Married women without piquets registered in their names whose husbands cultivate rice	<u>14</u>	<u>379</u>	
Total	42	489	

The decision to chose married women with rice fields registered in their own names was made under the assumption that a woman with a rice field registered in her own name has greater control over the division of income from rice production. Further research indicated that this is not necessarily the case. Hence, in inter and intra village comparisons, married women with rice fields in their own names were grouped with the rest of the married women, weighted, of course, by the appropriate sampling fraction.

Once rice cultivation actually got underway, it was discovered

that some of the widowed women did not have their own piquets but only aided their sons. In addition, one of the married women's husbands fell ill and she decided not to cultivate rice. Another actually did not cultivate rice with her husband, who was ill, but rather for her senior co-wife. These women were dropped from the sample when intravillage comparisons between independent women and married women were made since they worked neither on their own rice fields nor on the rice fields of their husbands.

ENDNOTES

Without the cooperation of the Massa women, this study would not have been possible; my greatest debt is to them. I would also like to thank my colleague, Achille Bikoi, for his support, and to gratefully acknowledge the use I have made of his data in this report.

I benefitted greatly from the detailed comments of Pauline Peters on Sections 5 and 6. Her intellectual guidance can only be partially acknowledged by citations to her work. I also benefitted from the comments of members of the Boston household study group on an earlier draft.

Section 2. The Setting of the Study

1. The fieldwork on which this study is based was carried out in the Yagoua area from December 1980 through January 1982. It was done in conjunction with the Social Sciences Research and Training Project (631-0007) financed by the U. S. Agency for International Development under USAID contract AID/afr-c-1610 with Tufts University. Two research teams were fielded to study the impact of the SEMRY I irrigated rice project. Both teams undertook a farm management survey to measure the inputs and outputs of all agricultural enterprises carried out by the farm compound. The preliminary results of the farm management survey carried out in 1980 are found in Sisson and Ahlers (1981) and in related reports by Ndembo (1981) and Koulandi (1981). The 1981 farm management survey was carried out by Bikoi (1982). Throughout the text I draw on the farm management data presented in the reports of Sisson and Ahlers (1981) and Bikoi (1982).

2. De Garine (1964:14) cites a study done in 1955 which found an infant mortality rate (aged 0-1) of 250 per 1000. More recent studies (De Garine (1978:43) found infant mortality rates of 177 per 1000 (aged 0-1) and 300 per 1000 (aged 0-4) in the Yagoua area. In comparison, the infant mortality rate (aged 0-1) reported for Cameroon in 1960 was 162 per 1000 and 109 per 1000 in 1980 (World Bank, 1982:150).

3. The labor data were collected and coded as follows. Women indicated with hand signs the position of the sun when they left for the field and when they arrived home. Enumerators were trained to assign hours to the position of the sun. The unit of time adopted was one hour. In analyzing the data, one to three hours spent on a given activity in one day was counted as a quarter-day, four to six hours a half-day, seven to nine hours, a three-quarter day, and ten or more hours, one day. This procedure was adopted to compensate for any possible idiosyncracies in the enumerators' coding of the data and in responses. (Enumerators were also rotated frequently to minimize bias in the coding procedure). However, all the t-tests and regressions were also run using the actual hours that women worked as well as in standardized days, with very little difference in the significance of the results. The data are presented, therefore, as standardized days, one day equalling eleven hours of labor. The conversion ratio was established by dividing the total numbers of hours spent on each activity by the standardized number

of days and averaging over all activities.

The average length of women's workday in sorghum production was 7.0 hours (n=3270) and in rice production was 10.0 hours (n=4002). No attempt was made to account for the intensity of labor, or time spent resting in the field. In several days of participation in rice threshing, for example, I observed that women spent approximately a third, if not more, of their time resting in the fields. However, threshing paddy is back-breaking labor. A sheaf of paddy is lifted up over the head, brought crashing down on a mud block several times, and then shaken to dislodge any remaining grains of paddy. See Haskell (1975) for data from a Gambian village on time spent resting in the field.

Section 3. The Organization of Sorghum and Rice Production

1. For a discussion of the land tenure system, see de Garine (1964:51-56).
2. Assuming yields of 4.3 t/ha, and average labor costs of 15,000 CFA, at the old producer price of 38 CFA/kg for paddy and fixed charges of 70,000 CFA/ha, a farmer would have netted 39,200 CFA per piquet. Under the new price system of 55 CFA/kg and fixed charges of 110,000 CFA/ha, he or she would net 55,750 per piquet.
3. For a discussion of the economics of other large-scale mechanized rice production projects in West Africa, see Pearson et al. (1981).
4. In order to compute the percentage of production which was not delivered to SEMRY, farmers were asked how many sacks they had harvested. The total number of sacks sold to SEMRY (or given to a friend to sell to SEMRY) was subtracted from the number harvested to arrive at the number retained. SEMRY estimates that farmers retained about 23% of their production in the 1980 rainy season and 20% in the dry season (S.E.M.R.Y., 1981:34).
5. About 80% of the fixed charges owed to SEMRY for the 1980 rainy season were collected in the immediate post-harvest period (S.E.M.R.Y., 1981:34).
6. In contrast to the Massa system of sorghum cultivation, women in a number of other West African sorghum/millet farming systems spend the majority of their time on the collective compound sorghum/millet field. They have small "evening" fields on which they often cultivate cash crops or sorghum for beer-brewing (Whitehead, 1981 and Saul, 1981). The issue of how women allocate their time between the collective and their own "evening" fields has not received much attention in the literature.
7. Widigue rice-cultivating women worked 43.9 days and Widigue nonrice-cultivating women worked 42.0 days (t=.86) in the period from June 23 to August 27.

Section 4. The Allocation of Women's Labor to Rice Production

1. Women received 18,400 CFA in paddy from their husbands. All the paddy retained for home consumption was given to women for safekeeping. This paddy is used to feed not only their children and themselves, but also their husbands. The paddy substituted for the sorghum that both husband and wife forwent on account of rice cultivation. Customarily, the sorghum of both husband and wife was consumed by the household (see Section 4.2). Thus, the amount of paddy women received was divided in half to reflect the fact that men share the responsibility with their wives for providing enough grain to feed their households. (If a husband was polygynous, the amount of grain each wife received was adjusted to reflect the fact that she is responsible for feeding him only part of the time).

2. The regression was estimated for thirty-one women whose husbands controlled the disposition of income from rice production: twenty-two women from Vele and nine from Widigue. The other married women in the sample were dropped since they either controlled the disposition of rice income themselves (see Section 4.3), or worked for their co-wife or son, in cases where their own husband was too old to cultivate rice himself. One married woman in Widigue was not included in the regression since she cultivated cotton in addition to rice with her husband, and another was dropped because she returned to her parent's compound on account of a dispute over bridewealth. Hence she had not received any money for rice cultivation by the time I left Yagoua. Two women from Vele were also not included in the regression because of irreconcilable inconsistencies in the amount of rice harvested by their compounds and the amount of compensation they received from their husbands.

Some of these women cultivated dongolonga, and spent less time, therefore, weeding their household rice fields. To determine if they were compensated at a higher or lower rate than the women who did not cultivate dongolonga, regression (4.1) was rerun with a dummy variable DONG, equalling the number of days worked on rice production if a woman cultivated dongolonga, and zero otherwise. The dummy variable is not significant, however, indicating that the two groups of women were compensated at the same daily rate. The estimated regression is:

$$\begin{array}{rcccc} \text{COMPENSATION} & = & -1738 & + & 364 \text{ (DAYS)} & - & 20 \text{ (DONG)} & & R^2 = .71 \\ & & (.73) & & (8.17) & & (.77) & & F = 33.51 \end{array}$$

3. The average returns from rice production are calculated using data from the farm management survey (Bikoi, 1982). Net returns to rice production are calculated to be 111,000 CFA. The average labor input per hectare, converted to the standardized day used in this study, was 185 days/ha. This is in line with the 164 days/ha that independent women (see Section 4.3) spent on their own rice fields, allowing for an additional 12% hired and exchange labor input found by the farm management survey. Dividing average net returns per hectare by average labor input per hectare shows an average return of 600 CFA/day. A similar calculation for Widigue gives an average return of 584 CFA/day.

4. This figure is based on a preliminary analysis of the farming management survey data obtained by Eikoi (1982).

5. Labor is hired for sorghum cultivation only in villages which are at some distance from the rice fields. Wage rates were obtained by asking the few farmers who hired labor for sorghum planting or weeding in Zebe and Widigue the rate they paid.

6. Average returns to sorghum labor are based on the following assumptions. Reported yields for Vele are 1616 kg/ha and for Widigue 806 kg/ha. (The yields were calculated by filling to capacity the container used to transport grain from the field to the compound, multiplying the weight of the filled container by the number of times the container was filled, and then applying a conversion rate to obtain the quantity of threshed grain). The cost of hired and exchange labor and seeds is 4000 CFA/ha. Labor inputs are 175 days/ha for Vele and 133 days/ha for Widigue. The post-harvest sorghum price is 74 CFA/kg. Yields and input costs are based on farm management survey data (Bikoi, 1982), labor times on women's labor allocation survey data, and sorghum price data on weekly weighings of sorghum in local markets. Calculated on the basis of these data, average returns to sorghum labor are 660 CFA/day for Vele and 418 CFA/day for Widigue. Since evidence from other villages suggests that yields of 1.6 t/ha are unreasonably high (see Section 2.1), yields of 1.4 and 1.2 t/ha are assumed (which are still on the high side). Returns to Vele women's sorghum labor would then be 569 CFA/day and 485 CFA/day respectively. For the purposes of the calculations presented in this chapter, returns to Vele women's sorghum labor are assumed to be 550 CFA/day and to Widigue women's labor, 500 CFA/day.

7. Vele women derive most of their income from sales of grain, sales of sorghum beer, and wages from rice cultivation labor. The opportunity cost of women's nonagricultural rainy season labor is determined, therefore, by the returns to their labor from sorghum beer-brewing. Despite the fact that independent women spent more time than married women on agricultural labor in late August and November, the rice transplanting/weeding and harvesting periods, they earned the same amount of income from brewing sorghum beer. In August, independent women's sales of sorghum beer averaged 356 CFA over a two-week period, while married women's amounted to 265 CFA. In November, at the height of the harvesting season, independent women sold 77 CFA of sorghum beer, compared to paltry 44 CFA sold by married women. In contrast, there was a pronounced increase in the sales of both groups after the rice harvest: independent women sold 862 CFA and married women 500 CFA.

The greater quantity of sorghum beer sold after the harvest reflects increased demand for sorghum beer, due to the influx of cash, and the slack demands on women's agricultural labor. It may also reflect the fact that women have more cash to purchase sorghum to brew beer; almost without exception, women purchase the sorghum used to brew beer even if they have a surplus of grain. The interest rate of 50% (for any time period) is a powerful disincentive to borrowing money. In addition, brewing sorghum beer takes several consecutive days of labor,

which makes it more difficult to brew beer during the peak agricultural season. (For a discussion of sorghum brew-brewing in Upper Volta, see Saul, 1981). Since married women do not spend more days on sorghum beer production than independent women even though they theoretically have more time available, it would be reasonable to take the opportunity cost of their (nonagricultural) time during the rice cultivation season as zero. However, if they did no work on rice weeding or harvesting at all, they might nonetheless be able to expand their production of sorghum beer somewhat, although there would hardly be sufficient demand to support full-time beer-brewing. Since net profits per day of sale in August and November were about 500 CFA, for about three days of work, 100 CFA/day has been adopted as the average opportunity cost of women's nonagricultural labor.

8. If the opportunity cost of Vele women's sorghum planting, first weeding and second weeding labor is assumed to be 660 CFA/day (see note 6), the opportunity cost of women's labor in total would be 14,470. The net gain is still positive.

9. The comparison provides only an approximate indication of the size of men's sorghum fields because it is not clear how an active worker is defined in the reported results of the farm management survey (Bikoi, 1982). If older children are included in the definition of active worker, as I believe they are, then mean area cultivated per adult man would be larger than the survey results indicate. (Older children work on both their mothers' and fathers' fields, although they are usually occupied with other tasks).

10. See note 9.

11. To calculate consumer equivalents, an active household member was assigned a weight of 1 and an inactive member (child or elderly person) a weight of .75. Calculations are based on mean compound field size (Bikoi, 1982).

12. Every active household member supported on average .75 nonactive household members. Thus, the 165 kg of paddy (110 kg of hand-pounded rice) households retained on average per active household member is equivalent to 70 kg of hand-pounded rice per consumer equivalent.

13. One reason that purchases of grain were low in July relative to other months is that the July expenditure survey was administered at the height of the sorghum planting and first weeding period. Women had little time to go to market to sell tobacco and buy grain because of demands on their time. When they did go, however, they often bought 50 to 100 kilograms of sorghum at a time. Thus, the low July expenditures on grain are not necessarily an indication that grain consumption was lower in these two weeks than in other weeks.

On average, Zebe households contained 2.0 adults and 1.5 children, thus 3.1 consumer equivalents. The purchase of grain in May would amount to 422 gm/day/consumer equivalent over the two-week period.

14. A comparison of Zebe widowed and married women's household food expenditure pattern shows a similar pattern: widowed women's household's spent approximately the same amount on food per adult equivalent as married women's households:

Food Expenditure per adult equivalent	May	July	August	November	January
female-headed households	796	554	803	610	873
male-headed households	939	342	670	573	920
probabilities* (%-test)	.62)	(.21)	(.59)	(.84)	(.89)

* See note to Table 3.9.

The comparison lends further support to the hypothesis that the preferences of male- and female-headed households do not differ with respect to expenditures on food.

15. Women are assumed to benefit equally whether they work on their own sorghum field or on their husbands' sorghum field, since virtually all the sorghum produced by Vele farmers is home-consumed. Thus, the sorghum labor regressions are estimated for women's total household sorghum labor input. Estimating the regressions using only the labor inputs to women's own fields gives the same results. Most of the time Vele women spent planting and weeding sorghum was on their own fields. Of the 8.7 days married women spent planting sorghum in the rice transplanting period (6/23 - 8/27), 7.6 days were spent on their own fields. Of the 11.1 days they spent weeding, 10.7 days were spent on their own fields.

16. Married women were not weeding their husbands' sorghum fields in exchange for their husbands spending more time on rice transplanting. See note 15.

17. As Table 4.4 indicates, the most significant difference in the amount of time which the two groups spent on agricultural production occurred in the second half of the transplanting period (8/1 - 8/27): married women spent 15.5 days in total cultivating and independent women spent 17.8 days ($t=1.94$). The following regression was estimated to control for the number of children and also for whether the women had a child under the age of three (in which case BABY equals one):

$$\begin{array}{rcccccc} \text{TOTAL} = & 15.2 & + & 2.9 & (\text{GROUP}) & - & 0.1 & (\text{CHILD}) & + & 1.69 & (\text{BABY}) & R^2 = .16 \\ & (12.93) & & (2.20) & & & (.25) & & & (1.21) & & F = 1.97 \end{array}$$

As the regression shows, only the dummy variable for GROUP is significant.

It is interesting to note in this respect that the difference in the amount of time Zebe widows and married women spent on agricultural labor (virtually all sorghum/millet cultivation) is not significant: widows spent 41.9 days on agricultural cultivation, while married women spent 40.1 days ($t=.60$) in the period from 5/15 to 8/27. (Nor are the slight differences in the number of days worked significant for any subperiod within this period.) This comparison lends further support to the hypothesis that the difference in the amount of labor married and independent women allocate to rice production is due to conflict over the disposition of income from rice production.

18. Married women spent 6.9 days more cultivating rainy season sorghum in the rice cultivation period (June 23 - December 31), but independent women spent 1.0 days more cultivating dry season sorghum. Independent women also spent an additional 0.3 (0.4 days in total) days harvesting rice for their own use from SEMRY's nurseries (not an activity approved by SEMRY); this labor time is not entered in the harvesting data presented in Table 4.4, since it was done during the household rice weeding period.

19. If the returns to sorghum labor average 660 CFA/day, the difference in independent and married women's incomes would drop to 5220 CFA.

Valuing married women's household sorghum labor at 550 CFA/day and their household rice labor at 600 CFA/day per rice, married women's household rainy season rice and sorghum labor is worth 47,275 CFA. (sorghum: 30.1 days x 550 CFA/day = 16,555 CFA; rice: 51.2 days x 600 CFA/day = 30,720 CFA). It is assumed that men spend the same amount of time as women cultivating rice and sorghum, which accords with indirect evidence on men's labor allocation (see note 23).

20. The sample of thirty-one women used to estimate regression (4.1) was divided into two groups on the basis of whether their household cultivated .75 piquet or more per household worker. Thirteen of the households fell into this category, averaging .95 piquet/household worker, while the remaining eighteen averaged .47 piquet/household worker. (The group of independent women cultivated .94 piquet.) About 31% of the married women in Vele cultivated .75 or more piquets per household worker; 25% cultivated 1.0 or more piquets per household worker. The Vele women who cultivated .75 piquet or more/household worker were compensated at the mean rate of 363 CFA/day, while the group of women who cultivated less than .75 piquet per household worker received only 302 CFA/day from their husbands ($t=2.14$).

21. In the context of the household, joint rationality implies that the household operates on its production possibility frontier. This means, for example, that the household allocates its labor time to maximize

household income.

22. The Massa make prestigious loans of cattle to create and reinforce social ties (de Gaspine, 1964; Dumas-Champion, 1980). Dumas-Champion describes the long process of negotiation which is undertaken before cattle are loaned. Young men, in particular, benefit from loans of cattle which enable them to take part in milk-cures and associated ceremonies.

23. The available evidence suggests that men and women spent about the same amount of time on rice production. Yields of married and independent women's household rice fields were virtually identical, and independent women spent approximately the same amount of time cultivating rice per hectare, 164 days/ha compared to 182 days/ha ($t=.66$). This would suggest that men were spending approximately the same amount of time on rice production as their wives, which was verified by a preliminary analysis of the farm management rice transplanting and weeding survey data.

Men's sorghum fields are also approximately the same size as women: one average woman cultivated .17 ha of sorghum, while compounds in Vele averaged .13 ha of sorghum per active worker (see note 9). Furthermore, men and women reported spending approximately the same amount of time on sorghum production, though this could, of course, be ideology rather than practice.

Section 5. A Comparative Perspective

1. Mackintosh (1981) hypothesizes that the sexual division of labor is most rigid for the tasks most closely linked to the construction of gender identities--in most societies, tasks associated with the rearing of children. In a study of how the introduction of plantation wage labor altered the responsibility for domestic labor tasks, she found that there was no shift of domestic labor activities from women onto men, even though the demands of the "double day" on women were extraordinarily heavy (1979).

2. The post-marriage residence pattern, however, sometimes work independently of the inheritance system. In a comparison of different groups of pastoral women in one region of Kenya, Little (forthcoming) observes that where marriage patterns are more localized, widows are often able to obtain access to irrigated land through their kin, in contrast to widows in a nearby district where marriage patterns are not as localized. See also Muntemba's observation (quoted on page 95) which suggests that women in virilocal villages had particular difficulty in maintaining usufructory rights to land.

3. See also Peters (forthcoming).

4. This is not to imply, however, that female heads of households universally have less access to critical resources than male heads of

households. As Peters (1983 and forthcoming) points out, the focus on the household as the unit of analysis often masks critical interhousehold links along which resources flow. Thus, the assumption that female-headed households are a socially and economically undifferentiated category is not correct, as Little's (forthcoming) research also shows.

5. Dwyer (1983), for example, infers that women place a greater priority than their husbands on their children's needs from the fact that women spend a greater percentage of their income on basic needs than men.

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