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THE ECONOMICS OF FEMALE HOUSEHOLD PRODUCTION:
REPORT OF RESEARCH AMONG THE DOGON
(REPUBLIQUE DU MALI)

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THE ECONOMICS OF FEMALE HOUSEHOLD PRODUCTION

M.H. MASSING, JUNE 1978

In developing countries, the household work of women is generally onerous and time-intensive and forms a constraint on the available time for agricultural activities. Women obviously have to make crucial decisions about how to allocate their time to agricultural and household production. These decisions are related to the returns in agricultural activities relative to those in alternative occupations; they may also be influenced by other factors. (c.f. Ch.V) Little is known about the household production of women and about the technology of such activities or their costs and returns time-wise and moneywise. It was the purpose of this study to provide data which should allow to devise technologies to relieve bottlenecks and increase productivity in the household sector and hopefully improve the general welfare of the family in which the women appear to be, in our area at least, the primary providers. The results of this study might also prove useful for the economic study of dryland farming since for the modelling of household-firms the opportunity cost of female labor is important.

This study was planned in five phases:

I. Establish the use of time on a daily basis and find out the characteristic activities of women and the proportion of women's time devoted to them.

II. Select from the characteristic activities those which involve processing or production--e.g. dye-making, cotton spinning, shea butter preparation...--and describe the component processes in each of them.

III. Measure the time involved in each component activity identified above, weigh quantities of ingredients involved, evaluate sums paid for inputs, etc.

IV. Determine the cost per unit of the finished products: e.g. One liter of millet beer, and identify those processes which constitute bottlenecks within the activity.

V. Establish a list of foods prepared, the ingredients involved, the modes of preparation, the use of food, i.e. for home consumption or for market sale.

A sixth phase was initially planned but couldn't be thoroughly completed: to study the actual food consumed by different families for a longer period of time and determine nutritional contents and quality.

Due to unforeseen administrative delays before and upon arrival in

Mali, this study which was to last four and a half months (february to June) and to take place in a Dogon village on the plateau, had to be completed within a few weeks. Our base turned out to be Bandiagara, a town on the Dogon Plateau, some 75 kms. from Mopti. A handicap for our project was the quasi-impossibility to find a female interpreter who could release herself from other tasks and prove reliable:: either the parents would object to her lack of participation in household activities (in spite of the salary offered), or the girl had to tend a child of her own, which puturbated the work and was a challenge to any planning effort. We had to work out solutions to these problems on a day to day basis and conduct our study by mere passive observation, observation and questioning (with an interpreter--hardly any women speak French in the villages we visited) and by mere questioning about the activities taking place during the other seasons of the year of

(a) women in Bandiagara
 (b) women from neighboring villages: Dondjourou, Bendieli, Nombouri, and in particular Djombolo where the women kindly demonstrated their technique to me.

(c) by having a woman pound and cook meals daily in front of us

(d) by observation and questioning in the Bandiagara market which takes place twice a week (Monday and Friday) and to which women walk from villages sometimes as distant as 25 km.

This provided us with information on household production and market sales, (at least for May/June). We would have preferred to conduct a more limited but more thorough study within a village close to Bandiagara instead of conducting it from Bandiagara. On the other hand our scope was much larger in terms of activities and food production this way. We would also have liked to spend more time in a village where the women "acknowledge" their involvement in gardening (which they rarely do; we will come back to this in ch V) and see the impact of gardening on other secondary activities and time organisation.

Results of the present study will be presented as follows:

I. Exposition of women's daily tasks and listing of characteristic activities.

II. Brief description of processing activities and of technology involved.

III. List of foods prepared; general observations.

IV. List of processed foods and other foods sold by women on the market; sales prices per unit.

V. Attempt to identify the bottlenecks in technologies applied, and the factors influencing the present behavior of women; suggestions for

changes and problems which may occur.

Appendix I. Detailed description of food preparation.

Appendix II. Account of all the gestures and time involved in each processing activity mentioned.

Appendix III. New code for consumption revenues and expenditures for the Mopti region farm management study.

When reading this report one should keep in mind that temperatures on the Dogon Plateau at this time of the year vary between 40° and 50° centigrade and that these temperatures form the background conditions of most of the work described below. Thus, not only are the work processes strenuous in themselves but the conditions under which the women's work is done are quite extreme. In spite of the high temperatures, women are often seen working right in the sun. As a weaver who kept me company in one of the villages visited put it: "it's a question of pride. A Dogon woman doesn't want to be seen working in the shadow. People would say she is lazy."

I. EXPOSITION OF WOMEN'S DAILY TASKS AND CHARACTERISTIC ACTIVITIES

Two factors have a striking influence on the women's use of time and daily activities: (1) the water situation (i.e. proximity of permanent wells)

(2) the number of wives in the household: e.g. most co-wives in Bandiagara are responsible for food two days at a time after which they are "free" for the other 2, 4, or 6 days (depending on the number of wives). Some are in charge on a one day basis. In Djombolo the first five women questioned at random were the only spouses and therefore they were responsible for the cooking seven days a week. I was told that it was customary there for the husband to pay a dowry not to the woman's family but to the woman herself in terms of goats or sheep at the time of the wedding. Would that account for the rarity co-wives in a village otherwise strongly under Muslim influence? The dowry is probably one of the very few occasions when the Dogon woman will receive a valuable present from her husband...

The daily activities vary tremendously between the "hivernage" and the dry season. The following activities were observed mainly in May before the beginning of the rainy season.

I. 1. DAILY ACTIVITIES

I.1.a: Fetching water: At this time of the year it is not rare for women to walk four to five kms. to find a well which has not dried up. On the average a woman makes two to three trips a day: twice in the morning and once at night, unless she has a daughter old enough to carry water. The water is carried in clay pots which contain 25 to 35 liters and transported as a head load. Drawing water is done with the help of a rubber bag ("épuisette") usually made from old inner tubes. Each woman takes along her own "épuisette" to the well. As many of these "épuisettes" have holes, the whole process is lengthy and tedious. By the time a woman has pulled it some 40, 50 or even 60 meters up, a good amount of water has already leaked out. Drawing water, usually the first task of the day, starts between 4 and 5 A.M. It is repeated in the afternoon shortly before sunset. After the rains have set in, water will be collected from depressions in the rocks around the village.

I.1.b: Fetching wood: Andanga or Goudopil is the Dogon name for the wood used for cooking and for all processing activities requiring boiling or heating. Men also cut and gather wood--with carts--but this is

exclusively for market sale. The woman in charge of cooking has to provide the wood. Women usually go and fetch wood in the morning after drawing water or after the first meal. Fetching wood doesn't constitute a "daily" activity as such since women may go only every second, third or fourth day depending on the size of the family and the number of co-wives. Extra trips are made by women who bring wood to sell at the market. This wood is kept apart from the wood collected for home consumption. The wood is cut fresh and the woman carries it back to the village on her head. We have never seen a woman using a cart or a donkey to transport wood as men do. Millet stalks are also collected and used as fuel.

I.1.c: Preparation of food: The Dogon family usually eats three meals a day: the breakfast which sometimes consists of some left-overs from the previous supper with additional sauce is eaten around 6 AM; the second meal is ready by 10 or 11 AM. The third meal is eaten at sunset or slightly later. It is not rare however at this time of the year, when no work is done in the fields yet, that the first meal is skipped. On the average, two and a half hours are necessary for the preparation of a meal. This includes the pounding of the millet, the preparation of the sauce (for more details concerning the actual preparation cf III-1 and III-3) and a certain number of interruptions eg. child care, chasing sheep out of the compound...

Millet is the staple: each morning the head of the household gives a certain quantity of grain to the woman who will do the cooking on that particular day. The millet is always threshed outside the village in order to avoid grain dust and litter in the compound and to avoid the harmful effects of the sharp husk on children. It is then pounded a second time inside the compound and made into flour. During the hivernage the midday meal is taken to the fields by the woman, otherwise it is eaten in the village.

the same process is repeated for the evening meal: first pounding outside the village, then inside the compound. It is to be noted that in larger families with co-wives, every woman, even though she may not be responsible for the cooking, will help with the pounding. In other words, each woman pounds every day, usually twice except for older women who have daughters in law in the compound and who pound only during the hibernage so that the younger ones can spend more time in the common field. Most women actually do not pound twice a day. If they pound in the morning--especially in the case of a numerous family--they will often grind the millet at nights (or vice versa) Grinding is done with a pebble on a flat "rectangular" stone. All the women whom I asked agreed that grinding is less tiring than pounding and less time consuming. Many younger women declare not to see any difference in the quality of the flour, whether it is pounded or ground. When asked then why they kept pounding instead of choosing the less tiring process, their only answer was that their grand-mothers used to do both so they do the same. Older Dogon women do say however that there is a difference and that only pounded millet should be used to make To or Bouillie (cf III-1).

I.1.d: Fieldwork during the hibernage: By the time the midday meal is ready (10 or 11 AM) the woman takes it to the field where the other members of the family, including co-wives, have been working already for 3 or 4 hours. The meal is not eaten right away; the women will contribute an hour of work or so before every one starts eating. Sharing the work on the common field is a must except for older women: if there are enough hands, the husband may "free" his aging wife from field work. Out of 20 women questioned, two older women no longer worked in the common field (But they still cultivated their private parcels) and one woman who appeared to be in her early thirties and had two young children declared that her husband did not require her to work in the field but spend time tending the children instead. She said herself that this was a very exceptional

situation for the village.

Women are allowed private fields where they mostly choose to grow groundnuts and okra, more rarely millet, even more rarely do they do market gardening. To cultivate their own parcels, they are granted some time off. This seems to be done according to four patterns:

1) the woman's field is near the common field: she can take time off during resting periods (a) after the midday meal; (b) during Salfana, ie prayer time; (c) during Lassara (around 4 AM).

2) the Muslims have one or two days of rest during the week: on Fridays and around Bandiagara on Mondays, although this second day is not observed unanimously. These are days of rest, ie no work is done on the common field and the women are free to devote time to their own fields when not occupied by other household activities.

3) For those who are still under animist influence, there are the "Dama", ie days of sacrifice which also recur at regular intervals. On these days too, the women have free time to work on their own parcels. (These "Dama" and holy days are not observed however during the week when the sowing takes place on the common field).

4) Finally some families fix in advance a limited amount of days granted to the wives during the rainy season to cultivate their own fields. It varies from: one to three days for sowing; two to three days for the first cultivation (ie, first weeding); one to three days for the second cultivation (ie second weeding). Occasionnally a woman mentions that her husband or a brother helps her sowing; but in general they work alone on their parcels.

During the rainy season, women are expected to stay longer than men in the fields at night, as the men start working by 5:30 or 6 AM whereas the women, delayed by such tasks as fetching water, wood, pounding, child care, etc. join in only later.

The woman responsible for preparing the evening meal quits the field earlier. We have no first hand data about the repartition of work at harvest time, in particular concerning the gathering of onions, the pounding of bulbs and leaves, activities in which women have an important part. It appears that in exchange for their contributing, women are given the leaves of the onions to make balls which they sell in the market for their own benefit. The Dogon women also receive a packet of millet after the harvest, which they keep in their own granaries and can use for extra food preparation, beer making...when they wish to.

I.l.e: Activities during the dry season:

Activities connected to cultivation:

- transportation of compost
- watering of gardening crops for the husband

Market Gardening: Out of twenty women two declared, reluctantly, doing gardening. One grows onions and peppers, the other one onions only. This takes place in December and lasts about 2 1/2 months. These women have to harvest early because there is not sufficient water to wait until the end of the third month. The first woman works alone, the second one is helped occasionally by her brothers. Watering is done every other day, early in the morning usually before starting preparing food. One part of the production is used for household consumption. As for the surplus, one woman sells it fresh in Bandiagara, the other sells mainly onion balls, and leaf balls. The first woman took the initiative of growing onions, and she cleared her own parcel; the other one was told to do so by her husband and would discontinue it if her husband didn't want it otherwise. As secondary activities they only mentioned spinning cotton. The cash earned from the onion sale is used to buy condiments and cotton.

Gardening by women seems to be distributed regionally, hardly any women own gardens in the arrondissement of Bandiagara or Dourou, but more do in the arrondissement of Sanga and Kendie. It seems that two conditions must be fulfilled for a woman to have her own garden, first, sufficient water in the dry season, second, sufficient land, i.e., more than the men can cultivate.

Other Activities: Not all the activities listed below are "daily" activities, not all of them could be found at one time or another in one compound, not even in one village, the following list was established by observing and questioning in several villages and by weekly checking during the month of May of the production brought to the Bandiagara market:

- pottery making
- spinning cotton
- dying: "pagnes noirs" (Indigo) and Bogo (brown color)
- Koru : (powder made out of dry bones to facilitate spinning)
- making of Gala (Indigo cakes) for dyeing
- mats to cover clay pots
- potash lumps
- making of sesame oil and raisin oil for body and hair or to prepare soap
- making of soap
- shea butter making
- peanut oil making
- peanut butter
- making of condiments such as kama, pourkama, baobab, okra or tomato powder
- Latjeri ndiordi (couscous of millet mixed with ground peanuts)
- fruit juices or sirops
- millet or sorghum beer brewing

I.1.f. Leaves and Fruit Gathering:

Women are responsible for providing all the ingredients to make the sauce which will accompany the millet (2 women out of 20 mentioned that their husband occasionally gives them some money to buy "condiments", by which is meant any ingredient entering the making of a sauce). Some of these ingredients are bought on the market, the rest is collected from trees and used fresh or dry; children, mostly girls, help the women in that activity. Here is the calendar of wild plants or fruit we were able to reconstruct for the year:

<u>Month</u>	<u>Ingredient</u>	<u>(Dogon)</u>	<u>(Latin)</u>
May	prune	bi	Combretum Aculeatum: the fruit may be eaten raw or used to make juice or sirop.
	baobab	oro	Adansonia Digitata: the leaves are used dry in the sauce. The fruit ("pain de singe" - monkey bread) is eaten raw
	ronier	kongo	Boressus Aethiopum: its fruit is eaten raw or boiled. It also produces a seed which is planted to give a tubercle called Dissi.
		Anave	? : used in the sauce of the couscous
June	grapes	sa	Lannea Acida: the fruit is eaten raw, raisins are used to make juice, also used to make oil and soap
	Zaban	kame/Ara	?: the fruit is used to make juice for millet cream
	Nere	youlo	Parkia Biblobosa, the dry fruit are ground into flour, also used to make condiment
	Ronier - see May		
	?	Muna	?: black fruit used instead of tamarind or zaban in millet cream

	Henne	podu	Lawsonia inermis: used as a dye on the body
	Indigo	gala	Indigo Tinctoria: used for dyeing
	?	sigel	?: used as a medicine against jaundice; also used as dye (like cola)
November	?	odjo	?: the fiber is used to make mats, fruit gives juice for the crème
	watermelon	gugum	Citrullus Vulgaris: the fruit is used in the sauce for couscous
	?	Numa	?: the fruit is eaten raw
	water lily	burukum	nymphaeaceae (family): the root which is in the water is added to sauces
	squash	gono/bogodji	cucurbita: is added to the sauce for couscous
	?	keje	?: the seeds of the fruit are eaten, the flowers give some kind of "honey" in May and June
December	Balanzan	Senge	Acacia Albida: provides food for animals, the bark is used to make medicine
January	no special plant or fruit was recalled by the women		
February			
March			
April			

Part of the food gathered is used for home consumption, part is used to sell on the market: e.g., baobab leaves, sa; as a mere example, a full basket of raisins which took three days to fill was presented on the market at the initial price of 1 000 MF. (The woman walked 10 kms. to bring it to the market). Some trees belong to everyone, i.e., everyone can pick the leaves or fruit; these are mainly the baobab and the bi. Others such as shea trees or sa belong to certain families in the village. It is difficult to evaluate the amount of time spent by the women in

"food gathering" since this constitutes a joint activity with others. Fruit or leaves may be collected on their way back from the field or from the market, sometimes special trips are made. Young girls often help picking leaves from baobab trees, etc.

I.l.g. Market Activities: There are 2 weekly markets in Bandiagara, plus a small market going on every day. In other towns, some markets take place every 5th day- corresponding to the Dogon week of 5 days (at Dourou, Sangha, Ennde and Kani-Kombole). Women from surrounding villages walk to Bandiagara to buy and to sell. Even those who deny producing anything for market sale will always try to bring something to get some cash and buy condiments (mainly smoked or dry fish and salt). Besides those who come only once or twice a week, some women, often native of Bandiagara are involved as retailers or "middlewomen". At this time of the year they go to Mopti to buy mangoes or fish which they transport as far as Sangha or resell in Bandiagara. It is to be noted that there are no - official - taxes for people who sell on the market in Bandiagara. (Hangars shelter the regular traders, men or women who can afford to build them, e.g., three women specialized in mango trade put money together to build a shelter.) The women walking from distant villages who come only once or twice a week can't enjoy those facilities. Those women usually bring some food along and leave the market after they have sold their products.

I.l.h. Other Activities: Here again an evaluation of the time devoted to these is quasi-impossible. For example: child care is not necessarily done by the mother of the child, but more often by the older women who remain in the compound. It also happens that a child is completely brought up by an uncle or an older widow who has no living children.

- Hair combing
- Contributing to the building of a house
- Laundry: the woman is responsible for washing her own clothes and those of her younger children. There is no "obligation" for the woman to take care of her husband's laundry, unless he is old or sick.

1.2. FREQUENCY OF TASKS:

The following table shows the frequency of tasks (sample of 16 women from 3 different villages)

Activities	Dry Season	Rainy Season
cotton spinning	16	3
dyeing (Indigo or Dogo)	4	-
pottery	none	-
Fu (indigenous brush)	2	-
Potash	7	1
raisin oil	7	-
sesame oil	3	-
peanut oil	5	1
shea butter	9	2
peanut butter	5	1
soap	6	1
Ka ma/Poukama (condiments)	9	- (?)
Brewing beer	8	3
fruit juices	7	1
okra, baobab, tomato powder	12	- (?)
dry couscous	6	2
onion balls	6	-
wood gathering for sale	5	3

Most women declared they discontinued all these activities during the rainy season because they were too tired when they came back from the fields. It seems to us, however, that when the women declare for example they don't make any Kama

or baobab powder during the hivernage they probably don't mean that they discontinue it altogether but rather that they don't do these things as often as before, and not for sale any more.

Summary:

The Dogon women are active as:

- Farmers: although men control the allocation of land, they cultivate their own parcels (limited acreage) and are expected to share in the sowing, weeding, tending and harvesting on the common field. Many women also water their husbands' gardens.
- Food Producers: they cultivate, gather plants, and fruit and process food for home consumption or for market sale.
- Breadwinners: The marketing of processed food or other goods is a must to earn some cash which will be primarily devoted to buying salt, fish and other condiments for cooking. The remaining money, if any, may be used to buy cotton and to clothe themselves and their children. It is to be noted that the woman's freedom to trade with homemade foods or other articles is impeded by the husband's demand for her labor on the common field.
- Housewives: They fetch wood and water, cook, clean, maintain the home, take care of the children, do laundry; socially and economically, their duties may not be limited to their husband and children but they also have to be concerned with the 'extended family' (La grande famille).

II. PROCESSING ACTIVITIES: TECHNOLOGY INVOLVED^{1/}

II. 1. Products Other Than Food Products:

II.1.a. Spinning Cotton: triple operation:

- Removal of the knots in the cotton harvested. This is done with the fingers.

- Carding: cleaning and disentangling the cotton. This requires the use of a double brush consisting of metal teeth set closely in rows and fastened to a back

- The spinning itself, for which the women use a very thin stick ended with a ball and an old piece of sheep or goat skin on which they can spin the distaff. To facilitate the work, the women put some korou (chalk from bones) on their fingers.

II.1.b. Making of Gala (Indigo cakes): Gala is the local name for indigo.

The leaves of the gala tree are collected and pounded in the mortar. The gala is subsequently shaped into small "cakes" and placed in the sun to dry (2 or 3 days). Oftentimes the woman who does the dyeing makes the cakes herself but they can also be found at certain times on the market. (average weight - 600 gr.).

II.1.c. Dyeing:

- Indigo: the tools required are a big clay pot and a long stick, cotton thread and a needle for the pagnes with designs. The dyeing is done completely by hand, 2 "pagnes" at a time. It takes 1 1/2 days of work- not very intensive work as it consists mainly in soaking the cloth in the clay pot. (Due to the cost of industrial dye the women don't have more than one clay pot ready). This does not include sewing, which takes half a day, on average, of work. Sewing is done

^{1/} A detailed description of processes and complementary information will be found in Appendix I, p.

to form a pattern: dots, interrupted or uninterrupted lines. The parts of the clothes covered by the thread will remain white throughout the dyeing process. The time spent preparing the indigo cakes must also be considered if the woman makes them herself and the sometimes difficult task of finding commercial indigo.

- Bogo: the dye comes from the bark of the Sa (*Lannea. Acida*) which gives a grape-like fruit. The dyeing requires a clay pot, wood for the fire, some ashes and raisin oil; it can be done easily in 1 day. This dye does not "hold" very long but the process can be redone over and over again as all the "ingredients" needed are found locally. I have never seen brown cloth on the market in Bandiagara. In the villages I visited, the women would do it for personal use or for a friend.

II.1.d. Making of fu: These are used to rub the body or to clean kitchen utensils. The Dogon women make them during the dry season; they take the branches of the ronier palm tree (*Borescus aethiopum*) which they beat with a stone to obtain some kind of a fiber. This is then curved to make several small circles bound together. The women tie 40-50 in a bundle and sell them 2/5MF on market days to retailers who will sell them 5F a piece the following days.

II.1.e. Pottery Making: The making of clay pots couldn't be observed during our stay. In the neighborhood of Bandiagara it was done in only 1 village: Tognon. (Apparently the only place which had the right soil for it). The women coming to the market to sell their "canaris" said those had been made right after the end of the rainy season. Clay pots are made outside the village; to bake them the women turn them upside down, cover them with wood and ashes and place them in an half open oven. (Depending on the size, they cost from 50MF (about 5 liter content, to 350 MF, 30-35 liter content, on the market).

II.1.f. Making of potash: An old clay pot is needed, with a hole at the bottom and a metal basin. Potassium can be extracted from millet, sorghum or sorrel as well as from the branches of the Bi (Combretum Aculeatum). The burned millet or sorghum stalks are soaked in cold water overnight, the liquid is heated the next morning until quasi-complete evaporation. This is not very time consuming. The main effort consists in activating the fire (and collecting enough wood for that.) One clay pot of liquid yields about 12 lumps. (75 to 90 gr/each).

Potash is used mixed with tobacco (to snuff or to chew), it is used for dyeing, and many a woman adds some when she cooks ground millet (not pounded millet).

II.1.g. Making of Raisin Oil: This oil is for external use only to rub on the body and in the hair. It is also used to make soap. The fruit of the Sa which have been soaked to make Sadi (see II.2.f.) are dried in the sun, crushed with a stone, pounded and made into a paste which is slightly heated and from which the oil is drawn out with the fingers. The cost is minimal as the raisins are first used to make Sadi, but the work is extremely long and tiring; in 1 1/2 hour a woman made 18 centiliters, and a girl helped her to crush, pound and light the fire.

II.1.h. Sesame Oil: Poli. This process which was not demonstrated but described to me is similar to the process to make raisin oil. After being heated in a pot on the fire, the grains are pounded; hot water is then added to the paste which is squeezed with the fingers to extract the oil.

II.1.i. Making of Soap: Soap can be made with wild dates, the fruit of the acacia, millet stalks, shea butter, peanut oil or animal grease. In the villages visited, the women used mainly raisin oil (see above). The heated dough is used before the oil "comes out", mixed with liquid and solid potash and "cooked"

15 to 30 minutes before being shaped into balls. Shea soap washes best, soap made from millet stalks is said to spoil the hands.

II.2. Food Products:

II.2.a. Shea Butter: The flesh of the fruit is eaten raw and the nut inside the flesh is used to make the oil. This is a long tiring process requiring a mortar and pestle, a large stone and pebbles for crushing, a pot, large and small calabashes and water. Once the nuts have been cracked, the kernels are sorted, smashed on a rock, ground into a smooth paste, mixed with water before being finally boiled. The most tiring process is probably the grinding of the nuts into a paste. The stirring of the paste is also quite tiring and tedious since no interruption of the rapid circular hand motion is allowed for about an hour. Shea butter is used mainly for cooking, it solidifies (if the temperature comes down to 37°C) and can keep for weeks in the shade or inside granaries. It is cheaper to cook with sheabutter than with peanut oil. Some people use it to rub their body and their hair, but many object to the smell. Soap is made with sheabutter. The cost depends whether the woman has the sheanuts at home or has to buy them. (As no sheanuts are sold on the market at this time of the year, we have no indication of their price).

II.2.b. Peanut Oil: The process of making peanut oil is similar to the making of sheabutter. It appears slightly less for groundnuts however. The nuts are shelled, heated, crushed and ground into a smooth paste which is pounded gently until the oil appears at the surface and can be squeezed out with the fingers.

II.2.c. Peanut butter: There are 2 kinds of peanut "butter" or peanut "paste": Tougoudjou and Tiguédeguena.

Tougoudjou: The peanut paste which remains after the extracting of the oil is mixed with Dah (sorrel), cooked for 3 hours, then cut into small pieces to be eaten as a snack.

Tiguedeguena: The preparation is the same as for peanut oil, but at the time the oil is ready to "come out" the paste is removed from the mortar and smoothed with a bottle on a wooden board. Tiguedeguena enters the composition of several sauces.

II.2.d. Condiments: Condiments such as baobab, okra or tomatoe powder, the preparation of which doesn't require any special explanation (the leaves or vegetable are pounded when dry) are made in practically each family inside the villages and sold in large quantities in the Bandiagara market. Two condiments require a more elaborate preparation: kama and pourkama also called soubala.

- Soubala: is made from the fruit of the néré. 2 kinds of soubala can be found on the market: dry balls and powder. The seeds are washed, boiled, for 2 days then spread on a mat and left to ferment for 3 days, before the woman shapes them into balls. The powder is obtained by pounding soubala balls with onion balls.

- Kama: is made from the dry seeds of sorrel which are pounded, boiled for 1 day and left to ferment for 3 days.

II.2.e. Latjiri n'diordi this is steamed ground millet mixed with peanut paste, salt and pepper, it is an instant food for people who travel. One only has to add water, (or milk) and sugar if available to get a ready meal within a few seconds.

II.2.f. Fruit Juices: The principle of preparation is to soak the fruit for a certain period of time in water.

Bedi: prune juice: the besobs (be = prune and sobs means to pick in Dogon) is the instrument used to pierce the skin before soaking the fruit. On the Dogon Plateau the fruit are soaked only for one night whereas in the plain it is customary to let them ferment for 2 or 3 days. Pounded pepper and onion leaves may be added.

Donjoulou: is a sirop obtained by nearly complete evaporation of the juice over a fire.

Sadi: raisin juice. The dry grapes of the Sa are soaked 24 hours in water. To obtain fermentation, some people wait 2 or 3 days. Then the juice is filtered through a sieve (one kilo of dry grapes yields 3 1/2 to 4 liters of juice).

Tamarind Juice: Tamarind pods are washed and soaked in water for 30 min, the juice is filtered and sugar is dissolved in water and left on the fire until it turns brown before being added to the juice. Some women add pounded pepper - 150 gr of tamarind pods are necessary to make 1 liter of juice.

Limbouroudji: lemon juice. Same principle, the soaking lasts 1/2 an hour to 1 hour.

II.2.g. Millet and Sorghum beer =N'dolo = tchap = koundio: beer made from millet is sweeter; women prefer to use sorghum (they say it is cheaper) or a mixture of sorghum and millet rather than millet alone. The preparation lasts 6 to 7 days: 4 to 5 days for soaking and drying the grains and 2 days for grinding, boiling and allowing time for fermentation. Several buckets of water are needed and the women often walk to far distant villages (15 to 20 km) to buy millet or sorghum as they usually don't use the grains from their own granaries to make koundio for sale. Beer brewing is also time-consuming as it requires supervision (frequent stirring) during the long periods it is kept on the fire.

III. LIST OF FOODS PREPARED: METHOD OF PREPARATION

This chapter contains general information concerning the modes of preparation of foods on a cereal base, including household recipes, processing methods and equipment used on the Plateau. We believe that knowing what and how the women cook is important as it is interrelated with production, marketing and processing. A more detailed account of the preparations will be found in Appendix II.

III.1. List of Utensils used for Cooking:

- Bassitémé - wire sieve
- Calabashes - deep rounded out calabashes are used as containers, to wash grains, remove stones, winnowing...
- Canari - clay pot
- Draining spoons - sometimes called "coudes" (elbow); they may be locally made or manufactured
- Gnintiré - clay pot with holes at the bottom used to steam
- Gnomiguémé - basins with individual holes to fry millet cakes
- grinding stone : to loosen seed coats, grind.
- louche - small calabash used as a spoon and to measure quantities
- Mougoutémé - wire sieve - the wire is thinner than the bassitémé
- Paliguili - long wooden stirring stick
- "tasses" - basins used as containers for stirring or eating
- tins of all kinds and sizes

III.2. Basic Components and Various Dishes: The staple in Mali is millet, then come rice, fonio and sorghum, processed in different fashions and served with varied kinds of sauces.

III.2.a. Dishes prepared with Millet.

III.2.a.1. TO: This is a 2-step process. After the millet has been pounded into flour (for details on pounding see III.3) sifting is done with the mougouteme then with the bassitémé. The flour and the remaining grains are subsequently boiled until they form a rather dry and mashy paste.

Sauce Oro: the basic, traditional, unavoidable sauce served with t^ô is the sauce oro (baobab sauce). The dish is called Oronia in Dogon. It includes dry fish, dry pepper, salt and baobab powder.

Orania mafé: another sauce which sometimes accompanies the sauce oro for the t^ô. The ingredients are: meat, shea butter or peanut oil, tomatoes, laurel, fresh onions, dry peppers, salt and spices: féfé, soubala and maffigui.

Sauce Andjou-Oro. Made with smoked fish (sometimes some meat), sorrel leaves, peanut butter, pepper and salt.

T^ô can also be served with sauce Tigue deguena or Soubala_ji*. The time for preparing t^ô-oro: 2 hours if millet is already removed from the ears.

Sagasore: is a fast way of making t^ô. The millet is pounded only once, washed and tossed into boiling water. This dish is infrequent in Band'agara, more common in the villages around. It has a rougher texture than t^ô and people like to eat it with peanut butter sauce.

III.2.a.2. Couscous-latjiri can be made with fonio or sorghum, but is mostly made with millet. The millet is pounded and sieved then cooked by steam in the gnintiré. The pounding and cooking constitute a very long process. One has to pound about 3 hours (if the millet had already been threshed by the time the woman starts pounding.)

Mafé, a sauce made with smoked fish, shea butter, fresh tomatoes and tomato powder, soubala, pounded peanuts, pepper, fresh onions, cabbage or cabbage leaves, bean leaves, watermelon, anavé, oula or tasso leaves (according to the season).

* These sauces are mostly served over couscous or rice and will be described in II.2.a.2. The sauce soubala is only served to accompany the "nia-udurumu" i.e., the remaining t^ô from the previous night, which is warmed up for breakfast.

Sauce soubala_ji: same ingredients as for the Sauce Mafe which accompanies to, but it contains more tomatoes, more soubala and more spices

Sauce Jaba_ji: similar to the sauce soubalaji, with less soubala and even more onions.

III.2.a.3. Other dishes made from millet:

- Agnidang or anfang - ground millet, sorrel, smoked or dry fish are boiled together. This is quickly done once the millet is ground.

- Daguana (or ougourou) - millet cream. This is a mixture of raw and boiled millet flour mixed with water and tamarind juice.

- Pouno-ougourou. Milk cream. Contains millet flour, sour milk, salt, pepper and sugar.

- Omo. Millet "bouillie" (porridge) sauce. ^{Same} Ingredients as for millet cream; this time all the flour is cooked and sugar is added.

- Pouhomano. Millet flour is boiled with pepper and salt, shaped into balls and eaten with water, omo, sugar or sour milk.

- Moni. Millet "galettes" (flat cakes). A dough made of millet flour and water is fried in the gnomiquémé with a little shea butter.

- Four-four or millet donuts are similar to the galettes but they are fried in deep oil (the galettes are oilier).

III.b. Dishes prepared with Rice

Rice is pounded to remove the dark skin. A popular but expensive preparation is called Zamé.

III.2.b.1. Zamé. Requires meat, fresh and dry tomato, tomato paste, fresh onions, féfé, peanut oil or shea butter and salt. The condiments are sometimes replaced by dry, pounded sorrel. In that case one adds meat, oil, sorrel and salt. After

the sauce has boiled for awhile then rice is added to it. Altogether the preparation takes about 1 hour 15 min.

III.2.b.2. Tchordi. A simple cheaper dish made with dry fish pounded pepper and salt which are added to the rice once the rice is done.

III.2.b.3. Arania. Rice and sauce jabaji or sauce soubalaji. See couscous.

III.2.b.4. Daguena malo. Rice porridge. The rice is pounded and boiled with tamarind or zaban juice. (The rice is only slightly pounded.)

III.2.b.5. Tchaba Tchagal. Rice boiled with milk.

III.2.b.6. Sari. Similar to the preceding, but rice has to remain "liquid". When the rice is cooked, milk and sugar are added and the sari is ready to drink.

III.2.C. Dishes made with Fonio:

Fonio is pounded and prepared like millet. It can be either boiled or steamed like millet couscous.

III.2.c.1. Pongonia. Fonio and beans are boiled together and served with baobab sauce.

III.2.c.2. Foji: is fonio couscous and sauce tiguède-guena.

III.2.c.3. Pongopedi. Couscous also, but steamed longer than for fodji. It is served with sauce Tiguèdeguena, soubalaji or jabaji.

III.2.c.4. Pongopedi-Zamé. Same method as for rice zamé (see II.2.b.1.)

III.2.c.5. Tô Fonio. Tô can also be made with fonio although it is very rare.

III.2.c.6. Andjomo consists of pounded fonio, fish and sorrel boiled together in water.

III.2.c.7. Fonio-galettes. Same preparation as for millet galettes (rare around Bandiagara).

III.2.D. Others.

III.2.d.1. Dishes made with sorrel. Andjou oro: dry sorrel leaves, dry fish, shea butter, onions, salt, dry peppers and soubala are cooked together. This is a snack eaten between meals, it is also sold in the cabarets to "help" millet beer drinkers.

III.2.D.2. with Beans. Tonié (or Tomongo) are bean flour donuts. Beans are also mixed to millet or fonio (see above).

III.2.d.3. With sorghum. Tô, couscous, galettes are sometimes made with sorghum (rare in Bandiagara).

III.2.d.4. With Wheat. "Gâteuse" is the local name for wheat donuts which are fried either in peanut oil (preferably) or shea butter.

III.2.d.5. With cowpeas. Vouandzou: Fresh cowpeas are boiled in salty water.

III.3. Consumption Patterns.

The list of dishes given above has been established from observations made in Bandiagara. The diet in the "bush" is far from being so rich and so diversified: first during the dry season, in April, May, villagers may "skip" the first meal which reappears on a regular basis, mostly as millet cream, when the rainy season begins and the farmers start going to the field, and second, from a study done in 2 villages where the women do not do gardening, the only condiments^{1/}

^{1/} The word "condiments" includes in the local language meat, fish or vegetables as well as spices, i.e., every ingredient put into the sauce.

are dry fish and salt plus the powder made from dry leaves of okra or baobab and in season, fresh leaves gathered from trees and bushes or farm plants growing in the yards.

From a list of 273 meals established in 12 different families in Bandiagara, and 74 meals taken by 17 different families in a village (Bendieli) we obtain the following figures:

Dishes	Bandiagara (town)		Bendieli (village)	
	Number	percentage	number	percentage
Millet: tô + sauce	69	25.2%	28	37.8
Millet: bouillie	58	21.2	12	16.2
Millet: couscous	50	18.3	4	5.4
Millet: crème	10	3.6	2	2.7
Millet: donuts/cakes	13	4.7		
agnidang			3	4.0
sagasore			2	2.7
Rice + sauce	60	21.9	8	10.8
Rice bouillie			1	1.3
Fonio + sauce	2	0.7	7	9.4
Sorghum tô			2	2.7
locust bean			4	5.4
cowpeas			1	1.3
bread (+ coffee)	6	2.1		
wheat donuts	3	1.1		
noodles	1	0.3		
salad (?)	<u>1</u>	<u>0.3</u>	—	—
Total	273	(99.4)	74	(99.7)

Out of 27 families checked the same day in Bendieli, 7 skipped the first meal.

III.4. Methods of Preparation:

It is obvious from the preceding figures and receipts that whether the woman deals with millet, which is mostly the case, fonio or sorghum, whether she makes Tô or couscous, Crème or Bouillie, most part of her preparation time is spent pounding or grinding grains to make flour. Millet has to be threshed to remove the grains from the ears and winnowed, then they are pounded into flour and sieved before being steamed or boiled or mixed with cold water or juices.

The following figures will give an idea of the time spent by a woman in pounding. We started with 3878 gramms millet (on ears).

Activity	Quantity (in gr.) (per kg)		Time (in mn) (per kg)	
removing millet from ears			30	7.7
winnowing	3800	1000	23	5.9
threshing repeated			3	.77
winnowing	2900	980	7	1.8
I. 1st pounding with water	3375	748	33	8.5
sieving	3050	870	20	5.2
washing			4	1.0
II. Pounding			18	4.6
sieving			9	2.32
pounding			5	1.28
sieving			4	1.03
pounding			2	.5
sieving	2750	786	2	.5
Total	2750 gr.	709 kg.	160 mn.	41.25

Note: The time figures per kg. are based on the assumption of a linear relationship between quantity and time of pounding. This assumption may not be all too realistic. A hyperbolic relationship seems to be more plausible.

It is to be noted that most of the ingredients for the sauce are usually pounded: e.g., fresh onions, dry peppers, peanuts, dry fish, baobab or okra leaves, soubala, . . . The monotonous and heavy tasks are exclusively done by hand. Next to threshing, winnowing and pounding or grinding millet into flour, the 2nd time and energy consuming task consists in shelling and crushing groundnuts, shea nuts, raisins. Some preparations require continuous hand stirring. Cooking by steaming is long and fuel consuming. Wood is also needed to extract oil, make peanut paste. . .

It would be most useful to evaluate the nutritional value of the wild fruit and leaves gathered by the women and investigate which percentage of the marketing crops is actually kept for home consumption. Women do establish some relationship between the food they eat and their well-being. When children are sick (epidemics . . .) women meet together to establish special diet for them; feeding mothers in Djombolo often prepare some extra millet cream for themselves. The grains in that case are taken from their own granaries.

IV. LIST OF FOOD PRODUCTS AND OTHER GOODS SOLD
BY WOMEN ON THE MARKET. SALES PRICES PER UNIT.

<u>Commodities</u> <u>Food Products</u>	<u>Price/Kg.</u> <u>in Malian Francs</u>	<u>Commodities</u>	<u>Price/Kg.</u>
Millet: small grains	103	Dry couscous	375
Millet: large grains	118	Millet beer	90/liter
Sorghum (white)	105	Salt	200
Rice	288	Kola	1000
Fonio	127	Sour milk	80
Sesame	222	Fresh milk	375
Groundnuts in shell	265	Maggi cubes	20/a cube
Groundnuts shelled	420	Potassium	400
Fresh onions	244	Candy sugar	500
balls of pounded bulbs	555		
Garlic	1125		
Laurel	1850		
Choux-pomme (cabbage)	108	<u>Other Products</u>	<u>Price/Kg.</u>
Cow pea	250	Cotton strips (10 cm. wide)	90/meter
Bean (niebé)	330	White cloth (6 strips)	1200 (16 cm. wide)
Bean leaves M	510		50→350
Fresh tomato M	200	Clay pots	200→400
Lime M (Rare)	490	Mats to cover pots	666
Banana M (Rare)	320	Korou (for spinning)	500
Mango small	60	Tobacco	1100
Mango grafted	110	Henné	
Papaya M (Rare)	177	Local soap (made with shea nuts)	500
Wild dates	55	Local soap (made with potash and millet)	125
Fruit of the ronier (boiled)	29	Indigo cakes	63
Tamarind pods	200	Cotton	250
Fruit of the baobab	50	Calebash	75 on. . .
Dry leaves of baobab	133	Raisin oil	375/liter
Dry leaves of okra	148		
Dry leaves of sorrel	308		
Dry slices of okra	750		
Sweet potatoes (Rare)	200		
Néré flour	205		
Baobab powder	250		
Okra powder	260		
Tomato powder	900		
Tomato paste	1666		
Peanut butter	560		
Peanut oil	925		
Shea butter	450		
Dry pepper	1000		
Soumbala balls	600		
Soumbala powder	1100		
Kama	333		
Féfé (spice)	1250		
Maffigui (spice)	1300		
Dry grapes (sa) M	56		
Fresh grapes J	167		
Dry Fish	308		
Smoked fish	320		

The prices of these items were evaluated on the Dandiagara market at the beginning of May; a 2nd checking was done at the end of the same month and a 3rd one in early June. The prices given correspond to the average between the 3 figures.

M: indicates items which were no longer found on the market in May and J those which appeared on the market only in June.

Incidentally in 2 instances at least (peanut and tamarind), it was consistently cheaper to buy small heaps for 5 MF than to buy for 25 MF.

Apart from the products mentioned above, the women also sell (in front of their house or on the market place) at night or early morning:

<u>Food Product</u>	<u>Price in MF per Unit</u>
Millet cakes	5 F/1
Millet donuts	5 F/1
Wheat donuts	5 F/1
Bean donuts (on market days)	5 F/3
Millet balls (gombé)	5 F/1
Sesame seeds with honey	5F/1
Chicken with sauce	100 F/1 piece of chicken
Tougoudjou (peanut paste and sorrel)	5 F/1

V. BOTTLENECKS IN PRODUCTION AND BEHAVIOR DETERMINANTS

V. 1. Factor Constraints

The processing of foods for home consumption or for market sale as described in Chapters II and III generally involves some or all of the following operations:

- soaking
- removal of shell or husk
- threshing
- pounding or grinding
- boiling or cooking

These operations generally require considerable time as well as consume often considerable quantities of water and fuel, not to speak of the women's physical energy.

The physical energy and time involved in transformation processes prevents women from increasing their output or devote time to other, perhaps more remunerative activities such as trade or gardening. It is also a constraint on household consumption itself, for which considerable potential of expansion still exists in Third World regions such as Mali. Improvement of home consumed food should come not only in terms of more food but also in terms of food quality. Improvement of the food quality is also constrained by women's lack of time and physical energy.

Water is a major constraint especially in the Dogon Plateau from February through June. Such activities as preparation of raisin oil, shea butter, potash making, brewing of fruit juices or millet beer require greater or lesser amounts of water, and the quantity of output is obviously severely restricted in villages where water is scarce. In certain villages, where women have to walk several kilometers to fetch water, they are likely to reduce the activities which use water over and above the needs for drinking and washing. I was struck when I asked women to show me certain

processing activities by their seemingly unrelated answer, "water is rare here". After first thinking that this was a general way to solicit some gift, I realized that water in the village was so scarce that they could not have started the demonstration if I had not brought some along from Bandiagara.

Firewood or fuel is a less obvious but never-the-less serious constraint at times, in particular for cooking and the preparation of oils and beer. An average family of six will use a bundle of firewood valued at 150 FM about every two to three days. This represents 24 inches of logs of about 10 cm. in diameter. Cutting of wood has to be done at several kilometers away from the village. As women who cook have to provide their own firewood, it means they either have to make long trips collecting firewood or spend about 400 FM every week on same. For activities such as millet-beer making where a constant fire is required, wood is a major input in the production process.

In cotton spinning, where women display a considerable dexterity and rapidity, hand labor is never-the-less probably the greatest bottleneck. For other processing tasks (e.g., drying and pounding of herbs and spices), it is again the grinding activities which constrain output.

Lastly, as mentioned before, women could probably be involved in gardening to a greater extent, if first the water constraint (dam) and then the land constraint (pumps or irrigation canals) were removed.

V. 2. Other Factors Constraining the Behavior of Women

Customary and religious rules as well as social status determine what activities women should take up at what time. For example, the dominance of the Islamic Toucouleur in Bandiagara forbids that millet beer be sold openly on the market. Therefore, it is brewed by women in specified compounds and there is some agreement among producers to only sell on specific days. This seems to assure to each producer that she can sell all her product on "her" day and does not have to fear competition. In the animist villages of the surroundings millet beer is only brewed for the market day. Villages without a major market nevertheless have a "kondjo fair" for which millet beer is made. No millet beer is supposed to be sold on other days.

Other rules determine, for example, that no unmarried girls should prepare Kama or Pourkama, and that soap making or preparation of Shea butter and raisin oil should be left to the old women of the village. A potentially powerful constraint on development is the idea that no woman should be or appear to be "lazy" and, therefore, ease her work. The custom also requires that certain activities

such as soap making and oil making, as well as millet pounding, be performed outside the village often in the plain sun.

Government intervention also tends to influence the activity of women. For example, market taxes - which did not exist in Bandiagara but were found in Sevaré - reduce the benefits women can gain from selling home-processed foods on the market. In Bandiagara, however, Kondio-sellers have to pay a license of 27,000 FM. Fish-sellers are also taxed. The forced marketing of grain also could influence intra-household labor exchanges: husbands may require more time from their wives in order to meet the marketing requirements.

Government intervention has so far affected only few women in positive ways. Extension services are mostly provided to men only, even though the distribution of fungicides or fertilizer could be applied as well to the wives' peanut fields as to the man's gardens or family fields.

Vegetable gardening seems to be practised only in few villages by women as field-owners. It is not known whether there the women are approached by the extension service in the same way as male gardeners. Recent attempts by the administration or by imposters to collect fees for the right to do gardening have discouraged women from even admitting that they do gardening on their own.

V. 3. Present State of Technology

Most of the processing is done by hand with grinding stones, mortars, crushing stones and other hand tools as instruments. Water is drawn by hand, wood cut by hand, and all transport done by head load. There are only 2 commercially operated mills in the area (Bandiagara) to grind millet, fonio, beans or sorghum into

flour. None of the women in the surrounding villages we went to have ever used one of these mills.

Taking the same amount of grain, we made the following experiment in order to see how much time could be gained from grinding. We had a woman process millet flour by hand (Table p. 28) and later had the same amount of grain processed by machine. However, millet still had to be prepared by hand before it was taken to the grinder; i.e., the grain had to be removed from the ear (threshing) and the husk from the grain (decorticating).

<u>Activity</u>	<u>Quantity in grams</u>		<u>Time in minutes</u>	
Threshing	3800		33	
Winnowing			30	
	2900 gr.			
<u>Pounding done by hand</u>			<u>Millet taken to the mill</u>	
	<u>Quantity</u>	<u>Time</u>	<u>Quantity</u>	<u>Time</u>
I. pounding (with water)	3375	33	3340	28
sieving (to remove bran)	3050	20	3000	15
washing		4		10
II. pounding		18	MILL	
sieving		9		
pounding		5		
sieving		4		
pounding		2		
sieving	<u>2750</u>	<u>2</u>		
	2750 gr.	97 mn.	2920 gr.	53 mn.

Time gained = 44 minutes. Of course, this does not take into account the time to walk to the mill and the time spent there. Altogether the operated mills in Bandiagara may save energy, but

do not save very much time after all. The difference in the amount of flour (170 gr.) is not negligible. We have 2 explanations for it:

- 1) the more numerous the manipulations, the greater the amount of grain or flour lost;
- 2) the grinding machine is never stopped; grains are poured in and basins quickly switched to collect the flour. One sometimes benefits from extra grains from a previous customer when the previous basin is removed too fast.

No agricultural or rural development organisation or farming program has been designed for women so far. No extension service reaches the women in and out of Bandiagara. Even though the Catholic Mission in Bandiagara has started recently a program of "Animation Rurale" and some of its volunteers are trying to reach women, this program does not provide much material help. It's idea is not to impose any topic but wait until the women ask by themselves about a particular subject (which may take a while. How can women ask information about things they have never heard of or alternatives to things they have never questioned?) Apparently the volunteers have tried during the last months to disseminate medical information (childbirth, child care, etc.). There is also a school at the Mission for girls from neighboring villages ("Alphabétisation" Program). Many of these young women eventually become good "fonctionnaires" wives in Bandiagara, and do not return to their villages.

V. 4. Potential for Technological Change

The greatest potential to reduce time and energy requirements for women's processing activities lies in improvements in the following areas: water supplies not only will have to be increased, which is done partly by the existing dam-building and well-digging

programs, but the technology of water-hauling has to be changed profoundly. Currently, water is drawn from wells of 30 to 300 feet depth by goatskins and then filled into buckets, or clay pots, which are then transported home. This limits the capacity of water which can be drawn from a well at any one time. Poulies on top of the wells would permit a substantial saving in human physical energy in water drawing. The introduction of animals and the Persian wheel would even entail greater savings. Evidently, the study of the technical and socio-economic aspects of such introductions is beyond the scope of this study but remains to be done in situ prior to their introduction.

Not only water-hauling in particular but most marketing activities are severely limited by the low transport capacity of the human carrier. A woman can only carry one bucket from the well to her home at any one time. In Bandiagara, the professional water-haulers use 2-wheel push carts or donkey carts. In the villages of the plateau, no such improvements are known, in particular not for women. The authority structure within the family itself constitutes here a major impediment to change. While men may own donkeys, carts, or bicycles, their wives or daughters are never allowed to use these. It is difficult to conceive a way by which this situation could be changed except by the fact that the women might invest themselves in transports (e.g., donkeys, bicycles or carts¹). Perhaps, men might be convinced to let their wives use their means of transport if they are addressed by the extension services. (A similar problem occurs in the plain - household heads frequently do

¹The present means of transport could be also improved upon; I think here primarily of water containers which could be strapped to the sides of the donkey (like the present 'farada': donkey-loads); also of bicycles to which are mounted boxes for the transport of objects, or 2-wheel bicycle-drawn carts, etc.

not permit their sons the use of their plough for use on the son's fields, and extension agents try to convince the fathers to extend the use of the plows to their sons). As long as a woman's transport capacity is restricted by what she can carry on her head (30 kg. or 30 liters) and how fast she can walk, her income from marketing is likely to remain limited. On market days, for example, a woman could sell more than one clay pot of raisin juice or more than one calabash of grain if only she could carry more to the market. Also the number of trips to be made for market purchases might be reduced; e.g., women walk up to 20 km. to villages in the cliff to buy sorghum for beer brewing.

Improvements in transport would also benefit the hauling of firewood. But at the same time they would increase the depletion of the already scarce wood resources. The need for re-forestation and for alternate fuel resources is evident. Animal dung and crop residues are mainly used for soil improvements and are, therefore, too valuable to be used as fuel. A forestation program for the main species used for firewood (andanga and goudopil) would probably be the only usable long-run solution. Each village should have its own reserve to avoid the common property resource problem of over-exploitation, and each village given the exclusive right to exploit its reserves. Presently, those who have good relations with the authorities easily obtain cutting permits and may cut the wood wherever they find it.

A second area of time savings lies in the processing activities. Here suitable hand-machines for threshing, grinding, hulling, shelling, crushing, oil pressing, as well as for spinning (spinning wheel) will allow to increase women's productivity and reduce the

time as well as the physical energy required for processing. The time saved could be spent by women in various ways. It could be invested in agriculture; e.g., in market gardening. On the other hand, it could allow women to improve their education; e.g., in nutrition and health care, and devote more time to their children's education. Finally, the time could be profitably spent in the processing and marketing sector itself where women could now be involved in small-scale food processing industries with a greatly improved capacity and productivity. Most of this machinery should fulfill the following requirements: it should be easy to operate by the women themselves; repairs should be done with local or locally available materials by craftsmen or smiths. A particular research grant could be designed to find and test the best suitable machinery and compare the various environments in which such machinery is already in operation (e.g., India, Near East). Such organizations as the Intermediate Technology Group in England or Vita in the U.S. could be helpful in locating suitable machinery.

V. 5. Social Aspects

It is often repeated about Dogon women that to deal with them is very complex as they are not accustomed to participate in decisions. There is, however, no proof of unwillingness to experiment with new technologies (I would almost state the contrary). They could probably, with the proper initiation, handle the management of some technical devices. I have several instances of women's community spirit and their capacity for initiatives should not be underestimated. Three examples: 1) Women of a village have created an association and each member contributes some money to buy food to feed visitors. . .; 2) During epidemics or when children suffer from

some special disease, women meet together to decide about the best diet and remedies. . .: 3) In one village the women, who cannot start watering their crops as early as men (because of their household activities) send a delegation to the chief of the village once a year when the water in the holes becomes rare to ask that a sufficient quantity of water in those holes be left to them. Thus every year some water holes are reserved for their own crops.

Although we do not agree with Eskelinen's statement that women can best be reached through men, we do think that the introduction of new technologies would have to be presented as an asset for the entire household and the whole village. The main point is to make the villagers realise that far from being a luxury, these technologies are the answer to a need. For that the potential benefits would have to be demonstrated. If we remember that in some places women working in the shadow (where the temperature is still above 40°C) instead of in the sun are called "lazy" (or afraid to be called lazy) one realises the necessity of approach works on both men and women's mentality.

The devices would have to be light and handy enough to be moved around easily (inside as well as outside the village if the customs prescribes that some processing be done outside).

The last problem, but not the least, is one of distribution. How many hand mills can be introduced in a village at one time and who will have a right to use it? To choose arbitrarily one or several compounds or let the women's representatives decide might soon be a source for bitterness and quarrels. It could be a good idea, instead of starting with one millet mill for example - for which each woman has a need twice a day - to experiment first with

an oil press, or a decorticator as not every single woman will want or be able to make raisin or peanut oil every day.

V. 6. What then?

Who would eventually benefit from the introduction of new technologies?

V. 6. a. Impact on nutrition

Nutrition, as we said before, is entirely independent on the woman's knowledge and capacity to purchase ingredients, or her capacity to reserve some of the processed food normally sold on the market for home consumption. If women managed to increase their production and consequently their income, they might use it to improve their nutrient intake and that of their family.

V. 6. b. Possible consequences of increasing the participation of women in agriculture

"Women have no control over the millet they helped to produce, not even access to the granaries where it is stored. . . ; men dole out portions of millet as needed for women to pound and prepare. For their participation in agricultural work, wives are accorded one bundle of millet for the total harvest."¹ This corresponds to what we were told in the villages around Bandiagara. In that case, working longer on the common field would not prove very rewarding. What if they did more gardening? "In areas of the Plateau where women do have their own garden, their

¹Eskelinen, R.: Dogon Agricultural Systems: Sociological Aspects Relating to Development Interventions, Sept. 1977, p. 46.

economic contribution to the household is accordingly increased. They must buy grain for half the year and work in the fields to help produce the grain which is stored in the granaries."² Is this customary only around Dourou where Eskelinen did her research or would it apply elsewhere? Giving women more time to spend in agriculture would then mean an extra burden without necessarily improving their economic status, but that of their husband. What would be the woman's chances to be allowed to devote this time to work on her own parcels, especially as the introduction of modern agricultural techniques - which provokes an increase in the land area under cultivation - requires more input on the part of the women on the common fields. Of course, the harvest will be more profitable, but would the farmers use an increase in their income to improve the household standards of living? Presently, most men do not contribute any cash to buy food. However, a husband "gives" his wife some small cash in exchange for such services as helping harvesting and pounding onion bulbs and leaves, selling his products on the market (tobacco, tomatoes, onions, peppers), etc.

It is our opinion that the investment of the time women could save during food preparation thanks to the use of work saving devices may not necessarily benefit the women themselves (nor their children) unless they get directly involved in agriculture, which would mean: either that they are given some larger lots to cultivate for themselves, or that they are rewarded by a larger percentage of grain for the extra work done on the common field or husband's plots. Can women have access to more land? This also depends on the husband. A suggestion has been made by Eskelinen

²Idem, p. 46

as an appropriate condition to the financing of dam building projects "that some garden areas be reserved for women with training programs to teach the women the necessary methods"¹. This sounds very interesting from a theoretical point of view. It is to be feared, however, assuming that foreign aid wishes to include this kind of requirement in their contracts, that the villagers would find a way to evade the requirement. It is most important presently that the women try to increase the production of their secondary activities (food processing for market sale and for home consumption) as it is the surest way to improve their economic status. It seems better to try and increase productivity in the household production sector by providing them with work saving devices for food processing since this will a) raise the value of women's time, b) provide women with a larger income, and c) increase the standard of living of women and their children. Also it seems that the returns in the manufacturing and processing sector are higher than the returns which could come from additional involvement in purely agricultural production.

¹Idem, p. 47

APPENDIX I

RECIPES¹A. BASED ON MILLET:

A. 1. TO: After threshing, millet is pounded to remove the bran, washed and pounded again and passed through a sieve (Mougoutémé). When the quantity of flour passed through the mougoutémé is considered sufficient, the remaining grains and flour are sieved through the Bassitémé. At that point there are 2 different ways of proceeding: 1) the grains which have not passed through the Bassitémé are tossed into boiling water on the fire. After they have cooked for a while, the woman mixes the thinner flour with warm water and adds it to the grain on the fire. Ten minutes later the remaining flour is added. The woman stirs with the Paliguili and covers; she "removes the fire"; i.e., the wood from under the pot which remains on the embers for ten more minutes. Then the woman removes the lid and stirs the paste for a couple of minutes before pouring it into a dish. 2) The second way of proceeding consists in pounding the grains long enough so that everything can pass through the bassitémé. The thinner flour is boiled first, the rest doesn't vary.

Preparation time depends of course on the quantity of millet pounded (see p. 28). The cooking itself takes about 40 minutes.

Sauce Oro: The sauce is prepared while the T6 is cooking.

Ingredients: dry fish, baobab powder, salt, dry pepper. Preparation: The fish is pounded or broken into very small pieces after the bones have been removed (some women first soak the fish in warm

¹For explanation on kitchen utensils see p. 22.

water to remove the worms.) They also pound the dry pepper and baobab leaves, unless they buy the powder ready made on the market. A small clay pot filled with water is placed on the fire next to the pot where the Tô is cooking. When the water comes to a boil, pepper, salt and fish are tossed in. After 6 or 7 minutes, the baobab - or okra - powder is added. The sauce remains on the fire some 5 more minutes (or until the Tô is ready). Preparation time and cooking time: 35 minutes.

Oronia-Mafé: This doesn't replace the sauce oro which always accompanies Tô. It is sometimes served in addition to it. Ingredients: meat (sheep, beef, or goat. I have never found any beef in Bandiagara during the month of May, only once during the first week of June; a butcher told me that people didn't care very much for goat and that he rarely sold any.), oil or shea butter, tomatoes, laurel, féfé, maffigui, soubala (these are spices), fresh onions, salt and dry peppers. Preparation: The meat is fried in oil before the tomatoes and spices are added. Most women crush the tomatoes with their hands to remove the seeds from the pulp. The juice is then filtered and added to the stew. After some fifteen minutes the woman pounds the balls of soubala with maffigui and dry pepper. The fresh onions are also pounded apart - and everything is added to the stew. The sauce is cooked when the oil comes to the surface. Preparation and cooking time: about 1 hour (although the women may let it simmer longer on the fire).

Tô and Sauce Andjou-Oro: Ingredients: smoked or dry fish (rarely meat), sorrel, peanut butter (if available), dry peppers and salt. Preparation: The fish powder is added to boiling water; dry sorrel leaves are washed and thrown into the pot; when the water has boiled for a few minutes, the woman stirs in pepper and peanut

butter and lets the sauce simmer for 5 or 6 minutes before adding salt; some women also add shea butter after removing the pot from the fire. Preparation and cooking time: 35/40 minutes.

A. 2. LATJIRI = COUSCOUS

Millet is threshed, winnowed, pounded to remove the bran, washed and pounded again and sieved through the Bassitémé. After the flour has been sprinkled with water the woman carefully pours it into the Gnintiré already placed on a clay pot filled with water on the fire. A wet strip of cloth sprinkled with okra powder (to make it stick to the clay pot) is used to prevent the steam from escaping between the Gnintiré and the other pot and the Gnintiré is closed with a lid. After some 30-40 minutes, the couscous is poured into a calabash and the grains which have agglomerated are crumbled finely with the fingers or with a "louche"; a few drops of water are added before the couscous is placed back into the Gnintiré. After 15 minutes the same process is repeated and baobab powder mixed to the millet. Then the couscous is steamed for the 3rd and last time (10-15 minutes). Preparation and cooking time: one has to count a minimal amount of 3 hours after the millet has been threshed. This includes 1 hour 20 minutes for cooking - i.e., twice as much as for T6.

Sauce Mafé: Ingredients: smoked or dry fish or meat, shea butter, soubala, pounded groundnuts, fresh tomatoes if available, tomato powder, fresh onions, peppers; according to the season cabbage, or cabbage leaves, bean leaves, etc. Preparation: It is the same as for Oronia Mafé. The preparation of couscous is drawn out as the women often interrupt the pounding to start preparing the sauce which, however, doesn't require long cooking, especially when no meat is added. The women often start pounding onions, groundnuts

and soubala before pounding millet for the 2nd time. The reason is that millet pounding is more energy consuming and the women do not want to do all this pounding at once. This way of proceeding, however, is even more time consuming.

A. 3. OTHER PREPARATIONS MADE FROM MILLET

Agnidang: (Anfang): Ingredients: Sorrel, millet flour, smoked fish, shea butter, salt. Preparation: Dry sorrel and small pieces of fish, salt and pounded pepper are added to boiling water on the fire. After 3 or 4 minutes, the flour is tossed in. The woman stirs with the Paliguili, covers and lets simmer 5 more minutes; then she pours the mixture into a dish and adds shea butter. Preparation time (after grinding the millet): 30 minutes.

Daguana: millet cream: Ingredients: Millet, tamarind, sugar. Preparation: Tamarind pods are soaked in water in a calabash, while water is heated on the fire. Millet which has been pounded a first time to remove the bran is washed and pounded again with cold water (15 centiliters). The millet paste thus obtained is divided in two. The 1st ball is mixed with boiling water, the 2nd ball with tamarind juice before everything is poured into one calabash. Sugar may be added. Preparation time: 1 hour 30 minutes (after millet has been threshed) for 700 gr. of threshed millet. No cooking time.

Pouno Ougourou. (milk cream): Ingredients: Millet flour, sour milk, salt, pepper, sugar. Preparation: Slightly dampened millet flour is shaped into balls and thrown into boiling water; after a quarter of an hour, the woman removes part of the water, stirs and covers. The pot is left on embers (i.e., the wood is removed). Salt and dry peppers are pounded together in a mortar where the cream is subsequently poured. The woman pounds gently 1 or 2 minutes before

adding sour milk, water and sugar. Preparation time: 40 minutes after the millet has been ground.

Omo = Millet "Bouillie": Ingredients: Millet flour, tamarind, sugar. Preparation: Millet flour balls are tossed into boiling water. Tamarind juice is stirred into the remaining flour (1/4) and added to the flour balls in the pot. After 7 or 8 minutes the Bouillie is removed from the fire and sugar is added. Preparation time (after the millet has been ground): 35 minutes.

Pounmano (pouno = cream; mano = action of making balls): balls with sour milk: Ingredients: Millet flour, sour milk, sugar, salt and pepper. Preparation: Most of the flour (4/5) is thrown into boiling water on the fire; after 4 or 5 minutes, the woman stirs, then adds salt and pounded pepper and removes the paste from the fire; this paste is shaped into balls which are rolled in the remaining flour and eaten soaked in water with sugar and sour milk. (The cooked millet flour balls are sold on the market). Preparation time (after the millet has been ground): 45 minutes.

Moni: millet cakes: Ingredients: Millet flour, shea butter. Preparation: Millet is pounded the day before (around 5 PM) and sieved through the Mougoutémé and Bassitémé. The flour sieved through the Bassitémé is boiled in water (the mixture has to remain liquid). After allowing time to cool, the flour sieved through the Mougoutémé is stirred in. The dough is left in a basin, covered. Around 10 PM the woman stirs again. By 4 AM the dough is fried with shea butter in the Gnomiguémé. Preparation time: 1 hour 30 minutes (after millet has been threshed) for about 3 liters of dough. Frying takes approximately 2 minutes and 12 cakes can be fried at the same time in the Gnomiguémé.

Four-Four: millet donuts: Ingredients: Millet flour, shea butter. Preparation: These resemble millet cakes, but the frying is done differently. The preparation also starts the night before. The dough is a little less liquid and the donuts are fried in deep oil in a large basin. 30 to 40 at a time instead of in individual holes. Preparation time: 1 hour 30 minutes. Frying time: 2 to 3 minutes.

B. BASED ON RICE:

Tchordi: Ingredients: Rice, dry fish, pepper, salt. Preparation: Rice is washed and tossed into boiling water on the fire. (Women always wait until the water boils to start washing the rice). Once the rice is cooked, the woman makes a "well" and adds pepper, salt and fish powder. The pot is left on embers. Five minutes later, the woman removes the lid, stirs, covers and lets it stand for 10 more minutes. Before eating, butter, if available, is added. Preparation time: 50 minutes.

C. BASED ON FONIO:

Pongonia: Ingredients: Beans, fonio. Preparation: Boiling water is poured on beans to facilitate the removal of the skins; this is done by crushing the beans gently with a stone. After the beans have boiled 15 to 20 minutes, fonio flour is stirred in. The pot remains on the fire for another 1/2 hour, before the paste is poured into a dish; baobab sauce is served with it. Preparation time (after the fonio has been ground): 1 hour 30 minutes.

D. OTHERS:

Tonié = bean flour donuts: Ingredients: bean flour, okra powder, salt and water. Preparation: The beans are soaked in cold water, then put to dry on a mat and pounded in the mortar to remove the skins. Flour is obtained either by bringing the beans to the mill (women who make large quantities of donuts for sale use the mill) or by grinding them with a stone. After sieving, the woman adds water, salt and some okra powder. She mixes the dough with the hand, "beating" it to incorporate air (15 to 20 minutes). The dough is immediately deep fried in a pan filled with peanut oil or shea butter. Preparation time: 4 hours (with interruption).

Gâteaux = wheat donuts: Ingredients: wheat flour, sugar, baking soda, yeast, peanut oil or shea butter. Preparation: Yeast is mixed with water and sugar. Flour and baking soda are stirred in and the dough is left covered for a few hours before small pieces of dough are thrown with the fingers into boiling oil. Preparation time: 35 minutes (wheat flour is found in some local shops).

APPENDIX II

PROCESSING ACTIVITIES;
COMPLEMENTARY INFORMATIONI. PRODUCTS OTHER THAN FOOD PRODUCTS:I. A. SPINNING COTTON:

This occupation is common to every single woman in all the villages we visited. Girls, age 6 or 7 are already very good at it. Women spin cotton as soon as they have some "free" time. It is mostly done in the dry season in the afternoon, after the 2nd meal (from noon on). Most women have declared they stop spinning cotton during the rainy season because they are too tired and would have to do it at night with the help of a lamp. (1 woman out of 20 said she does it). Spinning gives the women an opportunity to "socialize" - 5 or 6 women meet together in one's house - but it is much more than a mere pastime. In many Dogon villages, the woman is responsible for clothing herself and her daughters, as well as her sons until they are 10 or 11, at which time the father should start providing garments for the boys. Besides it is customary for the woman to "put aside" every year for her husband enough cotton to weave a shirt and a trouser. Considering too, the necessity for a woman to have one or two "pagnes" ready for quick sale in case she needs cash urgently, one may understand that spinning is a very important activity in the Dogon woman's life. Incidentally, none of the women we met grows cotton. Some women get together to buy cotton from a wholesale dealer in Mopti - where it is cheaper than in Bandiagara - but this is not very satisfactory; they have to wait for the "occasion": someone going to Mopti and . . . coming back. Otherwise they buy cotton at the market in Bandiagara where it costs around 250 MF the kilo. A distaff costs 25 MF and the brush for carding 1000 MF in boutiques.

I. 2. DYEING:

Indigo: Two or three days before dyeing, the woman breaks the indigo cakes into a clay pot filled with water (25 liters). Liquid potash is added. The day of the dyeing a tin of chemical dye is stirred in. Two "pagnes" are dyed at a time. Each one is previously dampened with clear water before the woman places them into the clay pot. She moves the cloth constantly for the first half hour, taking it out of the pot from time to time to remove the twigs of gala or the dirt. Soaking lasts at least 1 day (2 or 3 days if the mixture is older and has already been used to dye several pagnes). Then the pagnes are put in the sun to dry. The next day they are washed. When they are dry, the woman removes the threads if the pagnes had been sewn before to create a pattern, and washes them a 2nd time (always without soap). A tin of Galani of 500 gr. (industrial dye) costs between 7500 MF and 8500 MF (\$16.50 to \$18.50). With it and 3 indigo cakes (about 2 kg. = 125 MF) a woman can dye 10 pagnes. The amount of potash added is insignificant (maybe for 25 MF = 60 to 65 gr.). The charge for dyeing varies from 800 MF to 1000 MF for a pagne without pattern, from 1700 MF to 2500 MF for pagnes with a pattern. (The price varies according to the size of the cloth and the complexity of the design). I evaluated the benefit made by the woman who demonstrated dyeing to me between 3000 MF and 4000 MF for 10 pagnes. It depends on whether she is asked to make patterns or not. Of course, the profit is higher if the woman is asked to provide the cloth. She has her regular suppliers from whom she buys strips of woven cotton which she sends to a tailor to be sewn together.

Bogo: Some bark is removed from the sa-tree with an axe, deposited on a flat stone to be broken into small pieces. These

pieces are placed into a clay pot filled with water on the fire. After the water has boiled some 10 minutes, the clay pot is taken away from the fire, the pieces of bark are removed and the pagnes placed - 1 at a time - into the pot for about 15 minutes. The cloth is subsequently spread on the ground, and covered with ashes. When it is dry, it is soaked in the canari once again (15 more minutes), put to dry (no ashes this time), washed and dried again. Finally the woman takes a fair amount of raisin oil and rubs the cloth with it. The cloth is then ready to wear (no further washing after the raisin oil has been rubbed in). The cost of the dyeing is very low: little fuel is needed; 2 pagnes can be dyed with one clay pot. This requires approximately 1 kilo of bark (fetched in the bush) and 1/2 a liter of raisin oil (190 MF)!

Women prefer by far Gala dyeing. The dye does not fade so fast and it is considered more "fashionable".

A. 3. POTASSIUM LUMPS:

Potash is mostly done with millet stalk around Bandiagara: the woman places a clay pot with a small hole at the bottom into a larger container. She fills with ashes of millet stalks and cold water. The next day, the water which has passed through into the 2nd container is poured into a pot on the fire. The actual work now consists in activating the fire to make the water boil and evaporate. When what remains at the bottom of the pot comes to dropping consistency, the pot is removed from the fire. The woman sweeps the floor of her "kitchen", spreads some ashes and drops small quantities of the "paste" on the ashes. The lumps will solidify within a few hours. One clay pot of liquid yields 10 to 12 lumps of potash (60 - 65 gr.) which are sold for 25 MF each on the market.

I. 4. RAISIN OIL:

The dry grapes are placed on a flat rocky surface outside the village and crushed with a pebble. Then the woman winnows to remove the seed coats. The operation is repeated until all the seed coats are removed. The dry grapes are poured into a basket and washed (the basket working as a sieve) then pounded in the mortar (20 minutes). The paste is placed on a large inclined stone with a calabash at the bottom. The woman lights a fire under the stone which is some 12 cm. thick, and she starts moving the paste up and down the stone, she sprinkles it with water. It takes about 20 minutes for the oil to "come out". The oil is drawn out with the fingers and runs into the calabash placed at the bottom of the stone. The remaining paste can be put to dry and the process repeated a 2nd time to extract more oil. A small "louche" (about 7 centiliters) costs 25 MF.

II. FOOD PRODUCTS:

II. 1. SHEA BUTTER:

The nuts are cracked in the mortar then sorted and crushed 2 or 3 at a time with a pebble on a flat stone, collected with a small "broom" or a piece of scrap iron and put into an empty pot on the fire. The woman stirs the contents of the pot constantly for some 10 minutes. The paste is then pounded slightly, placed on a large inclined stone and crushed with a pebble until it gets smooth and runs into the calabash at the bottom of the grinding stone. Then the utensils (calabash, pebble, grinding stone) are rinsed with water. This water is added to the paste. A full bucket of water will still be added, very little at a time while the woman mixes

with regular circular hand motion to incorporate the air. Mixing alone takes 1 hour. When the stirring is done the water and foam which has formed at the surface are eliminated and the paste is heated on the fire. It turns liquid again. Every 2 or 3 minutes the woman removes it briefly from the fire. The oil cooks for about 30 minutes. Then the woman removes impurities from the surface. When hot, shea butter has a brown color, but cooling it solidifies (37°C) and turns white.

400 gr. of shea butter were made in 3 hours. Shea butter is sold in larger quantities at 450 MF/kg. (5 MF/ball).

II. 2. PEANUT OIL:

The groundnuts are shelled with the fingers. Shells and nuts are tossed into the same calabash and the sorting is done afterwards (mainly by winnowing). An empty pot is put on the fire and allowed to heat for 5 minutes. Then the groundnuts are poured into the pot (600 or 700 gr. at a time). After 3 or 4 minutes of constant stirring, the woman adds 2 "louches" of water (15 cl.). Then she pours sand on the nuts and keeps stirring 4 or 5 more minutes. The nuts are passed through a sieve to remove the sand and spread on a small mat while the remaining groundnuts are put on the fire. The woman crushes the nuts gently with a stone to remove the skin. When all the skins have been removed, the woman adds salt and pounds everything in the mortar; then the paste is placed on a large inclined stone and ground until it runs into the calabash placed below. Then it is brought back into the mortar. The woman pours some hot water on it and starts pounding very softly. Actually it is not so much pounding as stirring the paste around the sides of the mortar. After some 10 minutes, the oil "comes out" and is squeezed into a

calabash with the fingers. The preparation I attended took 1 hour 30 minutes, deduction made of numerous interruptions; 3 people helped shelling and 1 helped pounding. Quantities:

groundnuts: 1950 gr.
 shelled groundnuts: 1320 gr.
 oil extracted: 225 gr.
 remaining paste: 910 gr.

II. 3. PEANUT BUTTER:

Touzoudjou: The remaining paste after the oil has been drawn out is cut into pieces, mixed to dry sorrel which has been soaked for a few minutes and cooked in a covered pot for 3 hours. It is then poured on a wooden board (or flat surface) and cut into squares.

The proportions are roughly 70% of paste for 30% of sorrel.

A few figures:

peanut oil = 925 MF/liter (market price)
 peanut butter (tiguedeguena) = 560 MF/kg.
 groundnuts = 265 MF/kg. (in May)

Assuming the woman buys the peanuts to make peanut her profit for the quantity of peanut mentioned above would be: 110 MF

1950 gr. of peanuts cost: 525 MF
 yield: 1135 gr. of peanut butter at
 560 MF/kg. = 635 MF.

110 MF represent her "salary" for 2 hours of intensive work and 2 or 3 hours of walk to bring it to the market.

II. 4. CONDIMENTS:

Soumbala Balls: The women collect the fruit of the néré which have dried up on the tree. The fruit is pounded. The powder - a yellow flour - is mixed with water and eaten (or sold on the market). The seeds are washed and boiled in water for a full day. The pot is removed from the fire for the night, but cooking continues the next day. Then the seeds are spread on a mat and covered with a 2nd mat. They remain for 3 days until they ferment and turn black. Then

the woman shapes them into small balls.

Soumbala Powder: When the balls of soumbala are dry, they are placed with onion balls into a clay pot on the fire. When they are hot, the woman removes them from the fire, pounds them and passes them through a sieve to obtain a thin powder.

Kama: Dry grains of Dâh (sorrel) are pounded in the mortar, then winnowed and poured into a clay pot filled with boiling water on the fire and boiled for 2 hours. The grains are subsequently placed into a basket and covered for 3 days. The 3rd day the lid is removed. The woman pounds the grains with liquid potash then shapes the paste thus obtained into balls which are put to dry on the roof of her kitchen. Kama is used in the following manner: a ball is dropped into hot water. The water takes the smell of the fermented sorrel. This is repeated. Each time the water is poured into the small clay pot in which the sauce will be cooked later. The kama ball is then thrown away.

II. 5. LATJUI N'DIORDI:

Millet is pounded a 1st time to remove the bran. After the 2nd pounding, the flour is sieved through the Mougoutémé. The remaining grains are pounded until turned into flour. The flour is sprinkled with water and steamed in the Gnintiré (only once) for about 30 minutes. The couscous is spread on a mat and left in the sun to dry for half a day. When it is dry the woman adds some peanut butter, pounds the mixture, passes it through a sieve, adds salt and dry pepper and pounds once more. Retail price: 25 MF/louche (60 - 65 gr.) = 375 MF/kg. The cost varies depending whether the woman takes groundnuts from her own field and millet from her granary or whether she buys the ingredients.

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II. 6. FRUIT JUICES:

Tamarind Juice: cost/liter: 150 gr. of tamarind pods = 30 F;
retail price: 100 F/liter.

Lemon Juice: Small yellow lemons are cut into four pieces and soaked in water for about 1/2 hour. The fruit and seeds are discarded and pounded pepper is added to juice. Some women pour sugar directly into the juice; others first have it melt in a little quantity of water on the fire until it turns slightly brown. Retail price: 100 MF/liter. 1 kilo of lemons yields about 7 liters of lemon juice. The price varies according to the season. By the end of May it was impossible to find lemons in Bandiagara.

II. 7. MILLET BEER = Koundio:

This is by far the most complex processing activity I have been confronted by on the Plateau. There are 2 slightly different methods of proceeding I have observed.

1st recipe (from Bandiagara).

3 steps:

- 1). -1st morning: millet grains are poured into a clay pot and covered with water.
- 2nd day (evening): the water is removed
- 3rd day (morning): fresh water is poured in
- 3rd day (evening): the water is removed
- 4th day (morning): fresh water is poured in
- 5th day (morning): the water is removed
- 2). -5th day: The grains are put to dry in the sun (usually on a roof because of the sheep walking freely in the compound).
- 3). -6th day: The grains are ground; baobab powder and flour are mixed together and poured into a clay pot filled with water. After stirring, the woman lets it stand and decant for the day.

In the evening (6PM) the water at the surface is collected and kept in another clay pot. The mush is cooked for about 5 hours with frequent stirring, then removed from the fire and left to cool until morning. The cooked mush is filtered through a basket. The liquid collected the night before is also passed through the basket. All this is boiled for another 7 or 8 hours. (What remains in the basket is given to the sheep).

-7th day: After allowing time to cool, the woman adds some yeast (or some remaining koundio from a previous preparation).

The next morning (8th day) the millet beer is ready for sale.

2nd recipe (observed in Dondjourou).

This woman mixed millet (2/3) and sorghum (1/3). Three steps:

1). -1st morning: The woman pours water on the grains. In the evening she removes the water and stirs "to make the air come in".

-2nd day (morning): She pours the contents of one calabash (3 liters), leaves it for 5 minutes then removes it. This procedure is repeated in the evening.

-3rd day:

2). -4th day: The grains are spread on a mat to dry.

3). -5th day: The grains are ground; 6 small calabashes of flour and some baobab powder (to help decanting) are mixed to one clay pot of water. After a few hours, the clear water at the surface is collected and kept in another clay pot; what remains is placed on the fire, boiled for 3 hours, added to the clay pot containing the clear water and left to stand until morning.

-6th day: The water which has decanted is poured into a clay pot on the fire. A basket used as a filter is placed above the clay pot with the water and the mush is filtered through. The liquid

collected is cooked in one pot; the mush is cooked apart.

When everything is "well cooked", the contents of the 2 pots are put together. Yeast is added (or rest of Koundio). The next morning the beer is ready (7th day).

We evaluated that about 9 kilos of millet are necessary to brew one canari of koundio (30 liters). A liter is sold for 70 MF to 100 MF/liter. One kilo of millet costs between 103 MF (small grains) to 118 MF (larger grains) on the Bandiagara market. However, women prefer to walk some 30 km. to other villages where it is much cheaper.

NU poudre de gumbo
 NV poudre de baobab
 NW tomate pilée, séchée, ou
 concentré de tomate
 NX gumbo séché
 NY feuilles de baobab séchées
 NZ pedingue
 N1 pourcama (= soumbala)
 N2 fruits bouillis du ronier
 N3 couscous séché
 N4 potasse
 N5 fève friée de faux acacia (?)
 N6 fève fermentée de faux acacia
 N7 huile de sésame
 N8 farine de néré
 N9 fonio pilé

T = travaux

TA travail d'animaux
 TC manoeuvres contractuels
 TD credit personnel
 TE travail communautaire
 TF credit materiel agricole
 TM louage machines
 TP manoeuvres permanents
 TR transport de personnes ou
 marchandises

E = équipement (culture)
et engrais

EA charrue légère
 EB charrue lourde
 EC multiculteur
 ED semoir
 EE traceur
 EF charette
 EG houe Maya légère
 EH houe Maya lourde
 EI urée
 EJ phosphate d'ammoniaque
 EK superphosphate triple
 EL fongicides
 EM daba
 EN pioche
 EO lame de charrue
 EP boulons

M = marchandises locales

MA tissu de coton
 MB coton cru

MC couverture de coton
 MD corde
 ME pipe en argile
 MF boule de tabac
 MG tabac
 MH encens
 MI balles de fusil (poudre?)
 MJ savon
 MK pagnes "noirs"
 ML pagnes bogo (marron)
 MM balais
 MN fu (frotteurs)
 MO couvercles tressés
 MP éventails
 MQ nattes
 MR huile pour corps/cheveux :
 raisin
 MS huile de sésame
 MT korou

O = outils

OA mortier
 OB pilon
 OC panier
 OD vanne
 OE anse de bois (??)
 OF marmite
 OG canari
 OH calabasse
 OJ "tasses" = bassines
 OK gnintiré
 OL tamis fin: mougoutémé
 OM "moins fin: bassitémé

I = imports

IA allumettes
 IB bic
 IC bonbon
 ID biscuits
 IE chambre à air
 IF chaussettes
 IG cigarettes
 IH colle
 IJ crayon
 IK collier de perles
 IL épingles de sureté
 IM fouiardi
 IN glace
 IO lampe à pétrole
 IP lunettes de soleil
 IQ nescafé
 IR pneu

IS pile
 IT pétrole
 IU radio
 IV sandales
 IW savon
 IX sucre
 IY torche
 IZ aiguille:

(nescao, pâtes, cahier, fil
 médicaments)

Obviously the alphabet won't
 suffice! Several items such as:
 pen, pencil, colle might be put
 together for the sake of simpli-
 fication)

H :: Habitation

HA achat de maison ou concession
 HL loyer

plats émail
 seau
 outre pour puiser