

PN-AAF-437 Agr.

SEX ROLES IN FOOD PRODUCTION AND FOOD  
DISTRIBUTION SYSTEMS IN THE SAHEL

BY

KATHLEEN CLOUD

December 15, 1977

This paper was prepared under contract for USAID, Bureau for Africa,  
AFR/SFWA Project Activity No. 625-11-625-0907, Order No. AFR-147-42.

Comments may be directed to the author at:

The Center for Educational Research  
and Development  
College of Education  
University of Arizona  
Tucson, Arizona 85721

# SEX ROLES IN FOOD PRODUCTION AND DISTRIBUTION SYSTEMS IN THE SAHEL

BY

Kathleen Cloud

## Overview of the Sahel

The Sahel as a geographic region first entered the consciousness of Americans during the disastrous drought of the early 1970's. The drought focused world attention on the area and prompted massive international relief efforts. As the drought abated, consensus grew that to prevent such massive human suffering from recurring, a large-scale, long-term international development effort for the Sahel was necessary. Such an effort is now underway, with participation by UN agencies, the World Bank, the European Development Fund, many individual nations including the United States and the African Nations themselves.

Massive international development efforts will continue to be focused in this area over the next decades. Knowledge of current food production and distribution systems is essential so that improvements to these systems can be made in rational and integrated ways. Various studies of Sahelian food systems have been done, but they have tended to overlook sex role differences in responsibility for food production, food processing and food distribution.

This case study will make a first attempt to identify the roles and responsibilities of women within Sahelian food production and distribution systems. When their role is more clearly understood, it should be possible to plan more effectively.

A discussion of food production in the Sahel must start with a description of the natural environment. The Sahel is a band of land about 200 miles wide, extending across Africa from the Atlantic 2,600 miles inland, and including much of Senegal, Mali, Niger, Upper Volta, Mauritania and Chad. It is bounded on the north by the Sahara, on the South by a tropical area of endemic disease. There is one rainy season a year in the summer months. The amount of rainfall decreases as it moves north. Two eco-climatic zones are described in the AID Development Assistance Program (DAP) for the regions:

The Sudan zone, with 20-40 inches of rain, can support relatively intensive systems of agriculture. Health conditions are favorable here in comparison with the Guinea zone to the south. Over most of the Sudan zone, millet, sorghum and cowpeas are the principal food crops, and cotton and groundnuts the cash crops. The possibilities for further diversification into crops such as maize and soybeans are substantial and, as pasture growth is better than in the Sahel, mixed farming is possible and in some areas is being developed. A feature of the cultivated areas of the Sudan zone is the type of parkland where scattered mature trees of economic value, e.g., the shea butter tree, which produces a cocoa substitute, stand in cultivated fields.

The Sahel (An Arabic word meaning "border" or "shore") receives 10-20 inches of rain annually. A vast area encompassing some two million square miles (two-thirds of the area of the U.S.) extending 2,600 square miles between latitudes 10-20 degrees north, the Sahel is typically an acacia-dominated tree and shrub savannah. Crop production is possible in the Sahel: millet is grown under as little as 5 inches of rainfall, and groundnuts under as little as 16 inches. Not surprisingly, under such conditions, yields can be good but they are unpredictable. Pastoral operations are the zone's most important economic activity, and under more or less normal conditions nomadic pastoralists in the zone maintain an estimated 19 million cattle, 29 million sheep and goats, and 3.3 million camels, horses and donkeys. For the nomadic grazers, the Sahel represents a base which provides adequate forage for their herds during four to five months of the year; thereafter, the herds move southwards to graze in areas which, while better watered, present disease hazards in the wet season. A substantial number of breeding females and young stock, however, remain in the Sahel in a normal dry season.

2

To quote further from the DAP:

This region is one of the poorest on earth. Some 90 percent of the population lives in rural areas, where subsistence agriculture predominates. Few roads are paved, many areas are difficult to reach and some are inaccessible. In addition, the meager capital wealth is concentrated in the hands of a few. Illiteracy rates average 85-90 percent. While the United States is dissatisfied with an infant mortality rate of less than 20 per thousand, countries of this region have rates which vary between 100-200 per thousand. In some countries only one-half of the children born alive can be expected to live beyond the age of five years. Nonetheless, the current growth rate of population is estimated to be 2.2-2.5 percent per annum.

The social systems of the Sahel have adapted to seasonal, and yearly, as well as cyclic variations in rainfall in a variety of ways that permit considerable expansion and contraction of food production systems. Nomads travel north to graze on open range when the rainy season produces grasses. They return to the wetter south when the harvest is over to graze their cattle on the farm stubble. Farmers plant more and weed more when grain reserves are low. Young men go to work in the coastal cities when times are hard, taking whatever work they can get. Pastoral families usually have a family branch in the richer, moister south who can manage family trade and absorb some family members in the bad times.

In the really desperate times of drought, whole herds of cattle were driven far south into the tropical elephant game reserves of Nigeria. They were kept there, illegally and at risk of sleeping sickness in a gamble to save some of the herd. This desperate measure must have evolved as a strategy long before there were governments and borders to deal with in the area.

Sahelian societies tend to be conservative and vest authority in older members. Oral cultures have to depend on human memory for successful strategies in problem solving. When times are good, the young may assume it will always be that way. The older people remember the bad times; how to prepare for them and how to survive them. The span between major droughts in the regions may be 40 to 60 years. In the droughts, the margin for mistake is very small, especially for the Nomads. The advice of the old, who have survived previous droughts, is crucial. Food production systems change slowly in the Sahel for good reason. There is a very delicate balance between people and their environment which rests on the experimental wisdom of centuries.

#### Food Consumption Patterns

Many people in the region are hungry at least part of the time. The degree of hunger depends to a large degree on the presence or absence of rainfall. There are seasonal variations in hunger; food is shortest just as the rainfall begins, when the previous year's crops are most depleted and animals are producing little milk. In a nutritional survey in Senegal, people weighed least just before the first rainfall. Some years are worse than others. If the rains don't come at the right time, or miss certain areas, many people are hungrier that year.

Figures 1 and 2 show this seasonal variation in food intake over the course of the year in two different areas of the Sahel. Both samples were done before the drought, in relatively good years.

Firm quantified data on the relative amounts of food consumed by men, women, boys, and girls are very scarce. An Economic Commission for Africa (ECA) document gives a descriptive account of food consumption patterns. "Unfortunately, in many areas, men of the household get the lion's share of available food and in particular the soups, stews and relishes (which women produce--ed.). In some African cultures, it is still considered ill manners for a woman to eat much of the more nutritious foods, in spite of her higher physiological needs. Within households, women are likely to consume a lower proportion of their requirements than men, not to mention children, girls as opposed to boys." (ECA/FAO Women's Unit, 1974).

## SEASONAL VARIABILITY OF FOOD CONSUMPTION

SOUTH CHAD, 1965

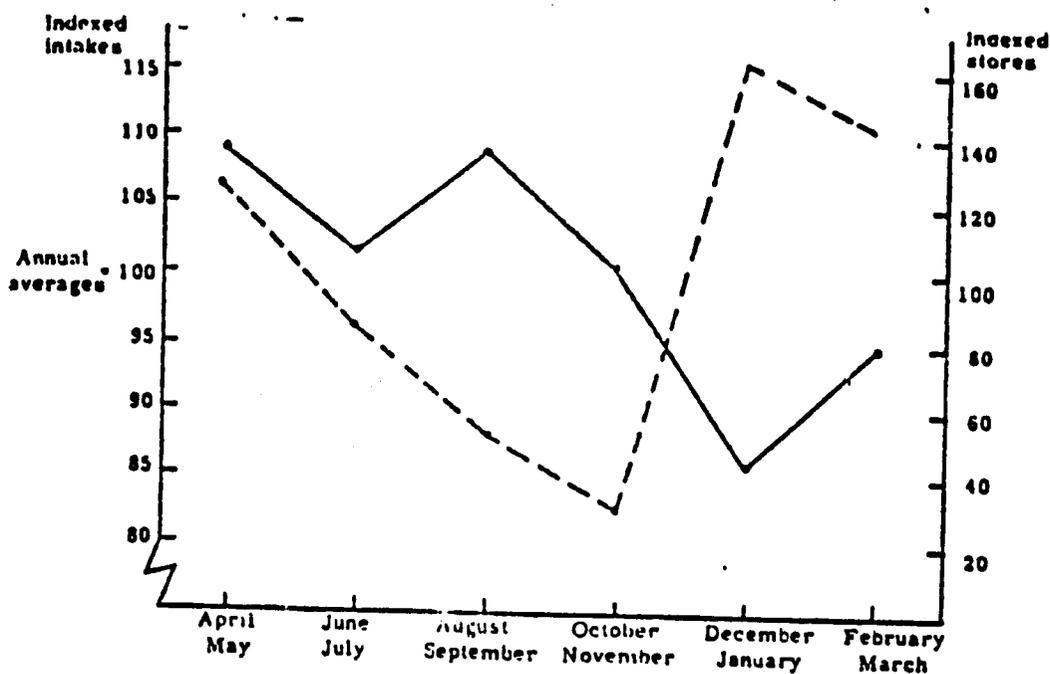
| Grams per capita per day |                       |                              |                       |                    |
|--------------------------|-----------------------|------------------------------|-----------------------|--------------------|
|                          | 3/15-6/15<br>Hot, dry | 6/15-9/15<br>Heavy ag. labor | 9/15-12/15<br>Harvest | 12/15-3/15<br>Cool |
| Cereals                  | 441                   | 371                          | 332                   | 472                |
| Tubers                   | 36                    | 64                           | 136                   | 105                |
| Oils                     | 48                    | 64                           | 172                   | 61                 |
| Starches                 | 70                    | 75                           | 112                   | 50                 |
| Legumes                  | 18                    | 103                          | 175                   | 31                 |
| Calorie<br>Equivalent    | 2,295                 | 2,196                        | 2,841                 | 2,493              |

Source: SEDES quoted in Intech, Inc. Nutrition Strategy in the Sahel, Final Report.

FIGURE 1

4-

SEASONAL VARIABILITY OF CALORIE  
INTAKE IN RELATION TO STOCKS OF STAPLE  
GRAIN (GUINEACORN OR SORGHUM)



Seasons are defined as bimonthly periods which roughly correspond to the farming calendar.

- April/May: Period of planting of millet, land preparation and beginning of rains.
- June/July: "Labour bottleneck" period of ridging, weeding, more planting. Women gathering wild fruits.
- August/September: Beginning of millet harvest in early August, continuation of weeding tasks and rains.
- October/November: Beginning of harvests of groundnuts, rice, peppers, and other vegetable crops, end of rains.
- December/January: Guineacorn, cotton, sweet potatoes, and sugarcane harvests.
- February/March: Essentially non-farming months.

Village data have not been adjusted for the small sample sizes; all villages are combined without weighting. The index number 100 is taken as the level of average annual intakes and storage.

Solid line: Calorie intake  
Dotted line: Stocks of grain

Source: Simmons, Emily, "Calorie and Protein Intakes in Three Villages of Zaria Province," May 1970-July 1971. Samari Miscellaneous Papers (Nigeria) 55 (1976) p. 25, Fig. 1

FIGURE 2

Sahelian Food Production Systems

Most food production and distribution is still in the framework of a traditional subsistence economy. People raise much of what they eat; social obligations and barter provide much of the rest. "In a subsistence economy the result of work is not intended for exchange, but for consumption by the worker or his immediate companions, and the work, of course, is not remunerated. In a money economy, the results of labor are intended for exchange. The work and its wage allow the worker to participate in the mainstream of economic activity. Someone who has nothing to exchange is excluded from the mainstream." (Housbaum, 1964).

In the Sahel, the amount is small compared to other parts of the world, but some surplus farm production moves into the monetized sector of the economy, either through the open markets or through government purchasing agencies. Men's work and women's work have different levels of access to the money economy; this fact, which has enormous practical ramifications for development planning, will be discussed more fully later in the paper.

First, I would like to describe, in broad outline, the Sahelian food production systems themselves. For simplicity's sake, I will talk about two major types of food production systems, Sedentary farmers, and Pastoralists. These two groups exist in overlapping territory and have symbiotic relationships. There are literally hundreds of variations in each pattern; no group displays all of the characteristics of the type, but a general description does serve to give a general picture. In planning specific projects it is, of course, important to investigate the specific sex role responsibilities of the groups involved in that project.

Sedentary farmers live in small extended family villages in the moister areas of the Sahel. Many families are polygamous. They practice slash and burn hoe agriculture that makes good use of their scarcest commodity: labor. Lands are held in common with some combination of inherited usufruct rights, available labor, and need determining land assignment. There are five main areas of food production among sedentary farmers; (1) grain production, (2) vegetable gardening, (3) gathering of wild plants, (4) hunting and (5) small animal production. I will take each area in turn and describe sex roles for that product.

Sex Roles in Food Production Among Sedentary Farmers

1) Grain Production. The grain is usually millet or sorghum. These are most often seen as men's crops, and the husband or a group of brothers will control the field and its product. The division of labor is often as follows:

- a. Clearing the land is done by boys and young men during the dry season. Trees and large plants are cut down and the area is burned to prepare for planting. Trees with some use (fruit, shade, fodder) are left.
- b. In planting, men make holes, women plant seed--often women are responsible for selection of seed from previous harvests to be used. Because of erratic rainfall, they will sometimes plant 4 or 5 types of seed with varying moisture requirements in the same plot.
- c. Weeding. This is the most labor-demanding part of the grain farming, and in most instances every available hand will be used in hoeing weeds. Young men come home from the city to help during this period. Wives will take turns staying home to cook and care for the children while the others go to the fields for the day. A man with several wives and many children has a distinct advantage in agriculture because of the labor he can call upon during the weeding and the harvest. The crops may be weeded one, two or three times. The amount of weeding has an effect on the amount of grain harvested. There is some indication that when grain reserves are high, less weeding is done--there is not the urgent need for grain.

- d. Harvesting. Again, every available person will tend to be used.
- e. Storage. Generally, men are responsible for building the family storage sheds and supervising the grain stored in them. Women are responsible for the household storage of the grain.
- f. Threshing. This is the women's job, and it will be done just before pounding the grain into flour each day. This threshing and milling may take a woman 2 to 3 hours, and is one of the most arduous, time-consuming tasks she has to perform.

There are some exceptions to the pattern of male dominance in grain production. In addition to assisting in their husband's millet field, women from some groups will have their own grain fields where they and their children do all the work. Notable among these are some of the Hausa women. In Mali, women grow corn in fairly large quantities and in some areas swamp rice is grown by women.

2) Vegetable Gardens. Women in most sedentary farm groups have hut gardens where they grow vegetables for the sauces eaten with the millet as well as for trade. They may grow carrots, red peppers, onions, garlic, tomatoes, eggplant, gumbo and various kinds of beans. It is these sauces that provide the necessary additional amino acids to the millet to make a complete protein chain. In addition, they provide many necessary vitamins, minerals and fats to the diet while also providing variety in flavor and appearance.

Near urban areas, where there is a cash market for vegetables, they may be grown by men, often with the help of the whole family.

3) Gathering of wild plants and fruits is done almost exclusively by women. In many groups, the gathering of wild foods provides a significant addition to food supplies. This is especially true at the beginning of the rainy season. Wild leaves, grass seeds, and fruit provide a supplement to low food stocks. Wild grass seeds are pounded together with millet to add flavor to porridge. Wild leaves are added to the sauces and some of them find their way into the markets, entering the cash economy. Baobab leaves in particular have a strong market value, providing cash income for women. Some of these leaves have a surprisingly high protein content as well as furnishing vitamins and minerals.

"The importance of gathering wild foods increases manyfold during years of crop failure. This is very important. Wild foods in time of stress provide a most vital reserve. Again, you have the flexibility of systems: if all goes well, people prefer a subsistence farming approach; but if the rains don't come the way they should, the system falls back into its original pattern: hunting/gathering. This, of course, is possible only if some of the traditional bush is available. Projects which eliminate "useless bush" on a grand scale can have terrible effects in that they eliminate the fall back reserve of the people. All too often, visitors see the bush as useless, but in reality there is scarcely a plant that is not used for feeding people or keeping them well." (Weber, 1978.)

Fruit is eaten enthusiastically when it is available. One thing that makes it especially popular is that much of it ripens before the new crops, at a time when food supplies are low. A second is that it requires no preparation, it can simply be picked and eaten. However, quantities of fruit are often wasted that with simple drying frames could be preserved into the dry season. Several consultants have suggested introduction of orchards into parts of the Sahel, and in fact, among the Mossi, people do plant fruit trees as a kind of old age insurance "giving people an expectation of minimal income with little expenditure of effort." (Luhac, 1970.)

One wild crop of considerable economic importance is the Kerite nut. It is harvested in the summer and buried in pits--later in the fall it is roasted and pounded by groups of women to extract its oil. The Kerite oil, or Shea butter, is then mixed with dough, rolled in leaves, and packed in jars. These balls of oil and dough are either sold in local markets for use in sauces or purchased by wholesalers (men) who refine the oil and export it. In some West African countries it's one of the largest agricultural exports. (Bingham, 1976.)

4) Hunting and fishing. Hunting was at one time a more important food source than it is now; it was one of men's major food producing activities. Big game is gone and smaller game is much scarcer as large areas have become deforested. Game birds, snakes and animals still provide some protein in Sahelian diets. In many areas, there is a taboo against women and children eating birds, eggs, or snakes, so the protein goes to the hunters. Termites and locusts swarm during the rainy season, and children have feasts on them, roasting them over an open fire. Fishing occurs in rivers, streams and mares. In some areas it is a major source of protein.

5) Small animal production. Women are primarily responsible for small animals--goats, chickens, sometimes sheep and pigs. They are not raised primarily for meat, but "to make more." Chickens and young animals are kept in the compound. The older animals may be herded by children or kept in corrals while crops are growing. In some places compost from goat droppings in the corral is used for fertilizer. With proper breeding procedures, goats are a reliable source of milk year around, providing cheese and milk sauce for millet porridge. They recover faster from drought and reproduce more quickly than larger animals. As a result, they have great value as a food source in difficult times. When their milk producing years are over, their meat finds its way into the sauce pot, often at feast times.

#### Food Distribution Practices Among Sedentary Farmers

In most farming groups husbands and wives have reciprocal obligations to provide one another and their children with certain things. There is rarely one household budget in the western sense. Often the husband is to provide grain as well as most meat and fish for the family. The wife is to provide the vegetable or milk sauce that accompanies the grain. She is responsible for preparing both the grain and the sauce for eating, as well as for brewing the beer used on social occasions.

In addition to her responsibilities for the provision of food, the wife is responsible for the health of the family, often paying for necessary medicines. Both husband and wife may be responsible for part of the clothing needs of the family. The man is responsible for the defense of the family, although since colonial times this obligation is not as important. The husband is generally responsible for house building. The wife, the husband, or both, may be responsible for children's school fees. If there are several wives, each uterine family of mother and children forms a somewhat separate economic unit. (Paula, 1976)

Under Moslem law the role obligations are somewhat different. The husband has an obligation to support his wives completely. This is an obligation which only the richer Sahelian Moslem families can accommodate.

In most households, more traditional African patterns prevail. In some polygamous households, each wife cooks each night for her husband; in others, the wives only cook when the husband is to spend the night with her. Denise Palme, in her introduction to Women in Tropical Africa, has this comment on the uses of this obligation.

"The task of preparing the meals is not without its compensations. It provides women with a means of exerting pressure when necessary, as when a man is having an affair to which his wife wishes to raise objections. If he remains deaf to her first remarks, she resorts to a simple method for curing his faithlessness: one evening

the husband will find no dinner waiting for him when he comes home. Aware of his guilt, he does not dare to protest and goes to bed with an empty stomach. The next morning when he gets up, the same scene is repeated, without a word being said. The husband can do little about it, for if he starts shouting, his wife's complaints will raise all the women of the village against him."

As a general rule, men control the decision-making about the disposal of grain crops. Once their family and group obligations are met, they may store the grain or sell it as a cash crop. Women control decision-making about excess vegetables and legumes grown in their hut gardens, and wild plants such as Baobab and Kerite. They will often sell excess at the market. As a woman gets older and has more children to help her with gardening and gathering, she may have considerable excess for sale, and travel to fairly distant markets, becoming an "own account" trader of some substance. With technical assistance to such women, more fruits and vegetables could enter the money economy, bringing many women a small income. Already, men are moving into the production of vegetables as a cash crop in several areas where an urban market exists. Care needs to be taken that women are not squeezed out of vegetable production for the money economy.

Chickens may be given as gifts or used in ceremonial meals. In some cultures, women sell them in the markets for cash. Chickens and eggs may be eaten by the whole family or just by the men, depending on local taboos.

In fishing villages, women sometimes sell the fish they smoke, and in the coastal areas, some women are fish wholesalers, doing substantial business. Unfortunately, they are being gradually squeezed out of the market as refrigerated warehouses and freezer plants are introduced.

Most of the crops grown specifically for cash (peanuts, cotton, gum arabic) are seen as men's crops, although women often contribute labor to them. They are grown in men's fields and the cash profit goes to men. It is used to pay taxes, to reinvest in farm inputs (fertilizer, better seed) or to purchase symbols of modernity such as radios. Seldom does the income find its way back into the family food budget.

There are, however, some interesting examples of women's cash cropping. In Upper Volta, the UNESCO project has introduced the growing of soybeans as a cash crop for communal women's groups. The proceeds of the sale are used for such things as buying medicine for the Village dispensary. A proposed AID project in the area will attempt to help women and women's groups develop cash crops in much the same manner.

#### Sex Roles in Food Production Among Pastoralists

The second major food production system in the Sahel is that of the Pastoralists. They live in small, extended family groups, many of them polygamous. These nomadic and semi-nomadic pastoralists have developed movement strategies that permit them to make use of very dry areas for food production.

During the course of the year, animals and people may move considerable distances to take advantage of various food and water sources. Herds and people are combined and recombined in various ways to produce the best conditions for food production with the least stress on animals, people, and environment. The major food production activities are (1) stockbreeding and milk production, (2) gathering of wild plants, (3) hunting and (4) vegetable gardening and grain farming. Again, I will take each activity in turn and describe sex roles for that product.

1) Stockbreeding and milk production: Most pastoralists breed a wide variety of animals and maintain diversified herds as an adaptation to the environment. Camels, cattle, sheep and goats each have characteristics that provide different benefits. Goats breed quickly and recover quickly from drought. They can exist on browse when grasses are not available. Both their milk and meat are palatable. Sheep give somewhat more milk and their

meat is considered tastier, but they are more vulnerable to drought than goats, and herds take longer to reconstitute. Both sheep and goats stay fairly close to camp. They are herded by boys and girls and are milked by women.

Cattle can go further from water for pasturage than either sheep or goats, and when they are fresh, they give considerably more milk. Cattle are taken on long treks to the north during the rainy season by boys and young men and return after harvest to graze on farmers' stubble or fallow fields. Cows with young calves are often left near the camp and milked by the women. Whether men or women milk cattle varies from group to group, but even when women don't do the milking, the milk is seen as belonging to them.

Camels have the largest grazing reach because they can go furthest from water. They reproduce slowly, but they give high-quality milk for long periods. Males are castrated and used for transportation and trading; females are used for breeding and milk. Camels are the exclusive responsibility of men, even to the milking. Not all pastoralists have camels; some prefer horses or donkeys for transportation.

2) Gathering of Wild Plants. Among pastoralists also, collecting is mainly the task of women, but boys may also participate. Among the Tuareg, more than 50 different plants are gathered: seed, leaves, or fruit. As an example of the volume of this production, one Tuareg household gathered 1,000 kgs of wild iceben seeds in one season. They are pounded along with millet to give flavor to the porridge. The leaves are used in sauces, just as in farm families. Fresh fruit is consumed with enjoyment.

3) Hunting. Hunting of small game is still sometimes done by men, but here also it is not as important as it used to be because there is less game.

4) Vegetable Gardening and Grain Production. Some few Nomadic groups farm around oases in the northern Sahel. They use irrigation, raising water from shallow wells with a bucket and a pole or animal traction. They grow wheat and some barley in the winter, millet and sorghum in the summer. Tomatoes grow most of the year. Potatoes, sweet potatoes, onions, melons, dates and sometimes lemons, beans, saffron, red peppers, and mint are each grown in the same areas. Millet and sorghum are harvested by women, dates by men, other crops by both men and women.

#### Food Distribution Practices Among Pastoralists

Among pastoralists also, husbands and wives have reciprocal obligations to provide one another and their children with certain goods and services. Again, there is not a common household budget in the western sense. In general, women are responsible for the provision of household goods, pots, chests, utensils, and for the processing and trading of milk and milk products. Men are responsible for the care and herding, as well as the actual selling of the large animals, although they may not be their owners.

The ownership and usufruct rights to nomadic animals is one of the murkiest areas of knowledge in development planning in the Sahel. The general assumption of development planners repeated to us all over the Sahel was that men owned the cattle; women might own goats and sheep. However, an examination of the literature, including the AID-sponsored Rupp report shows this to be a misconception. Animals are owned by individuals, but herded as a group responsibility. According to Nicolaisen, among the Tuareg almost everyone is a stock owner. Even little boys and girls may own a few animals which are given them by their parents or close relations. Offspring of these domestic animals also belong to the children, but the milk, butter and meat should serve the needs of the household to which they belong. Within the household the husband and wife also have individual animals. Among the Tuareg, the husband or wife can freely sell or slaughter animals they own without asking permission of the spouse, while among the Fulani they must consult before selling. In both cases the meat or money should serve the needs of the household.

A woman may have title to animals in two different ways, with different arrangements for their management and disposition. First, the bridewealth animals paid by her husband's family goes to her father or oldest brother, but the offspring of these bridewealth animals go to the bride or her children. These animals are kept with her father's herds and her maternal family has use of the milk, or the meat if they are slaughtered, but the offspring continue to belong to her uterine family. Among the Tuareg, if there is a divorce the bridewealth is not returned, but is used to provide for the children.

A second kind of ownership is more directly under the women's control. It is the obligation of the bride's family to send her to her new home with a dowry consisting of household goods and animals--usually 5 or 6 donkeys and 10 to 40 goats. Sometime after marriage it is customary for a husband to give his wife a gift of animals according to his means--a few goats, one or two camels. This gift remains in her husband's camp so that the animals serve the needs of his household and their offspring.

In Madame Rupp's seminars with both Fulani and Tuareg herders, one of the major concerns expressed was that the government's program to reconstitute herds lost in the drought was replacing cattle only for the men. Women's stock was not being replaced. This was crippling their social system--animals were unavailable for dowry and bridewealth payments, women had lost their independent property. This was apparently the unintentional result of the government program that issued a card to the head of each family, and replaced animals only to the family head.

Program Administrators' lack of understanding of sex role control of resources seriously damaged nomadic women's economic and social positions.

Because usufruct rights are important among the nomads, people who are in need will be given the use of animals temporarily. Families also have rights to the use of animals they don't own, such as the cattle of sedentary farmers taken north in the collective herds during the rainy season.

The disposition of the milk and cheese that is a product of all these animals is the woman's responsibility. When and where it's possible, she will trade milk for millet from sedentary farmers. In good times, the trade ratio is a measure of millet to a measure of milk. If times are bad for one group or another, the ratio will change. Sometimes the pastoralists will exist entirely on milk for months. One source (Galon cited in Nicolaisen, 1963) cites 4 liters per day as the necessary amount. Nicolaisen himself cited 8-10 liters per day. Nomads say they get "weary" from just milk and prefer other foods.

Men trade further afield and use the cash profits to buy grain. In many groups, the men have traditionally been traders and middlemen transporting goods for long distances. These trading caravans have diminished in importance, and are no longer a major source of income for most groups, but men still trade animals vigorously. In some cases, where nomads have settled near towns and cities, milk has cash value. When milk is sold for cash, the trading sometimes passes out of women's hands and into men's.

I could find no indication that vegetables, cereals or gathered food were produced in large enough amounts by pastoralists for surplus to be sold. Their major cash product is meat and occasionally milk.

Female goats, sheep and cattle are all slaughtered for food somewhat before the end of their reproductive years, often for ceremonial occasions. The meat is consumed by the family or the live animals are sold for slaughter. Younger bulls and bullocks are sold to traders and are the major cash crop of the pastoralists.

### Sex Roles in Food Processing

Between the time food is produced and consumed, most of it has to be processed in some way. Sometimes this is done before distribution, sometimes after distribution. Since there is such commonality in the patterns, for simplicity's sake, I will discuss all food processing activities of both farmers and pastoralists together here.

The major food processing activities shared by both groups are water carrying, both for drinking and sanitation, cooking, including the gathering of wood and making of the fire, threshing and pounding of grain before cooking, and the drying and processing of foods for storage, such as fruits and vegetables, baobob leaves, and Kerite oil. In addition, farm women are responsible for brewing of beer for social occasions and nomadic women are responsible for processing milk into cheese and butter. All these food processing activities are done exclusively by women, and almost all of them are subsistence activities. With the exception of some processing of milk and kerite oil, and the drying of wild leaves, none of these activities produces any money.

These activities consume major portions of women's time and energy. Food could not be consumed if these activities were not performed. Yet they are often invisible in accounts of food systems. Economists do not generally include such activities in their accounting--(Spencer, 1976)--and as a result, development planning tends to overlook these activities. Thought needs to be given to ways of making these activities more visible within the planning process.

One solution to this problem is to look at the labor involved in various food-related activities, and to use a measure of labor as a way of making women's contribution more visible.

The ECA report on women's participation in food production and processing activities uses the unit of participation for measuring women's labor in rural Africa. "To obtain a unit of participation...one makes the best estimate, based on available data and experience, of the percentage of labor associated with a particular task which may be attributed to women and express it as a fraction of 1. For example, it is estimated that in Dukohata, Tanzanian men work 1,800 hours per year in agriculture and women work 2,600. This totals 4,400 hours of which 60% is women's work. Women's unit of participation is this 0.60." Using this method, they attempted to arrive at rough estimates of the participation of women in the traditional rural and early modernizing economy in Africa as a whole in order to provide a model.

### African Women's Participation in Food-Related Activities

| <u>Production/Supply/Distribution</u> | <u>Unit of Participation</u> |
|---------------------------------------|------------------------------|
| 1. Food production                    | 0.70                         |
| 2. Domestic food storage              | 0.50                         |
| 3. Food processing                    | 1.00                         |
| 4. Animal husbandry                   | 0.50                         |
| 5. Marketing                          | 0.60                         |
| 6. Brewing                            | 0.90                         |
| 7. Water Supply                       | 0.90                         |
| 8. Fuel Supply                        | 0.80                         |

The ECA report suggests that research needs to be done which would permit units of participation to be determined accurately for areas within countries, then on the national level, then for Africa. A limited amount of such research is included in several projects going on currently in the Sahel--in Upper Volta at the village level, in Niger at the District level (Zinder) and in a number of areas of Senegal. Much more of this research needs to be done to provide data in quantitative as well as descriptive terms. My own impressions of the division of labor in the Sahel would lead me to suspect that

the figures for food production and marketing might be slightly lower than the African averages cited in the table, but only sufficient research could establish what the proportions actually are.

### Summary of Women's Roles in Sahelian Food Systems

To summarize this description of women's traditional roles in food production, preparation and distribution in the Sahel:

1. a significant amount of food production is accomplished by women, primarily in the areas of vegetable growing, gathering of wild plants, small animal production, and milking and the processing of milk products.
2. almost all food processing is done by women. This includes threshing and milling of grain, cooking, drying and preserving of fruits, vegetables, and leaves, brewing of beer, and the making of cheeses and butter, as well as the gathering of firewood and transportation of water that are necessary for these processes.
3. most of the food produced and processed by Sahelian women is consumed by "their immediate companions" within the subsistence sector only. A small portion of women's food production reaches the monetized sector, usually the local markets.

### Recent Changes in the Sahel

The foregoing has provided a description of women's traditional roles in Sahelian food systems. These total food systems were affected first by some degree of modernization and then by the drought. Currently, there is an attempt to affect these systems in a planned, rational way through long term development programs. I would like to describe briefly the impact of each of these on the systems.

Modernization has not penetrated very deeply into much of the Sahel. The French pacified the Nomadic tribes that raided in the area. This modified the feudal relationships they had had with sedentary farmers. Some endemic diseases were brought under control for both humans and stock, thereby increasing population growth rates. Cash crops for export were introduced and men began to farm them in small plots, but there were few of the plantations that developed in other parts of Africa. Plow agriculture was expanded. In the early 1960's there were a number of deep wells bored in the north to carry the cattle through dry periods. The French educational system was introduced and while a small number of Africans went straight through the system and into the best French universities, most of the population was untouched. To quote from a report describing the years just before the drought,

"Human population pressure continued to rise and export crops became an important part of the output, replacing traditional culture in more favorable areas. The resulting pressure for increased production decreased fallow time and lowered productivity per hectare, even though total production continued to rise as a result of a larger percentage of the land being used for agricultural activities in any given year. Further, the expansion of cultivated lands in the moist areas decreased available grazing lands. Thus, even greater pressure was placed on the exceptional forage productivity of the Sahel. Heavy cutting of trees for firewood near urban areas contributed to ecosystem destruction." (Matlock and Cockrum, 1976).

For a while, the system continued to be able to handle the pressure because of very high rainfall levels in the 60's. But then the rains diminished, and in 1972 and 1973 in many areas they didn't come at all. The drought's impact was quick and dramatic. According to the area development Assistance Program:

The U.S. Center for Disease Control in Atlanta undertook a nutritional survey in 1973 which estimated that as many as 100,000 people may have died. International experts have estimated that perhaps 40% of the goats, sheep, cattle and camels on which much of the economy and social structure rests, have fallen victim to the drought, either through death, premature slaughter, or early sales. The Drought has had a profound effect on the region; a fundamental weakness of the ecological base, disruption of the social and economic relationships, and the changing of basic ways of life. (Agency for International Development, 1975).

The drought called forth large-scale relief efforts, followed by the institution of international planning mechanisms for long term development of the region. The international planning group, known as the Club du Sahel has developed what is in many ways a model of sensitive, rational development planning for the area. The theme is intensive rural development. To quote an AID planning document:

The region is poor in energy and mineral resources. There will be little opportunity for industrialization until agricultural development is assured. The proposed program must not result in energy dependence. Most of the people are rural and their socio-economic basis is in agriculture. The Sahel Development Program will not disturb this basis; the future of the Sahel clearly hinges on its agricultural production framework. ...The regions increased income will work to the advantage of all its people. (Agency for International Development, 1976)

The basic elements of the program are listed as Human Resources Projects, Near Term Rural Development Projects, Far Term Water Basin Development Projects, and Health Resources and Transportation Projects.

Because they relate directly to the topic of this paper, I would like to examine two elements--Near Term Rural Development Projects and Far Term Water Basin Development Projects in more detail. The Near Term Development Projects are intended to provide simple inputs to current farming and pastoral systems to make them more productive. These inputs might include fungicides for seeds, improved varieties of seeds, locally produced fertilizers (i.e., manures and phosphates) and improved crop rotation methods. In some places it would include the introduction of draft animals and plows to relieve the labor constraint in food production. Planning is being done with pastoralists for better placement and management of wells, and methods for managing the rotation of grazing land and delivery of simple preventative health services. As much as possible, the programs are attempting to use the people from the village in the planning processes out of a conviction that they know what their constraints are far better than anyone else.

Far Term Water Basin Development Projects are a much more ambitious effort to utilize the potential of the large river basins in the area with their fertile land and abundant water. Before these lands can be settled, their endemic diseases, such as onchocerciasis and sleeping sickness must be eliminated. Large scale efforts to do this are now in progress. If the basins can be resettled and brought into productivity their use will provide a basic food supply for the region both in wet years and in dry. Their production, added to the production of the traditional systems, would provide enough food for the expanding population.

This is the way the program is conceptualized. How is it being implemented? In what ways is it responding to women's position within this agricultural production framework?

In some ways it is doing fairly well. There are a number of Women in Development projects within the region that are bringing work-reducing technologies to village women. For example, cooperatively owned gasoline mills for grinding millet are being distributed through UNICEF in Senegal, UNESCO in Upper Volta and AID in Mali, and in the near future, AID plans cooperative programs with the UNESCO and UNICEF efforts. Some women's cash cropping

of vegetables is being done under European funding in Senegal, and American funding in Mali. There are non-formal literacy programs directed to women in the UNESCO project, the AID human resources program in Chad, and at Operation Riz-Segou in Mali, among other places. In Senegal the government is going through an administrative reorganization, and Village Councils of both men and women are being allocated some funds to implement their own development projects. UNICEF and Animation Feminine are working with the women in the reorganized villages to develop small projects--some of these will be AID funded. Animation Feminine in Niger has animatrices in over 200 villages working with village women in agricultural production as well as health services. Sometimes they have been able to act as liaison between the local women and a large project to encourage the provision of services to women. In one such case, the FED-funded 3M project, they were able to persuade the project to train the women in animal health and the treatment of seeds with fungicide.

But if the first principal of development is the Hypocratic principal "to do no harm," then there is a problem. At the same time that some programs are being developed to be responsive to women's needs, other programs are undercutting women's traditional roles by ignoring them. Most of the larger programs seem structured on the assumption that all farmers and pastoralists are men, that all decision-making is done by men, that all resources are controlled by men and therefore, a development project staffed completely by men, with male extension workers dispensing training credit and resources to men is an appropriate program structure. Exceptions to this pattern are far too few.

This problem is not restricted to the Sahelian programs, of course. Its prevalence as a world pattern has been amply documented by Boserup (1970) among others. It is, however, somewhat more dismaying in Africa with its well-documented dual-sex social systems. Traditional African societies tend to have two spheres of power, male and female. Sometimes the male power is conceptualized as formal power and the women's power is personal power, but often women's power is also formal and acknowledged. In many traditional societies, a queen mother or a queen sister represented women's power at the top of the authority structure in roles that emphasized the importance of both sexes. Market women's associations, women's age grade groups, wives' associations and lineage groups all are features of many African societies.

Halkin and Bay (1976) attributing the modern neglect of the dual sex power distribution to colonial rule in which men had all the power, write, "Traditional systems of dispersed and shared political authority had no place in the colonial system."

Another cause of this neglect may be that much of a woman's food production is for her family's use and doesn't reach the monetized sector of the economy. It doesn't get into national production statistics, but people are eating it. By starting with the consumer, with what people are eating, a different picture of food production emerges than if GDP or aggregate figures of production for the country are used as indicators. This difference in perspective is crucial in analyzing women's contributions to food production, particularly in subsistence economies.

A good example of the problem is provided by AID projected budget for 1978 in this region. Of the \$32 million budgeted, \$24 million is going for food nutrition activities, \$5 million for health and population activities and \$3 million for education and human resources. Of the \$24 million going to food production, the overwhelming amount is going to cereal and cattle production, which are primarily men's crops in the monetized sector. A small percentage is going to vegetable production, although the only relatively large (\$611,000) vegetable production project does not describe sex role participation, and sounds as if they may be trying to develop a cash crop for men. There is one small project for goat production included. There is no money for chickens, pigs, fruits or other gathered crops such as Shea butter or baobab leaves. Nor are there any funds for milk production or processing. There are, however, small projects for men gathering wild honey in Chad and Upper Volta.

No one seriously proposes that the Sahelian diet should consist only of grains and meat. Everyone expects that vegetables, fruits, greens, milk and cheese will continue to be produced. It is simply that little AID money is being expended to assist in their production.

Another factor contributing to neglect of women's role in food production is the fact that much of it takes place on uncultivated land--in gathering, small animal production and milk production. Alternatively it takes place in very small plots, in vegetable gardening. It is one of the characteristics of gardening that a great deal of food can be produced in a small space, but this very characteristic tends to work against women. For example, consider this quote, "Cereals are the major crop; many varieties are grown on about 65% of the cultivated land...Peanuts and cotton occupied about 25% of the cultivated area. Small amounts of manioc, yams, sugar cane and tobacco were produced on the remaining 10% of the cultivated land." (Matlock and Cockrum, 1976) Women's crops are invisible in this account of land use. This invisibility may also contribute to the lack of development resources available for some kinds of food production.

The question of land use and access to land becomes crucial in areas where plow agriculture is being introduced, particularly in river basin resettlement. As farming practices are intensified and more effort and energy is put into each plot of land, land ownership tends to move from communal ownership with usufruct rights over the land to private ownership. This shift in the control over land is often triggered by population pressures. The increased demand for food produces an intensification of land use. The intensified use of land for cash vegetable production near urban areas is an example of such a shift. This intensification of land use is precisely what is intended in the river basin resettlement projects and the process presents a real threat to women unless it's handled very carefully. Women's current food production activities use very little cultivated land, and most of their products do not enter the money economy. As a result of both of these factors, their existence tends to be ignored by planners. In resettlement schemes, land is often subdivided and assigned to families. The head of the family is the person listed as responsible for repayments. As the land passes into private ownership, it is the family head who has ownership rights, and the rest of the family become his dependents. Thus, as land passes into a more privatized kind of ownership, women are squeezed out of independent access to land. The results for women's power and status are so disastrous that a number of writers (Boserup '70, Sacks '74, Mullings '76) have identified this loss of independent access to the means of production as the development event that marks the marginalization of women.

African women have resisted this marginalization quite vigorously at times, the famous 1929 women's wars in Nigeria is one example of such resistance. But the process goes on. Within the Sahel there is a current example of river basin settlement that illustrates this problem quite clearly. The French have a project to assist in the development of the White and Red Volta Valleys in Upper Volta. By 1974, 187,000 hectares had been mapped, 1,000 had been cleared and plowed. In 1974 there was space for 250 families to settle, and it was expected that 600 more families could be received before the start of the 1975 rainy season. (Moton, G. 1974).

The first families moved onto the land as planned, and there was a substantial waiting list for upcoming farms. But within a year there were problems, wives were leaving, families were threatening to move out and new families were reluctant to move in. The Project Management approached the Voltaic Research Institute to find out why. The answer--because of the required land use pattern--women had no place for their vegetable gardens. The wells were far from the houses, making water for domestic use difficult and time consuming to procure. Finally, the women were not able to care adequately for the family's health because they could not find the necessary medicinal herbs and plants on the cleared land. (Gisseau, 1976). Some measures are being taken to correct these conditions, but the more serious questions of long term private ownership of land has not been addressed.

How to avoid marginalizing women economically at this point is not at all clear. Have any societies passed through this stage with women retaining a measure of control over access to land? If so, what were the conditions of such a successful transition? Are there any alternatives to continued access to land that would provide women with independent resources and some independent economic base such as they have in more traditional societies with usufruct rights and dowries? These are all questions that urgently demand investigation before planning for river basin resettlement proceeds much further.

Whatever the causes, the pattern of exclusion of women's productive activities from access to development resources plagues many of the current development projects in the Sahel. Women's work, women's productivity, and women's control of resources is often being denied by the refusal of projects to relate to it.

Governments and development projects are male staffed. They relate most easily to formal male power structures. One solution to this problem might be the institutionalization of visible, formal women's organizations for governments and projects to relate to in systematic ways. Interestingly enough, this organizational visibility is what African women themselves say they want. At the 1974 Regional Seminar on Women in Development sponsored by the UN Economic Commission for Africa, African women adopted a Plan of Action similar to the one American women recently endorsed in Houston. In the first resolution they call for a series of organizational structures on the national level that would include (1) National Commissions on Women and Development to make policy recommendations and action proposals, (2) Women's Bureaus or Permanent Secretariats of these National Commissions to undertake research, to formulate projects and programs, and, in general, to seek women's integration in all sectors of social and economic development, (3) an interdepartmental body of experts...to insure coordination of programmes and adequate representation within national policies and planning, (4) a non-governmental organization coordination committee, which might assist women to seek representation in decision-making bodies, to work toward changing attitudes, to supplement public resources and to promote international collaboration and exchange.

On the African regional level they called for an Africa Regional Standing Committee and a Pan African Research and Training Center to assist governments and voluntary agencies in strengthening the roles of women in the Africa Region. Since 1974, two of these National Women in Development Commissions have been formed in Senegal and Upper Volta and others are in various stages of formation. In addition to these commissions numerous other formal women's organizations exist at the national level in various countries. Some of them have organizational units that stretch down to the arrondissement and village level. In Senegal the national political party has a very active women's section that is running training and development programs in many regions. In Mali, Niger, Upper Volta and Mauritania there are National Women's Federations and some of these have published policy statements on the very specific development needs of women in their countries. Within the governments of Niger and Senegal, animation feminine programs organize village women to articulate their needs and help them to meet those needs at the local level. These groups and others like them need support for expansion. They also need greater visibility to donor agencies. During the summer of 1976 I visited many of these women's groups as a member of a CID/Arid Lands/AID team investigating the impact of development projects on women. The women were most eager to share their ideas with us. They have a clear perception of their situation and their needs, and very precise notions of what would be of immediate benefit to rural women.

What did these women's groups say they wanted from the development community? Very simple, practical things.

- 1) Relief from the enormous burden of work for poor women. UNESCO did an initial survey of women in their project area in Upper Volta. The most common request of the women was for relief from their excessive work load. First and foremost, they want gasoline or diesel-powered mills for grinding their millet. "Diesel-powered mills work and women want them," Mariama Wani, Animation Feminine, Niger;

"where there is a mill women use it," Louissette Alzoma, Secretary, Federation of Nigerian Women. They also want better access to wells to relieve their work. In some places they asked for pumps for raising water or some way of keeping the water clean in the well. "Men will support labor saving devices and help dig wells as long as they don't threaten the traditional role division," Jeanne Zongo, President of the Federation of Voltaic Women. Two-wheeled carts (charettes) for transporting water and firewood were also mentioned repeatedly in Upper Volta. In Niger, where Animation Feminine has had ten years of experience with the village women, their requests were more sophisticated. In addition to mills and improved access to water, they want weeding tools, fungicide for treating millet seed....and some Hausa women want animal traction for plows!

- 2) Help with gardens was requested. The village women ask for different varieties of seeds, more seeds, and better kinds. In Senegal, Catholic Relief had some small women's co-ops working with very simple drip irrigation techniques to extend their vegetable production season further into the dry season. Other women had heard of UNICEF's work with home made cisterns and wanted help with them.
- 3) Help with food preservation, particularly ways of drying fruits and vegetables, and smoking fish. (This last request from Senegal).
- 4) Help with petit elevage--the raising of small animals. They want information on disease diagnosis for animals, also better information on animal nutrition. The Hausa women want to know about diseases in cattle. They also want better breeds of chickens and goats that they can crossbreed with their own. The Nigerian Women's Federation, in their policy paper, specifically request a particular breed of goat, "La Chevre rouse de Maradi." Upon further investigation, I found this explanation, "among goat breeders of Niger, the Red Maradi occupies an exceptional place on account of its skin, considerable numbers being exported. It is an excellent source of milk and meat while its skin is a source of revenue for farmers. (Robinet, 1967)

In all four cases mentioned above, they repeatedly mentioned the need for access to paraprofessional and professional training of the women staffing the various programs. In Senegal they needed training in food preservation techniques; in Niger, training in animal husbandry and agriculture. One problem that was repeated to us over and over again in many contexts was the lack of adequate training facilities for women in agriculture, animal husbandry and rural development within the region. "There is a school for male agents (IPPR) that is being enlarged but there are still no places for women. No institutions are still training women in agriculture...we would welcome it if you can help us with the training of our agents," Nariama Wani, Animation Feminine, Niger.

In the planned expansion of agricultural training facilities in the Sahel, some slots are to be provided for women, but it would be useful to make a systematic assessment of the needs and the opportunities to see how well they match.

On the question of the acceptability of American women coming over to give technical assistance, "Religious leaders are reassured if women come to work with women," Mme. Marie Arne Sohail--Member, Chamber of Dupities, Senegal.

The final area was the one mentioned most often:

- 5) The need for cash income. "Women need a source of income. They can grow tomatoes, salad, make crafts," Josephine Gisseau, Upper Volta, "Women need cash," Barbara Skappa, Peace Corps, Mali. "Women need supplemental income--here in the Center they learn sewing to sell," Halimatou Orseini, PMI Clinic, Niger. "For rural women it is very important to give them some opportunity to earn money. It will help those who earn and those who don't but know they could. Their families will respect them more." (Boserup, 1976)

Literacy and health needs, although outside the purview of this paper, were also mentioned frequently.

Conclusions:

From the foregoing discussion, what conclusions can we draw?

- 1) Women are a major element in the food producing, processing and distribution systems in the Sahel. Studies should be done to qualify this contribution.
- 2) There are several successful projects in the Sahel that are specifically focused on supporting the effective participation of women in these systems. Several more such projects are in the planning stages now.
- 3) There is a major international development effort going on in the Sahel that is in many ways a model of thoughtful development assistance. However, in spite of some good faith efforts, the presence of women as an integral part of the agricultural system is being ignored in most of the larger projects. Assistance, training and resources are being delivered to men and men's crops proportionately far more than to women and women's crops. This differential input tends to undercut women's traditional roles and power.

Analysis of sex roles and responsibilities of the target population should be included in planning each project so that services and resources are delivered to the appropriate people.

- 4) The emphasis on development of a few food crops at the expense of others is a poor strategy for assuring adequate food for all. In an economy where most food for most people will be produced and consumed within the subsistence sector for some time yet, it would be wise to attend to increasing the productivity of a large range of subsistence activities.
- 5) Intensification of land use, with its accompanying changes in access to land present a threat to women's traditional roles and status unless it is handled very carefully. I would echo Paula's point that, "Research in land tenure changes and women's rights is important and could be profitable. ...What is the impact of land privatization or nationalization on women?" (Paula, 1976)
- 6) A contributing factor to the neglect of women's participation in Sahelian food systems is that women are not present in any numbers in either African or American government agencies dealing with agricultural development. With few to act as advocates for women's fuller participation in projects, it tends to be ignored.
- 7) This problem is intensified at the international level in the Club du Sahel.
- 8) Official government commissions on Women in Development and other official women's groups do exist in many Sahelian countries. They are new, and often not positioned in such a way as to influence program planning. However, they have a good grasp of the fundamental realities of development and they are most eager to be involved in the planning of development assistance.

These African women's groups could be involved as a resource in planning integrated projects as well as in projects specifically focused on women.

References Cited

- Agency for International Development. Development Assistance Program 1976-1980-Central West Africa Region. Volume I, Washington, D.C., Department of State, November 1975.
- Agency for International Development. Opportunity for Self-Reliance: An Overview of the Sahel Development Potential. Washington, D.C., Agency for International Development, 1976.
- Agency for International Development. Sahelian Africa: Program Summary 1978. Washington, D.C., Department of State, 1977.
- Boserup, Ester. Women's Role in Economic Development. New York. St. Martin's Press, 1970.
- Dupire, Marguerite. "The Position of Women in a Pastoral Society" in Women of Tropical Africa. London. Routledge and Kegan Paul, 1963.
- Gordon, David C. Women of Algeria: An Essay on Change. Cambridge, Harvard University Press, 1968.
- Hafkin, N. and Bay, Edna. Women in Africa: Studies in Social and Economic Change. Stanford University Press, Stanford, California 1976.
- Hosbaum, Eric. Pre-Capitulist Economic Formations. London, Lawrence Wishart, 1964.
- Intech, Inc. Nutrition Strategy in the Sahel, Final Report. Washington, D.C., March 1977. Contract AID/Ta-C-1214, W.O.10.
- Lahuec, Jean Paul. "Une commuante evolutive mossi zaongho (Haute Volta.)" Etudes Rurales, No. 37-39 (1970), pp 151-172.
- Moton, G. "La Mise en raleur des vallees des Volta, Blanche et Rouge en Haute Volta". Actuel Development, No. 4 (Nov. 1974) pp 44-50.
- Matlock, W. Gerald and Cockrum, E. Lendell. "Agricultural Production Systems in the Sahel," in The Politics of Natural Disaster. New York. Praeger, 1976.
- Nicolaisen, Johannes. Ecology and Culture of the Pastoral Tuareg. National Museum of Copenhagen, 1963.
- Paula, Achola. African Women in Rural Development: Research Trends and Priorities. Overseas Liaison Committee Paper No. 12. Washington, American Council on Education, 1976.
- Pauline, Denise. Women of Tropical Africa. London. Routledge and Kegan Paul, 1963.
- Robinet, A.H. "La chevre rousse de Maradi, son exploitation et sa place dans l'economie et l'elevage de la Republique du Niger." Rev. Elev. Med. Vet. Pays. Trop. 20 (1967) 129.86.
- Rupp, Marieanne, Report of the Sociological Study Conducted in the Districts of Tanout, Dakoro, Agadez from March 30 to April 30, 1976. Agency for International Development, unpublished, 44 pages.
- SEDES quoted in Intech, Inc. Nutrition Strategy in the Sahel, Final Report, Washington, USAID Contract ta-C-1214, W.O.10

- Sandy, Peggy. "Female Status in the Public Domain" in Women, Culture and Society. Palo Alto, Stanford University Press, 1975.
- Simmons, Emily. "Calorie and Protein Intakes in Three Villages of Zaria Province" May 1970-July 1971. Samari Miscellaneous Papers (Nigeria) 55 (1976).
- Sacks, Carol. "Engels Revisited" in Women, Culture and Society. Palo Alto, Stanford University Press, 1975.
- Spencer, Dustin. African Women in Agricultural Development: A Case Study in Sierra Leone. Overseas Liaison Committee Paper No. 9, Washington American Council on Education, 1976.
- United Nations. The Data Base for Discussion of the Interrelations Between Integration of Women in Development, Their Situation and Population Factors in Africa. Economic Commission for Africa, Addis Ababa, 1974.
- United Nations. Economic Commission for Africa/Food and Agriculture Organization, Women's Program Unit. The Role of Women in Population Dynamics Related to Food and Agriculture and Rural Development in Africa. Economic Commission for Africa, Addis Ababa, Ethiopia, 1974.
- United Nations. Plan of Action for the Integration of Women in Development in Africa. United Nations, Economic Commission for Africa, Addis Ababa, Ethiopia, 1974.

#### Interviews

- Alzoma, Louisette. Secretary, Federation of Nigerian Women. Niamey, Niger. July 14, 1976.
- Boserup, Ester. Economist. Wellesley, Massachusetts. June 1976.
- Bingham, James. Political Scientist. Bamako, Mali. July 13, 1976.
- Compase, Scholastique. Director, UNESCO. Project on Equal Access to Education for Women and Girls. Ouagadougou, Upper Volta. July 1976.
- Digne, Ana. Director. Promotion Feminine. Dakar, Senegal. July 26, 1976.
- Orseini, Halimatou. Assistant Sociale Direction de la Affairs Societes, Niamey, Niger. July 15, 1976.
- Paula, Achola. Anthropologist, Institute for Development Studies, Kemp. Washington, D.C. April 1976.
- Skapa, Barbara. Assistant Director, Peace Corps. Bamako, Mali. July 12, 1976.
- Sohai, Marie Anne. Member, Chamber of Dupities. Dakar, Senegal. July 25, 1976.
- Wani, Mariama. Agent technique d'animation. Niamey, Niger. July 14-15, 1976.
- Weber, Fred. Development Consultant. Niamey, Niger, July 15, 1976. Tucson, 1978.
- Zongo, Jeanne. President, Federation of Voltaic Women. Ouagadougou, Upper Volta. July 22, 1976.