## INSTITUTE OF CURRENT WORLD AFFAIRS

PJW-12 Traditional agroforestry Bobo-Dioulasso Burkina-Faso 1 November 1984

Mr. Peter Bird Martin Executive Director Institute of Current World Affairs 4 West Wheelock Street Hanover, NH 03755 USA

Dear Peter.

Agroforestry is a popular concept in forestry development circles these days. Touted both as a "new development approach" and a "traditional pattern of resource use", agroforestry refers to the combining of trees with cultivated crops and/or livestock.

Numerous conferences on agroforestry have been held throughout the West African Sahel and elsewhere throughout the world within the past five years (Weber and Hoskins 1983). Many development foresters currently working in the Sahel are convinced that agroforestry offers a great deal of promise for the future --- a way to enhance agricultural and/or livestock production while producing a variety of needed forest resources. Agroforestry, thus, offers foresters a way to tie their interests and skills to one of the major development priorities in Africa and elsewhere -- food production.

A Sahelian definition of agroforestry, adopted at a 1983 conference held in Niamey. Niger. states:

> Agroforestry is a general term encompassing land-use systems in which perennial, ligneous vegetation (trees, bushes, palms, bamboos) are deliberately cultivated (planted or protected) on plots of land, also used to raise crops or livestock, either simultaneously or successively on the same areas. In agroforestry systems, ecological, economic, and socio-cultural aspects are interrelated. (Original in French; translation provided by Weber and Hoskins(1983,p.5).)

This type of land-use has long been practiced by Sahelian residents, and has only been "rediscovered" by forestry development experts. In Ouagadougou, Upper Volta (now Burkina-Faso), a National Colloquium on Agroforestry was held from March 5th to 8th earlier this year, to assess experience with agroforestry to date and to develop recommendations for national policies concerning agroforestry.1

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Throughout the Sahelian countries, the most typical landscape is "farmed parkland" (Pullan 1974). The vegetation is not untamed tree and shrub savanna, but rather humanly-managed fields, pastures, and fallows, dotted with trees. The trees in the landscape are there because they have a value to the local human population -- whether for shade, wood, food, medicines, fibers, or spiritual reasons.

If this pattern of land use has long been practiced, why is there a need for development foresters or other experts to promote agroforestry? If the rural peasant already values trees, why does she or he need to be convinced that trees are good?

There are several levels on which this question can be addressed. Some proponents argue that traditional resource systems are breaking down. With increasing human and animal populations, land is being used more intensively for food production and more firewood is begin gathered and cut in the rural areas to sell. Whereas in the past the number and diversity of trees that were left by people in their fields and the "bush" were adequate for their needs, now the abundance of woody vegetation is declining. Consequently, there is -according to some experts -- a need to help peasant farmers improve their traditional methods of managing trees and shrubs or to plant species that are in the process of disappearing.

Others suggest that the problem is one of government policy, institutional arrangements, and development assistance approaches. Typically there are separate government agencies. often located in separate ministries, responsible for agriculture, livestock, and forestry issues. This sectoral approach is reinforced by development assistance projects, which usually provides funds only to a particular agency. Forestry law has been set up to protect trees and to prevent people from cutting them: foresters have been trained as policemen to protect trees, rather than as extension agents to work with the rural residents to utilize trees to meet rural needs. Agricultural experts advise farmers to clear their fields of trees. to facilitate use of intensive techniques. Grazing specialists suggest strategies to increase the production of herbaceous forage and to minimize the production of woody vegetation. Thus, what is needed to overcome these problems is a shift in government policy, a move towards a more "integrated approach to development", an attempt to adapt assistance to the rural milieu, to put techniques at the service of people. The real need for "sensibilization" (the French term for "consciousness-raising") is not among the peasant farmers, this line of reasoning goes, but among government bureaucrats, policy makers, and development experts.

In pursuing agroforestry objectives, Sahelian foresters are now emphasizing increasing the number of "trees in the landscape", irrespective of where they may occur, rather than merely managing "forests" (Weber and Hoskins 1983). Woody vegetation is assumed to be important not only for its productive functions, i.e., for producing a variety of valued resources, but also for its protective functions, i.e., in protecting and enhancing environmental stability.

A variety of techniques are being used to work towards these two goals. Trees and shrubs may be grown in fields and/or pastures to provide needed resources, such as edible leaves, fruits, and seeds, animal fodder, firewood, gum arabic. medicines, wood for construction or for the manufacture of tools, bark, roots, and other tree parts used in a variety of crafts as fibers and dyes. Ligneous plants can also enhance agricultural and livestock production. Woody species may be planted as windbreaks to minimize soil erosion, or as living fences to keep animals out of fields. Trees may stabilize or improve environmental conditions in fields as pioneer or stabilizing species: nitrogen-fixing species may improve the quality of the soil. Trees can be used to reinforce small dikes built in fields to trap and hold water. Thus the practice of agroforestry involves a broad spectrum of activities that promote long-term resource management and conservation.

This broad, multiple-use, long-term approach to resource management is one that many foresters have long claimed as their professional turf, not merely the growing and cropping of trees for timber. Whereas in the past foresters focused their efforts on multiple-use management of areas of land classified as "forests", with the concept of agroforestry they are trying to make a contribution to broader issues of resource development.

The cry for "integrated approaches to development" is nothing new. Agriculturalists also are interested in integrated approaches. Rather than rushing to embrace this new concept of agroforestry, however, they have been utilizing concepts of "farming systems". Many agriculturalists remain unconvinced that woody species can significantly improve agricultural production. They may be interested in trees as part of the total farming system, but in terms of setting aside certain areas as woodlots, or using trees in selected areas to aid with erosion control, for example. The lack of agricultural enthusiasm is quite evident in attendance at agroforestry conferences --most of the participants are foresters.

To truly develop agroforestry as an interdisciplinary approach, I believe that foresters will need to do three things. First, foresters will need to carefully assess their roles in agroforestry activities. While most foresters wish to convince agriculturalists and livestock specialists of the value of

including trees in their resource management plans, they do not believe that forestry activities can be totally subsumed under these other disciplines. Foresters, thus, are interested in promoting agricultural-forestry-livestock management interfaces. Although some proponents have suggested that "agro-sylvopastorialism", "resource management", or "land management" would be more inclusive and appropriate terms for this interdisciplinary approach, agroforestry (or sometimes "farm forestry" or "small-scale rural forestry") is the term that has caught on. The use of the term "agroforestry" emphasizes forestry --- forestry of a particular type, related to agriculture -- and thus implies a need for foresters to work on this issue. Foresters will have to consider, however, if they are willing to play subordinate. supporting roles in agroforestry activities, and to what extent they will want to work on resource management activities that may or may not include trees.

Second, in order to convince agriculturalists, livestock specialists, other development experts, and policy makers that agroforestry is a viable and necessary approach, demonstration plots, experiments, and research needs to be undertaken to demonstrate the impacts of growing trees in conjunction with crops and/or livestock. Little quantitative information on these interactions has ever been obtained (Gulick 1984). Once such data becomes available, a great deal of work will need to be undertaken on reformulating policies and institutional arrangements so as to encourage interdisciplinary efforts. Multiple-use resource management is possible, despite the difficulties to be surmounted. But it must be remembered that the technical information is only a tool --- the vital ingredient for bringing about this type of integrated resource management is political will, based on supportive constituencies.

Third, agroforestry as a development and resource management concept will only gain acceptance if it truly aids rural farmers in their patterns of resource management, improving resource production in an ecologically-sustainable and sociallysuitable manner. In order to do so, agroforestry must include rural residents as full participants in the process. Much remains to be learned from farmers about their current systems of production and tree management, their perceptions of priority issues, and their identification of constraints. These social considerations are more difficult for many technically-oriented development workers to assess, but without them the best technical approaches will fail.

Since it has been argued that rural Sahelian villagers have traditionally practiced agroforestry, I have been interested in learning about existing, indigenous patterns of tree management. Over the past couple of months, I have been working on a pilot study of uses of trees and shrubs for human food in three villages in Burkina-Faso -- Koumi, Koundougou, and Tougan-coura. When I have asked village women about their uses of trees and shrubs, I have also asked them about the woody species that the villagers plant and/or protect, and about the ways in which they take care of the trees. I am trying to understand why they choose the species that they do, in terms of what the villagers believe to be valuable about particular species.

I have discovered that there is quite a bit of diversity in tree management practices. The three villages differ from one another in both ecological and social characteristics. I assume that these factors influence not only what types of species can grow in each of the three villages, but also which species are valued by the residents of each village.

As is shown in the map on the following page, the three villages are all located in the western part of the country. The western region is more humid than regions farther north and east. Climatic data collected over the period from 1940 to 1964 (Renard 1965) show that the area around Koundougou and Tougan-coura receives an annual rainfall of 1000-1100 mm (39-43 in.) and that around Koumi receives an average of 1100-1200 mm (43-47 in.). There is, however, great variation from year to year<sup>2</sup>, and only during the rainy summer months does precipitation exceed evaporation. Koumi may have more available ground water than do the other two villages, as it is located along the Kou River (a tributary of the Black Volta).

The vegetation around each of the three villages is farmed parkland. As R. A. Pullan (1974) has noted, farmed parkland is most often characterized by one or two dominant species of trees. Although I have not done systematic studies of the vegetation, I have been struck by the differences in species abundances in the three villages. The most common trees found in the fields around Koumi are shea-nut (<u>Butyrosperum parkii</u>), nere (<u>Parkia biglobosa</u>), and fan palm (<u>Borassus <u>aethiopum</u>). In the fields around Koundougou, shea-nut and winterthorn (<u>Acacia albida</u>) are the most noticeable species, although several others are represented. Around Tougan-coura there are quite a variety of species, the most numerous of which is baobab (<u>Adansonia digitata</u>). My general visual impression is that the most woody vegetation occurs around Koumi, and the least in the vicinity of Tougan-coura.</u>

The villages differ in history, size, and ethnic composition. Koumi is an old village, with over 4200 inhabitants, virtually all of whom are members of the Bobo ethnic group. The majority of the inhabitants are still very traditional. (For a fuller description of Koumi, see PJW-10.) Koundougou also has over 4000 inhabitants and was originally a Bobo village. But many people have migrated to Koundougou over the past twenty years. Now the most numerous ethnic group is the Mossi, who migrated from a variety of areas, such as the MAP OF BURKINA-FASO

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villages around Ouagadougou, Ouahigouya, Yako, and Koudougou. There are also Samos, originally from the area around Tougan, and Fulanis, or Peuls, originally from Nouna. (For a fuller description of Koundougou, see PJW-11.) Tougan-coura is administratively classified as an "encampment" rather than a village. Most of the several hundred inhabitants are Samos and have migrated to Tougan-coura over the past seven to ten years from Tougan. Thus, while most of the inhabitants of Koumi grew up in that area, most residents of Koundougou and Tougan-coura have migrated to those locations from more arid areas farther north and east. It seems likely that these migrants probably have brought tree management practices with them from their "villages of origin".

In each village, certain tree species are planted and others that "grow by themselves" in the fields are left there. Choices of species, however, vary from village to village, as do the ways in which trees are protected and cared for. Trees that are planted may be raised from seed, or replanted as seedlings. Seedlings may be either purchased, or pulled out of the ground wherever they are discovered. "growing by themselves", and replanted where desired. Certain valuable or "useful" species that regenerate adequately without human intervention may be left (and sometimes also protected) in fields. Various means are used to protect woody species from animals, people, fire, wind, and water shortages. Species that are liable to be eaten by goats, sheep, cattle, or other animals may be protected with fencing made of branches and thorns. metal grills, or unfired clay bricks. Villagers try to keep fire out of their fields and away from their homes. which protects the trees in these locations. If a fire does start in the "bush", however, and move into the fields, the villagers may be powerless to stop it. Generally trees will be replanted in the rainy season, typically during the month of August when usually the heaviest rains occur. During the dry season, for perhaps a couple of years, planted trees may be watered. Wind can pose problems for trees here, especially for shallow-rooted species during heavy, tropical storms. In one village, trees were anchored down against the wind. The protection of trees from people occurs with the general consensus over use rights: in principle, the person who plants or protects a tree has exclusive rights to use the produce from the tree while it is alive. (This right, however, may be difficult to enforce if the tree is located in a distant field where constant surveillance is impossible.) It seems. however, that once a tree dies, anyone can cut it up for firewood. None of the villagers with whom I talked knew any ways of protecting trees from insects.<sup>5</sup> parasites, or diseases.

One tree managed in diverse ways in the three villages is the baobab. This tree is well-known throughout Africa, because of its distinctive form and massive trunk, and because

of the multiple uses made of various parts of the tree. Both the leaves and fruits are important in African cuisine. The tree is also used for forage, medicines, fibers, dyes, and soap. Because the species has been so highly valued by African peoples, clusters of baobabs are frequently found near current or former villages. Baobabs can live for a long time -- estimates vary up to 1000 to 6000 years. They are found in areas with rainfall ranging between 250 mm (10 in.) and 1000 mm (40 in.) to 1500 mm (60 in.) (Giffard 1974; von Maydell 1983). Baobab trees, however, are not easy to propagate: the germination rate of seeds is low and the germination period may be as long as a year. Consequently, as Fred Weber noted in 1977(p.177), "young trees in the wild are difficult to find".

In all three villages, women use baobab leaves and fruits in their diets, but to varying degrees. The management of the trees also varies considerably. In Koumi, I saw no baobabs. Koumi women sometimes obtain leaves from baobabs in the "bush" and dry these leaves to consume during the dry season. They never consume these leaves fresh, as they consider them to be one of the few species of leaves that dry satisfactorily and thus can be preserved. During the rainy season, they employ other kinds of fresh leaves in their sauces. In five different visits to the Koumi market during August and September, only once did I see a couple of women selling baobab leaves. Each woman had a moderately-sized basket of leaves.

In Koundougou, I found that baobab leaves were used more frequently in the cuisine and baobab trees had been planted near the village. Although members of the various ethnic groups all used baobab leaves -- in fresh, dried, or powdered forms -- in their sauces, most of the trees were planted in the Bobo section of the village. Young trees, either found in the bush or grown in the village haphazardly from cast-away seeds of the fruit, had been pulled out and replanted. Generally such replanting is done by men, but girls will be responsible for watering young trees.<sup>4</sup> All the trees that I saw were quite large and well-established: none of them had any need for protective fencing.

I also visited the Koundougou market several times in August and September. Each time I visited the market, there were men selling baobab leaves out of large fiber sacks. The women explained to me that if a man plants a baobab tree, he then "owns" the tree and has control over the use rights and can sell the leaves. Many of the men selling leaves in the market, however, had gone into the "bush" and cut the leaves.

I asked Koundougou women about their daily diets. Out of 92 interviews regarding the previous day's total food consumption, I came up with 112 recipes for sauces served with "tao". ("Tao", a thick porridge made with millet, sorghum, or maize flour. is the basic staple of the local diet.) For 73. or 65.2%. of these preparations, one or more types of leaves had been used in the sauces. Since it was the rainy season, the bulk of the leaves used were fresh, from cultivated plants in the fields -- most often, the leaves of black-eyed peas. Eleven women (10.3%) had used either fresh baobab leaves or powder made from dried baobab leaves to flavor their sauces. Typically baobab leaves are the sole type of leaf in a sauce, but in a couple of instances the women had mixed baobab leaves with cultivated leaves. Except for two Bobo women who had collected the leaves from their husbands' trees (planted behind their household compounds), the women had purchased the baobab leaves or baobab leaf powder in the market. Baobab leaves are probably used more frequently in sauces during the dry season.

Tougan-coura had several baobabs in the village, next to homes and in fields. As Tougan-coura is a much smaller village than the other two and more recently settled, the relative abundance of baobabs is quite striking. The villagers have gone to considerable extent to protect their young replanted baobabs with fencing or thorns to protect the trees from grazing animals. Since the village is located in an area with shallow, lateritic soils, the tree roots have a difficult time penetrating the soil. Consequently, the villagers have placed lots of big rocks on top of the roots of their baobab trees, to anchor them down and to prevent them from being blown over from the wind. One tree was even more elaborately protected from the wind: a large stone wall, about two feet high, had been built around the tree, and the area inside the wall had been filled with dirt, to bury the tree roots.

In August the small weekly market in Tougan-coura did not have much for sale, but several men, women, and boys were selling baobab leaves. When I discussed their use of baobab leaves in their cuisine, village women told me that they ate them fresh frequently during this period of the year -- perhaps four times a week, or every other day. They also dry leaves to use at other times of the year.

All of the young baobabs had been pulled up in the "bush" and replanted by the men. If, however, a woman happened to see a young baobab tree in the bush, she might tell her husband where it was located, and he would go and get it. But, the women explained, such young trees are very rare and difficult to find. The trees belong to the men who plant them. Their wives would have rights to use the leaves for the family cuisine, but the proceeds of sales of the leaves -- whether sold by the owner, his wife, or other family members -- would belong to the owner.

The situation with respect to another important "food tree", nere, was the reverse. In Koumi, the most "traditional" of the three villages, nere is grown from seed planted directly



Walled baobab tree in Tougan-coura

in the fields, as well as protecting trees that regenerate spontaneously. Nere trees are quite abundant in the fields. In the other two villages, nere trees are much less abundant. and in the past have never been grown from seed -- so the villagers have only have those nere trees that "grew by themselves" and that the villagers protected. Although none of the Koundougou women told me about growing nere from seed. the woman extension agent explained that this year. for the first time. villagers were planting nere seed. Perhaps this change in behavior has been motivated by the fact that the few trees in Koundougou produced so poorly this year, that none of the local women were able to obtain enough nere seeds to make "soumbala", a spicy, high-protein condiment used in over 40 percent of the sauces. Consequently, all the soumbala used had been purchased in the village market: the soumbala sold in Koundougou comes from Toussiana, a village roughly 125 kilometers (75 miles) to the south. This not only means

that Koundougou women cannot make soumbala themselves and must spend precious cash to obtain it (or do without), but also that women cannot make soumbala to sell and to obtain cash to purchase other daily necessities. In Koumi, in contrast, I talked with some women who made soumbala themselves, both to use for their own cooking and to sell in the village market.

One agroforestry question that interests foresters greatly is what impacts trees have on adjacent crops. Certain woody species compete with crops for sunlight. moisture. and soil nutrients. Other species do not compete at all: some. in fact, work very favorably in combination with crops. Of particular interest are certain leguminous species, which fix nitrogen and thus improve soil quality. An important leguminous species used in the more arid regions of Burkina-Faso is Acacia albida. This species does not compete with cereal crops because. unlike most trees here, it sheds its leaves during the rainy season, and grows new leaves and seed pods during the dry season. Thus, during the agricultural season the trees do not shade the crops nor compete with them for moisture and nutrients. Since there is more nitrogen in the soil around Acacia albidas. the sorghum or millet grown next to these trees is often quite noticeably taller. During the dry season, when little other forage is available, the seed pods are much appreciated as animal fodder.

There are quite a few <u>Acacia albidas</u> around Koundougou. When I asked the Koundougou women about them, they said that they give the pods to their sheep. The seeds are also burned and the ashes used as potash, either for cooking or for making soap. Did the trees have any other value? None that they knew about. Twice when I asked this question, the women's rural extension agent, Marguerite Konkobo, spoke up, saying that the trees are nitrogen-fixing and good for the crops. Marguerite later told me that the Koundougou villagers are just starting to plant <u>Acacia albidas</u> this year. I found it quite interesting that, although the women had heard Marguerite discuss this benefit of this species, they themselves never cited it. Is this because they are not yet convinced?

The women did tell me about the impact of other trees on crops. The Koundougou women believe that nere trees compete more with cereal crops than do shea-nut trees. In general, however, they felt that the trees in the fields do not pose great problems for the crops. They said that the trees provide shade, which cools the air temperature, increases the humidity, and thus benefits the adjacent crops. Similarly, the Tougancoura women told me that they believe that where there are lots of trees, the trees give rain.<sup>5</sup> They did not think that Tougancoura has lots of trees, and said that due to a lack of water, many trees had died.

Did birds come and sit in the trees? I asked. Yes, the Koundougou women replied. But although birds do eat some of the cereal crops, the women do not seem to feel that this is a reason not to have trees in the fields. When the crops are almost ripe, they will sometimes send a child who has nothing else to do out to the fields to scare away the birds.

None of the village women seemed to know anything that could be done to protect trees from insects. The Koundougou women said that it was possible that perhaps the men put something in the dirt before replanting a tree seedling, but they didn't know for sure if the men took any steps to protect the trees from insects. In Tougan-coura, the women said that termites were one of the main reasons that there were not more trees in the area.

In August, when there is typically the most rain, is generally when trees are replanted and when fruit tree seedlings -- such as mangos, lemons, oranges, guavas, and mandarins -- are sold in local markets. I saw mango and lemon seedlings for sale in the Koundougou market. The markets in Koumi and Tougan-coura are much smaller and never had any tree seedlings. I assume that the residents of those two villages go to nearby larger markets -- for Koumi. the city of Bobo-Dioulasso. and for Tougan-coura, the adjacent village of Dande -- to buy any mango or other fruit seedlings they plant. There were not many such trees planted in either Tougan-coura or in the traditional part of Koumi: however, in the section of Koumi where the Christian converts live, there were lots of such fruit trees. The Koundougou women said that the fruit tree seedlings are grown by individuals in small private nurseries. There were no nurseries in Koundougou, so the seedlings were transported from other villages, such as Banakélédara, to sell in Koundougou. (Banakélédara is also the main source of mangos, lemons, and other fruit occasionally sold in the Tougan-coura market.) In all three villages, some people had papaya trees, which are easily propagated from seeds thrown on the ground when someone eats a papaya fruit. When the papaya seedling was a suitable size, the men would replant it where they wanted it to grow. Generally thorns or fencing would be placed around replanted tree seedlings to protect them from being eaten by animals. For some trees, such as the shea-nut and nere left in the fields. this was not necessary, as the animals do not find the leaves of these species palatable.

I also asked the village women if there were certain types of trees that they would like to have more of in their villages. I was quite surprised that they never mentionned trees like baobab or nere, which they have traditionally used and protected, but always cited fruit trees already available in the local markets, such as mangoes. In Koundougou, one woman said that they used to have bananas, but that they had died due to insufficient water. Another woman said that she'd like to have avocado and oil palm trees, but knew they required more water than is locally available, and more suitable soil.

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Except under certain circumstances, the Koundougou women (as well as the women in Tougan-coura and Koumi) do not replant tree seedlings. When I asked them why, I was given a couple of explanations. One woman said that women never plant trees because they don't know how. Another said that it was because they don't have young trees to plant. What about buying trees in the market? I asked. Only men purchase young mango trees, they replied. The Koundougou women said that when the men decide to plant trees, they do so on their own, without any input from the women, even though the women use certain species for food and other uses.

The Koundougou women told me, "the tree is life". They also explained that, like people, trees die, and this was hard. Having explained that there were lots of shea-nut and nere trees in the fields, and sufficient tree seedlings to buy, the women then said that they would like to have a surplus of these trees, that the quantity was insufficient. Over time, the numbers of trees had diminished: due to a lack of water, all the trees were dead.

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In these three villages, trees are already being managed, planted, and protected. The mixture of trees and crops in the fields demonstrates that certain agroforestry techniques are already being used by the villagers themselves, without much input or assistance from foresters. Judging by the size and age of some of the trees, these practices have been ongoing for quite some time. Since private individuals have been running their own nurseries to grow tree seedlings to sell, tree planting appears to be a worthwhile activity for villagers, one that some villagers are willing to spend money on. If the villagers are already engaging in these activities themselves, what can foresters or other development workers do to assist them?

The most important thing seems to be sharing information. Villagers vary in their knowledge of various techniques for propagating, planting, and protecting trees. Thus, a forester or rural extension agent could be useful in learning from villagers how they manage trees, and by sharing this information with those in other villages. Demonstration is also important: some agroforestry projects have already learned that it can be very effective to arrange trips for villagers to visit other villages, to see different techniques in use, and to talk to other villagers about their activities. This villager-tovillager approach enables people to identify more closely with the feasibility of an activity, if they know that other villagers have undertaken it. This approach requires the development worker to play the role of a facilitator, rather than an expert.

In addition, it seems crucial to try to understand what the real constraints on tree management activities are, and how



Fan palm, shea-nut, and nere trees in a field near Koumi

they can most effectively be addressed. If, for example, there are fewer trees around Koundougou now than there were formerly because of insufficient water, then perhaps steps can be suggested to increase water availability. But is water the true constraint? When I asked the women about the history of Koundougou, they told me that the village's population had grown and more lands were now under cultivation than formerly. In addition, more green trees are being cut by the men to sell as firewood. (As the major road that goes past Koundougou has been paved for the last twelve years, firewood is easily transported by passing trucks to the city of Bobo-Dioulasso.) I would suspect that these changes have had something to do with the abundance of trees in the area declining over time.

Similarly. I don't think that women do not plant trees because there are insufficient young trees to plant. Rather women don't plant trees because of long-standing patterns in the division of labor between women and men, the divisions of rights and responsibilities. Tree seedlings are available in the markets, but women choose to spend their money on other purchases. It may be that the women have less disposable income than the men. Perhaps, as land rights are traditionally inherited through the male line, women lack incentives to plant The women also do not plant trees, they say, because of trees. a lack of knowledge of tree-planting techniques. If this is a true constraint, this may be an area in which women extension agents may be able to make a contribution. But, before launching such an effort, it is important to understand whether it would really benefit women if they learned how to plant trees. It may be that the women already have more than enough work to do and would be happiest leaving the tree-planting activities to the men. (The women and girls already do contribute by watering the trees.)

Thus, I think that foresters can make a contribution to enhancing villagers' existing agroforestry practices. But high on the list of agroforestry "techniques" to be promoted must be a true extension approach for foresters, a realization that the only way that foresters can aid villagers is by learning from them -- learning what trees they value and what constraints to tree-planting and management are amenable to interventions.

Sincerely,

Paula J. Williams)

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NOTES:

- 1. I also attended the USAID Africa Bureau Forestry Evaluation Workshop, held in Lome, Togo, from May 7th to 11th, 1984, at which agroforestry was a topic of much discussion. (The <u>Report of the Forestry Program Evaluation Workshop</u> was printed in August 1984 by the Technical Resources Division, Africa Bureau, U.S. Agency for International Development, Washington, D.C.)
- 2. For example, records of rainfall for Bobo-Dioulasso between 1940 and 1964 show a wide variation from year to year, with a low of 802.8 mm (31.6 in.) in 1959 and a high of 1551.6 mm (61.1 in.) in 1941. Unfortunately, I have not seen more recent data than Renard's (1965) report, so I unable to say whether average rainfall has remained the same or declined in the past twenty years.
- 3. My research assistant, Awa Quattara, who was living in the city of Bobo-Dioulasso, told me how her family had dealt with parasites and termites. When their mango tree had become infested with parasites, they had cut the tree to remove the infested portions: when the tree resprouted, they had no further problems with parasites. She also told me that they make an "insecticide" that is effective against termites: it consists simply of taking the water that has been used to wash and clean fresh fish (to prepare it for cooking), and throwing this water on the bark of the trees. For whatever reason, the termites don't seem to like the fishy water, so they leave the trees. Presumably other local remedies for dealing with these tree pests exist.
- 4. See PJW-11 for a discussion of conditions under which certain women replant baobab seedlings.
- 5. I don't know whether the villagers have always believe that trees give rain, or have been "sensibilized" to believe in this benefit of trees. But I did see the following message in the national daily newspaper, <u>Sidwaya</u> (1 Oct. 1984): "Ouagadougou, fais-toi belle et révolutionnaire avec des arbres et des fleurs. Il manque de l'eau? Ce sont des

- 16 -PJW-12 arbres qu'il vous faut d'abord ! L'arbre attire la pluie." (Ouagadougou. make yourself beautiful and revolutionary with trees and flowers. There is a lack of water? You must plant the trees first! The tree attracts the rain.) LITERATURE CITED: Giffard. P. L. 1974 L'arbre dans le paysage sénégalais: sylviculture en zone tropicale sèche. Dakar: Centre Technique Forestier Tropical. Pullan, R. A. 1974 Farmed parkland in West Africa. Savanna 3(2): 119-151. Renard, Jean. 1965 Atlas de Haute-Volta: Cartes Provisoires des Principaux Éléments Climatiques. Ouagadougou: Centre voltaïque de la Recherche Scientifique. (Paris: Imprimerie de l'Institut Géographique National. 1973.) von Maydell, H.-J. 1983 Arbres et arbustes du Sahel: leurs charactéristiques et leurs utilizations. Schriftenreihe der GTZ No. 147. Eschborn: GTZ. Weber, Fred R. 1974 Reforestation in Arid Lands. VITA Publications Manual Series Number 37E. Mt. Rainier. MD: Volunteers in Technical Assistance. Weber, Fred and Hoskins, Marilyn. 1983 Agroforestry in the Sahel: a concept paper based on the Niamey Agroforestry Seminar 23 May - 9 June 1983. Blacksburg. VA: virginia Polytechnic Institute. ALSO USEFUL: Advisory Committee on the Sahel. Board on Science and Technology for International Development, Office of International Affairs

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