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**INTEGRATED MANAGEMENT OF AGRICULTURAL WATERSHEDS
(IMAW) PROJECT**

**THE ROLE OF WOMEN IN NATURAL
RESOURCES MANAGEMENT**

FINAL REPORT

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EXECUTIVE SUMMARY

The accelerated environmental degradation caused by the exploitation of the renewable natural resources base and the recognition of women's responsibility in this process are linked to the growing interest that the international and national organizations and institutions are expressing towards women. It is in this respect that the study sponsored by Tropsoils Collaborative Research Support Program (CRSP) in the project zone, situated at approximately 30 Km north-east of Niamey, the capital, should be viewed. This study looks at the role women play in natural resources management in the form of three separate sections: the first part concerns the interviewed women's identity and their domestic and productive activities in which they are involved; the second deals with women's interaction with the environment; and the third constitutes a synthesis of the first two reports and addresses constraints to the involvement of women in the control of environmental degradation as well as solutions for facilitating their participation. Furthermore, the study was to develop a methodology to serve as a guide capable of being extended to other regions of Niger for assessing women's roles in natural resources management efforts.

Field surveys conducted during the months of March and April 1992 covered the three villages constituting the Integrated Management of Agricultural Watersheds (IMAW) pilot project zone; the villages are Bokotili, Falanke Kaina, and Hamdallaye. Residents from each of these villages hold fields in the watershed. The inhabitants of these villages, the majority of whom are Zarma, are distributed as follows: 234 in Bokotili, 218 in Falanke Kaina, and 1,000 in Hamdallaye.

Data collection was undertaken on the basis of questionnaires administered individually. The survey involved a total of 64 women and 28 men. The information provided, much of which is not new, is still important to be remembered.

In the watershed zone, as in other parts of the Sahelian region, domestic activities (wood collection, water collection, grain pounding, and meal preparation) that women are compelled to perform daily, require considerable time and energy. They constitute a significant constraint to the undertaking of income generating activities and to women's participation in development activities.

In addition to the heavy domestic duties, almost every woman is involved in production activities, which are more diversified than those of men. In fact, besides crop and livestock production, women perform various other activities including food processing, mat weaving, small-scale trade, gathering and other income generating activities, i.e. hairdressing, midwifery, selling water.

With respect to agricultural activities, women's participation in production activities varies according to their ethnic background. Contrary to their Hausa counterparts, Zarma women do not cultivate staple food products which are grown by men principally as millet-cowpea inter-crops. In the study zone, Zarma and Hausa women (for the latter, in addition to staple crops) grow peanut, okra, sorrel, sesame, and Bambara beans in their own plots or in gardens.

Irrespective of their ethnic group, women do participate in certain farming activities on the family fields: planting, cowpea harvesting, crop protection against predators.

Productivity on the woman's plot productivity remains low. If such a situation originates from factors innate to the Nigerian farming system in general, as far as women farmers are concerned, certain specific factors are quite conspicuous. These include the indifference of extension and training structures toward women; women's precarious land tenure status; the delay in the start of their own cropping operations as priority is given to planting the family cereal crop; the practice that requires boys to devote their labor on a priority basis to working on collective fields.

In spite of their dependent status and their subordinate position within the family farming system, the fact that women independently control the produce of their individual plots confers on them a relative economic autonomy that allows them to meet their family and personal commitments. Proceeds from their marketing operations do not need to be included in the collective income.

The basic constraints outlined and encountered by women in their agricultural activities are rainfall shortages, decline of land fertility, inadequate access to inputs and improved farming techniques, attacks by pest and other predators. Constraints to livestock production include the reduction of fodder resources, epidemics, infectious and parasitic diseases which often pose a devastating toll on cattle and poultry. Low incomes are the characteristic feature of their supplementary income-generating activities.

Nevertheless, the regular nature of these incomes as well as those accruing from their agricultural activities allow women to meet certain expenditures throughout the year. It should be emphasized that the growing economic decline of rural communities resulting notably from the ecological deterioration makes women's participation in household maintenance an imperious necessity. Consequently, family expenditures formerly borne by men alone, are now falling gradually on women's shoulders. This includes the purchase of clothing and medicine for themselves and their children.

While women do not express a clear understanding of the real causes of environmental degradation (cause is essentially considered as

divine), they are nevertheless sensitive to its impact and its relation to population explosion. Environmental degradation is expressed by women in terms of the gradual decline in farm output due to the deterioration and exhaustion of the soil which is said to be "tired" and "dead"; the reduction or even disappearance of certain wood, shrub, and grass species; the progressive loss of access to and control over resources; and increased labor demands. The increased labor demands result from women's traditional role in providing water, firewood, wild foods, and livestock feed, which in a context of scarcity, means that women must allocate a larger proportion of their time to provide these resources from longer distances.

Women are rarely involved nor their opinions solicited regarding environmental preservation and protection actions initiated by local populations or through external assistance. This exclusion of women is not viewed by the interviewed men as being unjust, who assert among other things that these actions do not "concern women". Most of the women accept, at the current stage of things, the progressive loss of their traditional rights and control over resources as a fate and bear their marginalized status as inescapable. However, a certain proportion of women are beginning to be aware of their exclusion from projects undertaken by external sources and that they do not have access to the advantages that accrue from those projects.

The participation of women in efforts to preserve the environment and restore the ecological balance is of prime importance in light of the following factors:

- women have a close and specific interaction with the natural environment;
- women share the responsibility for ecosystem degradation;
- women's profound knowledge of forest products;
- women's role as educators;
- and finally, women's stability on the land.

Women's participation in natural resources management will not be effective unless efforts are made to alleviate the various and multiple obstacles hindering women. Apart from the general constraints which intensify the destructive and irrational exploitation of natural resources by local communities, specific constraints pertain particularly to women's participation in natural resources management. These constraints are basically as follows: land tenure insecurity, negative socio-cultural environment, men's opposition aimed at perpetuating the confinement of women to the narrow circles of domestic life, lack of

information and training for women, and their isolation from training and extension service programs.

Women's participation in the effort to restore and preserve the agro-sylvo-pastoral potential could be achieved by undertaking actions relating to domestic work, land tenure issues, information, training and extension services (agriculture, livestock and forestry). It must be emphasized that such measures can only succeed in a context of global transformation of the production system and only if such changes are introduced through legislative, legal, institutional, technical, and economic frameworks. These measures need to alleviate domestic tasks, guarantee women's land rights, ensure access to information, training and extension, and transform the methodological approach of the external partners.

Providing women guaranteed land rights should be a priority, their access to land constitutes an indispensable and essential support to their production activities. The adoption of the proposed Rural Code should bring about improvements in terms of women producers having more egalitarian access to land.

Pending the effective implementation of this code, which is not likely to be easy, small specific actions could be initiated for women in the areas of livestock production and forestry. These actions would consist of giving support to women in terms of animal feed through the production of nutrient-rich fodder crops and the provision of plants and/or seeds of species such as windi bundu (*Moringa oleifera*) which the interviewed women favor greatly.

As socio-cultural barriers hinder the actions of male field agents towards women, efforts should be made to recruit female staff to be in charge of education, training, and extension activities with women. It is necessary that sensitization/animation campaigns be conducted among the men in rural areas to enlighten them on the need to involve women in all efforts designed to restore the ecosystem balance, and that any actions carried out without women's participation are bound to fail.

Furthermore, the survey revealed the dire need to embark on actions designed specifically for women whose living conditions are being rendered more difficult and precarious due to the degradation of the resource base. Certainly, men also suffer from the destruction of the ecosystem balance. However, the repercussions on women are more severe given their dependence on and specific interaction with the environment as traditional suppliers of water, firewood, wild foods and fruits, and animal feed. The depletion of these resources not only worsens their situation but also diminishes their control over these same resources. In light of this situation, women have a high stake in the fight for ecological rehabilitation and their exclusion can only lead to unquestionable setbacks.

I. IDENTITY OF WOMEN INTERVIEWED

I.1. Ethnic Grouping

The majority of the interviewed women were Zarma. Out of a total of 64 women, three claimed to be Hausa in Hamdallaye and three were Fulani in Falanke Kaina.

I.2. Age

For the interviewed women, the minimum age was 15 years and the maximum age was about 70 years. At Bokotili and Hamdallaye, most of women ranged in age from 31 and 40 years. At Falanke Kaina, the range was between 21 and 30 years.

I.3. Level of Education

Out of the 64 women interviewed, one had received formal education in French and three had received arabic education. None could read or write the local languages.

I.4. Marital Status

Since the use of female labor is essentially within the household and mainly concerns married women, the survey, for the purpose of this study, was limited to married or previously married women. The majority were married as compared to divorced and widowed. Furthermore, apart from Falanke Kaina (probably due to the fact that the households were much younger than in the other villages), polygamous families out-numbered monogamous ones. This has an impact on the domestic workload for individual women since co-wives can take turns in accomplishing certain tasks thus allowing some time free for undertaking income-generating and other activities.

I.5. Number of Children

The reproductive role of women and all its related commitments relates to a woman's availability to carry out the activities

expected of her. At a certain age, women are granted greater freedom of movement and action.

Women interviewed during the survey have between 0 and 10 children, the average number being 4.4 at Bokotili, 2.8 at Falanke Kaina, and 3.9 at Hamdallaye. Because the majority of these children are old enough to take care of younger children and to perform certain domestic and productive tasks (from 6 years plus), they are a vital support to their parents.

1.6. Social Status

While on the surface, the interviewed women seem to represent a homogenous group, differentiations exist according to caste and economic stratification. Unfortunately, time constraints could not allow a detailed analysis of this issue.

II. HOUSEHOLD ACTIVITIES

One cannot overemphasize the burdensome and repetitive nature of the domestic tasks performed by women - husking and pounding grains, hauling firewood and water, preparation of meals, etc. These duties, performed in the most rudimentary fashion, demand considerable time and energy, and continue from dawn to 11 pm.

Manually operated boreholes have alleviated the task of water provision in all the sampled villages. Now, it is the post-harvest activities (husking, pounding, and grinding of millet) and the search for firewood that remain the principal preoccupations of women. Thus, women have requested the installation of communally owned threshers and mills that charge moderate fees. Hamdallaye is the only village in the project zone equipped with a motorized mill, but overwhelmed by their domestic activities, women rarely use the machine, except on market days. The fee for grinding a tia (a unit equivalent to 2.5 kg) does not exceed 50 FCFA, but for a certain number of women, this price is too exorbitant.

In view of the on-going environmental degradation and deforestation, the women's task of providing firewood is increasingly burdensome. In particular, girls are assigned the task of collecting firewood, sometimes from distances as great as 7 km, leaving home early in the morning to return in the evening. One way of alleviating the burden of firewood collection is to curtail energy waste; the traditional three-stone cooking system is a high energy user. Improved stoves permit energy conservation of 30-50%. However, the introduction of improved stoves is limited to Hamdallaye where adoption is on a very limited scale.

In polygamous households where understanding prevails, women often take turns performing household duties, alleviating the overall burden. Also, older women have the option of passing on a share of their duties to their daughters-in-law.

III. PRODUCTIVE ACTIVITIES

Besides unlimited domestic duties, the majority of the women interviewed are involved in productive activities relating to agriculture, livestock, handicrafts, and trade. The search for income-generating activities to satisfy their family needs is a top priority for women. There is considerable diversity in women's economic activities as compared to men, and despite their limited opportunities and resources, these activities grant them a certain degree of economic autonomy.

III. 1. Agriculture

III.1.1. Access to Land

With the exception of three (one of whom is handicapped and another very old), all the interviewed women are involved in farming activities. Two women have been assigned the status of chef d'exploitation (head of the production unit), one a Fulani widow and the other, a married Hausa woman whose husband serves as a guard in the chief's house and hence does not cultivate. All the other women are dependent, cultivating generally three plots, loaned to them by their husband or a male relative under precarious title. Precarious because the land can be reclaimed at any moment and the length of the loan rarely exceeds one year. The exclusion of women from secure land rights, except in the absence of a male inheritor, is the rule.

It should be noted that the land cultivated by the two women chef d'exploitations does not belong to them. In both cases, the land is on loan. In compensation, the borrower pays a percentage of the production, set at 10% of the harvest, but which often depends on the actual harvest and the relations between the tenant and the land owner.

Other methods of acquiring land, such as renting or purchase, have not yet occurred in the watershed zone.

III.1.2. Plot Sizes

In the context of this study, it was not possible to determine the dimensions of the women's plots. But from all indications, it can be assumed that apart from the two women chef d'exploitations, women's plots rarely exceed 0.5 ha. It is probable that the size of a woman's plot correlates to her age which relates to her family commitments, family labor available to her, and her ability to hire labor.

III.1.3. Type of Crops Cultivated

Within the Zarma ethnic group, men cultivate millet (*Pennisetum spp.*) mixed with cowpea (*Vigna unguiculata*), sorghum (*Sorghum*

bicolor), maize (*Zea mays*). Women cultivate peanuts (*Arachis hypogaea*), vouandzou (*Vouandzeia subterranea*), and okra (*Hibiscus esculentus*) on their own plots or in backyard gardens. Another crop cultivated by the women is sorrel (*Hibiscus sabdariffa*) which is grown on the borders of the family fields to indicate the field boundaries.

The two women chef d'exploitation also cultivate millet, like the men counterparts. Another Hausa woman, an immigrant to Hamdallaye, cultivated cowpea initially as she had done at her previous site. However, influenced by her Zarma women neighbors, she soon abandoned this activity.

III.1.4. Access to Agricultural Extension Services

Women in the project zone are rarely targeted for extension activities. This is due, on the one hand, to the lack of female extension field staff and, on the other hand, to the fact that credit and loans are often granted on land ownership which excludes women.

Consequently, women's production techniques are rudimentary. A very few women, thanks to their husbands, have benefitted from the use of animal traction. Only traditional seeds are used; women complain of lack of access to improved varieties.

With regard to fertilizers, it is interesting to note that even organic manure produced by livestock owned by women is considered the property of the husband, as the windikoye (household head). Fertilizer is used only by the two women chef d'exploitation. According to some women, fertilizer input is not necessary because peanut and vouandzou "dislike" it and the clay soils where okra and sesame are cultivated are adequately fertile.

III.1.5 Output Use

In spite of their dependent status and subordinate position within the family production system, women have relative economic autonomy over the outputs from their personal holdings.

A large proportion of women's farm output is consumed within the family. A small part of it is distributed as donation either during or after harvesting. The proportion marketed is quite negligible, very often at the Wadata market in Niamey. Since the cooperative shop in Hamdallaye has not yet integrated women, they do not have the opportunity to market their produce through the cooperative system. Storing produce is only done when production is very high.

III.2. Livestock

The large majority of the women interviewed raise fowl (chickens and guinea fowl) and small ruminants (goats and sheep). Apart from the Fulani women, in very few cases did the interviewed women own cattle.

Most commonly women acquire animals through gifts, purchase (with prices ranging between 500 and 4,000F CFA), inheritance, habbanae, and finally barter. Habbanae is a Fulani custom whereby individuals who have no resources to purchase animals acquire them through the family unit, friends, or an alliance.

The number of livestock per woman varies (Table 1). The relatively few number of livestock is explained not only by the repercussions of repeated droughts (1972-1973 and 1983-1984), but also by the tendency to sell animals to meet needs. Due to the precarious nature the land rights, women use small ruminants as the priority form of savings and investment.

Table 1. Number of Livestock per Woman

	Total	Average	Intervals
<u>Bokotili</u>			
Poultry	24	2	0-6
S/ruminants	36	2	0-4
Cattle	9	4	0-7
<u>Falanke</u>			
Poultry	36	3	0-7
S/ruminants	51	4	0-10
Cattle	10	2	0-5
<u>Hamdallaye</u>			
Poultry	13		0-7
S/ruminants	20		0-6
Cattle	0		0

Feeding, watering and caring for animals is the responsibility of women. A woman may not sell her livestock without consulting the windikoye, and the sale transaction is not conducted by her but by her husband or male relative. However, the woman has the liberty to use the proceeds as she wishes.

Chickens and guinea fowl scavenge so feeding is not a problem. Keeping ruminants, however, is demanding and involves the supply of bran, zoru (water used to wash millet grain prior to grinding), crop residues, leaves and forage. During the dry season, animals graze freely on the fields and plateaus. In the rainy season, to keep the animals from destroying crops, livestock owners hire a Fulani herder at the sum of 500 FCFA/small ruminant and 1,000 FCFA per head of cattle.

Livestock, among the women interviewed, are sold in order to purchase cooking utensils, clothes for themselves and their children, and food commodities. Animals are also sold to meet urgent needs as in the case of illness or to finance family ceremonies such as baptisms and weddings.

According to the women, the major constraint in livestock production is the frequent occurrence of infectious and parasitic diseases. The regular outbreak of fowl plague constitutes a major handicap for raising poultry.

III.3. Other Activities

Other activities undertaken by the interviewed women mainly include handicrafts and to a lesser extent small scale trade and wage activities.

III.3.1. Handicrafts

Activities such as pottery, carding or spinning of cotton have largely declined with the introduction of manufactured goods. Today's handicrafts largely involve the weaving of mats, winnowing baskets, and déguéré (a type of basket made of rush). This is mainly done during the rainy season when the plant is abundant involving 15% of the women in Bokotili, 56% in Falanke Kaina, and 40% in Hamdallaye.

Food processing, also, is an important activity. This involves not only the processing of commodities for home consumption but also for sale as millet boule (millet flour mixed with milk or water which serves as the principal daytime meal), fritters, fried pancakes, copto (a mixture of leaves often the windi bundu plant and seasoned with diverse ingredients), mari bi (a condiment prepared from fermented sorrel grain), tousme (mixture of ground millet and plant leaves), and finally milk, cheese and butter, processed by Fulani women.

III.3.2. Petty Trade

Commercial activities generally involve women of a certain age who are free from maternal and domestic responsibilities. Only one tenth of the women interviewed are engaged in trading (at the Hamdallaye market). The essential products being traded include

agricultural raw materials, fruits, processed products, and in some cases, cola-nuts, cigarettes, and matches.

III.3.3. Waged Activities

Only a few women are engaged in activities where they receive payment either in cash or in kind. These include hair-dressing, selling of water, and midwifery.

IV. INCOMES

IV.1. Characteristics of Women's Income

Women's incomes either from the sale of farm produce and animals or from other sources are generally meager as compared to men. According to the women, limited liquidity is their main problem. However, the regular and all-year-round nature of their incomes, though meager, permits them to meet certain expenditures and family commitments throughout the year.

IV.2. Use of Women's Incomes

Generally, women use their incomes to purchase the following items: cooking utensils, bedding, mats (which every woman must possess in her home), snacks for children, cosmetics, and diverse articles. In the specific case of women who go to the market to sell their goods (often older, widowed or divorced women), part of the income is instantly used to buy condiments.

IV.3. Distribution of Family Properties and Responsibilities

Traditionally, family budgets are separated. Each member of the couple is assigned a well defined sphere of responsibility. According to Islamic concepts, the family head has the responsibility of providing for the food needs of his wife and children; the enforcement of this regulation is subject to ethnic variations. For example, if one compares Hausa and Zarma women from the point of view of their participation in family maintenance, it appears that the former have a larger contribution. Hausa women, like the men, produce staple food crops and thus provide part of the family's food requirements, notably during the hungry season.

Until recently, the participation of Zarma women in meeting household requirements was basically limited to the following purchases: plates and dishes, kitchenware, bedding, furniture (deemed as indispensable for a married woman since such properties form part of the items she should possess on the wedding day), snacks and supplementary food for children, cosmetics, and diverse items. When the family head is away as migrant labor and the granaries are empty, a sheep or a goat may be sold to ensure the

subsistence of the women and children. Nevertheless, the general rule, is for the husband's family to provide for his dependents which, in some cases, involves the supply of clothing by the brothers-in-law and cooking ingredients by the mother-in-law. Due to the deteriorating economic situation, women are finding it increasingly their responsibility to supply clothing for themselves and their children as well as purchase medicines. The transfer of certain responsibilities to women is likely to be accompanied by a certain evolution in the relations existing between husband and wife.

Opinions expressed by the interviewed Zarma men indicate their growing aspiration to have their wives assume a greater proportion of the household responsibilities. Such statements as the following were recorded: "with life becoming increasingly difficult, both parties should participate in the household's maintenance"; "since we have large families, if the men succeed in assigning a greater share to women for supplying food, ingredients, and clothing, we shall have less problems in making ends meet".

Such aspirations can only be attained when women, like their male counterparts, are given adequate support in their productive activities. This is the prime objective of the IMAW project for the coming years.

V. PARTICIPATION IN IMAW PROJECT

V.1. IMAW Project Activities

The project's scope of activities mainly consists of establishing demonstration plots where technical interventions (fertilizer inputs, improved seeds, adherence to planting densities, etc..) and anti-erosion activities are carried out. Currently fifteen men, mostly residents of Hamdallaye, have benefited from the project.

V.2. Extent of Women's Awareness

Issues relating to women's participation in the IMAW project have concerned those women whose husbands are involved in the project. Responses show that they have a marked lack of information concerning the project, its objectives and activities. Furthermore, there is much confusion in the minds of most of the interviewed women between this project and others. Only a very few of them are able to make any distinction between the various projects that have intervened in the area and are able to provide some vague information on the activities carried out by the IMAW project. Even more discouraging is the percentage of those who claim to have heard of the positive effects of recommended planting densities and to have participated in a demonstration on their husband's field. Among these, one tried the technique on her own plot with satisfaction. In some cases, the fertilizer supplied to

the men also benefited the wife's plots. With respect to soil conservation practices, no women are involved, as yet.

Women complain of being marginalized and disregarded. They offer such statements as "when the White men come, they only contact the men. When we ask the men the purpose of the white men's visit after their departure, they claim that the issue concerns only men". Women aspire to be accorded the same privilege as men when improved farming technologies are being disseminated.

IV. WOMEN'S INTERACTION WITH THE ENVIRONMENT

In view of their traditional role to provide water, firewood, wild food items and animal feed, women maintain a specific and special relationship with the environment. If their knowledge about topography and environmental protection appears less profound than that of their male counterparts (see study on "Land Tenure and Indigenous Knowledge of Soil and Crop Management", Tropsoils Bulletin No. 91-04, November, 1991), it is not the same for their knowledge about wild plants; the gathering of which constitutes a key activity.

VI.1. Wild Plant Collection

VI.1.1. Inventory

The commodities gathered by women include leaves, fruits, tree bark, roots, raw materials for handicrafts, and exudation products (gum arabic and resin).

The déli trees (gum arabic) are the batali, dagna, and déli-nya. The first two species are gradually disappearing if not completely disappeared.

Generally, fruit gathering is done by children (both boys and girls) while women and girls mostly collect leaves and tree barks. Teaching children to know, how to gather, the use, and purpose of the various wild products is done at an early age. Since the collection of roots requires some level of physical strength, this task is exclusively performed by young and adult men. According to some women interviewed, "in the matter of digging something up, women are not involved." Gathering honey (which is increasingly becoming scarce) is also a man's activity.

VI.1.2. Gathering Periods

Gathering constitutes a key activity of women in the watershed zone in the dry and rainy seasons depending upon the species.

The collection of darey continues all year round, that of gum arabic in the dry season, and finally the collection of hubey,

ganda foy or foyuutu during the rainy season. With regard to tree bark and roots, the operation is done only when the need arises, i.e., when a family member is sick, who are often young children.

VI.1.3. Use of Gathered Products

Women have a perfect knowledge of the specific utilization of each species, a knowledge which has accumulated and been transferred over generations.

The interviewed women listed the uses of the various species in terms of consumption (human and animals), energy, construction, and traditional medicines. No reference was made to the positive effect of certain species on soil fertility. While women clearly appreciate multi-purpose species, they given greatest preference to those which have a nutritive and curative function.

VI.1.3.1. Consumption

Human Consumption. Gathered products provide a substantial vitamin supplement to a food regime which remains more or less unvaried. Local people, notably women and children, consume the above mentioned wild foods, especially darey; less of the other species due to their growing scarcity. Equally appreciated by women are leaves used either in copto (boiled leaves accompanied with diverse ingredients) or in sauces. The most popular sauce leaves are fakku and hubey. Windi burdu is used to prepare copto.

Animals. Fodder species preferred by animals include the leaves of balasa, fugutu, kosey or kosorey, mufa, and subu nya.

VI.1.3.2. Firewood

The following species are used as firewood: bataley déli-nga, farka hanga, gao, garza, kiri sabara, and kongo zara.

VI.1.3.3. Construction Wood

The search for construction wood is a man's task. Nevertheless, this does not keep women from knowing about preferred woods. According to the interviewed women, the following species are used for the construction of huts and for fabrication of farm implements and mortars: bata, kokorbey, kubu, sabara, subu nya, and finally zamturi.

VI.1.3.4. Traditional Medicine

According to the women interviewed, the tree bark and roots mentioned above are used for therapeutical purposes. They are used to cure dysentery, diverse stomach ailments, piles, and finally witlow. Some of the species are also used by women as fattening ingredients and to stimulate breast milk for nursing mothers.

Generally, roots and tree bark are mixed for consumption after boiling. From a general point of view, the use of traditional medicine is on a gradual decline since the establishment of the dispensary in Hamdallaye.

VI. 1.3.5. Handicraft

In making degueres (a basket shaped object placed at the top of huts for decoration or to support a calabash), mats and winnowing baskets, the women use kobu or rush as raw materials. They complain that this resource is becoming increasingly scarce.

VI. 2. Environmental Degradation as Perceived by Women

As a result of uncontrolled exploitation of the natural resources base, environmental degradation has become a potent reality in the IMAW project zone. This situation has basically originated from an extensive agricultural production and pastoral system hitherto efficient but no longer compatible with the current social and economic transformations. In view of the high population growth, the system is no longer capable of responding to the needs of the local population. If the current trend of exploitation is not curbed, it will handicap women who are already encountering serious difficulties as confirmed by the statements made by various inhabitants of the project zone.

VI. 2.1. Impact of Environmental Degradation

Discussions held with women in the watershed zone indicate that, while they contribute to the destruction of the ecosystem balance, they remain largely ignorant of the magnitude of the environmental degradation which is occurring. They speak about degradation in terms of:

- gradual decline of agricultural output instigated by inadequate and irregular rains as well as dwindling fertility of the soils which are considered "old", "exhausted", and "dead".
- gradual reduction of and irregular rains: "since the drought of Bandaberi, roughly 20 years ago, the rains have become irregular and less abundant".
- scarcity of wood, shrubs, and fodder resources: "while previously (a period the villagers estimate to be roughly 20 years ago) wood collection required only a little effort as the forest was within limits of the village, one has to cover long distances today to find wood; added to this are the forest guards who provide constant supervision"; "before it was possible to gather whole sacks of leaves or full calabashes of deli in several hours; now it takes some months without ever obtaining the same quantity; it takes much more

effort for a less reward"; "many types of tree and shrub species are no longer available in the bush; the bush has become like our fields."

- reduction in the number of domestic animals: "while previously some of us could possess up to 10 goats and sheep, one should count himself/herself lucky to have a single animal. The last two droughts and diseases have caused this situation: we need support to reconstitute our livestock base".
- scarcity or even disappearance of several fauna species: "animals are no longer available, they have all escaped to seek refuge in "gourma" lands as they feel so much exposed due to lack of shelter trees"; "nobody can remember the last time he/she consumed game meat".
- increasing domestic workload: "we spend more time than before searching for fuelwood and gathering wild plants; the only area where positive change has occurred is water collection".

VI. 2.2. Causes of Environmental Degradation

Environmental degradation is rarely attributed to man-made factors, but rather is claimed to be of divine creation: "our yields are poor because in recent years, rains are irregular and inadequate, they stop as soon as the millet is heading out, thus causing the millet to wither". "Our fields are no longer productive as they are old, exhausted, and dead and we have no means of recuperating them". "God is the only supreme being with power over everything". Havoc caused by wind is also part of the low crop yields, but this is always attributed to divine forces and beyond human control.

A minority of the interviewed women see man as an agent in the destruction of the vegetative cover. But this explanation seems to be part of a certain xenophobic sentiment and constitutes the search for a "scape goat" since immigrants coming from Zarmaganda are said to be the cause of the on-going deforestation.

VI. 2.3. Proposed Solutions

Given that few of the respondents accord environmental degradation to man-made factors, it is not surprising that the majority see the deterioration of their living conditions from a fatalistic point of view and consequently as a problem with no remedy. The only solution is to seek God's grace.

Certainly, indigenous environmental preservation and conservation techniques exist (TropSoils Bulletin 91-04, 1991), but the involvement of women in these activities is quite discouraging. Women have little access to organic manure for reasons stated earlier. Most of the women claim to have only a vague idea of methods for minimizing wind erosion and for curtailing or managing

run-off water as indicated by the following statement: "The men should be consulted on such issues, we do not know much" (while their ignorance may be genuine, it also may be that in certain cases, this could be an affected attitude on the part of women in their effort to conform to the existing social norms where "men's affairs" need to remain secret to women). For externally initiated activities, the interviewed women again indicated only limited information. Since they have not been involved in the environmental restoration and preservation efforts being carried out by the IMAW project and other similar projects, they have not been apart of any technical advancements. Women are certainly aware of the restrictions imposed by the forestry services such as the prohibition of cutting trees, but the repressive, rather than educative role of the forestry agents, means that the real meaning of such prohibitions is not understood.

VI. 2.4. Role of Women in Natural Resources Management as Perceived by Men

The precarious nature of women's land tenure status has been discussed. This is a situation which remains a major constraint to land improvement efforts.

Almost all of the interviewed men feel that the current land tenure situation is normal and should be maintained: "It is quite normal that girls must not possess land to avoid the possibility of such land falling into the hands of strangers who may marry them"; "Women do not need to possess lands since they depend on us"; "They do not have the right to plant trees on the farms since that is the man's task. In any case, they use the leaves and fruits produced by the trees on our farms".

If women are traditionally less involved in land management, soil improvement, erosion control activities and do not participate in making decisions; if this exclusion is admitted and accepted by the majority of the men interviewed, what about environmental preservation and restoration activities initiated by external organizations? To this question, most respondents felt that the role of women should only be an extension of their domestic activities; for example, "Women should stick to their role of carrying water and food to working men". A minority of the men shared the view that women should be involved in such activities as carrying stones, digging holes, and watering the plants. These same men, however, did not think that women should participate in making decisions related to land management or in profiting from the resulting benefits.

This short analysis on how men perceive women's participation in natural resources management indicates the obstacles to tackle before women can be involved in the fight for ecological restoration.

VII. CONSTRAINTS TO A RATIONAL ENVIRONMENTAL MANAGEMENT

VII.1. Major Constraints to Women's Participation in Natural Resources Management

In addition to the historical, psychological, land tenure, legal, institutional, economic, technical and organizational constraints which generally impede the involvement of local communities in the rational management of natural resources, there are certain specific constraints which pertain specifically to women.

VII.2. Scope of Household Activities

Domestic tasks are one of the major bottlenecks to development activities in rural areas. The listing of such activities has become a leitmotif in development efforts targeting women. The four activities that take most of women's time include: fetching water, collecting firewood, pounding grain, preparing and cooking meals. Even though fetching water no longer represents a major problem given the installation of wells in the study villages, meal preparation and cooking continue to require a series of long and tedious operations. Environmental degradation increases the time women must spend in searching for firewood and fodder resources. Consequently, given the present situation, women cannot put much effort in development activities.

VII.3. Precariousness of Women's Land Tenure

The issue of land tenure for women is a key factor as it determines possibilities for soil improvement, intensification and reforestation.

The precariousness of women's land rights and their lack of control over land constitute a major barrier to their involvement in actions related to soil improvement and management. Insecurity leads to a lack of profit guarantee, so they are reticent to invest in land improvement actions. Men who are not owners of their lands fall in this same situation.

Besides not reaping any benefit from their labor, another factor that hinders women from improving their agricultural activities is their inability to secure credit. The ability to borrow is directly proportional to one's land and inheritance rights.

VII.4. Socio-cultural Constraints

The socio-cultural environment constitutes an obstacle because it confers on women an inferior status and places women under the permanent control of men (father, uncle, husband, son). Women can not undertake any action without prior approval from one of these men.

Also related to the socio-cultural environment are the following:

- anti-feminist prejudices of which women are victims; such prejudices lead women to question their ability to carry out tasks which do not fall within their domestic and family domains;
- men's reluctance to involve women in activities which do not fall within their domestic domain and their exclusion from public places and general assemblies where information is given and decisions made.

VII.5. Information Gaps

The gaps in women's information that originate from the separation of male and female spheres as imposed by the socio-cultural environment represent an important factor in non-participation.

For example, at the time of the project's inception, women were not involved in decisions concerning the actions to be undertaken and lands to be developed. Women therefore could not be asked to participate in project activities when their opinions had not been consulted and they knew nothing of the objectives and purpose. It must not be forgotten that if women do not participate in the decisions concerning lands to be developed, areas to reforest and species to plant, they will not be in a position to participate in the implementation of such activities or their evaluation.

VII.6. Barriers to Training and Extension Services Access

Most extension services do not have female personnel. Male extension agents, in general, pay little attention to women's role in agriculture, either because of their indifference or due to social norms which do not allow contact with women. Consequently, extension agents remain ignorant of the crops cultivated by women. Women's crops have not been the target of agricultural research and research results have not been extended to or applied by women.

In the field of livestock and forestry, technical assistants express indifference to women's activities for the same reasons as their agricultural service counterparts.

VII.7. Women's Organizational Capacity Weaknesses

Women's groups can be a strong factor to mobilizing women and providing a forum for members to deliberate, analyze needs and constraints. Such groups can also be a source of innovations. Finally, they provide women the opportunity to exert their influence and claim their rights. The lack of dynamic women's groups in the zone is a major handicap. The Association of

Nigerien Women (AFN), the only women's organization currently in place, operates in name only.

The above mentioned factors are the major constraints to women's participation in the fight for a balanced management of land and ecology.

VIII. ACTIONS PROPOSED FOR THE BETTER PARTICIPATION OF WOMEN IN ENVIRONMENTAL DEGRADATION CONTROL

It is obvious that, left to themselves, local communities will continue to manage their land resources based on an extensive and destructive mode in the absence of alternatives. Only outside assistance can help introduce some modifications. Solutions exist that can be applied, not only by the community as a whole, but more specifically by women. Specific measures can only succeed in the context of a general transformation of the production system including the related legislative, institutional, technical, economical, and methodological issues (the latter referring to the approach taken in working with rural populations). It is evident that such a transformation is long and difficult. That said, certain known and small-scale timely interventions could be carried out. Discussions with the women served to identify their priority needs which the IMAW Project should consider.

VIII.1. Burden of Household Work

No efficient or regular participation of women in development activities will be possible as long as they must spend 6 to 7 hours a day doing strenuous tasks performed under rudimentary conditions. It is therefore imperative to consider the reduction of household activities as a condition precedent to any action to be taken for the benefit of women. Household work can be reduced through the installation of and extension of simple and inexpensive equipment, both collective and individual.

Among the needs expressed by women in the IMAW Project intervention zone, a collective grain mill is the priority. Presently, only Hamdallaye has a grain mill which is privately owned. Since its use is subject to fluctuations in women's monetary resources, simultaneous efforts are needed to help women improve their productive capacity in agriculture, livestock production, etc. A grain mill can only make sense if solutions are found to women's lack of purchasing power. Furthermore, a collective grain mill can only play its expected role if men refrain from its control and management as much experience has shown. This requires that women be trained in mill maintenance and management.

The burden of firewood collection could be reduced by more efficient energy use such as by using clay stoves which are easy to construct. First, it would be possible to engage masons who would train dynamic and motivated women; these women, in turn,

would then pass on their knowledge to their fellow village women who eventually would be capable of building their own stoves.

VIII.2. Land Tenure

It is imperative that women's access be guaranteed to individual and collective property, to trees they have planted, and to all restoration benefits if one wishes to secure women's participation in the fight against ecological degradation; such is the case for all non-landed cultivators, men and women. This is to say that secure land tenure is the keystone of land intensification and improvement actions.

Considering the multiple and diverse constraints facing women, only a strong political will can succeed in lifting women out of their subordinate position. This is the meaning of the legal and institutional measures contained in the Projet de Loi Fixant les Principes d'Orientation du Code Rural et l'Avant Projet du Code de la Famille; which, if applied, would bring certain improvements and help elevate women from their inferior status. Article 95 of the Projet de Loi stipulates the principle of equal access for both men and women to any restored plot. However, issuing a decree or a law will be not be sufficient to counteract men's resistance and other obstacles; implementation will be more important.

Pending enforcement of the above mentioned legislation, one of the possibilities to enable women to enjoy usufruct rights over land for more than one year is to allocate a plot to a group of women who would develop it collectively. In order to secure the allocation, a possible solution might be a term lease, negotiated by the contracting parties. This plot could be considered as an example of research-action, "women and land security", which could also serve as a demonstration plot for improved production and environmental protection techniques.

VIII.3. Livestock

In view of women's precarious land tenure status, efforts should be made in the field of livestock production, namely small ruminants, which, as mentioned above, constitute the priority form of saving and investment for women. Solutions should therefore be found to the serious problem of scarce fodder resources (the growing scarcity will be increasingly detrimental to women as it will inevitably lead to restricted grazing liberties), fowl pest and parasitic diseases which decimate regularly fowl and livestock. A solution to feeding, might be the production of fodder crops. Close attention will be needed to ensure that men do not subvert this action to their sole advantage.

Regarding insufficient animal health protection, the IMAW Project should select among the various models being tested in Niger to find the one which could be easily applied. Training

para-veterinarians as done by the Zinder Agro-Forestry Project might be a possible solution. This project consists of providing beneficiaries with basic knowledge on animal feeding and care and supplying them essential drugs.

VIII.4. Forestry

Given the current situation, constraints impede women's participation in the planting of trees. An alternative is to facilitate their access to certain gathered products. The survey made evident the great value women accord windi bundu. Seeds or plants could be distributed to women to plant around their homes where they could be watered with household waste water. Over the long term, such actions can only be efficient if solutions are found to the water shortage problems, followed by appropriate education campaigns on the importance of tree and reforestation efforts.

VIII.5. Research and Extension

It is of utmost importance to extend research activities to encompass crops commonly cultivated by women: okra, sorrel, sesame, bambara nut, which may lead to the development of appropriate technological improvements. In terms of such agronomic research, it will be advisable to fully account for women's indigenous knowledge and skills.

VIII.6. Involvement of Women in Identifying Needs

An effective participation of women in project activities demands that women not be marginalized at the needs identification stage; only women can best determine their priority needs and the activities which interest them most. Therefore, it is important to engage female field agents whose duties will include, but not be limited to, informing women on all events and decisions relating to their community.

VIII.7. Need for Female Field Agents

Given the strong constraints that impede male agents from working with women, efforts should be made to engage female agents who will be responsible for organizing women and who can provide extension and training in the fields of agriculture, livestock, and forestry. The necessity of female extension agents is further justified by the fact that information rarely transfers horizontally from men to women in Niger given their separate socio-economic spheres.

In order to promote self-management, it would be very useful to identify local women who are influential and listened to by others who eventually could become local extension agents/facilitators.

VIII.8. Sensitization and Animation Actions for Men

Awareness and educational activities should not be limited only to women. Men also must be targeted in order to help them:

- understand that women can no longer be marginalized due to the fact that their involvement is a condition precedent to the success of environmental degradation control efforts;
- accept women's participation in actions concerning the community and land management;
- recognize women's full role as agro-sylvo-pastoral producers.

Given the evolution of production systems and the new environmental conditions, there is the need to embark on educational actions oriented towards both men and women in order to enhance their understanding of their respective rights of access to natural resources. This evolution is being accompanied, in effect, with an erosion of traditional rules relative to women that have served to fix and determine both men's and women's rights and duties.

IX. POSSIBILITIES FOR EXTENDING THE METHODOLOGICAL APPROACH USED IN THE HAMDALLAYE SURVEY

Having completed the survey, it is important to determine the extent to which the findings may be generalized. More specifically, it is necessary to examine the extent to which the methodological approach used in the specific case of Hamdallaye can be efficiently used to identify and evaluate the specific role of women in natural resources management in other regions of Niger. In this respect, the various participants who took the floor at the workshop jointly organized by TROP SOILS, INRAN and USAID agreed upon the validity of the approach used but recognized that specificities and peculiarities could exist according to the region. Issues that would need to be studied specifically by region include:

- women's household activities;
- women's productive activities;
- women's access and control over resources;
- women's management of such resources;
- men's perception of women's role in the management of the natural environment;

Answers to these questions will certainly show differences between regions, whether they be significant or not.

The present study required the mobilization of large financial and human resources. In order to achieve the same results at less cost and in a shorter period, the survey could focus on a specific number of basic issues such as:

- the role of women in production, with emphasis on land tenure rights;
- women's role as users of natural resources, highlighting their knowledge and specific skills about wild plants;
- the impact of environmental degradation on women's domestic activities, access to resources, and their control of such resources;
- women's perception of this degradation, its causes, and its consequences;
- the degree of women's participation in ecological rehabilitation efforts;
- the constraints to women's participation in the rational management of the environment;
- and finally the strategies to be adopted to ensure an active and efficient participation of women in the rehabilitation of the ecological balance.

To further reduce the study's costs, data collection in the field could be done by using the Participatory Rural Appraisal (PRA) (Méthode Accélérée de Recherche Participative) as a means of changing from the conventional survey approach. With respect to African francophone countries, such an approach is already being studied at a regional level. In Burkina Faso and Senegal, some institutions are sponsoring training and follow-up programs on this approach. It has the advantage of involving local populations from the beginning in the management process and ensures their continued participation through all the stages of planning and implementation of the entire natural resources management program. The quantitative evaluation of women's involvement in environmental management can therefore be integrated into the monitoring system of watershed development projects without embarking on a complicated and expensive study.

CONCLUSION

The general destruction of the ecosystem balance in the watershed is very well perceived, particularly in terms of the reduced vegetative cover and, more precisely, in terms of the decline in food crop production during the last twenty years. This was confirmed during the various interviews conducted during the course of this study in the IMAW Project zone. While much of the information obtained through these interviews is not new, it is worth mentioning the following points:

* In the performance of their domestic duties, women are suffering greatly from environmental degradation in terms of the duties traditionally assigned to them - search for water, fuelwood collection, wild plant gathering, and supply of animal feed; activities which have become more difficult, demanding, and require more and more time against diminishing returns. Consequently, women have little time for other economic and income-generating activities.

* If women recognize the gravity of environmental degradation and have begun realizing the relationship between this phenomenon and other factors like population explosion, they have not yet developed a clear and global perception of the causes leading to ecosystem deterioration or of the measures required to stop the process. The situation is compounded by the fact that women have been marginalized in the various activities initiated by the national technical services and external donor organizations; a marginalization which women have started questioning. There is, therefore, the absolute need to undertake a large-scale information and educational campaign among women to upgrade their awareness of the issue of rational management of natural resources.

* In connection with men's perceptions of women's role in natural resources management, some contradictions were noted during the course of the survey. While a considerable number of men are calling for greater participation of women in household responsibilities, they give them a minor role in the rehabilitation and preservation of the ecology; they see the female role as a mere extension of women's domestic duties (i.e., the supply of water and food to the male workers at the tree planting/afforestation/soil conservation site). Such a contradiction, among others, is explained by the fact that generally men ignore, or pretend to ignore, that women cannot significantly increase their productive capacity and resources as long as they remain marginalized in environmental preservation related activities. To counteract this situation, it is necessary to mount a wide ranging educational campaign among the men to enhance their understanding of women's agro-sylvo-pastoral role.

* The financial pressure no longer allows family heads to bear expenses which, according to Islamic concepts, fall under their sole responsibility and which are proportionally heavier than those for their wives. Notably, in periods of drought, men have considerable difficulties in assuming their responsibilities. Therefore, they rely more and more on their wives whose contribution is increasingly indispensable for the maintenance of the family unit.

* Women are living under increasingly precarious conditions as a result of environmental degradation. While men's rights and control of natural and productive resources may be increasing, women, on the contrary, see their access to and control of these resources on the decline. In the context of growing competition for productive resources, especially land, women can only become the first victims. If the access of women to agro-sylvo-pastoral resources is already precarious, this precariousness is likely to be compounded by the growing population pressure. If environmental degradation is allowed to continue at this very rapid pace while men increase their supremacy over resources, women will see their rights to these resources dwindle lamentably. As a result of this situation and contrary to what used to happen, landowners are beginning to reserve for exclusive use the fruit, leaves and wood from trees growing on their fields. The risk is then greater for women whose relative economic autonomy is gradually reduced as their control over the land, trees, etc. diminishes. The risk is also higher to the health and wellbeing of families as the significant nutritional supplement provided by non-crop foods decreases. It is therefore urgent, not only for the sake of simple equity but also for the health and well-being of women and children, who constitute the most vulnerable group, to educate communities in the rational management of their environment and the role each man, woman and child plays.

* The current situation is the outcome of both men's and women's role in the extensive, disorganized use of the resource base. Because women, just like the men, are responsible for the damages caused to the environment, they have to participate in the fight for restoring the ecological balance. The close interaction women have with their natural environment, their thorough knowledge of the forest resources, and their role as educators constitute valuable advantages in this regard.

Given the diverse and multiple constraints that hinder women, who constitute half of society, and women's implication in the fight for restoring the ecological balance, intensive efforts must be undertaken. Such an involvement is imperative as this category of the population constitutes the guarantee of land management programs.

Since some of the constraints to a rational management of the natural resources base are quite specific to women, strategies to be implemented in response to these constraints should be specific and should consequently deal with the sphere of domestic activities, the status of women in society, and her legal status. Thus, durable and sustained management of agro-sylvo-pastoral resources would not to be effective without profound changes; this involves modifications in the legal, institutional, organizational, and socio-cultural environment governing the land tenure system; in one word, a political willingness without flaw.

LISTE DES PLANTES CITEES DANS LE TEXTE

ZARMA	SCIENTIFIQUE	FRANCAIS
bagay	<i>Aristida sieberiana</i>	
balasa	<i>Commelina forskalaei</i>	
banguiza		
beta	<i>Aristida longifolia</i>	
bataley, batali ou batalia	<i>Cola lauriflora</i>	
boye	<i>Vitex doniana</i>	prunier noir
dadigni		
dagna	<i>Sclerocarya birrea</i>	anacardier
darey	<i>Ziziphus mauritania</i>	jujubier
déli-nya	<i>Combretum nigricans</i> ou <i>Combretum glutinosum</i>	gommier
dendi mufa		
diney	<i>Sclerocarya birrea</i>	
dubagara		fleurs de balanités
dussey		
fakku	<i>Corchorus tridens</i>	
fantu	<i>Detarium microcarpum</i>	
farka garbey	<i>Tephrosia obcordata</i>	
farka hanga	<i>Terminalia avicennoides</i>	
fegi mani	<i>Crotalaria areanaria</i> , <i>C. atrorubens</i> , <i>C. macrocalyx</i> ou <i>Aerva javanica</i>	
fugutu	<i>Ipomea involucreta</i>	
foyuutu	<i>Ceratotherca sesamoides</i>	
ganda damsi	<i>Tephrosia lupinifolia</i>	
ganda foye	<i>Ceratotherca sesamoides</i>	
gao	<i>Acacia albida</i>	gao
garbey	<i>Balanites aegyptica</i>	balanite (dattier sauvage ou du désert)
garza	<i>Brachiaria distichophylla</i>	
howdeni	<i>Limeum viscosum</i>	
hubey	<i>Amaranthus graecizans</i> , <i>Gynandropsis gynandra</i> ou <i>Merremia tridentata</i>	
jitti	<i>Acacia nilotica</i>	gonakier ou gommier rouge
kalthan	<i>Cassia obtusifolia</i>	
kassi	<i>Tapinanthus globiferus</i>	
kassi kirey		
kiri sabara	<i>Guiera senegalensis</i>	
kobu	<i>Hyphaene thebaica</i>	
koiratounbo	<i>Merremia pinnata</i>	
kokorbey	<i>Combretum glutinosum</i>	

ZARMA	SCIENTIFIQUE	FRANCAIS
kongo zara	Mirremia pinnata ou Mirremia tridentata	
kosey ou kosorey	Piliostigma reticulatum	
koufoto	Maema angolensis	
kubu	Combretum micranthum	
luley	Silerocarya birrea	
mufa	Annona arenaria et A. senegalensis	pomme cannelle du Sénégal
nine basey	Waltheria indica	
nonabassatagui		
sabara	Guiera senegalensis	nger, n'guere
sinesan	Cassia sieberiana	
souboumorou		
sixu nya	Andropogon gayanus	
tassa	Grewia bicolor	
tchappeata	Amaranthus viridis	amaranthe
tondifara	Gardenia sokotoensis	
turare		eucalyptus
zam-turi	Prosopis africana	
windi-bundu	Moringa oleifera	pois quenique ou nevedie