

PN-ABY-995



**DESFIL**

**Development Strategies for Fragile Lands**

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**GENDER-RELATED INCENTIVES AND CONSTRAINTS  
IN ADOPTING AND ADAPTING  
LAND-USE MANAGEMENT PRACTICES  
IN WEST AFRICA**

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Development Strategies for Fragile Lands (DESFIL)**

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## **I. PURPOSE OF ASSIGNMENT AND ORGANIZATION**

### **A. Purpose of Assignment**

The Development Strategies of Fragile Lands (DESFIL) project is designing a natural resources management (NRM) database to categorize land-use management practices according to user profiles (a user being an individual currently using a particular land-use management practice). The design of the database is based on the guiding principle of the AFR/ARTS/FARA Analytical Framework. DESFIL's point of entry to the NRM Analytical Framework is Level III—the identification of practices currently adopted by natural resources users. To further understand the characteristics of a user identified in Level III and the relationship of variables among analytical levels, the NRM database also examines practices according to users' profiles using Levels II, IV, and V of the NRM Analytical Framework.

The principal objective of this short-term technical assignment was to help DESFIL identify the critical variables (Level II) associated with the adoption or adaptation of regenerative agricultural practices to be included in DESFIL's approach to developing an NRM analytical framework database (see Annex A for Scope of Work). The second objective, not included in the original scope of work but later assigned, was to design a literature review database on FoxPro to analyze the cause-and-effect relationship among variables in land-use management practices and variables associated with factors that influence the choices resources users make concerning the management of their land.

### **B. Report Format**

This report is divided into five sections. Section I briefly describes the objective of the AFR/ARTS/FARA buy-in activity during Phase I and the purpose of this consultancy. Section II provides the background and context for the assignment. It discusses critical variables that might act as incentives for women to adopt improved land-use management practices, and constraints to women's participation in natural resources activities. Section III introduces the complex gender issue and provides a methodology to develop a theoretical profile to identify land-use management incentives and constraints from numerous practices. Section IV discusses the literature review database, provides a model of the layout and description of main subject line items, and offers research and project documentation suitable for land-use management practices. Section V contains comments and recommendations developed during this assignment.

## **II. BACKGROUND AND CONTEXT**

It is difficult to anticipate whether a new land management practice is likely to be accepted or adopted, since it often depends on critical variables that influence users and non-users and their decisions. These variable include land, labor, profitability and risk, appropriate technology, and government policies. In more defined terms, we address in this report the underlying incentives that influence an individual to change his or her behavior.

Farm management practice decisions are determined in part based on the availability and control of resources. This may include the quality and quantity of land, land tenure, control over economic benefits and land's ability to increase family welfare, and access to credit. To understand the parameters within which variables are defined, we need to ask what the conditions are that provide someone with the choice to adopt a land management practice. How are resources used and allocated? How do women's options vary from those given to men? What is involved in the decision making process to adopt a new practice?

To avoid repeating information presented in the annexes, this section provides a brief overview of these critical variables in the context of ownership of natural resources, division of labor, personal and social incentives, government policies, and institutions.

### **A. Description of Land-use Management Practices**

Many terms and definitions exist for land management practices. For clarity, the land-use management practices included in this study were limited to soil and water conservation practices, soil fertility enhancement practices, and agroforestry, in West Africa. The practices listed below were taken into consideration when developing questions for consideration for the NRM database, and in the review literature discussed later in this study.

- Biological contour barriers (grass bunds, perennial leguminous scrubs and trees)
- Tillage (manual and animal traction, tied ridges)
- Cropping systems (intercropping, zay, and demi-lunes)
- Improved fallows (leguminous cover crops and woody species, herbaceous, timber and fruit trees)
- Physical contour barriers (rock, earthen, and trash bunds; gully plugs/check dams)
- Crop Rotation (intercropping with N-fixing legumes and rotating with cereal crops)
- Residue (mulch) management (manure, composts, residue, green manure, ashes)
- Agroforestry (windbreaks, intercropping, pole trees, fuelwood and fodder trees)

### **B. Gender Differences in Land-use and Resources Management Practices**

Both men and women play critical roles in land-use management, but each group often has distinctive interests and roles in using, managing, and conserving natural resources. Land management incentives are strongly associated with access to and control of fertile land and credit, control over benefits, increased family welfare through improved production, status recognition, and government policies.

#### **B1. Ownership of Natural Resources**

Access to and control of land are pivotal prerequisites to adopting and adapting improved farm management practices. Control of resources means having the jurisdiction over the inputs and outputs of agricultural production, including how the land is used, what it is used for, and the rights to full benefits of revenues generated. Thus, long-term use of land, freedom to how the land is used, and reasonable compensation in return for the use of land are enabling conditions that influence user and non-user behavior.

Land tenure provides little security for women, since traditionally, women in patrilineal societies do not own land. Instead, they receive access to land through kinship relations with their husbands or extended family members, or through their social status in society. The most fertile land is reserved for communal or privately held family fields, while only the less productive, most exploited land is generally available for women's use.

Although there is much uncertainty in the conditions of borrowed land, such land creates more incentives for applying new practices than does public land. Private land tends to have more resource potential than public land, based on the simple notion that private means the owner has a long-term vested interest in the betterment of the land. Private land is lent on loan for short, medium and long terms, ranging from one to five years. However, even though private land generally has more potential than public land, the private lands women receive are usually the less desirable lands that are considered marginal due to their location, low soil fertility, and limited access to water. There is little incentive for women to invest labor time improving land when the likelihood of increasing its productivity within several years is unlikely.

Continuous management of a new practice on borrowed land can become increasingly risky for the borrower as productivity increases. An increase in land productivity can lead to a decrease in access rights to the land. As a means of control, lenders place strict guidelines on the conditions of land tenure, which consequently can influence what practice borrowers use. For example, use of fertilizer or animal traction are commonly not favored by lenders for fear that borrowers will claim credit for the improvement in land and thus declare ownership of the land. Increases in productivity, on the other hand, can be risky for borrowers, as these individuals fear that lenders will reclaim the land before completion of contract or before the borrower has reaped the benefits of her investments. The goal for borrowers, therefore, is to reap the benefits of the land in a short amount of time with as little investment as possible.

Above we have discussed the risk of increasing productivity and how it might influence farm management behavior. The nature of a practice can also have cultural connotations of ownership that influence the choices resources users make with respect to the management of borrowed land. Practices such as fertilizer or animal traction are financial investments for the long-term improvement of the land, and thus can be seen as a threat to the lender. In other practices, such as agroforestry, the rights to apply them to borrowed lands are more complex. Trees traditionally symbolize ownership—either of trees or the land on which they grow. On borrowed land, the question is whether the borrower has ownership of the trees or just of the fruit they bear. Trees have multiple purposes, offering not only fruit and fodder, but also material for fences on field perimeters for protection from stray animals. A fence, however, can symbolize a boundary, and thus potential ownership of land. Agroforestry, because of its symbolic connotations, is not encouraged and often not allowed on borrowed land.

## **B2. Division of Labor**

Incentives for and constraints to land management practices are inclusive—i.e., they require a thorough understanding of the division of labor between men and women in a given community to determine who has access and control over the inputs and outputs of a given practice. Women play a vital but often different role from men as community organizers, and this difference often determines not only their interest and availability in natural resources use, but their role as beneficiaries as well.

In many cases, the cost of adopting a practice is based on labor. The less labor-intensive the practice, the greater the incentive to learn and maintain a practice. Labor constraints can prevent new technologies from being adopted. It is important to understand what motivates a person's decision to adopt a new technology, and how a new practice may cause a change in the farming system, which can in turn determine the division of labor.

A farming system is an integrated process. A positive change at one point in the process may result in a negative change for someone else later in the chain of events. For example, the use of animal traction reduces men's labor time for clearing a given parcel of land. From the men's point of view, the cost of adoption is positive with respect to labor. However, plowing the land is only one activity in a range of farming activities and excludes the first and second weedings, which are primarily the responsibility of women and children. Despite the fact that animal traction is viewed favorably by men, it results in an additional burden to women's workloads, especially if the amount of land cultivated has increased. As this example illustrates, knowledge of the integrated process of farming production in a given culture is an important prerequisite to understanding the preferences affecting the choices of land-use management practices.

Acceptance of a land-use management practice also depends on the degree to which labor is needed for other family or community work. In the agriculture sector, women provide a substantial portion of labor on community and family fields, and in their own home gardens. As a result, adoption of new land management activities may be more limiting to women than men.

The timing of a given practice during the calendar year can also be a determining factor for women in their decision to be users or non-users, and may result in a conflict among farming system tasks. For example, a practice such as residue management or agroforestry can run up against labor constraints for women when the timing of the operation corresponds to the heaviest period of their responsibility for weeding, planting, or harvesting a second or third cycle crop.

Table 1 on the next page shows how to allow selective organization of data for gender analysis and how to explicate differences in community and family responsibilities between genders and the dependent relationship of gender-related activities involved in farming systems. The chart serves as a model to characterize farming system and other potential constraints to women's adoption of new technologies. It is important to note that male and female responsibilities within farming systems vary by community, class, and culture, and

thus, the chart should be used only as a point of departure for identifying gender roles in land-use management practices. Child labor is included under female division of labor.

### **B3. Personal and Social Incentives**

Social status plays a significant role in determining gender-related incentives for and constraints to adopting improved land management practices. Women are typically associated with low visibility, subsistence-level activities. Although they play a pivotal role in maintaining family income, health, and education, they have limited control over the benefits or outputs of agricultural production. They are not encouraged, and in many cases not allowed, to hold strong political or economic positions in their communities, especially if the results of their activities are visible.

Cultural norms set boundaries to women's access and control over production. The likelihood of a woman having complete control over the inputs and outputs of production are rare, even on borrowed land. Women's know-how of farming practices is traditionally neither recognized nor respected by men, and thus advice on improved land management practices is rarely solicited. On family plots, men determine when, what, and how inputs are applied. On borrowed land, women have more responsibility and choice—even within the conditions set by the lender—of how to manage the land and their investments. Women's rights to income generated from their private plots are a significant incentive to their choices to embark on and continue land management practices. This freedom of choice allows women to reinvest their returns in the practice or in a component of the farming system that can include means of transportation, improved quality of seeds, or hired labor.

Community beliefs that award women for engaging in land-use practices are difficult to identify in a broad sense and rarely documented in case studies. Because cultures vary in their beliefs, generalizations are not possible. Cultural practices and behavior have been shaped over time by ritual beliefs and respect for ancestral spirits and totems. These beliefs have an influence on gender roles in the communities socioeconomic system. For example, in some cultures women are restricted from planting certain fruit trees because they are considered men's crops, or because they are taboo and will bring misfortune. Even the gathering of fruit or leaves from trees can be considered taboo. The origins of such beliefs are cultivated and encouraged through generations and are difficult to change. However, change, even with all its difficulties, is inescapable as population increases, land becomes more limited, and the market continues to penetrate traditional socioeconomic systems.

**Table 1: Division of Labor**

<b>Activity</b>	<b>Exclusively Male</b>	<b>Exclusively Female</b>	<b>Shared by Sexes</b>
Clears and prepares fields			X
Maintains water sources		X	
Collects water		X	
Planting	X	X	
Replants			X
First Weeding			X
Land Maintenance after harvest		X	
Animal traction work and care	X		
Seed Planting			X
Seed Replanting		X	
Fertilization	X		
Pest Management	X		
Poultry Care		X	
Home Gardens		X	
Market Participation			
Cash Crops	X		
Traditional		X	
Market Transportation			X
Fuel Wood Collection		X	
Gathers Roots, Fruits, Berries		X	
Constructs Fences	X		
Tends Small Stock	X		
Tends Large Stock	X		
Landscaping		X	
Fishing		X	
Household Maintenance		X	
Meal Preparation		X	
Child Care		X	

#### **B4. Government Policy and Institutional Support**

Adoption and adaptation of improved land-use management practices are also affected by who has access to local government services and influence over local government actions and priorities. Government policies have significant influence on the conditions of land tenure through land taxes and accessibility to credit and technical assistance. In general, policies set social and economic boundaries that shape people's behavior. In the farming system, government policies influence the extent of women's role in agricultural production.

Government policies encourage gender discrimination by limiting women's opportunities to own land and access credit and technical assistance. Although women are important players in the farming system, their role is traditionally viewed as subordinate to men and less important for increasing household income. This perception is based primarily on the men's traditional role in managing cash crops and the technical support and resources provided to them from government services. Based on the structure of the market system and the direct effect of government policies on pricing and standards, the male farmer-to-government relationship has become mutually dependent. Extension services have an invested interest in assisting men rather than women as means to increase production of market crops, and thus, the national economy. Typically, extension services use men's, rather than women's, land for technical demonstrations. Test and transfer technologies and interventions, including assistance to communities in the adoption of improved agricultural technologies, target men rather than women. This relation fosters the traditional view that men have more to offer the economy than women. Despite these trends, however, increasing technical assistance to women would lessen the risk of adopting new practices and help increase women's economic benefits.

Women's influence over the priorities and actions of local government will only change if women are given more access to the basic resources of land, credit, and technical assistance to improve crop production. Government can help local communities develop farmer-to-farmer contracts for land use that give women more security to the land and make them less risk-adverse to new management practices. The government can also play a significant role in redefining terms of credit for women to decrease their dependence on their husbands for credit assurance. Access to credit is largely contingent on availability of assets, which in most cases is based on land ownership—a right that is limited for women. Improved and more appropriate rights to credit would serve as strong incentives for women to become self-educated, and would provide them with the opportunity to invest in improved technical practices that are presently inaccessible.

### **III. METHODOLOGY FOR IDENTIFYING USERS AND NON-USERS OF LAND-USE MANAGEMENT PRACTICES**

One of many challenges confronting DESFIL is identifying gender-disaggregated variables for land-use management practices, in order to develop user profiles. There are numerous practices, and as noted throughout this report, they are accompanied by complex incentives for women to adopt or not adopt them. We have already examined these incentives in a broad sense, which is all that is possible given the limited access to concrete

case studies. As a result, a suggested methodology for identifying users and non-users of land-use management practices is needed.

This section introduces a preliminary, one- or two-step approach for identifying incentives and constraints and choosing among land management activities. This approach can be used as an analytical tool in the follow-up of the literature review and, if warranted at a later date, adopted for a participatory rural appraisal.

The first step involves asking a series of questions to help define potential constraints and incentives. This approach simply recognizes and formalizes the subjective first step in identifying a profile of adopters and non-adopters among women's land management groups.

The second step is the development of a spreadsheet of secondary economic, social, and policy incentives associated with general land management practices. On the following page, we have provided such a spreadsheet, showing primary and secondary incentives for West Africa. The purpose of this spreadsheet is to show the importance of secondary incentives that are equally as important as the primary incentives noted in this report, but not captured in the NRM relational database. A database is only capable of measuring a limited number of variables and their relationships to other variables. However, not addressing secondary variables creates a wide margin of error. This fact needs to be taken into consideration during the development of all database profiles.

**Land management questions.** Because DESFIL is attempting to assess the causes and effects of land-use management practices, it is important to focus on identifying and defining incentives and constraints of gender-related practices, rather than ascertaining which practice is adopted. To increase understanding of the characteristics of users and non-users and the potential incentives of a given practice, the project has developed a set of survey questions. These questions were not designed to be used in the field, but to serve as an analytical tool that can be revisited throughout the project to monitor gender issues. The questions have been recast to conform with the format of the NRM Analytical Framework Practice database under Level III, and Level II, file 7 and 9.

Input for the development of these questions was solicited in interviews with gender specialists. A review of the documentation in the literature review database in Annex C also served as a resource for developing gender questions.

**Land Management Practices; Primary and Secondary Incentives  
In Adopting and Adapting Land – Use Management Practices in West Africa  
Development Strategies for Fragile Lands (DESFIL)**

Practice	Enabling Conditions	Economics Incentive	Social Incentive	Institutional Policy Incentive	Comments
General	Access to market transportation	Increase income from sales of produce; provides access to wider variety of produce.	Increase status recognition; status as senior wife or political leader increases rights to ownership or use of communal or privately – owned transportation (vehicle, push – cart, etc).		Men control women's mobility and discourage women from being financially independent.
General	Access to market information	Liberalized fruit and vegetable prices.	Increase in status	Receives current market information directly from extension agent.	
General	Access to storage facilities	Can store food over long period of time	May have temporary access to husband's or brother's storage due to migration		Storage facilities traditionally responsibility of men.
General	Labor Availability	Has access to labor that otherwise would be engaged in 1st weeding of family fields		Member of village association	Labor constraints are more evident during planting season and 1st weeding; labor becomes more accessible during 2nd weeding.
General	Location, quality and size of available land	Has use and control of land for 5 yrs or more; manageable size	Women have complete control of land preparation and harvest	Title to land; plot use by agents for trial interventions	
Animal Traction	Access to animals and plow		Decreases labor time & participants; social status determine access.		Traction might increase size of plot, resulting in increase need to weed.
Agroforestry		Increase soil fertility and production;	Labor time decreases overtime; increase availability of time for child care, leisure time or other income – generating activities.	Public awareness/promotional campaign	Trees do not require maintenance after second year; need ease pruning trees; men traditionally cut/trees.
		Subsidized seedlings		Subsidises for fertilizers removed	Department of Forestry promotes agroforestry by subsidizing purchase and transportation of seedlings.
		Increase fuel supply;	Decrease labor time used to collect fuel supply; increase security of family welfare	Market price for firewood reflect scarcity; land tenure	Young men traditionally sell firewood, completion for market sales may not be appreciated.
		Protect production of crops from roaming animals	Define boundries	Grazing Rights; land tenure	Men are traditionally responsible for constructing fences, even in cases of women's gardens; therefore, responsibility of planting live fences could fall under the duty of men; women restricted from planting certain trees; Men are traditionally responsible for applying fertilizer.
Organic Fertilizer	Access to water, mulch, dung	Increase crop production; lack of fertilizer; access to tools	Labor time decreases overtime; fertilizer applied to haome garden, not family plot		
Tied ridges		Increase yields; secure potential loss of crops		Unterraced land taxed	Women are typically given the most undesirable land, including lowland where flooding occurs.

## **IV. LITERATURE REVIEW CASE STUDIES AND BIBLIOGRAPHY**

The purpose of developing a literature review database is to identify determining factors of land-use management adoption that have been recorded in case studies through research and project documentation. The database in this study focuses attention on NRM practices in West Africa and was designed on FoxPro to maintain continuity with AFR/ARTS/FARA's use of and familiarity with this software.

Considerable data on agricultural practices and rural economies in West Africa exist, but little is presented in the context of how land-management practices affect land-use management decisions or how land-use management decisions are made in relation to other socioeconomic variables. The consultant's objective was to review the documents available on land-use management practices, target the sources relevant to the project to be included in the literature review database, and provide an analysis of data availability. The analysis performed on the division of labor in Section II, Annex B (gender-disaggregated questions), and a model chart "Gender Incentives for Land Use Management Practices" in Annex C are all tools developed for analyzing data for the document review.

Below is the literature review data layout developed on FoxPro. See Annex D for application of this model, and Annex E for the sources reviewed.

### **A. Literature Review Layout**

#### **A1. Introduction**

**Reference number** (each reference input is numbered)

**Authors**

**Title of book or journal**

**Article title**

**Pages**

**Year of Publication**

**Publisher and place**

**Country** (where the technical practice was introduced)

**Practice**

**Useful** (or not, for our purpose)

**Location of publication** (where it is currently located)

#### **A2. Category of Information**

##### **A2a. Source and Site**

A paragraph summarizing who, where, when, and how the intervention was introduced. This includes the history of the project(s) in the community and the effect of outside interventions on community behavior toward adopting a targeted practice.

### **A2b. Biophysical Conditions**

A brief paragraph summarizing local biophysical conditions.

### **A2c. Objectives of Interventions**

### **A2d. Technical Practice**

A summary of the technical practice or intervention introduced (e.g., water catchments, windbreaks, contour bunds, etc.).

### **A2e. Enabling Conditions**

Incentives for adopting the technical practice.

### **A2f. Constraints to Adopting the Technical Practice**

Concise one-sentence bullets listing constraints, e.g.:

- Lack of labor
- Lack of animal feed
- Annual changes in private plots for women
- Lack of credit
- Quality of available land

### **A2g. Comments on the Source**

This subsection includes notes that are useful background for understanding constraints and incentives, and any gender notes that are in the reference. These notes will depend on what is in the article that is not expected to be standard. Topics might include land tenure, access to credit, division of labor, farmers' perspective on policy and technical assistance, labor availability, migration, access to markets, and farmers' cash needs.

## **V. COMMENTS AND RECOMMENDATIONS**

There is no single incentive profile of a user or non-user of a given land-use management practice. It has been stated throughout this study that the conditions and economic, social, and political reasons for adopting or adapting a practice are too varied to allow a theoretical male or female profile. The decision making process on whether to adopt a practice is based on a set of interdependent variables of primary and secondary conditions and incentives, all uniquely defined by situation-specific circumstances. Thus, incentive profiles must be created case-by-case in the field.

The literature review revealed that there are limited data available on how opportunities and socioeconomic variables are linked to land-use management decisions. Considerable data on agricultural practices exist, ranging from scientific literature to overviews and assessments of

project implementation. Of approximately 70 sample reports and documents reviewed from the DESFIL and ARTS/FARA libraries, only a few were documented in the literature review as sources applicable to the DESFIL literature database. The majority of resources reviewed were too broad in scope technically or geographically, and thus were not included in the bibliography. Case studies in general left too much room for self-interpretation.

Findings show that socioeconomic rather than technical literature was more resourceful. Case studies with a socioeconomic emphasis provided more information on the history of projects in communities and the effects of outside interventions on community behavior towards adopting targeted practices. Incentives and constraints for adopting a technical practice were also more readily available through socioeconomic overviews. However, the socioeconomic literature typically lacked biophysical information and clear descriptions of the technical practices in question. Information on cultural norms and beliefs and the effects they have on men's and women's choices was limited.

The need for comprehensive case studies on how land-management practices affect land-use management decisions or how these decisions are made in relation to other socioeconomic variables is great, and these case studies should be seen as prerequisites to moving forward DESFIL's objective to identify incentives to adopt improved land-use management decisions.

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**ANNEX A**  
**SCOPE OF WORK**

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**Objective:**

Identify gender incentives for and constraints to adopting and adapting land-use management practices in West Africa.

**Tasks:**

- Develop a list of critical variables (enabling conditions) that might act as incentives for women to adopt improved land-use management practices.
- Identify constraints to women's participation in natural resources activities.
- Develop a theoretical profile of adopter and non-adopter women groups related to natural resources management interventions.
- Interview women with relevant field experience about incentives.

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**ANNEX B**  
**SUGGESTED SURVEY QUESTIONS**

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**Characteristics of Users of Practices by Gender (Level III)**

**I. Land**

- Are land and trees communally or individually owned?
- If communal, is land allocated according to seniority of gender and then among wives?
- Does X have ownership or access to this land?
- Can X get access to additional land?
- Is the use of land based on a written or verbal contract?
- If borrowed, how long does X have rights to land?
- Are conditions made on how the land can be used?
- Under what conditions does X's right to the land cease?
- Does land use change as men and sons take on new wives?
- Is there a social restriction on how much land is allocated to men and women that would prevent women from opportunities to expand their practices?
- On borrowed land, who has harvest and cutting rights?
- Is access to borrowed land threatened with increased land productivity?
- Are there owner restrictions on the kind of land improvement allowed?
- Are borrowers reluctant to increase land productivity through fertilization or use of manure for fear that the lender will reclaim land before the borrower receives investment returns?
- Does tree planting on borrowed land cause a threat to the lender, since it might symbolize ownership?
- Do borrowers restrict fencing (agroforestry) because it establishes boundaries and thus signifies ownership?

**II. Labor**

- Is there a shortage of labor resources during a certain period of the year (i.e., migration) that will affect the decision to carry out a land management practice?
- What constraints does X face given that she is obligated to work the family fields before her work in her own field? How does this differ from men's responsibilities?
- Does X work collectively or individually? If collective, is she a member of a cooperative or local women's group?
- Does X get assistance from her children? Age? Sex?
- Does X hire out for labor? If yes, what tasks does this person carry out?
- Does maintenance of the practice require low, medium, or high amounts of water?
- How many more hours per week does X spend fetching water as a result of taking on this land management practice?
- Is the water source be close to the field?
- How do labor activities between men and women differ from the family field responsibilities?

Are responsibilities of the practice clearly defined and understood among X's husband, children, and herself?

Are women dependent on men for particular tasks required to carry out this practice?

Does the labor demand of the land management practice become less difficult and less intensive over time?

Are garden crops/trees planted and harvested at different times from the family field?

Are there certain times during the season when women's workload is less, which would justify why a woman would adopt a new land management practice?

### **III. Capital**

Where do women get access to credit? Formal or informal institutions?

Are women's credit qualifications dependent on the status of their husbands'?

Is credit subsidized, short-term loans?

Are input costs considered a minimal expense?

Is there a market for produce?

Do women make a financial profit from the practice? If yes, what percentage of women's profit is reinvested in the practice?

How does the practice increase family welfare?

Is the product stored for capital gains or consumption at a later date?

### **IV. Access to and Control of Resources**

Who is responsible for management of revenues?

Does X have the power to decide how revenues are used, for example, if revenues will be reinvested in agricultural inputs, a social event, or family welfare (children's health, education, or clothes)?

Are women given a selection of land to choose from?

Do women have access to manure?

Does X have access to animal traction for weeding or is this task done manually? If access, is X an owner or does she depend on men for use of animals and plows? How often does she get access?

Does X have access to a tractor? If there is only one tractor in the village, does availability depend on status?

Do women have access to transportation? Does availability depend on seniority?

Do women spend a lot of time and effort planting and then lose control of the benefits?

Do men and women have equal access to agricultural tools?

Does X have access to storage?

### **V. Knowledge**

Where did X learn the practice? From mother, husband, extension worker, church?

Do women have direct access to technical assistance?

## VI. Sociocultural Status

Do widows and wives of headmen or chiefs vs. junior wives have different constraints and opportunities in terms of planting places, management, and labor payment?  
Do senior females have more autonomy?

## VII. Institutional

Does X belong to an association?  
If yes, what are the financial costs to being a member? Benefits?

### File 7: Perception of Resources Users regarding NRM practices, by Gender (Level II)

#### 6. Sources of knowledge about practice

- a. Where did women learn this practice? From their mothers, fathers, brothers, husbands, extension workers, or church?
- b. Do experimental crops require a management practice different from those practiced by women?
- c. Are men's rather than women's plots used for trial interventions?

#### 7. Finance: perceived financial cost/benefit of practice

- a. Does the practice increase resources availability (fuel, fodder, organic vegetation)?
- b. Are trees traditionally perceived as having multiple uses?
- c. Does the quality of land determine the type of crop women plant and its economic return (floods, eroded land)?
- d. Are trees grown for livestock fodder, to improve livestock production?
- e. Could cow dung as a fertilizer or soil conditioner outweigh the cost of agroforestry and rural woodlots?

#### 8. Social—perceived social cost/benefit of practice

- a. Is there an appropriate time in the crop cycle to start this practice?
- b. Is the decision to carry out a practice dependent on the crop cycle (cost benefit)?
- c. What constraints do women face given that they are obligated to work the family fields before they work their own?
- d. Who burns, clears, and prepares the fields for planting?
  1. If both men and women, do women have a say in what will be planted?
- e. Do men and women have different planting practices? If so, whose practices are recognized on a family field?
- f. If seed germination is needed, are women dependent on men to raise the seedlings?
- g. Do women plant the crops? If yes, do men and children help?
- h. Do women depend on men to cut and prune the trees as they get bigger?
- i. What are the perceived financial benefits?
  1. What is the expected time over which benefits from the practice can be met?
- j. Are women restricted from planting fruit or timber trees?

9. **Technical: perceived cost/benefit of practice**
  - a. Do women reach out for assistance or do they wait for an extension worker to come to them? Do they ask their husbands to speak on their behalf?
10. **Risk: perceived risk from using the practice**
  - a. Are the trees thorny? Hard to prune?
  - b. Do men apply fertilizers to women's gardens?
  - c. Do women apply crop residue from family fields to the composts?
11. **Tenure: perceived land tenure security associated with use of practice**
12. **Security: perceived enhancement of food security**
13. **Off-farm income impact of adoption**
14. **Time Run: perception of cost vs. time to benefit (returns)**
  - a. Is the market far from the practice site?
  - b. How convenient is the location of practice site to water, village center?
  - c. Is the garden managed on a part-time basis?
  - d. Does the practice provide fodder that was once gathered from the fields?
15. **Sociopolitical: perception of sociopolitical cost/benefit analysis**
  - a. Is it socially acceptable for women to hire help?
  - b. Are women dependent on men for preparing the seedlings?
  - c. Are women dependent of men for transportation?
  - d. Do women need to consult with their husbands about where to plant trees?
  - e. Do women traditionally plant trees/shrubs? Is it considered a taboo?
  - f. Do women involve men in the practice as a means to change cultural norms?
  - g. Are women allowed to plant trees that are taller than men's crops?
  - h. Does one's status in the village give priority access to transportation, tools, etc.?

**File 9: Socioeconomic incentives for using NRM practices depending on gender (Level II)**

6. **Cash**
7. **Food**
8. **Kind**
9. **Tax**
  - a. Are taxes levied on livestock production, reducing overgrazing and land clearance?
  - b. Do women collect grazing and water fees from herders to control and maintain vegetation and water flow?
10. **Profit**
  - a. Do women make a financial profit from this practice?

- b. Do women have to give a certain percentage of their produce to the land owner for collateral?
- c. What percentage of the wood is for household consumption and market produce?
- d. Is wood sold in the local market?

**11. Economic Stability**

- a. What is the fuel wood requirement?
- b. Is investment based on short-term (nutrients, humas) or long-term (soil conservation, climate control) incentives?
- c. Would a woman prefer to allot an entire area to a woodlot or a portion, leaving the remaining portion for consumption crops?
- d. Does a woman have the right to use her land as she wishes, even if the practice goes against the traditional practices of women?
- e. How do women use wood differently than men?
- f. Does the market price reflect growing scarcity of wood?

**12. Security**

- a. What percentage of crops planted are for household consumption?
- b. Do women plant crops that give continuous production?
- c. Do women plant crops that have a short season and quick return?
- d. Do the women's fields need to be protected from livestock and wild animals?
- e. Is cow dung used for cooking fuel?

**13. Risks**

- a. Do women traditionally practice monocropping?

**14. Tenure**

- a. Are trees considered communal?
- b. Do women practice agroforestry on private, public or borrowed land?
- c. Can a women plant a tree on her husband's, brother's, father's land and still have rights to its fruits?
  - 1. If yes, would the circumstances change if the fruits of the tree had a market vs. consumption value?
- d. Is it prohibited to plant trees on borrowed land?
- e. Are trees marked to identify ownership?
  - 1. If yes, are both men's and women's tree marked accordingly?
- f. Are the villages compact, leaving minimal land for cultivation around homesteads?
- g. Are women given less desirable land?
- h. Do women have other fields under cultivation?
- i. Do women harvest their gardens by themselves?
- j. Who is responsible for maintaining the land after harvest?
- k. What do women consider the most time-consuming tasks?
- l. Do women have access to other plots of land for home gardens?

**15. Credit**

- a. How do terms of credit for a woman differ from those for a man?

- b. Does X have choice in how to spend her money?
- c. Is this X's first credit loan?
  - 1. If no, how did she choose to use her other credit loans?
  - 2. Would she take out additional credit to expand/improve practice? Why?

**16. Market**

- a. Who is responsible for transporting goods to the market?
- b. Who is responsible for sales of traditional and nontraditional crops?
- c. What percentage of village crops sold at the local market are sold by women?
- d. Do women barter wood/crops with others in the village?

**17. Labor**

- a. Do women pay children to water or transport the seedlings?
- b. Are tree maintenance responsibilities clearly defined among men, women, and children?
- c. Does the number and spacing of the trees affect the labor time required?
- d. How much time in a day or week is allocated to collecting wood?
- e. Is the woodlot managed on a part-time basis?
- f. Do children help their mothers with pruning and watering?
- g. Are women responsible for tending sheep, goats, cattle?

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**ANNEX C**  
**LITERATURE REVIEW DATABASE**

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**A. Entry #1**

<b>Ref Number</b>	1
<b>Authors</b>	Critchley, W., C. Reij, A. Seznee
<b>Year</b>	1992
<b>Source</b>	Water Harvesting for Plant Production
<b>Article Title</b>	
<b>Volume</b>	II
<b>Pages</b>	134
<b>Publisher/Place</b>	World Bank, Washington, D.C.
<b>Country</b>	Burkina Faso
<b>Practice</b>	Contour bunds (permeable rock dam)
<b>Useful</b>	Yes
<b>Location</b>	Bill Fiebig's office

**A1. Category of Information**

**A1a. Source and Site (Background)**

The permeable rock dam project, funded by the Association Française de Volontaires, was formed in 1981 in response at the request of 13 villages in the Ressim Region of the Bam Province. Villages were responsible for collecting the rocks, funding 50 percent of the running cost of the lorry. If cash was not available then millet was accepted. Village groups were formed with an official who was responsible for technical, agricultural financial management of the intervention. Between 1982-1987, 148 permeable rock dams were build in the region between Kougoussi and Tikare on the Central Plateau of Burkina Faso. The area is inhabited by the Peul and Mossi people. The Peul are primarily pastoralist; the Mossi are pastoralist and agriculturalist.

The average population density is 45/km, which exceeds the ecological carrying capacity of the land. As a result, a large percentage of the young men migrated during the dry season to find work. Therefore, there is a lack of labor resources during an average of 6 months out of the year.

**A1b. Biophysical Conditions**

There has been a significant drop in rainfall over the past 20 years in the Central Plateau. Rain occurs from mid-June until mid-September. The soils are typically sandy clays or loamy sands. Approximately 15 percent of the land cultivated on the Central Plateau, and 90 percent of that land is cultivated with sorghum and millet. The area is inhabited by Peul and Mossi peoples.

### **A1c. Intervention Objective**

Although the literature does not specify which people requested the assistance of the AFVP, the reader assumes that the objective of the people was to decrease gully erosion and increase the deposition of silt and spreading of runoff water.

### **A1d. Technical Practice**

Contour bunds are long low structures across valley floors designed to control gully erosion and improve plant growth by causing deposition of silt and spreading of runoff water. Yields from land treated with contour bunds and planted with sorghum in the Rissiam region are 1.9 ton/hectares compared to 1.0 tons from untreated lands. Yields are said to increase with age.

### **A1e. Enabling Conditions**

1. Labor to collect stones
2. Lorry to transport stones
3. Funds to purchase lorry

### **A1f. Constraints to Adopting a Technical Practice**

### **A1g. Comment on Source**

According to the literature, this practice is labor-intensive and requires mechanized transportation. However, the results of the effort and its economic benefits are immediate; thus, it has been very successful in the area.

The literature does not specify the number of women involved with this practice.

**B. Entry #2**

<b>Ref Number</b>	2	
<b>Authors</b>	Feldstein, H., and S. Poats	
<b>Year</b>	1989	
<b>Source</b>	Working Together	
<b>Article Title</b>	Burkina Faso: Part I, Country and	Project
<b>Volume</b>	I	
<b>Pages</b>	77-97	
<b>Publisher/Place</b>	Kumarian Press, CT	
<b>Country</b>	Burkina Faso	
<b>Practice</b>	Tillage	
<b>Useful</b>	N	
<b>Location</b>	DESFIL Library	

**B1. Category of Information**

**B1a. Source and Site (Background)**

This case study is an evaluation of Purdue/SAFGRAD Farming System Unit (FSU) interventions in Burkina Faso by their members to learn about farming systems of the Mossi communities where they work. Three villages were targeted for intervention based on the criteria that all villages needed to represent a complete range of tillage practices, different agroclimatic zones, and agricultural potential. The villages were Bagasse, Nedogo, and Diapangou.

**B1b. Biophysical Conditions**

The Southern Mossi plateau contain weak aggregates. After a rain the soil surface dries and forms crusts which restricts water infiltration and aeration and increases rainfall runoff. In wet season, rainfall is highly unpredictable and in the dry season the harden soil makes replant cultivation impossible.

**B1c. Objective of Intervention**

To identify the principal constraints to increased food production; to identify technologies appropriate for farmers which can minimize the production constraints; to develop and implement a multidisciplinary research method which can guide production technology and production research to directly address these production constraints, and to identify the elements of that method which can be implemented in national farming systems research program.

Increase in yield from more timely planting, seeding, and weeding.

**B1d. Technical Practice**

Tillage by hand is a tradition practice; some households use animal traction. All planting is

done manually, by making a hold in the ground with a short handle hoe. where animals traction is use for weeding, lines ar traced out on the field to mark row spacing. Replanting may be required based on seed germination and plant emergence.

### **B1e. Enabling Conditions**

1. Access to fertile land
2. Available labor
3. Member of former credit group
4. Access to animals or lorry
5. Long-term tenure to land

### **B1f. Constraints to Adopting a Technical Practice**

**Quality of land.** People on eroded land are unable to do preplanting cultivation by hand due to severe soil erosion.

- **Quality of land.** People on eroded land are unable to do preplanting cultivation by hand due to severe soil erosion.
- **Lack of labor.** Labor demand is higher during the first weeding of millet and sorghum which coincides with planting of maize, rice, and groundnuts.
- **Lack of credit.** Formal credit is available to only head of households.
- **Lack of animal feed.** Lack of animal feed is a constraint to households that have access to animal traction.
- **Land tenure.** Private plots for women change year to year.

### **B1g. Comment on Source**

Yields increased from more timely planting, seeding, and weeding. Maize stocks are cut by men; little crop residue is left in the fields because stalks are used in the households and for animal feed. Migration for herders vary but usually occurs during two periods; September through November or November through May. Ruminants run fee and are tended by children.

Based on the response to questionnaires, the farmers indicated that their concern is subsistence agriculture;

**Land tenure.** There is communal, customary and individual land tenure. Women do not inherit land but obtain the right to the use of land through their husband. The best quality of land is reserved for communal fields. These fields typically provide higher yields because of the additional labor available at the optimum planting and weeding periods. On customary land, use of the land is paid in tokens (kolas, salt, or grain). Borrowers do not have rights to gather straw, firewood, of fruits and leaves from tree on borrowed land. Land is lent for short periods, not more than 5 years, and usually the less desirable land is on loan. In kaya, where tenure is customary, 36.6% have individual rights, 9.8% have customary, and 53.8% have borrowed. In Bangasse, 54% have access for 41 ha communal fields, the remaining 46% in private (9 ha cultivated by women, 24 by married men, and 2 ha by unmarried children).

Borrowers do not favor use of fertilizer or tree planting through fear of reclaim of land. Borrowers seemed reluctant to increase fertility through use of fertile, composts, soil water, or anti-erosion practices for fear that the owner would take back the land before the end of the contract and borrower would not get the return on the investments. Women are given use of borrowed land.

**Labor.** Work over communal fields take priority to individual plots. Over work in private fields, especially during the peak labor demand periods. Hired labor does exist and use for planting and first weeding, but labor is sparse and when asked shy they do not hire more labor, the farmers said there was no one to hire; everyone is busy with their own weeding.

Farmers' perspective for case needs: Cash is needed to pay head tax, medical supplies, traditional events, and rewarding family members with cloth for providing good agricultural labor.

Farmers' perspective on policy: Farmers said that prices do not affect their cropping and marketing decisions, but the land tells them what to plant.

**Socioeconomic conditions.** People feel obligated to lend land when asked which results in an overuse of fallow land. Now in over populated areas, farmers do not fallow land in fear of losing access to land.

**Credit.** Informal credit is available and active but typically used for food, clothes, and family obligations.

**C. Entry #3**

<b>Ref Number</b>	3
<b>Authors</b>	Office of International Affairs
<b>Year</b>	1990
<b>Source</b>	
<b>Article Title</b>	Saline Agriculture: Salt-Tolerant Plans for Developing Countries
<b>Volume</b>	
<b>Pages</b>	
<b>Publisher/Place</b>	National Academy Press, Washington, D.C.
<b>Country</b>	
<b>Practice</b>	
<b>Useful</b>	No, too technical; resource focuses on techniques of agricultural use of saline land and water
<b>Location</b>	ARTS/FARA
<b>Comments</b>	Resource focuses on experiences and opportunities in the agricultural use of saline land and water, and provides a technical overview of the current and potential use of saline land.

**C1. Category of Information**

**C1a. Source and Site (Background)**

**C1b. Biophysical Conditions**

**C1c. Objective of Intervention**

**C1d. Technical Practice**

**C1e. Enabling Conditions**

**C1f. Constraints to Adopting a Technical Practice**

**C1g. Comment on Source**

**D. Entry #4**

<b>Ref Number</b>	4
<b>Authors</b>	P. Dugue
<b>Year</b>	1985
<b>Source</b>	Soil Preparation in the Sudan Sahelian Zone; Prospects and Source Appropriate Technologies for Farmers in Semi-Arid West Africa
<b>Article Title</b>	
<b>Volume</b>	
<b>Pages</b>	33-53
<b>Publisher/Place</b>	Purdue University, Illinois.
<b>Country</b>	
<b>Practice</b>	
<b>Useful</b>	Yes
<b>Location</b>	ARTS/FARA

**D1. Category of Information**

**D1a. Source and Site (Background)**

**D1b. Biophysical Conditions**

**D1c. Objective of Intervention**

**D1d. Technical Practice**

**D1e. Enabling Conditions**

**D1f. Constraints to Adopting a Technical Practice**

**D1g. Comment on Source**

**E. Entry #5**

**Ref Number** 5  
**Authors** Putz, Francis and M. Pinard  
**Year** 1985  
**Source** Natural Forest Management in the American Tropics: An Annotated Bibliography  
**Article Title**  
**Volume**  
**Pages**  
**Publisher/Place** University of Florida, Gainesville.  
**Country**  
**Practice**  
**Useful** No  
**Location** ARTS/FARA

**E1. Category of Information**

**E1a. Source and Site (Background)**

**E1b. Biophysical Conditions**

**E1c. Objective of Intervention**

**E1d. Technical Practice**

**E1e. Enabling Conditions**

**E1f. Constraints to Adopting a Technical Practice**

**E1g. Comment on Source**

**F. Entry #6**

<b>Ref Number</b>	6
<b>Authors</b>	National Research Council
<b>Year</b>	1991
<b>Source</b>	Micro Livestock: Little Known Small Animals With Promising Economic Benefit
<b>Article Title</b>	
<b>Volume</b>	
<b>Pages</b>	
<b>Publisher/Place</b>	National Academy Press, Washington, D.C.
<b>Country</b>	
<b>Practice</b>	N/A
<b>Useful</b>	No
<b>Location</b>	ARTS/FARA

**F1. Category of Information**

**F1a. Source and Site (Background)**

**F1b. Biophysical Conditions**

**F1c. Objective of Intervention**

**F1d. Technical Practice**

**F1e. Enabling Conditions**

**F1f. Constraints to Adopting a Technical Practice**

**F1g. Comment on Source**

**G. Entry #7**

**Ref Number** 7  
**Authors** Winrock International  
**Year** 1987  
**Source** Ecological Development in the Humid Tropics: Guidelines for Planners  
**Article Title**  
**Volume**  
**Pages**  
**Publisher/Place** Winrock International, Arkansas  
**Country**  
**Practice**  
**Useful** No  
**Location** ARTS/FARA

**G1. Category of Information**

**G1a. Source and Site (Background)**

**G1b. Biophysical Conditions**

**G1c. Objective of Intervention**

**G1d. Technical Practice**

**G1e. Enabling Conditions**

**G1f. Constraints to Adopting a Technical Practice**

**G1g. Comment on Source**

**H. Entry #8**

**Ref Number** 8  
**Authors** International Food Policy Research Institute  
**Year** 1991  
**Source** Agricultural Sustainability, Growth and Poverty Alleviation:  
Issues and Policies  
**Article Title**  
**Volume**  
**Pages**  
**Publisher/Place** International Food Policy Research Institute, Washington,  
D.C.  
**Practice**  
**Useful** Possibly, but information scarce  
**Location** ARTS/FARA

**H1. Category of Information**

**H1a. Source and Site (Background)**

**H1b. Biophysical Conditions**

**H1c. Objective of Intervention**

**H1d. Technical Practice**

**H1e. Enabling Conditions**

**H1f. Constraints to Adopting a Technical Practice**

**H1g. Comment on Source**

**I. Entry #9**

<b>Ref Number</b>	9
<b>Authors</b>	National Research Council
<b>Year</b>	1992
<b>Source</b>	NEEM; A Tree Solving Global Problems
<b>Article Title</b>	
<b>Volume</b>	
<b>Pages</b>	
<b>Publisher/Place</b>	National Academy Press; Washington, D.C.
<b>Practice</b>	N/A
<b>Useful</b>	No
<b>Location</b>	ARTS/FARA

**I1. Category of Information**

**I1a. Source and Site (Background)**

**I1b. Biophysical Conditions**

**I1c. Objective of Intervention**

**I1d. Technical Practice**

**I1e. Enabling Conditions**

**I1f. Constraints to Adopting a Technical Practice**

**I1g. Comment on Source**

**J. Entry #10**

**Ref Number** 10  
**Authors** P.Dugue  
**Year** 1985  
**Source** Soil Preparation in the Sudan Sahelian Zone; Prospects and Source Appropriate Technologies For Farmers in Semi-Arid West Africa  
**Article Title**  
**Volume**  
**Pages** 33-35  
**Publisher/Place** Purdue University; Indiana  
**Practice** Animal traction  
**Useful** Yes  
**Location** ARTS/FARA

**J1. Category of Information**

**J1a. Source and Site (Background)**

**J1b. Biophysical Conditions**

**J1c. Objective of Intervention**

**J1d. Technical Practice**

**J1e. Enabling Conditions**

**J1f. Constraints to Adopting a Technical Practice**

**J1g. Comment on Source**

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**K. Entry #11**

<b>Ref Number</b>	11
<b>Authors</b>	International Food Policy Research Institute
<b>Year</b>	1987
<b>Source</b>	Soil, Crop, and Water Management Systems For Rainfed Agricultural in Semi-Arid Tropics
<b>Article Title</b>	
<b>Volume</b>	
<b>Pages</b>	
<b>Publisher/Place</b>	International Crops Research Institute for Semi-Arid Tropics
<b>Practice</b>	Tillage; animal traction
<b>Useful</b>	Yes; resource focuses on the bio-physical aspects of rainfed agriculture.
<b>Location</b>	ARTS/FARA

**K1. Category of Information**

**K1a. Source and Site (Background)**

**K1b. Biophysical Conditions**

**K1c. Objective of Intervention**

**K1d. Technical Practice**

**K1e. Enabling Conditions**

**K1f. Constraints to Adopting a Technical Practice**

**K1g. Comment on Source**

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ANNEX D  
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**ANNEX E**  
**PEOPLE CONTACTED**

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Gretchen Bloom, AFR/WID  
Rick Bossi, AED  
Mark Buccowich, Forestry Support Program, USDA  
Jim Esselmann, CDIE  
Valarie Este, GENESYS project, The Futures Group  
Judith Lansanski, World Bank, Consultant  
John Lichte, University of Florida  
Linda Lind, VOCA  
Mary Picard, AFR/ARTS/FARA  
Marianne Schmink, WID/USAID  
Sarah Workman, On-farm Seeds project, Senegal/Winrock International

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**ANNEX F**  
**MEETINGS ATTENDED AT ARTS/FARA**

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September 17, 1994  
October 22, 1994  
November 10, 1994  
December 9, 1994