



A PLOT OF ONE'S OWN

SA PROPRE PARCELLE

Gender Relations and Irrigated Land Allocation Policies in Burkina Faso

*Genre et politiques d'attribution des
parcelles irriguées au Burkina Faso*

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Foreword

The CGIAR Gender Program began in 1991 and has been supported by funding from Australia, Canada, the Ford Foundation, the International Development Research Centre (Canada), the Netherlands, Norway, Switzerland, the United Kingdom, and the United States. Its objectives are to assist the international agricultural research centers in addressing gender issues by: (i) strengthening the use of gender analysis in research aimed at technology development; and (ii) improving the conditions and mechanisms within the centers for promoting the recruitment, productivity, advancement, and retention of highly qualified women scientists and professionals. One of its activities is to make available to scientists and other interested readers materials which further the understanding of gender analysis in research.

We are very pleased to publish the paper prepared by Margreet Zwarteveen from IIMI for the International Congress on Irrigation and Drainage (ICID). This paper addresses the often contentious issue of who controls the resources for production, particularly land and, in this case, irrigated land. Generally, the person who controls productive resources has first call on their use and can determine who else may use the resource and under what conditions. The person who controls land usually gets a substantial portion or all of the product produced on it. Patterns of control of resources and benefits vary considerably between and within regions. In Africa, women's and men's independent income streams and expenditure responsibilities

are most pronounced. In the Gambia, men's control of "communal irrigated land" led to their taking control of rice production, formerly a woman's activity. The Burkina Faso case presents a different picture. In the irrigated agriculture project described here, providing women with their own irrigated plots has had a demonstrably positive effect on both men's and women's productivity and income. It is a salutary example of how recognizing women's roles and potential results in benefits for both men and women and their families.

For this paper, Ms. Zwarteveen received the 1996 N. D. Gulhati Memorial International Award, given triennially at ICID to "the best paper by a young professional." We are pleased that her four years at IIMI supervising and conducting case studies to learn more about how gender issues intersect with water management and use have been rewarded. The paper is an important contribution to policy considerations with respect to allocation and registration of land, and underlines the potential for improved food security and livelihoods by providing women with unconstrained access to or control of productive resources.

We are grateful to Heidi Marinaccio-Opet for her expert assistance in moving this paper into publication in record time, and to David Berman and his colleagues at Bayne Herrera Berman Communications Ltd. for their excellent design.

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IIMI's Women and Water Program

The Women and Water Program of the International Irrigation Management Institute (IIMI) identifies and analyzes the linkages between gender relations and irrigation development, with the dual objectives of:

- improving the welfare of women through better quantity and quality of water services to agricultural and nonagricultural uses; and
- increasing the productivity of water through participation of women in decisionmaking, managing and operating water resources, and irrigation systems.

IIMI's Women and Water Program activities start with the premise that increasing women's access to and control of resources (including land and water) is the most crucial element in improving their welfare, while at the same time contributing to sustainable and equitable management of irrigation systems or watersheds.

The first phase of the program (1992–1996) was primarily diagnostic in nature, aiming at the identification of gender

issues relevant to irrigation management, and irrigation issues that most strongly relate to broader gender questions. With funding from the Netherlands (the Dutch Ministry of Development Cooperation—DGIS) and Denmark (Danish International Development Agency—DANIDA), one literature review and five case studies in five different countries (Bangladesh, Burkina Faso, Nepal, Niger, and Sri Lanka), were conducted.

The second phase of the Women and Water Program will move beyond the diagnostic focus of the first phase and be directed at analyzing and understanding the determinants and implications of identified gender questions. To ensure that state-of-the-art knowledge is brought to bear on answering identified questions, IIMI closely collaborates with professionals from other research and development organizations around the world through its global Women and Water Program network.

David Seckler
Director General
IIMI

Abstract

Land allocation policies in command areas¹ of new irrigation systems rarely allow women to obtain an irrigated plot. Plots are normally given to heads of households only, the majority of whom are men. Even though there are a number of studies which suggest that allocation of irrigated plots to men only is one of the causes for the disappointing performance of irrigation projects in West Africa (Carney, 1988; Dey, 1990; Jones, 1986), normal practice in Burkina Faso continues to be the allocation of plots to male household heads only.

The reluctance to also allocate plots to women stems from a number of implicit and explicit assumptions about the intrahousehold organization of agricultural production, and about the roles of men and women therein. In particular, (a) there is fear that the allocation of plots to both men and women will result in lower overall irrigated agricultural productivity; and (b) the need for allocating plots to women is not clear, since it is thought that women will benefit from the plots of their husbands. In addition, unless plot sizes are varied, allocating more than one plot to a single household is considered to be inequitable in that it will lead to fewer households having access to irrigation.

The Dakiri irrigation system is one of the few systems in Burkina Faso where some women obtained irrigated plots on

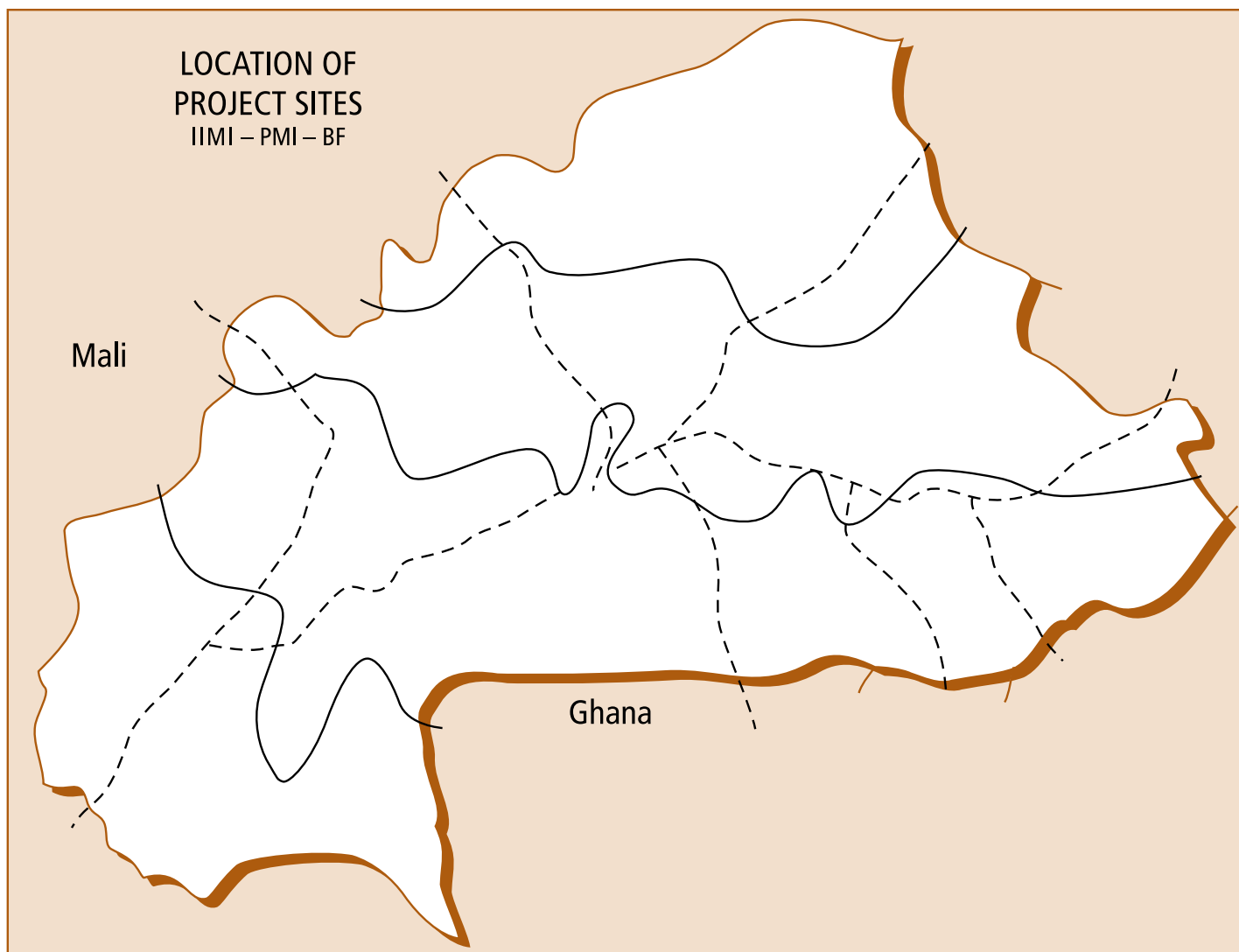
an individual basis: Sixty women (or 9 percent of the total number of plotholders) have an individual plot. Most of their husbands also have plots. This paper presents the findings of a case study that was carried out in the Dakiri irrigation system in 1995. The study explored the effects of the allocation of plots to both men and women by comparing the households in which only men are plotholders with those in which both men and women have access to irrigated plots. This comparison was made with respect to (a) the agricultural productivity of irrigated plots, (b) the labor contributions of male and female household members to the different plots and fields, and (c) the intrahousehold distribution of agricultural incomes.

The study findings show that the productivity of both land and labor are higher where both men and women have plots. Income received by women increases sharply, while the proportion of labor contributed by women to men's plots is virtually the same. It is important to recognize that Dakiri households in which both men and women have plots have more irrigated land than households where only men have plots, but the evidence suggests that allocating smaller plots separately to men and women would have positive production and social benefits.

¹ The total land area reached by an irrigation system.

LOCATION OF THE DAKIRI IRRIGATION SYSTEM

(EMPLACEMENT DU PÉRIMÈTRE IRRIGUÉ DE DAKIRI)



Resumé et conclusions

Dans la plupart des périmètres irrigués du Burkina Faso et d'autres pays Africains, les conditions d'occupation et d'exploitation des parcelles sont telles qu'il est presque impossible pour une femme d'obtenir une parcelle. Les comités d'attribution ont souvent tendance à privilégier les chefs de famille, qui sont en général des hommes. Bien qu'il existe de nombreuses études montrant que l'allocation exclusive des parcelles aux chefs de famille soit une cause importante des mauvaises performances de beaucoup de projets d'irrigation en Afrique, la pratique des politiques d'allocation des parcelles à Burkina Faso continue à privilégier les hommes par rapport à l'accès aux parcelles.

Le choix de n'attribuer les parcelles qu'aux hommes est déterminé par des idées souvent implicites sur l'organisation de la production agricole au sein du foyer et sur les rôles et capacités respectives des hommes et des femmes. En outre, l'attribution de parcelles individuelles se heurte à une opposition par crainte de voir des familles attributaires de plusieurs parcelles, tandis que d'autres en seraient privées. Un autre argument avancé contre l'attribution des parcelles aux femmes, est que cela diminuerait la quantité totale de main d'oeuvre disponible pour l'agriculture irriguée. Le raisonnement considère que l'attribution des parcelles aux femmes réduirait leurs contributions en main d'oeuvre aux parcelles de leurs époux, ce qui diminuerait les rendements agricoles des périmètres.

Contrairement aux pratiques usuelles, l'attribution des parcelles dans le périmètre irrigué de Dakiri, à Burkina Faso, a été faite individuellement au sein du foyer. L'active participation aux travaux d'aménagement du périmètre agricole constituait la seule condition d'obtention d'une parcelle. Ainsi, hommes et femmes avaient, en principe,

égalité d'accès. A Dakiri, il y a soixante femmes (soit 9 pour cent du total des attributaires) qui ont ainsi reçu une parcelle. Pour la plupart d'entre elles, l'époux est également attributaire.

Le présent article présente les conclusions d'une étude menée au périmètre de Dakiri avec l'objectif de comparer les foyers dont seul l'homme est attributaire d'une parcelle irriguée avec les foyers dont la femme a également obtenu une parcelle. Cette comparaison s'est fait en analysant les rendements agricoles, l'allocation de la main d'oeuvre au sein du foyer et en prenant en compte l'impact de l'aménagement hydro-agricole sur le foyer et sur le comportement individuel de ses membres masculins et féminins.

Traditionnellement dans la région de Dakiri, la production agricole pluviale est organisée au sein des ménages, constitué d'un homme, d'une ou plusieurs femmes et de leurs enfants. Le premier et le plus important objectif de la production agricole est la satisfaction des besoins alimentaires de la famille. La production céréalière (mil et sorgho) se fait avant tout sur le champs familial (non-irrigué), où tous les membres du foyer travaillent. La production céréalière est contrôlée par le chef du foyer, qui a pour tâche essentielle de nourrir sa famille. Au champ familial s'ajoutent les champs individuels. Presque tous les membres adultes de la famille, à l'exception du chef, cultivent des champs d'arachide, de haricot, et de sésame. Les produits de ces champs sont contrôlés individuellement. Beaucoup de femmes cultivent également des champs individuels de mil.

La priorité en ce qui concerne l'emploi de la main d'oeuvre familiale est accordée au champ familial. C'est en travaillant sur ce champs que les femmes "gagnent" en quelque sorte le droit de travailler

sur leurs propres champs. Le nombre exact de jours où une femme travaille aux champs familiaux, et le nombre de jours où elle est autorisée (en récompense) de travailler son propre champ est sujet de négociation entre époux et épouses. En moyenne, les femmes contribuent trente-cinq jours à la production céréalière des champs familiaux, tandis que les hommes y contribuent quarante-six jours.

L'aménagement hydro-agricole de Dakiri n'a pas fortement modifié la stratégie traditionnelle de production agricole. Les parcelles irriguées s'ajoutent aux champs de culture pluviales pour permettre aux exploitants de mieux satisfaire leurs besoins de consommation. L'agriculture irriguée n'a pas éliminée la culture pluviale, mais au contraire augmente le nombre total des champs cultivés. Quant à l'allocation de la main d'oeuvre familiale, la plupart des exploitants continue à accorder la priorité aux champs de culture pluviales dont la famille tire 80 pour cent de ces besoins alimentaires. Les parcelles irriguées constituent néanmoins un élément important dans la sécurité alimentaire des foyers; les individus détenteurs de parcelles disposent de plus de revenus et de biens et ont une plus grande marge de sécurité alimentaire que ceux travaillant exclusivement en champs de culture pluviale.

Les résultats de l'étude montrent que, contrairement aux idées à la base des pratiques usuelles, l'allocation des parcelles irriguées aux femmes comme aux hommes augmente les rendements agricoles sur le périmètre irrigué. Sauf pour les parcelles inondées, les exploitantes réalisent des rendements légèrement supérieurs à ceux des exploitants (5.12 tonnes par hectare contre 4.46 tonnes par hectare). Les données sur les rendements montrent également que, pour

une situation hydrique donnée, les rendements moyens des parcelles exploitées par des hommes dont la femme est également attributaire sont sensiblement identiques voire plus élevés que les rendements des parcelles où l'homme seul est attributaire (5.53 tonnes par hectare contre 5.38 tonnes par hectare pour les parcelles sans problèmes, et 4.28 tonnes par hectare contre 3.44 tonnes par hectare pour les parcelles en hauteur).

En effet, l'allocation des parcelles aux femmes ne diminue en rien la participation proportionnelle des femmes aux travaux des parcelles irriguées du chef de famille. En outre, le fait d'avoir une parcelle à soi augmente les revenus d'une femme. Cependant, l'utilisation de ces revenus est tributaire à la production des champs familiaux. En effet, si ces derniers ne satisfont pas les besoins alimentaires de la famille, la récolte des parcelles des femmes devra être utilisée comme complément à la production des champs collectifs. L'utilisation prioritaire du produit de toutes les parcelles est la consommation. Le surplus d'argent après satisfaction des besoins en consommation du ménage, est utilisé pour l'achat des vêtements et pour les dons. Bien que la plus grande partie du produit est utilisée pour la satisfaction des besoins du ménage, le fait d'avoir une parcelle augmente le pouvoir de négociation d'une femme dans le ménage. Elle est moins dépendante économiquement de l'époux et le fait qu'elle contribue plus à la satisfaction des besoins du ménage accroît le respect de l'époux pour elle et le respect qu'elle a pour elle-même.

A Plot of One's Own

FARM HOUSEHOLDS, GENDER RELATIONS, AND IRRIGATION IN WEST AFRICA

The introduction of irrigation in Sub-Saharan Africa holds the promise of increased food security and marketable surpluses by enabling farm households to cultivate two crops per year. However, realizing the income and subsistence potential of irrigation crucially depends on the availability of family labor for year-round agricultural production. In much of Africa labor, not land, is the most critical production input. Therefore, the main concern of many African farm households is to maximize returns on labor. Arrangements for access to and control over labor, and the products of labor, are crucial structuring principles in the intrahousehold organization of agricultural production. That is why household labor availability is not a simple function of the absolute number of adult household members, but is instead closely related to the intrahousehold division of rights and responsibilities. Gender is one of the main axes around which this division occurs.

In most irrigation systems plot allocation policies were based on the assumption that men were the main farmers, decisionmakers, and providers. Plots were allocated to only male heads of households because it was thought that women would benefit through their husbands (or other male relatives). The optimal size of plots and underlying estimates of labor availability were determined based on the belief that women would be willing and available to provide labor on their husband's plots. A number of studies have shown that these assumptions are based on a poor understanding of the actual intrahousehold organization of agricultural production in many West African societies.

In much of West Africa women have always done, and still do, independent work in addition to working for their husbands or male senior kinsmen. The effect is that many women combine their own independent farming activities with work done as unremunerated family labor on male-controlled family farms. This unremunerated labor is seen as the fulfillment of their duty as a wife, in return for which women enjoy the general welfare and security of the household. Labor exchange

arrangements take place in the context of a household economy in which sharing of resources in marriage does not always exist. Very often land, cattle, money, clothes, and much else tend to be owned separately by husband and wife (or wives). A joint family budget or single common purse out of which family needs are met is rarely encountered. Rather, the separate resource streams of husband and wife, which form the basis of their independent economic activities, involve a parallel way of keeping expenditure responsibilities separate. Often responsibilities for different aspects of household spending and consumption are conventionally divided, and there also is a complex division of responsibilities of providing different items of food (Whitehead, 1990).

How much labor a woman provides to the husband's fields often is the subject of intense negotiations and heated arguments between spouses. The implication for irrigation projects is that, unlike the normal expectations of project planners and designers, women are not automatically willing to contribute additional labor on the newly irrigated plots controlled by their husbands. In Cameroon, for instance, in order to acquire more than the minimum female labor input, men were obliged to pay their wives cash rewards, the size of which was directly related to the level of their labor input (Jones, 1986). In The Gambia women demanded compensation from their husbands for their work in the form of cash, a share of the rice harvest, or access to their own irrigated plot (Carney, 1988; Dey, 1990). In both cases if the husbands were not willing or able to provide their wives with some sort of compensation, women either withdrew or minimized their labor on irrigated plots. Because women's labor contributions fell short of expectations, anticipated yields could not be realized.

Both of the above studies and others suggest that the main reason women are reluctant to provide additional labor on their husbands' plots is that they are not sure of benefiting from the resulting incomes. Equally important is the very high importance women attach to some degree of economic independence through individual earnings which they themselves control. Especially in countries or regions with high rates of abandonment or divorce, women are quite motivated to secure control over household expenditures and to maintain independent incomes (Safilios-Rothschild, 1991:45). In the

Cameroon case, the compensation some women received for their labor contributions was higher than the income they could have earned pursuing their own farming activities. In spite of this they were unwilling to increase their labor contributions to their husbands' fields. This can be explained by their unwillingness to depend economically on their husbands (Jones, 1986).

One possible way to ensure that women better control the fruits of their work, and therefore ensure that enough labor is available for irrigated agricultural production, would be to provide women with their own irrigated plots. In Burkina Faso normal plot allocation practice in irrigation systems continues to privilege male heads of households when allocating plots. As a 1993 survey shows, the average percentage of female plotters in small-tank irrigation systems in Burkina Faso is 1 percent (PSE, 1993:9). At the same time, there is increased recognition that farm households' labor allocation decisions are a crucial factor in depressing productivity of irrigated plots and, therefore, in depressing returns to irrigation investments (Sally and Abernethy, 1994:4).

This paper presents the results of a study which explored the implications of individual allocation of irrigated plots in terms of intrahousehold labor allocation, agricultural productivity, and intrahousehold gender relations. Research was conducted in the Dakiri irrigation system in Burkina Faso during the 1994 wet season. In Dakiri some women obtained access to an irrigated plot: Sixty women (or 9 percent of the actual plotters) are individual plotters. Most of their husbands also have an irrigated plot. The study consisted of detailed, semistructured, individual and group interviews with male and female members of twenty households, ten in which there are a female and a male irrigated plotter, and ten in which there is only a male plotter.

The paper starts with a brief introduction to the Dakiri irrigation system and to the intrahousehold organization of production of households living in the Dakiri area. This is followed by a presentation of the study findings, and conclusions.

THE DAKIRI IRRIGATION SYSTEM: AN INTRODUCTION

SYSTEM DESCRIPTION²

According to an inventory taken in 1990, Burkina Faso has sixty-four small irrigation systems backed by storage dams (see the map on page 6 for the distribution of these schemes and for the location of the Dakiri system). The developed area of land for irrigation in all sixty-four systems is about 2,497 hectares. On average about 86 percent of the developed land is being used. Individual landholdings are relatively small, from 0.08 hectares to 0.25 hectares. Crop yields are moderate, and in those systems where rice is the main wet-season crop (about 70 to 80 percent of all systems) the seasonal mean yield obtained is about 4.4 tons per hectare.

The Dakiri irrigation system has a command area of 120 hectares, of which 112 hectares are being cultivated by 740 farmers. Individual plot sizes are either 0.08 hectares or 0.16 hectares. The Dakiri reservoir has a capacity of 10,460,000 cubic meters. The first irrigation season in Dakiri was in 1984. Most of the command area is cultivated with rice twice a year (cropping intensity is 200 percent). Total annual rice production is almost 900 tons, and agricultural productivity is around 4.7 tons per hectare, which compares favorably with figures for the rest of Burkina Faso. Table 1 presents an overview of the main features of the Dakiri system.

INTRAHOUSEHOLD ORGANIZATION OF AGRICULTURAL PRODUCTION

Intrahousehold behavior in the region of Dakiri is characterized by both cooperation and conflict between male and female household members with respect to the allocation of resources, labor, and income. Household members cooperate with respect to the collective goal of household survival; all household members contribute labor and income toward this goal. Conflict occurs basically around the individual goal of surplus accumulation. This conflict usually takes the form of disputes over the amount of labor women are entitled to work

² This information is based on IIMI Burkina Faso studies, results of which are presented in Sally and Abernethy, 1993 and 1994.

on their individual fields compared to the amount of labor they must contribute to the cultivation of the collective fields.

Most households in the Dakiri region consist of one adult male, one or more adult females, and a number of children. The adult male is considered the head of the household, which implies that he is responsible for managing all labor and other means of production, with the objective of feeding all household members year-round. Most important in terms of achieving food security is the so-called collective or family field. All household members are obligated to work on the rainfed collective field, on which sorghum and millet are

household member contributes about fourteen days of millet cultivation in the collective field, while each male household member contributes about twenty-five days. The total amount of adult female labor invested in the collective fields is, on average, thirty-five days, while the total amount of adult male labor is forty-six days. The exact amount of labor days each household member has to contribute is a matter of negotiation between spouses. Before agricultural activities start, husband and wife agree about the number of days the wife has to contribute to cultivation of the collective field. The agreed days a woman is authorized to work on her own field are called

“woman’s days.” Table 2 illustrates the differences between households with respect to the number of “woman’s days.”

Normally, the harvest of the collective field is stocked in the collective granary. Either women serve themselves out of this granary when it is their turn to prepare

meals, or alternatively the household head allocates shares to each of the “kitchen units.” These kitchen units are comprised of an adult woman and her children. If the production of the collective field exceeds consumption requirements, the surplus is controlled by the household head. He can use it for savings in the form of livestock, or he can use it to buy clothes for other household members as a token of appreciation for their labor.

Over the last decades productivity of rainfed agriculture has considerably decreased. As a result the production of the collective fields is seldom sufficient to meet family consumption needs. Households depend more and more on the production from individual fields for complementing that of the collective fields. This has forced women, often at the request of their husbands, increasingly also to produce basic food grains (millet and sorghum), whereas they used to cultivate only groundnuts and vegetables. They also continue to produce groundnuts.

Table 1. Main features of Dakiri Irrigation System.

(Caractéristiques principales du périmètre irrigué de Dakiri.)

Distance from Ouagadougou (km)	250 km NE	Size of landholding (ha)	0.08–0.16
Dam construction date	1959	Type of irrigation	gravity
Rehabilitation date	1984	Main canal capacity (l/s)	670
Catchment area (km ²)	2,300	No. of secondary canals	13
Reservoir volume (m ³)	10,460,000	Wet season crop	rice
Command area (ha)	112	Dry season crop	rice
Res. vol./Com. area (m ³ /ha)	93,390	Cropping intensity	200%
No. of farmers	740	Type of organization	Cooperative

SOURCE: SALLY AND ABERNETHY, 1993:4.

grown. In Dakiri the average size of the collective field is 1.7 hectares, ranging between 0.5 hectares and 4 hectares. In addition to the collective field, all the adult household members except the head of the household have access to one or more individual fields, which are most often allocated to them by the male household head.³ The average size of women’s fields is 0.47 hectares, ranging from 0.2 hectares to 1 hectare.

With respect to labor allocation, the collective field has absolute priority. Household members can only start cultivating their individual fields after they have complied with the obligation to work on the collective field. On average each adult female

³ Often men give to women those millet fields which are exhausted because the men themselves have been cultivating the fields for a number of years. Women then grow groundnuts on these fields, which they carefully fertilize with organic matter. When the fields are regenerated, the men again use them for millet.

Women store whatever they produce in their fields in separate granaries, and they themselves control and decide how it is used. As two men explained:

A woman never stores her millet in the same granary as her husband. In our region it is like this; it is what our parents have done. A man has his own properties and a woman as well. It has been like this since time immemorial. If the production of the man is not enough, in that case the wife gives hers to the household members.

Although they are the ones to control their own production, women do have the responsibility to complement the supplies in the collective granary when the year's harvest is insufficient to feed the family. A woman elaborates on the way in which production of the different fields is shared in her household:

When the husband's production is likely to be enough, we give him a share of our millet or we sell [some millet] and give him some money. When we expect a shortage of millet, we put all our productions together and consume everything. We give half of our harvest to the husband when the food shortage is minor. However, she who has more children has to contribute more: It is the husband who has decided it like this. He says that we (four women) should not give the same quantity. I, for example, have two kids and I give one bag and one tin (117 kilograms). The fourth wife who has one child gives three or four tins (51 kilograms to 68 kilograms), depending on her production.

In most years women do not sell any millet; all of it is used either to feed their own household or to help their parents. On average a woman's contribution is around 330 kilograms, compared to the average production from the collective field of around 1,950 kilograms. Of the harvest of groundnuts, women often give some to their husbands and sell the rest. The cultivation of groundnuts is and always has been an important source of individual income for women.

Table 2: Number of days a woman is entitled to work on her own farm in relation to her contributions to the collective field.

(Nombre de jours qu'une femme peut travailler sur sa propre ferme, comparé à sa contribution aux champs collectifs.)

Household type	Monogamous			Polygamous			
	HH1	HH2	HH3	HH1	HH2	HH3	HH4
No. of days on collective field	7	3	7	6	1	2	4
No. of days on woman's field	2	2	7	1	1	1	1

IRRIGATED AGRICULTURE⁴

The introduction of irrigation has offered households the possibility to increase annual agricultural output. However, it has not replaced traditional rainfed agriculture. Rather, farm households use the irrigated production to supplement rainfed production. Having access to one or two irrigated plots helps households meet consumption requirements. Although plot sizes of irrigated fields (0.08 hectares to 0.16 hectares) are relatively small compared to rainfed holdings (0.5 hectares to 4 hectares), productivity of irrigated land (3 tons per hectare to 5 tons per hectare) is very high compared to the 0.5 tons per hectare to 0.8 tons per hectare from rainfed farming.

The produce from the rainfed farm meets over 80 percent of the household's cereal needs. Irrigated agriculture provides the complement; most irrigated plotters use the income from the sale of paddy to purchase their requirements of millet and sorghum. Rice, the principal irrigated crop, is not part of the staple food of Dakiri households, but is considered a commercial crop or is reserved for special occasions.

⁴ Data presented in this section is derived from Sally and Abernethy, 1993.

INDIVIDUAL OR HOUSEHOLD PLOTS?

AGRICULTURAL PRODUCTIVITY

Allocation of irrigated plots to women is often resisted on the assumption that women will not produce as much as men, either because of time constraints or because of a lack of technical farming skills. Based on their experience, most farm household members in Dakiri do not agree with this assumption. Almost 60 percent of the interviewed women think there is no difference in agricultural performance between men and women, while 7 percent state that women can produce as much as men provided they receive some help from

decline. This fear is based on the assumption that if women are also given plots, they will reduce their labor contributions to male plots in favor of working on their own plots. Table 4 and Figure 2, which compare average agricultural productivity of male plots of households in which a husband and at least one woman have a plot with those in which only men have a plot, show that agricultural productivity for the first category of households is identical to or higher than that of the second category of households.

The study findings prove that the allocation of plots on an individual basis does not decrease, and may even slightly increase, productivity per plot and total agricultural productivity of irrigated land. As for the productivity of labor, there is no significant difference between female plots and male plots for households in which both men and women have plots: It is a little over 60 kilograms per person day. For those households in which only men have a plot, labor productivity is less than half, about 25 kilograms per person day, showing that efficiency of labor use increases sharply when women also have plots.

LABOR ALLOCATION

The cultivation of one or two irrigated plots obliges farm households to make a number of important decisions related to the allocation of labor among the different plots, especially in the wet season. Most farm

households continue to give priority to rainfed farming, due to its dependence on unpredictable rainfall. A delay in commencing the irrigation season is considered less risky because of the security offered by the storage reservoir. That is why many households start land preparation and transplanting of seedlings very late in the wet season: Most want to finish sowing their rainfed fields before embarking on irrigated production (Sally and Abernethy, 1993:8).

Households find different solutions to accommodate additional labor

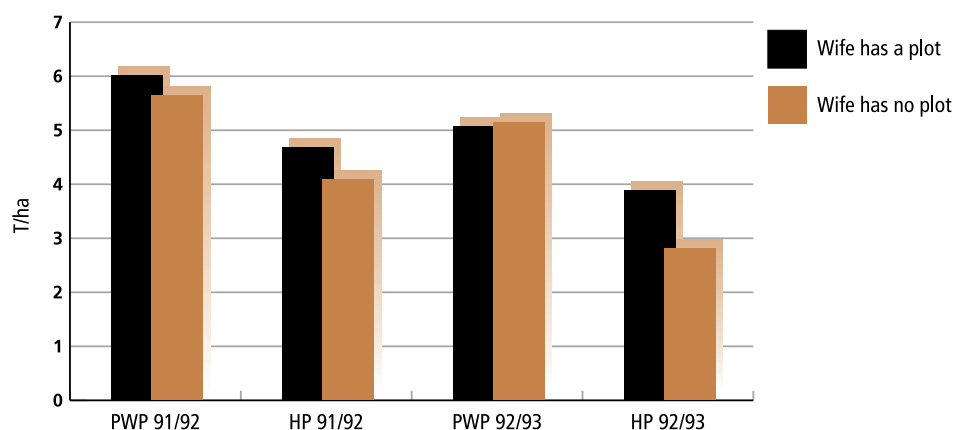
Table 4. Agricultural productivity of male plots per category of plotholder in tons per hectare.
(Rendements des parcelles travaillées par les hommes, par type d'exploitant en tonnes par hectare.)

Year	PWP		HP	
	WP	WNP	WP	WNP
1991/1992	6.00	5.63	4.68	4.08
1992/1993	5.07	5.13	3.88	2.80
Average	5.53	5.38	4.28	3.44

WP = WIFE HAS A PLOT WNP = WIFE HAS NO PLOT
PWP = PLOT WITHOUT PROBLEMS HP = HIGH PLOTS

requirements for the cultivation of irrigated plots in the wet season. In some households men and some children work in the rainfed fields, while women with a couple of other children take care of the irrigated plot. Others go to the rainfed fields in the morning and attend to the irrigated plots in the evening. In general those households in which only the man has an irrigated plot consider this plot more or less as a collective field. Usually (in seven of the ten sample households in this category) men and women collaborate in rice cultivation in a way similar to the cultivation of millet. Some women only help with weeding and harvesting, and not with the initial stages of

Figure 2. Agricultural productivity of male plots per category of plotholder in tons per hectare.
(Rendements des parcelles travaillées par les hommes, par type d'exploitant en tonnes par hectare.)



PWP = PLOT WITHOUT PROBLEMS HP = HIGH PLOTS

rice production. In two households women hardly provide any labor for rice cultivation, while in one case rice farming is entirely carried out by the eldest son.

In households where women have an irrigated plot, women in most cases (seven out of ten) carry out most of the tasks on their own plots themselves, often with assistance from their daughters. Women often try to optimize their time use by working an hour or half an hour on their plots when they are on their way to collect water.⁵ In two households the daughters are almost entirely responsible for irrigated farming, while there is one household in which husband and wife work closely together for both the plot of the woman and the man. Table 5 presents some examples of intrahousehold labor allocation arrangements for male-irrigated plots and collective fields.

On average households⁶ spend about 17 percent of their total labor capacity on irrigated fields. Since labor is the most critical production factor, households have a limited capacity to increase their total labor contributions to agriculture so as to accommodate additional labor requirements for irrigated plots. Part of the labor invested in irrigation would normally have been used for rainfed agriculture. The amount of labor households spend on agriculture is not simply a function of total household labor availability, but also depends on the intrahousehold division of rights and responsibilities. More specifically, the willingness of a particular household member

WP hh1	Male plots					Collective fields				
	FA	MA	FC	MC	OTH	FA	MA	FC	MC	OTH
	6.50	5.50	-	3.00	4.00	48.00	25.00	-	33.00	10.00

to invest (more) labor in irrigated agriculture depends on how much he or she can expect to get in return, compared to returns on labor on other activities.

In this respect one of the main hypotheses of this study was that women would be more motivated to contribute labor on irrigated agriculture if they have their own irrigated plots, because this gives them the possibility to directly control the benefits of agricultural production. The data confirms this hypothesis: In households where women have a plot, the total number of days they dedicate to irrigated agriculture is on average eleven days more than in households where women do not have a plot. Total household labor contributions to irrigation are ten days higher in households in which a woman has a plot. Some men leave a greater part of the tasks in rice cultivation to their wives when they also have a plot. Figure 3 shows how different categories of households allocate labor of different household members to irrigated plots.

Total female labor contributions to “male” fields (collective fields and male-owned irrigated plots) in households where women have a plot are 1.5 days lower than in households where women do not have plots, implying that women may slightly reduce their contributions to male fields in favor of their own

⁵ Because many women do not work full days on their own fields and plots, but instead go to their own fields whenever there is some time left, it was not easy for them to accurately estimate the number of days they worked on their own fields. Labor estimates for male fields are much more accurate, since female labor contributions to male fields are often the result of a previous agreement between husband and wife (or wives).

⁶ The atypical households and the households for which the data are unreliable have been left out of this analysis. The ten remaining households present a reasonable similar allocation pattern.

irrigated plots. However, when asked about this, all female plottolders replied that they continue to provide the same amount of labor on the male-controlled fields:

We help each other in the rainfed fields and in the irrigated plots. If you would not have been here to interview me, I would have been working in the collective field and this evening I'll go and work on my irrigated plot.

The amount of labor contributed by sons and daughters to irrigated agriculture is also higher when women have plots (sons with an average of one day and daughters with an average

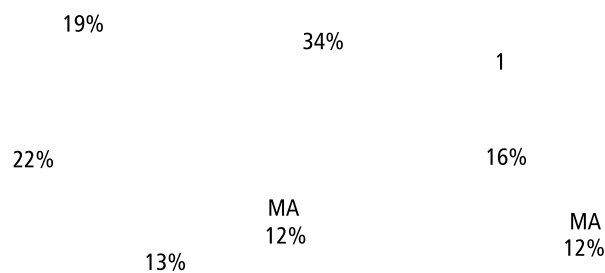
of three days per household); sons and daughters reduce their contributions to rainfed fields in favor of irrigated fields. The data show that women do not reduce their labor investments to their own rainfed fields when they have a plot.

Male labor contributions to irrigated agriculture vary greatly among households (from zero to twenty-two days), and are not related to whether women have a plot. Some husbands leave most of the work on the irrigated plots to their wives and children when the wives have a plot. If men assist with the cultivation of rice they do so mostly during land preparation, transplanting, and harvesting. When their wives do not have a

plot, men often also make the nurseries. Husbands who have more than one wife who do not all have irrigated plots usually restrict their assistance to the woman's irrigated plot so as not to make the women without plots jealous.

Per plot (the plots being 0.16 hectare) labor contributions in households where women have a plot are twenty-one person days, whereas households in which only the male head has a plot contribute thirty-two person days per plot. However, as the data in Table 4 shows, the higher labor contribution per hectare does not lead to an increase in yields per hectare for households in which only the man has a plot. This is probably partly an effect of scale (households in which women have plots cultivate twice as much irrigated land as households in which women do not have plots), and partly an effect of the higher quality of female labor.⁷

M



DISTRIBUTION OF BENEFITS

The fact that women are more motivated to contribute labor on irrigated production when they themselves have a plot suggests that they benefit more when an irrigated plot is in their name. In general the intrahousehold distribution of the proceeds of irrigated farming is very much a function of the productivity of the rainfed plots. When the harvest of millet from the collective field is too low to feed the family, the products from the individual plots (both rainfed and irrigated) are first of all used to buy additional millet. In most years this is the case, implying that the larger part of all irrigated produce is directly used for household consumption. As one woman explained:

My husband uses the income from the sale of paddy to buy millet because we never produce enough. Since our arrival here, we have always had to buy additional millet.

If my husband's production of millet is insufficient, I give him my earnings so that he can buy millet. I always have to do this because there is never enough millet.

In the occasional year the millet production from the collective field is sufficient, proceeds from individual rainfed fields and irrigated plots are used for other purposes. Men usually invest in livestock, which is the traditional means of saving:

It looks as if my millet supplies will be enough this year. I will buy animals so that if there is a very dry year I can sell some to overcome food shortages.

Sometimes they also buy clothes for themselves or their children, and a husband may also spend part of his income buying some meat or fish. He uses the rest of it for his personal needs, such as to purchase a radio or a little motorcycle.

Women usually use their income, or what is left of it after household food needs have been satisfied, to meet different kinds of small household needs. They may buy such things as fuelwood, spices, or kitchen utensils. As one woman explains, "Here, all the household expenses have to be met by women."

If there is money left after all expenses are met, women also invest in livestock and in clothes for themselves and their children. Table 6 shows how male and female plotters use production from their irrigated plots, while Table 7 compares

Table 6. Use of irrigated crop production, average of ten households, in kilograms.
(Utilisation de la production des parcelles irriguées, moyenne de dix ménages, en kilogrammes.)

	Male plots	Female plots
Sold	4120	4560
Household consumption	1360	800
Cooperative fees	920	760
Gifts to parents	-	520
Other gifts	160	320
Total production	6720	6800

Table 7. Use of the income of irrigated plots.
(Utilisation des revenus des parcelles irriguées).

Use, in order of priority	Male plots	Female plots
1	Millet	Millet
2	Animals	Spices, fuelwood
3	Clothes	Animals
4	Cash reserve	Clothes
5	Meat or fish	Cash reserve

the way in which women use the income from irrigated production with the way in which men use it.

All female plotters stated, and their husbands agreed, that their contribution to household supplies increased after having obtained an irrigated plot. Female plotters are very proud of their increased ability to contribute to the household's needs:

Before I got my irrigated plot I could not contribute much to the household because if you do not have anything, you cannot give anything, you cannot help someone else. Today my contribution is much more important. If I sell paddy, I can buy animals. If there is food scarcity, I sell some of my animals to buy millet.

I contribute much more to the household since I have my irrigated plot. Any kind of problem that occurs in the family, I

can help to solve, which was not the case earlier. My husband has his own plot; I do not give him anything. Now all my children have at least three sets of clothes. If my brothers or sisters have a problem, I help them.

It is primarily their greater ability to contribute to household supplies which accounts for female plotters' happiness with their plots. The reason why women prefer to contribute to a household's survival by contributing produce from their own plots rather than by providing labor on the plots of their husband is that cultivating their own plots makes them less economically dependent on their husbands. The fact that they themselves control the income is equally important because it allows women to use part of the income to support their own kin (parents, brothers, and sisters), and it increases their opportunities for individual accumulation of wealth in the form of livestock. In fact a comparison between female plotters and women without plots shows that plotters have on

average three to four goats or sheep and one cow, while nonplotters have only one to two goats or sheep and no cows.

The four effects of having an individual plot (ability to contribute to household survival, economic independence, ability to support kin, and individual wealth accumulation) together greatly improve the bargaining position of a woman within a household. The ability to significantly contribute to household survival is a cause of much pride, both within the household and within the community. In fact a man's appreciation of a woman is very much a function of her agricultural performance. Economic independence, wealth accumulation, and supporting of kin together strengthen a woman's fallback position: If for whatever reason she leaves her husband (or if he leaves her), she will be able to support herself at least for some time.

Conclusions

The study findings show that the productivity of both irrigated land and labor are higher in households where both men and women have an irrigated plot compared to households in which only men have a plot. Women are equally good or even better irrigation farmers than are men, while their motivation to invest labor in irrigated production significantly increases when they have an individual plot. Income received by women increases sharply when they have their own irrigated plot, while the proportion of labor contributed by women to men's plots is virtually the same. Through the increase in income, having an irrigated plot reduces women's economic dependence on men and strengthens their bargaining position within the household.

It is important to recognize that, in Dakiri, households where both men and women have plots have more irrigated land than households where only men have plots. The number of labor days per hectare therefore decreases when there is more than one plotter per household. The evidence nevertheless suggests that allocating smaller plots separately to men and women instead of allocating bigger plots to household heads has positive production and social benefits.

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