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Research Report

A Plot of One's Own: Gender Relations and Irrigated Land Allocation Policies in Burkina Faso

Margreet Zwarteveen

International Irrigation Management Institute

Research Reports

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Summary

Land allocation policies in command areas[1] 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 a number of studies suggest that allocation of irrigated plots to men only is one of the causes for the disappointing performance of irrigation projects in West Africa (e.g., Carney 1988; Dey 1990; Jones 1986), the normal practice in Burkina Faso continues to be the allocation of plots to male-headed households only. The reluctance to allocate plots to women stems from a number of implicit and explicit assumptions about the intra-household organization of agricultural production, and about the roles of men and women in this organizational setup. In particular, (1) there is fear among policy makers and project planners that the allocation of plots to both men and women will result in lower overall irrigated agricultural productivity, and (2) the need for allocating plots to women is not clear, because it is assumed that women will benefit from the plots of their husbands. Also, unless plot sizes are varied, allocating more than one plot to a single household will be inequitable as it will lead to a situation where fewer households will have 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; 60 women (or 9% of the total number of plot-holders) have individual plots. Most of their husbands also have plots. This report presents the findings of a case study carried out in the Dakiri irrigation system in 1995. This study explored the effects of the allocation of plots to both men and women, by comparing the households in which only men are plot-holders with those in which both men and women have access to irrigated plots. This comparison was made with respect to (1) the agricultural productivity of irrigated plots, (2) the labor contributions of male and female household members to the different plots and fields, and (3) the intra-household distribution of agricultural incomes.

The findings of the study in Dakiri show that both the productivity of land and the productivity of labor are higher in irrigation systems where both men and women have plots. Income of 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 households where 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]Command area is the total land area reached by an irrigation system.

A Plot of One's Own: Gender Relations and Irrigated Land Allocation Policies in Burkina Faso

Margreet Z. Zwarteveen

Farm Households, Gender Relations, and Irrigation in West Africa

The introduction of irrigation to sub-Saharan Africa holds the promise of increased food security as well as marketable surpluses by enabling farm households to cultivate two crops per year. However, realizing the income and subsistence potential of irrigation depends crucially on the availability of family labor for year-round agricultural production. In much of Africa, labor and not land is the most critical production input, and therefore the main concern of many African farm households is to maximize returns to labor. Arrangements for access to and control over labor and the products of labor are crucial structuring principles in the intra-household organization of agricultural production. This 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 intra-household division of rights and responsibilities. Gender is one of the main axes around which this division occurs.

In most irrigation systems, plot allocation policies are based on the assumption that men are the main farmers, decision makers and providers. Plots are allocated to male-headed households only because it is thought that women would benefit through their husbands (or other male relatives). The optimal size of plots and underlying estimates of labor availability are determined based on the belief that women would be willing and available to provide labor for their husbands' plots. Several studies have shown that these assumptions are based on a poor understanding of the actual intra-household 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 a woman's duty as a wife, in return for which she enjoys 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 (or wives), 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 is also a complex division of responsibilities

for providing different items of food (Whitehead 1990).

How much labor a woman should provide to the husband's fields is often 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 to newly irrigated plots controlled by their husbands. In Cameroon, for instance, to acquire more than the minimum female labor input, men were obliged to pay their wives cash rewards, the sizes of which were directly related to the level of their labor inputs (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 to irrigated plots. Because women's labor contributions fell short of expectations, anticipated yields could not be realized.

Both of the above studies as well as some others suggest that the main reason for women to be reluctant to provide additional labor to 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 that 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 not willing to increase their labor contributions to their husbands' fields, which can be explained by their unwillingness to economically depend on their husbands (Jones 1986).

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

This report presents the results of a study that was carried out to explore the implications of individual allocation of irrigated plots in terms of intra-household labor allocation, agricultural productivity, and intra-household 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 irrigated plots; 60 women (or 9% of the actual plot-holders) are individual plot-holders. Most of their husbands also have an irrigated plot. The study consisted of detailed semi-structured individual and group interviews with male and female members of 20 households. Each of these ten households had a female and a male holder of an irrigated plot and the other 10 had only male plot-holders.

The Dakiri Irrigation System: An Introduction

System description[2]

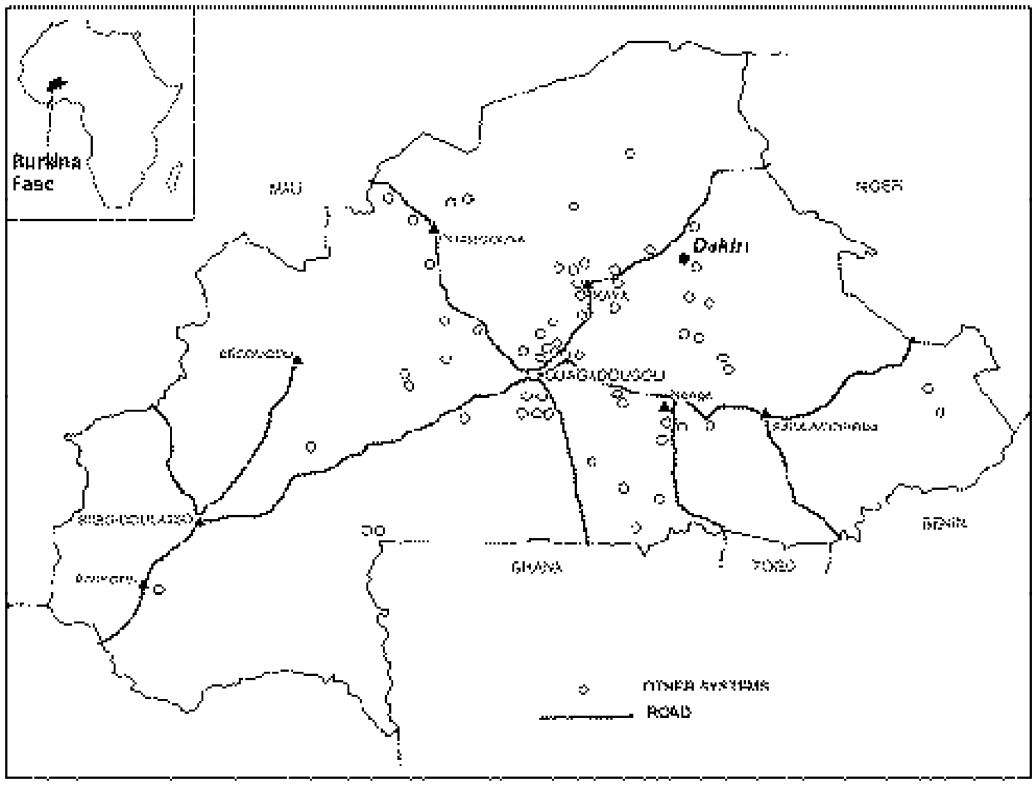
According to an inventory taken in 1990, Burkina Faso has 64 small irrigation systems backed by storage dams (figure 1). The area of land developed for irrigation in these 64 systems is about 2,497 hectares in all. On average, about 86 percent of the developed land is being utilized. Individual landholdings are relatively small, ranging from 0.08 to 0.25 hectare. Crop yields are moderate, and in those systems where rice is the main wet season crop (about 70-80% of all systems) the seasonal mean yield obtained is about 4.4 tonnes 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 or 0.16 hectare. The Dakiri reservoir has a capacity of 10,460,000 m^3. The first irrigation season in Dakiri was in 1984. Most of the command area is cultivated with rice twice a year, and the cropping intensity is 200 percent. Total annual rice production is almost 900 tonnes, and agricultural productivity is around 4.7 t/ha, which compares favorably with figures for the rest of Burkina Faso. Table 1 presents the main features of the Dakiri irrigation system.

Intra-household organization of agricultural production

Intra-household behavior in the region of Dakiri is characterized by both cooperation

FIGURE 1.
Location of the Dakiri irrigation system.



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

TABLE 1.
Main features of the Dakiri irrigation system.

Position from Ouagadougou	250 km NE
Year of dam construction	1959
Year of rehabilitation	1984
Catchment area	2,300 km^2
Reservoir volume	10,460,000 m^3
Command area	112 ha
Reservoir volume / command area	93,390 m^3/ha
No. of farmers	740
Size of landholding	0.08–0.16 ha
Type of irrigation	gravity
Main canal capacity	670 l/s
No. of secondary canals	13
Wet season crop	rice
Dry season crop	rice
Cropping intensity	200%
Type of organization	Cooperative

Source: Sally and Abernethy 1993:4.

and conflict between male and female household members with respect to the allocation of resources, labor, and incomes. Household members cooperate in respect of the collective goal of household survival; all household members contribute labor and income toward this goal. Conflicts occur basically with respect to the individual goal of surplus accumulation. These conflicts usually take the form of disputes about the amount of work a woman is entitled to do on her individual field, as compared to the amount of work she has to contribute to the cultivation of the collective field.

Most households in the Dakiri region consist of one adult man, one adult woman or more, and a number of children. The adult man 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 securing food security is the so-called collective or family field. All household members have the obligation to work on the rain-fed collective field, on which sorghum and millet are grown. The size of the collective field ranges from 0.5 hectare to 4 hectares, the average being 1.7 hectares. In addition to the collective field, all the adult household members except for the head of the household have access to one or more individual fields that are most often allocated to them by the male head of the household.[3] The size of women's fields ranges from 0.2 to 1 hectare, the average being 0.47 hectare.

With respect to labor allocation, the collective field has absolute priority. Household members can only start cultivating their individual fields after complying with the obligation to work on the collective field. On average, each adult female household member contributes about 14 days to millet cultivation in the collective field, while each male household member contributes about 25 days. The total amount of adult female labor invested in the collective fields is, on average, 35 days while the total amount of adult male labor is 46 days. The exact number of 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 the cultivation of the collective field. The agreed days a woman is authorized to work on her own fields are called the "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. Women either serve themselves out of this granary when it is their turn to prepare

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

meals, or the household head allocates shares to each of the "kitchen units." These kitchen units comprise an adult woman with her children. If the production of the collective field exceeds consumptive 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 inputs.

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

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

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

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

When the husband's production is likely to be enough, we give him a share of our millet or we sell 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 kg). The fourth wife who has one child gives three or four tins (51–68 kg), depending on her production.

In most years, women do not sell any millet; all is used either for feeding their own household or for helping out their parents. On average, a woman's contribution is around 330 kg per year, as compared to the average production from the collective field

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

	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 her own field	2	2	7	1	1	1	1

of around 1,950 kg per year. Of the harvest of groundnut, women often give some to their husbands while selling the rest. The cultivation of groundnut is, and always has been, an important source of individual income for women.

Irrigated agriculture[4]

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

The produce from the rain-fed farm meets over 80 percent of the household's cereal needs. Irrigated agriculture provides the complement; most holders of irrigated plots use the income from the sale of rice 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.

Individual or Household Plots?

Agricultural productivity

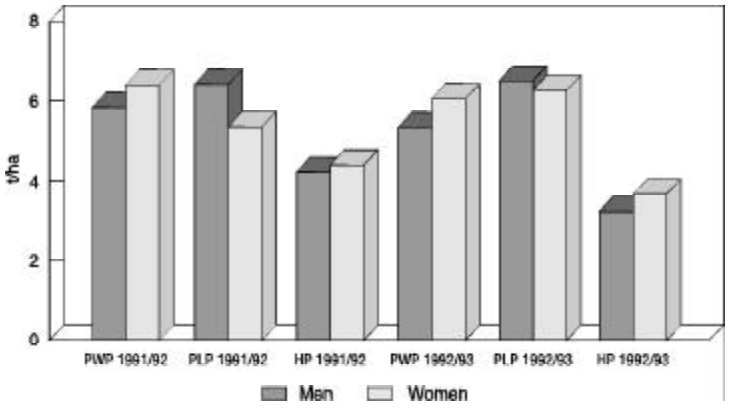
Allocation of irrigated plots to women is often resisted by policy makers and project planners on the basis of the assumption that women will not produce as much as men, either because of time constraints or because of a lack of technical farming skills. Based on their experience, most farm household 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 their husbands. Of the women, 36 percent think it might be difficult for women with small children to perform well. One woman explained:

I am working in the fields with my baby on the back. If the child starts crying, I am forced to stop working for a while. Except for that, the work is not difficult. Plowing with the hoe is heavy, but I hire laborers to take care of that.

A little over one third of the men (35%) also think that there is no discernible difference between male and female holders of plots, whereas almost 30 percent think that women have little free time because of their domestic duties and it may sometimes give rise to a constraint. Thirty five percent of the men think women are better rice cultivators, because they are much better and more careful weeders than men. They also attribute higher performance of women to the fact that women are more patient. One male respondent even claimed:

[4]Data presented in this section are derived from Sally and Abernethy 1993.

FIGURE 2.
Agricultural productivity (t/ha) of irrigated plots.[a]



[a]PWP = Plots without problems; WLP = Waterlogged plots; HP = High plots.

If you see a poorly maintained plot, with a lot of weed growth, it is always a man's plot and never a woman's plot.

These perceptions of men and women are confirmed by the production figures, as presented in table 3 and figure 2. The figures show that the average agricultural productivity of women's plots is slightly higher than that of men's plots in the case of plots without problems (PWP) and in the case of high plots (HP). It is only in the case of waterlogged plots (WLP) that the average productivity of women's plots is slightly less than that of men's plots.

Another fear that sometimes underlies the resistance of policy makers and project planners to allocating plots on an individual basis, is that overall agricultural productivity will 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 3 compare average agricultural productivity of men's plots of households in which a husband and at least one woman have a plot, with those in which only men have a plot, and 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 productivity, and may even slightly increase the productivity per plot and the total agricultural productivity of the irrigated land. As for the productivity of labor, there is no significant difference between women's plots and men's plots for households in which both men and women have plots: it is a little over 60 kg per person-day. For those households where only men have a plot, labor productivity is less than half, about 25 kg per person-day, showing that efficiency of labor use increases sharply when women also have plots.

TABLE 3.
Agricultural productivity (t/ha) of irrigated plots.[a]

Year	PWP		WLP		HP	
	Men	Women	Men	Women	Men	Women
1991/1992	5.81	6.37	6.38	5.32	4.21	4.39
1992/1993	5.31	6.04	6.50	6.26	3.22	3.67
Average	5.56	6.21	6.44	5.79	3.72	4.03

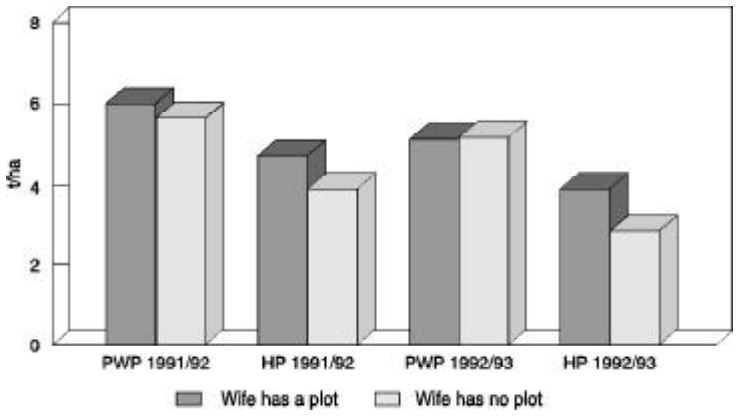
[a] PWP = Plots without problems; WLP = Waterlogged plots; HP = High plots.

TABLE 4.
Agricultural productivity (t/ha) of men's plots by category of plot-holder.

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

Note: PWP = Plots without problems; HP = High plots; WP = Wife has a plot; WNP = Wife has no plot.

FIGURE 3.
Agricultural productivity (t/ha) of men's plots by category of plot-holder.



Note: WP = Wife has a plot; WNP = Wife has no plot; PWP = Plots without problems; HP = High 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 rain-fed farming. A delay in commencing the irrigation season is considered less risky on account of the security offered by the storage reservoir. This is, for instance, why many households start very late with land preparation and transplanting of seedlings in the wet season; most want to first finish the sowing of their rain-fed fields before embarking on irrigated production (Sally and Abernethy 1993:8).

Households find different solutions to accommodate additional labor requirements for the cultivation of irrigated plots in the wet season. In some households, men and some children work in the rain-fed fields, while women with a couple of other children take care of the irrigated plot. Others go to the rain-fed fields in the morning and attend to the irrigated plots in the evening. In general, in those households where only the man has an irrigated plot, this plot is considered more or less a collective field. Usually (in 7 of the 10 sample households in this category), men and women collaborate in rice cultivation in a way similar to that of the cultivation of millet. Some women only help with weeding and harvesting, and not with the initial stages of 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 most cases (7 out of 10) of households where women have irrigated plots, the women carry out most of the tasks in their own plots often with assistance from their daughters. Women often try to optimize the use of their time 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 where husband and wife together work closely for the plot of the woman as well as that of the man. Table 5 presents some examples of intra-household labor allocation arrangements for men's irrigated plots and collective fields.

On average, households[6] spend around 17 percent of their total labor capacity on irrigated fields. Since labor is the most critical factor of production, households have a limited capacity to increase their total labor contributions to agriculture so as to meet

[5]Because many women do not work full days in their own fields and plots, but go there whenever time is available, it was not easy for them to accurately estimate the number of days they worked in their own fields. Labor estimates for men's fields are much more accurate as female labor contributions to men's fields are often the result of a previous agreement between husband and wife (wives).

[6]The atypical households and the households for which the data are unreliable have been left out of this analysis. The 10 remaining households present a reasonably similar labor allocation pattern.

additional labor requirements for irrigated plots. Part of the labor invested in irrigation would have been normally used for rain-fed agriculture. The amount of labor households spend on agriculture is not simply a function of the total household labor availability, but it also depends on the intra-household division of rights and responsibilities. More specifically, the willingness of a particular household member to invest (more) labor in irrigated agriculture depends on how much he or she can expect to get in return, as compared to returns to labor for other activities.

In this respect, one of the main hypotheses of this study was that women would be more motivated to contribute labor to irrigated agriculture if they have their own irrigated plots, because this gives them the opportunity to directly control the benefits of agricultural production. The data confirm this hypothesis; in households where women have a plot, the total number of person-days they dedicate to irrigated agriculture is on average 11 more than in households where women do not have a plot. Total household labor contributions to irrigation are 10 person-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 the latter also have plots of their own. Figure 4 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 person-days lower than in households where women do not have plots, implying that women may slightly reduce their contributions to male-controlled fields in favor of their own irrigated plots. However, when asked about this, all female plot-holders replied that they continue to provide the same amount of labor to the male-controlled fields:

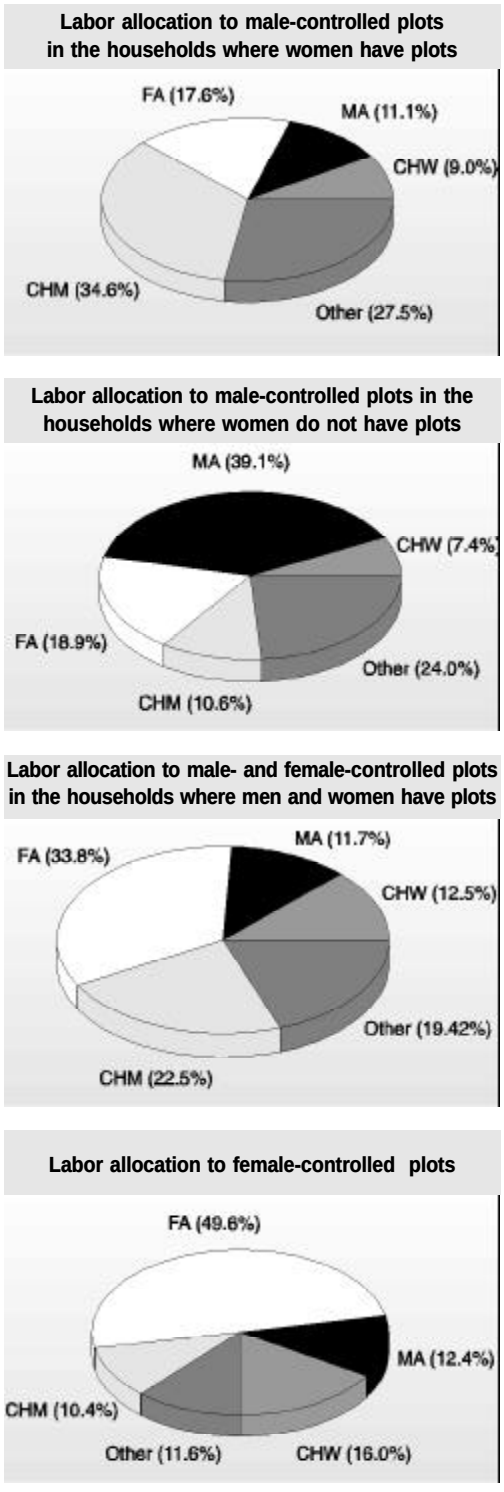
We help each other in the rain-fed fields and in the irrigated plots. If you would not have been here to interview me, I would

TABLE 5.
Labor allocation (person-days) to men's irrigated plots and collective fields; examples of eight households.

	Men's plots					Collective fields				
	FA	MA	CHW	CHM	OTH	FA	MA	CHW	CHM	OTH
Wife has a plot										
HH1	6.50	5.50	-	3.00	4.00	48.00	25.00	-	33.00	10.00
HH2	3.50	2.50	-	-	3.00	23.00	27.00	6.00	6.00	33.00
HH3	5.50	0.50	12.00	-	1.50	32.00	64.00	30.00	-	32.00
HH4	4.00	4.50	6.00	2.00	9.00	30.00	46.00	18.00	19.00	10.00
Wife has no plot										
HH5	3.00	3.00	14.00	-	16.00	42.00	-	15.00	86.00	7.00
HH6	13.00	15.00	-	-	17.00	-	27.00	10.00	50.00	1.00
HH7	13.00	30.00	-	-	5.00	2.00	33.00	20.00	-	3.00
HH8	-	22.00	-	-	3.00	41.00	59.00	-	-	27.00

Note: FA= Female adult; CHW = Female child; OTH = Other labor; MA = Male adult; CHM = Male child; HH = Household.

FIGURE 4.
Intra-household labor allocation to irrigated plots in different categories of households.



Note: FA = Female adult; MA = Male adult; CHW = Female child; CHM = Male child.

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 person-day, and daughters with an average of three person-days per household); sons and daughters reduce their contributions to rain-fed fields in favor of irrigated fields. The data show that women do not reduce their labor investments to their own rain-fed fields when they have plots.

Male labor contributions to irrigated agriculture vary greatly among households (from 0 to 22 person-days), and are not related to whether or not women have a plot. Some husbands leave most of the work in the irrigated plots to their wives and children when the latter have plots. If men assist with the cultivation of rice, they do so mostly during land preparation, transplanting, and harvesting. When their wives do not have plots, men often also make the nurseries. Husbands who have more than one wife all of whom do not have irrigated plots usually restrict their assistance to the women who have irrigated plots so as not to make the women without plots jealous.

In households where women have a plot the labor contribution to a plot is 21 person-days, whereas in households where only the male head has a plot the labor contribution to a plot is 32 person-days. However, as shown earlier under ***Agricultural productivity,*** (p. 6), the higher labor contribution per plot does not lead to an increase in yield per plot for households in which only the man has a plot. This is probably partly an effect of scale (households in which women have plots cultivating 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]

Distribution of benefits

The fact that women are more motivated to contribute labor to irrigated production when they themselves have plots suggests that they benefit more when irrigated plots are in their names. In general, the intra-household distribution of the proceeds of irrigated farming is very much a function of the productivity of the rain-fed plots. When the harvest of millet from the collective field is too low for feeding the family, the products from the individual plots (both rain-fed and irrigated) are first of all used for buying additional millet. Actually, in most years this is the case, implying that the larger part of all irrigated produce is directly used for household consumption. One woman explained:

My husband uses the income from the sale of rice 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 when the millet production from the collective field is sufficient, proceeds from individual rain-fed fields and irrigated plots are used for other purposes. Men usually invest in livestock, which is the traditional means of saving. One man explained:

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 for meat or fish or to purchase a radio or a small motor cycle or for his other personal needs.

Women usually use their incomes, or what is left of it after household food needs have been secured, to meet various household needs. They may buy fuel wood, spices, kitchen utensils, etc.

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 plot-holders use production from their irrigated plots, while table 7 compares how women and men use the income from irrigated production.

All female plot-holders and their husbands are unanimous about the increase in their contribution to household supplies after having obtained irrigated plots. Female plot-holders are very proud about their increased ability to contribute to the household needs. One of them explained:

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 rice, I can buy animals. If there is a 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

TABLE 6.
Use of irrigated crop production (kg) from men's plots and women's plots (average of ten households).

	Men's plots	Women's plots
Sold	412	456
Household consumption	136	80
Cooperative fees	92	76
Gifts to parents	-	52
Other gifts	16	32
Total production	672	680

Note: Part of the production is unaccounted for.

[7]Estimates of female labor contributions to their own plots may well be on the low side for the reasons given in footnote 6. Actual labor contributions per plot in households where women have plots are therefore likely to be higher than those reflected by these values.

TABLE 7.
Use of the income of irrigated plots.

	Use, in order of priority	
	Men's plots	Women's plots
1	Millet	Millet
2	Animals	Spices, fuelwood
3	Clothes	Animals
4	Cash reserve	Clothes
5	Meat or fish	Cash reserve

problem that occurs in the family, I can help 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 the greater ability of female plot-holders to contribute to household needs that accounts for their happiness with their plots. The reason for women's preference to contribute to the household's survival by providing produce from their own plots, rather than by providing labor to the plots of their husbands, is that cultivating their own plots makes them economically less-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 (their 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 plot-holders and women without plots shows that plot-holders have, on average, three to four goats or sheep and one cow, while women without plots have only one to two goats or sheep and no cows.

The four effects of having an individual plot (the 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 for 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 findings of the study show that the productivity of both irrigated land and labor is higher in households where both men and women have an irrigated plot each, in comparison with households in which only men have plots. Women are equally good as men or even better in irrigated farming, while their motivation to invest labor in irrigated production significantly increases when they have individual plots. Income of women increases sharply when they have their own irrigated plots, while the proportion of labor contributed by women to men's plots is virtually the same. The increase in income obtained by having irrigated plots 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 labor contribution (person-days per hectare) therefore decreases when there is more than one plot-holder 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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