Barbara van Koppen
Dept. of Irrigation and Soil and Water Conservation
Wageningen Agricultural University
Nieuwe Kanaal 11
Wageningen 6709 PA
Netherlands

Fax: [31] (317) 484759
Email: Barbara.vanKoppen@USERS.TCT.WAU.NL

Stream: Governance - Water/Watersheds/Irrigation
Discipline: Gender and Irrigation

# GENDERED WATER AND LAND RIGHTS IN CONSTRUCTION: RICE VALLEY IMPROVEMENT IN BURKINA FASO

Barbara van Koppen

ABSTRACT

It is widely assumed that local gender and class hierarchies are the major obstacles for achieving equity. However, skewed expropriation and vesting of new rights exclusively in the local male elite or male heads of households may result from how an agency structures local forums and determines title criteria. This chapter analyzes negotiations on water and land rights under externally supported construction of water infrastructure in southwest Burkina Faso, West Africa.

The project used the concept of the unitary household to legitimize expropriation of women's rights to rice land. Initially the local forum was dominated by the male elite and paid male construction workers. At later sites, allocation became producer-based. At the initiative of local male leaders, forums expanded to include women, who farmed almost all the rice land. Decision-making on title criteria was based on productivity considerations and on respect for former rights, which were registered before construction started. These locally invented practices crystallized into a standard procedure for expropriation and reallocation, which was time-efficient and in which productivity considerations prevailed over short-term construction interests.

## INTRODUCTION

For most water infrastructure development, external agencies provide technical expertise and bear most of the construction costs. Too little is known about how intervention processes define users' rights to the water conveyed by the newly constructed or rehabilitated infrastructure. It is too often assumed that users' rights start to count only after construction,when the scheme is to be handed over to users. This ignores the social and legal dimensions of the identification, design and construction phases and the steering role of external agencies in these matters (Von Benda-Beckmann et al. 1996).

Between 1979 and 1993 *Projet de Développement de la riziculture dans la Province de la Comoé*, or in short *Opération Riz* (OR) improved ten small rice valleys covering a total of eleven

hundred hectares in Burkina Faso, (formerly Upper Volta) West-Africa. In each valley, or *bas-fond*, OR expropriated land and water rights and reallocated rights to the improved resources. Only gradually did title criteria and allocation procedures crystallize in a way that better served productivity and equity. This chapter presents this learning process.[i] Insight in ways to vest water rights in priority target groups and the effects on productivity, equity and poverty alleviation, is crucial for intervention policy and practice.

OR intervenes in a production and tenure system that is almost exclusively controlled by women: rice cultivation in *bas-fonds*. Men control production in the uplands. Initially the project endowed men with resource rights. This gap between local reality and the agency's approach illustrates how projects can skew prevailing gender relations, as many authors have pointed out (Hanger and Morris 1973; Carney 1988; Von Benda-Beckmann 1991). The project's usage of the alien concept of the unitary household implied women's exclusion as rights holders. This fits the growing body of literature for Africa, Asia and Latin America which challenges this concept as a model to explain intra-household production relations and gendered division of resource rights (Jones 1983; Safiliou 1988; Agarwal 1994; Quisumbing 1996; Deere and Léon 1997).

In later schemes women producers received rights. The male local elite and other men refused to continue questioning women's existing power as the agency had done. This contradicts the common assumption that the male local elite and men in general have all power and always use this power to appropriate substantial project benefits at the expense of women. The agency's gender approach, rather than local class and gender hierarchies, appears as the main explanatory factor.

Expropriation and reallocation of land in the command area occurs internationally in large settlement schemes, and in some smaller schemes in West-Africa (Dey 1990). In OR and elsewhere, rights to the new land are linked to rights to water and other services. Often projects may not influence land rights directly, and land and water rights are not so strongly linked (Van Koppen 1997). If projects only expropriate and reallocate rights to the water conveyed by new infrastructure, then the engineers' role and the social dimensions of the so-called 'technical design' are usually more hidden than in the present case of changing land rights.

The importance of the agency's gender approach is not just relevant where cultivation is by women. An example is rice cultivation in Bangladesh. Here women rarely own land. They work as unpaid laborers on their men's fields or are not even allowed to enter the fields. Several Bangladeshi NGOs support purchase and management of private pumps for irrigating rice fields and selling excess water to neighboring farmers. If the NGO explicitly aims to empower women and targets all its services explicitly to women's groups, then some innovative groups keep considerable control for themselves. However, when NGOs stimulate women's groups to take the loans and channel these to their male relatives, men gain most of the benefits (Van Koppen and Mahmud 1996). Bangladeshi women lack sufficient control over rice cultivation and cannot easily valorize the investment in the pump themselves, so the intervention's gender approach pivotally influences equity impacts.

Field research in Burkina Fasso studied OR activities through 1993. Interviews were conducted with female and male rice producers, male and female local authorities and administrative authorities, project field officers and sociological, agronomic and technical project staff, project management and expatriate assistants. Project archives at the project's head office

---

[i]. . I am grateful for the generous support of all contributors to the research. The responsibility for the opinions expressed is mine. The citations of the French project documents are all my translations.

in Banfora and at the office of the Delegation of the Commission of the European Community in Ouagadougou were also studied.

The next section describes the social organization of production and resource tenure before the intervention. The following section shows how during project identification and formulation, the external project initiators took important decisions regarding these resource rights. In the first two schemes the project management imposed household-based allocation, with negative consequences for productivity and equity. In the next two schemes, field officers, local farmers and village elites invented practices for producer-based allocation that respected former resource rights. These practices then crystallized to become the standard project procedure. The final section presents the lessons learned and implications for construction and rehabilitation projects elsewhere.

## LOCAL SOCIO-LEGAL ORGANIZATION OF PRODUCTION

### *Gendered Farming System*

Agriculture is the main source of income in Comoé Province. As in much of Sub-Saharan Africa, the farming system is dual, 'both husbands and wives are full-time farmers but their agricultural production is separate, although there is an intricate system of exchanges and interdependencies between the two production systems' (Safiliou 1988; Ministère de l'Agriculture et d'Elevage 1991). Among the ethnic groups of the region, the Gouin, Turka, Senoufo and Dioula, intra-household production units of men and women are separated according to agro-ecological zones and crops.

Gently rolling hills divide the landscape into uplands and valleys. On the uplands rainfed maize, millet, sorghum, fonio, sesame, groundnuts and cotton grow. The latter two are the most important cash crops. In upland agriculture, male household heads dominate land tenure and decision-making. They mobilize the labor of their women and children, and control the harvests. Women and young men cultivate small upland plots on their own account.

In the valleys, or *bas-fonds*, inland swamp rice is cultivated during the rainy season. Annual rainfall is 1000-1200 millimeters. These *bas-fonds* are depressions subject to shallow or deep flooding with runoff and rising subsoil water sources. This naturally available water cascades from field to field along the valley slopes. At plot level farmers open or close small earthen bunds and ditches to store or drain water. These bunds and ditches also serve as plot boundaries.

Women manage more than four fifths of all rice plots, and control the harvests. Younger women combine their own rice production with labor obligations on their husbands' upland fields. These obligations are especially time-consuming among the Turka and Gouin. Older women of all ethnic groups dedicate themselves full-time to rice cultivation, which is their primary source of income. In this region, as in many West African societies, older women are 'liberated' from their obligations on their husbands' fields in their mid-forties, when their children are old enough to fulfill labor obligations. From then onwards they must provide for themselves.

Rice cultivation is labor-intensive. Women mobilize the labor of their unmarried and married daughters, mothers and maternal aunts, and of unpaid and paid working groups or individual laborers. The labor contribution of male relatives to women's rice plots ranges from zero to three percent of total labor time required (Van Koppen et al. 1987). Two-thirds or more of all women cultivate at least two plots (OR 1991). The total rice area cultivated per woman varies between 0.17 hectares and 0.34 hectares or more (Ouedraogo 1978; Ouedraogo 1990; OR 1991). There are also households in villages surrounding *bas-fonds* in which no woman

cultivates rice. This proportion varies between one third and three quarters of the households (OR 1980c).

Rice is consumed and sold. It is the preferred food for ceremonies, guests, and gifts. If men in the Comoé need rice, they usually must buy it on the market or from their wives. In half of the *bas-fonds,* men own less than one percent of the plots. In the other half male ownership may reach 14 percent. Most men who have rice plots are older land chiefs or family chiefs, who use the rice for their ceremonial obligations and for visitors. Their wives do the work. For the incidental man who cultivates rice himself, rice is a second crop. 'If one sees a man going down into the *bas-fond,* one knows he has finished upland cropping.'

The only exceptions to this pattern of women dominating rice cultivation are some fifty men of the N'Gon Dioula living in a provincial town. In the 1940s the scarcity of fertile dry lands in the locality pushed these men to cultivate rice. The women of this ethnic group are traders rather than farmers.[ii] Rice as a woman's crop is quite widespread in West Africa. It is reported among the riverine Gambian ethnic groups (Dey, 1984; Carney, 1988), the Kusasi of northeast Ghana (Whitehead 1981; in Dey 1984) and the Senoufo in South-Mali (Doucouré, Defoer, Ahmadi and De Groote 1996). Rice cultivation by both men and women occurs in other places such as Sierra Leone (Richards 1986).

*Land and Water Tenure*

As in most West African countries land, whether uplands or *bas-fonds,* belongs to 'a large family, with many members who died, some who are alive and innumerable members to be born' (Bachelet 1982). The clan that comes first in a region assumes the authority of land chief (in French: *chef de terre*; in Dioula: *dugukolontigi*). Anyone can clear fallow upland or *bas-fond,* including newcomers, but for such new land use the land chief concerned has to give formal permission. Usually the chief grants permission because 'you cannot deny people to feed themselves and their children'. Use of land strengthens the users' claims on the land over the years and generations. However, these proprietors are not allowed to transfer or sell land to people outside the group.

Among most communities in the Comoé Province land inheritance is still matrilineal, so land stays within the mother's clan over the generations. In Dioula this is called *basirafè,* which literally means 'in the way of the mother'. Sons inherit uplands from the brothers of their mothers, while daughters inherit their mothers' plots in the *bas-fonds*. Nowadays matrilineal inheritance is slowly changing towards patrilineal inheritance, especially in the uplands and among the Senoufo.

In local tenure, land chiefs have a certain authority on land issues, and in *bas-fonds* on water issues as well. They permit newcomers to occupy unused land, but they cannot take land back or redistribute land of these new cultivators, because by doing this 'one would go against the will of his father' (Ouedraogo 1978). Land chiefs represent the group's interests, towards third parties and within the group. Land chiefs primarily function as administrators (Le Roy 1982, 55). They are informed about initial land clearance and later transfers over the generations of all families in their area. In these oral societies there is no other registration than in the memories of the land chief.

---

[ii].. Very few comparative data on land productivity of women's and men's rice plots are available. They do not indicate a systematic difference (CRPA, 1990; OR, 1992).

Land chiefs may intervene in land disputes, which are primarily inheritance issues. In *bas-fonds* they may intervene in water disputes. Water management conflicts arise, for example, as neighboring plot owners enlarge their own cultivable area, encroaching bunds from both sides to the point of collapse. The need to stock water may conflict with a downstream neighbor's need for water. This neighbor may suffer from excess drainage, or from the sand and weeds coming with the drained water. In land or water conflicts the parties try to find solutions themselves. This is promoted by the rule that if intervention is needed, both parties must pay, even the party judged to be in the right. Another rule stipulates that if there is no solution, the land will be taken away from both parties.

Land chiefs play a central role in several socio-religious customs, making sacrifices, giving the sign to start rice cultivation, and fixing totem days on which no one may use a hoe. As a recognition of the authority of the land chief, the land users in his or her area give the chief some 10 percent of their harvest. They also labor on the chief's rice plots during one or two days per year.

Land chiefs governing uplands are always men. However, in the *bas-fonds*, women of the clan, married daughters, sisters or sisters' daughters of the male land chiefs, often carry out the function of land-cum-water authority. In some villages a taboo may even prohibit male chiefs going down into a *bas-fond* during the cropping season. 'This would cause inundation's and make cultivation impossible; a sacrifice would be needed to repair', reported a female chief. Only the slaughtering of animals is strictly forbidden for women chiefs, 'because women give life'. Male chiefs may also keep the function of main representative of the group towards outsiders.

*Women's Land Rights*

As rice cultivators, women have land rights in the *bas-fonds*. Women obtain plots in three main ways: via maternal relatives, via the husband's family and via the land chief. These three modes of acquisition were present more or less equally for 177 studied plots of 80 women in four *bas-fonds* (Ouedraogo 1990; Somé 1991).

*Mother's lineage: women's ownership rights.* In this case the rice plot passes from mother to daughter without interference of male kin or land chiefs. 'You do not have money, so the rice plot is your treasure to give to your daughter'. Usually the eldest daughter who has worked longest with the mother inherits, and she divides the land with her younger sisters. This inheritance system assures women of the labor force of their daughters, and assures daughters of their future land rights. Women keep these plots even in case of divorce, during illness when the plot is fallow for several years, or despite non-fulfillment of labor obligations on the land chief's field (Somé 1991). In some cases a woman works an inherited rice plot as far as ten kilometers from her marital residence.

*Husband's lineage: women's use rights.* If there are no plots in the matriclan to inherit or if a woman marries far away, she can obtain a rice plot via her husband's family, especially when she is older. In these virilocal societies, women go to live with their husband at marriage. Not only her husband, but her husband's mother, sisters and aunts should agree to the land allocation. Generally husbands prefer that their wives grow rice, rather than their sisters who 'are going to feed another family'. However, men do not support their young wives' land requests if women's own productive activities would jeopardize their labor obligations on men's upland fields. Most wives obtain life-long use rights but in case of divorce they cannot take the plot to 'feed another man'. There are exceptions on this rule especially when the divorce is at the husband's initiative (Van Etten 1991).

*Request to the land chief: establishing new rights.* The growing population density increasingly leads women to ask the land chiefs for permission to occupy unused land in the *bas-fonds*. Women go themselves or mothers negotiate with a land chief on behalf of their daughters (Van Etten 1991). In several villages and ethnic groups, husbands accompany their wives in their formal requests, or brothers accompany their sisters. According to a male land chief 'nowadays women should not bother their husbands anymore and address themselves directly to the land chief.' Elsewhere, however, it may be impossible for women to obtain a plot without the husband's formal request to the land chief. This is the case in a village studied by Somé (1991). Here women need the approval of both their husbands and the male land chief. This land chief allocates at best one small plot because 'if women would get more land they are not going to work properly on their husbands' fields'. Divorced women can hardly acquire land, and one of them complained that 'the land chief does not have confidence in women as in men'.

In principle, requested plots become the property of the clan who asked. In some parts of the Comoé Province families can still vest new permanent rights to land acquired via the land chief. Elsewhere in the province, land chiefs increasingly prevent people from establishing longer term use rights by allocating land for only one to four years. The land chief quoted above takes plots back 'even without giving a valid reason'. All twenty women interviewed, including the wife of the land chief, voiced criticisms that he takes too long to answer a request for a plot, imposes the choice of the site and requires excessive crop shares. So this land chief considers land under his authority as private property, which he lends to others for strict compensation. This behavior led at least two of the women interviewed to prefer the state to come and manage the *bas-fond*, as in neighboring schemes of OR (Somé 1991).

So, in local land and water tenure, women have independent access to land in the *bas-fonds* without interference of husbands and land chiefs under matrilineal inheritance. These male authorities or relatives might even not know the location of the plot. Access to rice lands via in-laws requires the husband's mediation. This allows him partial control over his wife's labor. If the land chief mediates access to land, he may enrich himself and hamper women's timely cultivation and long term rights.

## PROJECT IDENTIFICATION AND FORMULATION

*Opération Riz* aims to improve rice production and producers' incomes. It constructs two types of partial water control infrastructure. A central drain in the *bas-fond* provides quick evacuation of the floods, with storage and irrigation facilities for dryer periods in the cropping season. Bunds built along contour lines, together with soil leveling, improve spreading of peak floods, and water retention in dryer periods. The project provides high yielding varieties, fertilizers, credit and marketing facilities. Training is given on infrastructure operation and maintenance, and on cultivation practices. Users are organized in two-tier water users organizations, the 'Rice Organization Units' (*Unités de Groupement Rizicole*) and 'Rice Organizations' (*Groupements Rizicoles*).

The project began in January 1979, and continues to the present. Burkina Faso and the European Community provide financing. France and the Netherlands contributed technical assistance during the period studied, from 1979 to 1993.

### *Technical Planning*

A French engineer carried out the technical identification and formulation study. He selected eight *bas-fonds* covering a total of 1,000 hectares, for project intervention during four years. His rough physical designs took only hydro-technical aspects into account (Faye 1978).

He had little contact with local people (Ouedraogo 1978). The proposed technical plans were all incorporated in the official project document (DCCE 1978).

*Legal Planning*

Statutory law No. 29-63/AN of 1963 'allows the state to intervene at any time in the rural areas according to the criteria of its own development policy and . . . to reserve for the state parts of the land object of improvements' (Ouedraogo 1986, 165-166). Under this law, state endorsement of the site selection implied the formal decision to expropriate all local resource rights in that area and reallocate the improved resources on a tenancy basis. On this legal basis, OR decided to expropriate the land and reallocate lifelong tenancy rights according to new plot boundaries.

Even after technical improvement, the hydrological conditions within a scheme would still differ substantially. The plot location, for example higher or lower on the slope, would strongly influence the availability of water. In this natural environment, rights to a specific plot are land-cum-water rights. The new rights to the improved land would also be land-cum-water rights in that they link to the rights to operate the new infrastructure. Moreover, they would imply membership in the water users' organization and access to other services from the project.

*Title Criteria*

The physical design proposed uniform new plots of 0.25 hectare, without further justification. With one plot per beneficiary, the total number of beneficiaries was planned to be 4,000. The project document stated that these 4,000 plots would be allocated to 'the women who already cultivate rice in the *bas-fonds* that are to be improved' (DCCE 1978, 7). This decision was based upon the productivity and equity considerations expressed in the two sociological studies during the formulation phase (Ouedraogo 1978; *Société Africaine d'Etudes de Développement* (SAED) 1978).

The reports pointed out women's existing role in rice cultivation and the willingness women expressed to adopt new practices. The sociologists stated their doubts whether male family heads would be willing to spend their efforts in the labor-intensive rice cropping, while they already cultivate food crops and groundnuts as profitable cash crops (SAED 1978, 41). Allocation to women was expected to be the outcome 'if the mode of allocation would be left to the villagers' (SAED 1978, 42).

The SAED study tried to assess whether this technically defined number of 4,000 beneficiaries would match local reality. The only 'respectable' concepts and empirical data available at this time were 45 interviews with family heads and demographic data of the National Institute of Statistics and Demography of 1975. These data allowed estimating the number of women rice cultivators, the number of extended families and the number of nuclear families.

One scenario in the study adapted technology to social reality. It calculated that by reducing the plot size from 0.25 hectare to 0.15 hectare, all women rice cultivators could receive a plot. The other scenario adapted social reality to technology. It calculated that with allocation to the extended family, or the so-called family farm (*exploitation familiale)*, there would be an excess of plots. If all nuclear families *(ménages)* received a plot, the 4,000 plots would not be sufficient. So the sociologists started with demographic concepts on the household and nuclear household. Then, they simply assumed that this demographic concept fully overlapped with the social organization of agricultural production by assuming some unitary family or nuclear family farm. As seen in the former section, this does not match reality in which household members control their own intra-household production unit, and do not cultivate "as a family." The next step was to consider this assumed unit of production as a legal entity, represented by one person,

the male head. This representative would be vested with resource rights. They thus defined the legal entities that would fit an engineer's decision to design 4,000 plots of 0.25 hectares.

*Procedures*

The identification and formulation phases paid little attention to procedures to identify the 4,000 rice cultivators and to expropriate and reallocate the land-cum-water rights. The SAED study formulated a general recommendation that 'a committee elected by the population should be created to follow the project's progress, assist in plot allocation and mobilize people's participation' (SAED 1978, 44).

The rights that would be expropriated were ignored. According to the SAED, male land chiefs should be contacted because 'rice land is not inherited', and '*bas-fonds* for rice cultivation are the 'property' of the land chief who allocates plots to those who request' (SAED 1978, 20). The project document follows this biased interpretation (DCCE 1978, 3). The other sociological report recognized the existence of women's vested rights via matrilineal inheritance, but only in half the *bas-fonds*. Elsewhere it was stated that 'almost everywhere the management of rice plots is assured by men, who distribute to women, and by women who cultivate' (Ouedraogo 1978). This trivialized women's vested land rights. It ascribed forms of 'traditional' control over rice land to both husbands and male land chiefs which they never had in reality. Lack of time, lack of competence in agrarian law, and lack of contacts with women rather than with male authorities, contributed to this misconception.

*Project Implementation*

Phase I of OR continued till 1990, instead of 1983, and built not eight, but seven schemes. The schedule to construct the planned infrastructure and to spend the bulk of the negotiated funds (72 percent of the total budget) was extended. The next sections describe how in the course of these ten schemes the initial household-based allocation changed into producer-based allocation.

## HOUSEHOLD-BASED ALLOCATION

*Local Forums and Expropriation*

In 1979 OR started schemes A and B simultaneously. The emphasis was on construction. Expropriation of land and the mobilization of labor were the agenda at the interface of project and local people. This strongly influenced with whom the project engineers, technicians and male field workers established a communication network for regular negotiations, or in other words, the local forum for decision-making on project matters. These were male land chiefs, village authorities and administrative village representatives. The male elite assisted during further technical design and construction. They mobilized male construction laborers, up to 200 per day, who were well paid. They also managed maintenance funds.

This elite readily put women's rice lands at the disposal of OR. According to the women, the project and this elite had given them the idea that women would receive a plot on the day of distribution. In both schemes the project also organized the women rice cultivators into extension groups of some 15 to 20 members. These women's networks were separate and only for agronomic tests on farmers' plots, agricultural demonstrations, and extension.

*Allocation Procedures and Criteria*

In 1980 the project's expatriate management, an engineer and agronomist, initiated demographic surveys 'to evaluate the total population concerned, to get an idea about the number of men and women cultivators in the *bas-fonds* in order to proceed to a more rational

redistribution of plots after the construction' (OR 1980a, 7)'. The questionnaires were addressed to the male household heads. They asked detailed questions on the agricultural activities of each active family member on the 'family' field and on individual fields, including rice plots, and asked whether 'the family' had rice land in the *bas-fond* to be improved or wanted to have an improved plot. The field officers also visited the nearby tax offices to copy the lists of all households (Groesz 1992, 20). In 1980 the project management commented as follows on the findings in scheme A:

> An estimation of the population was made to know the number of families cultivating in the *bas-fond*. It was found that 191 families cultivate a plot in the *bas-fond*, and that 791 persons also cultivate an individual plot. On this basis one could reasonably allocate 0.25 hectare to each family and 0.125 hectare to those who cultivate an individual plot (OR 1980b)

The project management interpreted the survey data wrongly by assuming that, on top of the 791 cultivators (741 women and 50 men) in 191 families the 'family' as such would cultivate another 'family rice plot'. This imaginary production unit was sufficient basis to introduce a new category of potential title holders: male family heads. Just before cultivation in the new scheme would start in 1981, the project management made a decision on the title criteria that categorically excluded women.

> Information and sensitization meetings on the land distribution and cultivation requirements have been held in scheme A in the presence of the village chiefs, land chiefs and authorities. Unanimously it was decided that one or more plots would be allocated to the family heads according to the number of active members (OR 1981b).
>
> We proceeded to a survey of active members per family in order to guarantee an equitable allocation . . . Contacts were laid with the individual farmers concerned. It appeared that they agreed with any form of distribution. Therefore, allocation will be based upon the number of active members (OR 1981a).

'The individual farmers' were this class and gender biased forum, upon which the project management had depended to reach the construction targets. Evidently, these men endorsed a project's proposal which would provide them with a type of control over *bas-fond* land they had never had before. On top of the wages for construction, men's cooperation with the project was rewarded with land titles.

Scheme B is smaller. The number of farmers (484), almost exclusively female rice cultivators, already outnumbered the number of plots foreseen (360) (OR 1980c). In this scheme household-based allocation was explicitly justified as a solution to a distribution problem: only one plot per household would be allocated. This one plot would be allocated to the male head. So the project categorically ignored women's own demands for plots, because (sic!) there were too many women for the land. At the same time, a new category of title holders was introduced: male household heads. Furthermore, among the 484 new plotholders were 75 men who had not had any relation with the scheme before, neither by any of the women in their households cultivating in the bas-fond, nor by having a plot themselves (OR, 1982; in Groesz, 1992:47).

*Land Distribution*

In reality, on the day of land distribution no demographic list was used. Plots were allocated on the spot to any local man who presented himself. The project's field officer had formal responsibility, but the land chief of that portion of the *bas-fond* closely 'witnessed' the process. Although some less important land chiefs complained they had lost land, rumors

prevailed that land chiefs put their own family on their portion and 'even allocated plots to babies.'

Women in scheme A felt 'the men have betrayed us'. The two sisters of the most important land chief in scheme B commented as follows:

> Our brother, the village chief, and the people from the project said to us that there would be a list of the women wanting a plot. We thought that each woman would select her own plot. The day of the allocation we came too late, because we were not informed. Part of the plots had already been allocated. Then they said that the plots would not have been enough for all women, because many women would have wanted plots, including those who had no plot before. Therefore, they had decided to allocate to the chiefs of the extended households. Our brother had already selected our plots. But he does not know the good sites and he selected a bad site. We could not do anything. The chiefs of the families divided the plots they had got. First they took a part for themselves, and the rest they divided in small parts for the older women in their family. We have never seen a list.

For years OR had no idea of the actual number of rice cultivators, and estimates in the reports fluctuated considerably. One report even claimed that the plots had been allocated 'in alphabetical order' (SNV 1984, 19). Only much later did OR recognize the effects of household-based allocation on productivity and equity.

*Effects on Productivity and Equity*

Three studies (OR 1987a and b; Ouedraogo 1990; Groesz 1992) showed that the earlier predictions about allocation to men had been valid. Both in scheme A (Ouedraogo 1990, 11-12) and scheme B men did not abandon their upland food and cash crops to start working in the schemes, but let their wives cultivate the land. However, their new rights enabled them to increase their control over the harvest.

> In scheme B . . . plots were allocated to family heads. The latter have divided those among their women after taking a portion for themselves. Thus the women cultivate half or two thirds of the plot for the man and they themselves have only a small portion which gives them very little in comparison with the charges they bear. The need to revise their status is felt. The women want to be owners of the plots they cultivate, which would motivate them much more (OR 1987b, 8).

Out of 95 plots in scheme B studied by Groesz (1992) 44 percent belong to men. Only on 10 percent of these men's plots did the men provide some labor, which was minimal. However, 94 percent of the rice harvest from these plots is put in men's granaries, and so under men's control. In one interview a woman strongly disagreed when her husband called his plot the 'family' plot, the expression introduced by OR, instead of the local expression 'man's plot' (Groesz 1992).

Among 58 women who worked in rice cultivation in scheme B Groesz (1992) reports the mode of plot acquisition: 28 percent had not received any land from their husbands but were obliged to cultivate his plot; 26 percent received some land of their own from their husbands and 21 percent from other relatives, especially brothers. Only 7 percent, all widows, had succeeded in negotiating their own plots directly with OR on the second day of land distribution. But other widows had been less successful on that day, and did not obtain land via relatives either. Nineteen percent of the women interviewed had inherited the plots in the decade since the allocation, or obtained their plot otherwise.

Allocation to men has strengthened men's control over rice plots vis-à-vis their sisters as rice land inheritors. All improved plots of men in scheme B would go to their sons. Mothers would still pass on their plots to both sons and daughters, but the preference for a son as inheritor increased, especially when the daughter married at some distance (Groesz 1992).

This increasing inequity and women's exploitation depressed production at the plot and scheme level. According to Groesz' (1992, 41) observations, women's plots were better maintained than men's. Although no further comparative data are available, it is plausible that the motivation for women to provide labor for rice, which they do not control, is limited to the minimal culturally defined labor obligations.

Although men as formal plot holders were responsible for infrastructure maintenance most of them did nothing. The male village elite in schemes A, B and C used the maintenance fund to repair a school, a road and a prefect's office. Money quickly disappeared (scheme B), or was said to have been used for the land chief's pilgrimage to Mecca (scheme C). Field officers could not retrieve the money, even with the prefect's help. Only in one part of scheme A, where a competent male leader was elected, was the money kept safe. Recently, political rivalries forced him to leave office.

Inadequacy of the infrastructure further frustrated mobilization for scheme operation and maintenance. Overdimensioning of the central drain, inadequate leveling and earthen constructions unable to resist floods 'spoiled the *bas-fond*' to the point that cultivators wished the project 'to fill up this bad hole and leave'. One can wonder if women would have accepted such design had they had been involved in construction work (Dey 1984). In 1988 parts of scheme A were rehabilitated.

OR did not yet recognize these negative effects when it continued the next schemes. Other factors induced a change.

## CHANGE TOWARDS PRODUCER-BASED ALLOCATION

In schemes C and D the project started with a similar bias towards the male elite. The crucial difference was that OR contacted the local authorities long before construction. Project field officers, local male authorities and women rice cultivators used this time to develop criteria and procedures that fitted production and equity considerations of both local people and the project.

### *Scheme C*

Conforming to the earlier approach, OR contacted the male elite to inform them about construction plans and the proposed land allocation to both men and women. This was in 1981, two years before construction would start.

> In the meeting the land chiefs expressed their amazement that they had never been contacted for the construction of this infrastructure. The village authorities asked whether the survey would only concern the women cultivating in the *bas-fond*. Mr. . . . answered that a survey would be held among both men and women which would allow allocating the plots more equitably (OR 1981c).

After several meetings between the project, prefect, male village chiefs and land chiefs, the local chiefs 'invited the women, because rice is a woman's affair', as one male land chief explained. So the local forum expanded to include women. Many men still benefited from the project's wage employment and the elite misused the maintenance funds, but women played the major role in the negotiations on the land-cum-water titles. A woman leader summarized these negotiations as follows.

> The field officer registered all women per quarter. Some men asked for plots because the field officer said that if it succeeds everybody will have rice. But men do not like the work of rice. Some abandoned it and left it to their women. If you do not work you cannot take the benefits. During the land distribution women negotiated their own plots while men

observed, because the women cultivate. For the collective maintenance work men help because everybody eats the rice.

No demographic survey and tax lists were compiled in this scheme. Although the project had allowed men to apply for land, only 4 percent of the new title holders are male (DCCE 1990). The central drain has slightly improved water management. Women carry out the maintenance work.

*Scheme D*

In scheme D the first contacts were established in 1980, while construction was only to start in 1983. Immediately after the project began, the field officer took the initiative to contact the land chiefs and register the plot users. In two villages they were almost exclusively women but the opposite was found for the N'Gon Dioula. This obvious and rapid inventory of rights holders made the demographic survey superfluous. Although such surveys were still conducted in scheme D, they were never used. Women participated during the land distribution in the *bas-fond*. After allocation of plots to former title holders, new producers obtained plots. The large majority of them were women.

The physical infrastructure changed from scheme D onwards because of the negative experiences with the central drains and irrigation facilities in the first two schemes. The project started to construct bunds according to the contour lines, which resemble the existing infrastructure more. This technique hardly requires new centralized organization for scheme operation and maintenance. Costs per hectare are only one eighth as high as for the former system (SNV 1984). The massive wage employment offered to men also disappeared.

*The Crystallized Procedure*

This new approach, developed by the field officers, village authorities and farmers, crystallized further in the three schemes that followed from 1984 to 1986. From 1987 onwards OR gradually formulated these tested practices into a consistent procedure of expropriation, allocation of rights and stipulation of obligations (*cahier des charges*). The first three schemes in the second phase of OR, from 1990 onwards, applied the procedures and made further refinements. Now this written project regulation structures the interactions between project and villagers, and between project, prefects and other administrative authorities. The elements are the following:

. *Information for all concerned.* Public meetings inform village authorities, administrative authorities and all current rice cultivators about the project's proposals for construction, expropriation of land, reallocation, rights and obligations for future plot holders and future project assistance for crop intensification, operation and maintenance and users' organization.

. *Registration of current plot holders.* Field officers inventory current plot holders in the field. They register name, sex, age, quarter or village, ethnic group, liberated or non-liberated woman, number of plots cultivated, and plots held in neighboring schemes that have already been improved. In the field or later, the names are checked with the land chiefs. In order to accommodate women's collaboration on one plot, OR increasingly accepts the individual registration of and plot allocation to all different workers on one plot, like mother and daughter.

. *Registration of new applicants.* Once all former plot holders can obtain plots, remaining plots are allocated to any new applicants. Interested candidates register with the field worker. OR decides on plot sizes, how many new requests can be satisfied, and so to what extent the 'have-nots' benefit from the intervention. The little information available shows

that most new applicants are women. Male requests might come from the land chiefs. Where fertile uplands are scarce, other men are increasingly applying and cultivating rice (OR 1997).

. *Placement and land distribution.* Rice cultivators from the same quarter or village are placed in the same portion of the improved *bas-fond* for social cohesion. Further plot selection is at random. On the days of distribution, plots are distributed according to lists of rights holders and topographical maps. A committee of project staff and male village and administrative authorities supervises the process.

In general women rice cultivators accept this drastic change in land-cum-water rights, especially those who gain in the redistribution of land. However, former land holders still find it difficult to shift to another site, where others have buried their sacrifices, and to see their own claims on a site that were built over the generations vanish. Efforts to return to the old site immediately after land distribution, or whenever the new rights holder stops cultivating, are reported occasionally. On the other hand, the crop shares that cultivators give to the land chiefs are decreasing. Evidently, land chiefs regret this erosion of their traditional power (SAED 1988; Ouedraogo 1990).

Before the project most women cultivated two plots or more. The project has a uniform rule that rice cultivators can benefit from only one plot. It is appreciated that less time is needed for travel (cf. Groesz 1992). A disadvantage, however, is that cultivation risks are not spread anymore. In order to avoid risks some cultivators have started or continue to cultivate plots in unimproved local *bas-fonds* (Ouedraogo 1990).

*Again: the Family FarmAgain: the Family Farm*

In 1988 the first phase of OR was evaluated to formulate recommendations for the next phase (SAED 1988). This sociological study confirmed the fit between the project's crystallizing title criteria and local reality. It found that both older and younger women cultivate rice, but that only older women have no time constraints. Male land chiefs insist on continuing inclusion of older women, as they depend upon rice for survival. Local men 'do not disagree' with plot allocation directly to their wives. The author even acknowledges that the concept of the family farm is problematic in the local farming system. 'It is difficult to distinguish between family fields and individual fields of men because both field types are cultivated by the same family members' (SAED 1988).

In the concluding recommendations of this same report, however, another perspective on future title criteria appears (SAED 1988, 79).

The field studies show that traditional rice cultivation is a quasi-exclusive women's affair, especially of older women. Should such a situation be continued by allocating land exclusively to women? This raises the following questions:

-- Problem of infrastructure maintenance. Could one count on their contributions to ensure maintenance of the infrastructure?
-- Which attitude would men have if they saw economic power concentrating in women's hands?
-- What future would the project have if it is only animated by older women?
-- Would the objective of production increase be achieved? Could the cooperative spirit be initiated?
-- Would the objective of self-management be possible?

In fact, the basis should be laid already for a progressive elimination of actually predominant production forms (exclusively female) in favor of familial and collective forms.

> Those forms . . . could allow production growth by installing a credit system. Therefore, we suggest that in plot allocation one allocates both individual plots and family . . . plots. Individual plots of 0.25 hectares will be allocated to the women already present in the *bas-fonds* that will be improved . . . Family plots will cover 0.50 hectare. With the expected profits the production conditions (*cahier de charges*) that will be imposed on men to work on the plot, will bring rice cultivation to a higher level than the actual one of secondary crop.

Apparently, the preference of external 'experts' to expropriate land-cum-water rights from women producers and transfer them to men, under the pretext of the family farm, did not need to be justified. Their recommendations were inconsistent with empirical evidence they had just described. They disregarded the opinion of well-informed local actors, authorities, male and female farmers. They ignored the insights that the project team gained through years of trial-and-error. Fortunately, from the standpoint of productivity and equity, these recommendations were never applied.

## CONCLUSIONS

External support for irrigation infrastructure development does not merely introduce technical expertise and funds for new physical infrastructure. It also introduces title criteria and procedures which steer negotiations on land and water rights. Once the moment of handing-over the scheme to the users is reached, important stages in the expropriation of former rights and the allocation of new rights have already passed. The effects of different procedures on production and equity under similar physical infrastructure became clear in *Opération Riz*.

During the identification phase, design decisions for site selection entailed the formal expropriation of all former claims on water flows and land, without the claimants even being aware of this decision. The assumption that former cultivators would automatically become the new title holders eased smooth project approval by the funding organization. At local level, negotiations took place in forums composed of those whose participation was solicited by the project. In the first schemes, the project solicited people's participation primarily for rapid construction. The male political elite and well-paid construction workers were effective in arranging expropriation and construction. Initial promises that former rights holders would become the new rights holders facilitated land expropriation. However, the men in the local forums later endorsed the project's proposal to allocate the new resources to men. Introducing the foreign concept of the unitary household, represented by a male household head, solved the problem of distribution of scarce resources by simply excluding more than half the potential claimants along gender lines, and generational lines as well.

When the mode of people's participation was left to the participants, local forums emerged which took productivity and equity considerations into account. The forums included current and potential producers. Existing rights were recognized. This procedure actually took less time overall.

Male farmers in the Comoé Province in Burkina Faso have little interest in rice cultivation and in land-cum-water rights in *bas-fonds*. If they had been more interested then women's loss of resource rights and the shift from production for their own income to unpaid labor provision on men's fields might have remained as unnoticed here as it still is in many similar construction projects worldwide. Nevertheless, the lessons learned by OR have the following implications for construction projects elsewhere:

. Early inclusion of resource-poor women and men in the local forums, at the interface of the project and the community, is pivotal for their improved access to water and for poverty alleviation. In a sense, the first step to become a rights holder is to be member of

the forum which negotiates rights. Water users' organizations for operation and maintenance evolve out of these early forums. Agencies strongly steer the composition of these forums. So, inclusion of the resource-poor depends primarily on agency efforts. Incorporation of local registration arrangements may actually save time.

. Any technical design intrinsically entails the expropriation of water rights or land-cum-water rights. Expropriation and compensation need to be arranged in time, with effective participation of those who may lose existing rights. On the other hand, opportunities to include resource-poor smallholders without former access to water and irrigable land in the new arrangements can be considerable, provided these new potential rights holders participate in the local forums.

. Title criteria and other aspects of the new rights, and the procedures for implementation, need to have crystallized sufficiently before the investments in construction are carried out. This is even more evident in projects in which water rights are vested on the basis of participation in the investments in infrastructure, either by providing labor or cash for construction (Coward 1986).

. Negotiations on the legal dimensions of any designed infrastructure need to be public and transparent. Engineers should adapt the design to the desired water rights rather than implicitly imposing changes in water flows and rights by a so-called 'technical' design.

. The concept of the unitary household is inadequate to analyze agricultural production relations. Actual production units, and rights and obligations of individual producers within households, must be recognized. Most decision-making on infrastructure construction, operation and maintenance needs to be organized in multi-tiered organizations with forms of representation. However, the interests that male household heads represent may well go against the interests of other household members. Forms of representation should emerge from open discussions with both men and women. The same holds true for representation by authorities in class or ethnic hierarchies.

. Intervention practitioners and policy makers increasingly recognize the need for users' participation and organization in construction projects. They should act on the understanding that negotiations on resource rights are at the heart of such participation, from the first plans for collective investments onwards.

ENDNOTES

REFERENCES

Agarwal, Bina. 1994. *A field of one's own. Gender and land rights in South Asia.* South Asian Studies 58. Cambridge, United Kingdom: University Press.

Bachelet, Michel. 1982. Titulaires de droits fonciers coutumiers. Chapter 4 in *Encyclopédie Juridique de l'Afrique. Tome 5: Droit des biens,* ed. A. Bourgi. Abidjan: Les Nouvelles Editions Africaines.

Carney, Judith. 1988. Struggles over land and crops in an irrigated rice scheme: The Gambia. In *Agriculture, women and land. The African experience*, ed. Jean Davison, 59-78. Boulder, Colo.: Westview Press.

Coward, Walter E., Jr. 1986. State and locality in Asian irrigation development: The property factor. In *Irrigation management in developing countries: Current issues and approaches,* eds. Nobe, K. C. and R. K. Shanpath. Proceedings of an Invited Seminar Series sponsored by the

International School for Agricultural and Resource Development (ISARD), Studies in Water and Policy Management, No. 8. Boulder, Colo. and London: Westview Press.

Deere, Carmen Diana, and Magdalena Léon. 1997. Women, land rights and the Latin American counter-reforms. Paper prepared for the presentation at the XX International Congress of the Latin American Studies Association (LASA), April 1979, Guadalajara, Mexico.

Délégation de la Commission des Communautés Européennes (DCCE) en République de Haute Volta. 1978. Proposition de financement Développement de la riziculture dans l'Organisme Régional de Développement (ORD) de la Comoé. 4ème Fonds Européen de Développement, Bruxelles.

Délégation de la Commission des Communautés Européennes (DCCE) au Burkina Faso. 1990. Proposition de financement Opération Riz (Phase II). 6ème Fonds Européen de Développement, Ouagadougou.

Dey, Jennie. 1984. Women in rice farming systems. Focus: Sub-Saharan Africa. Women in Agriculture 2. Women in Agricultural Production and Rural Development Service. Human Resources, Institutions and Agrarian Reform Division, Food and Agriculture Organization of the United Nations, Rome.

Dey, Jennie 1990. Gender issues in irrigation project design in Sub-Saharan Africa. Contribution to the International Workshop Design for Sustainable, farmer-managed Irrigation Schemes in Sub-Saharan Africa. Department of Irrigation and Soil and Water Conservation, Wageningen Agricultural University, the Netherlands.

Doucouré, Defoer, Ahmadi and De Groote. 1996. Amélioration de la productivité du riz de bas-fond au Mali Sud. Papier présenté au séminaire sur l'aménagement des bas-fonds au Mali, Octobre 1996. Institut d'Economie Rurale Centre, Sikasso Mali. Régional de Recherche Agronomique-Sikasso, Equipe Systèmes de Production et Gestion de Ressources Naturelles et Programme Bas-Fonds.

Faye, Bernard. 1978. Expertise sur les aménagements rizicoles de l'Organisme Régional de Développement de la Comoé, Février 1978. Bureau pour le Développement de la Production Agricole, Paris.

Groesz, Nelleke. 1992. Dakoro, la plaine perdue? Een analyse van de motivatie van vrouwen om te investeren in de rijstproductie en de cultuurtechnische infrastructuur: Het project Opération Riz Comoé, Burkina Faso. MSc Thesis Department of Irrigation and Soil and Water Conservation, Wageningen Agricultural University, the Netherlands.

Hanger, Jane and Jon Morris. 1973. Women and the household economy. In *Mwea: An irrigated rice settlement in Kenya*, eds. Chambers, Robert and Jon Morris. Munchen: Weltforum Verlag.

Jones, Christine W. 1986. Intra-household bargaining in response to the introduction of new crops: A case study from North Cameroon. In *Understanding Africa's rural households and farming systems*, ed. J. L. Moock. Boulder, Colo.: Westview Press.

Le Roy, Etienne. 1982. Caractères des droits fonciers coutumiers. Chapter 2 in *Encyclopédie Juridique de l'Afrique. Tome 5: Droit des biens,* ed. A. Bourgi, 39-47. Abidjan: Les Nouvelles Editions Africaines.

Ministère de l'Agriculture et d'Elevage. 1991. Participation de la femme dans les projets de développement agro-pastoral: Strategies et moyens d' integration. Rapport du Séminaire national, July 1991. Ouagadougou.

Opération Riz, Organisme Régional de Développement de la Comoé, Ministère du Développement Rural, République de Haute Volta. 1980a. Rapport annuel d'activités du 1er Avril 1979 au 31 Mars 1980 du Cellule Vulgarisation-Formation. Banfora, Burkina Faso.

_____1980b. Rapport d'activities du 1er Janvier 1980 au 31 Mars 1980. Banfora, Burkina Faso.

_____1980c. Rapport d'activities du 1er Mars 1980 au 30 Juin 1980. Banfora, Burkina Faso.

_____1980d. Rapport d'activities du 1er Juillet 1980 au 30 Septembre 1980. Banfora, Burkina Faso.

_____1980e. Rapport d'activities du 1er Octobre 1980 au 31 Décembre 1980. Banfora, Burkina Faso.

_____1981a. Rapport trimestriel du 1er Janvier au 31 Mars 1981. Banfora, Burkina Faso.

_____1981b. Rapport semestriel nr. 4, April 1981. Banfora, Burkina Faso.

_____1981c. Proces Verbal de la Réunion à Moadougou le 21 Avril 1981. Banfora.
Opération Riz, Organisme Régional de Développement de la Comoé, Ministère du Développement Rural, République de Haute Volta, et Bureau pour le Développement de la Production Agricole 1982. Opération Riz, Avril 1981-Mars 1982. Rapport de Synthèse. Banfora, Burkina Faso.

Opération Riz, Organisme Régional de Développement de la Comoé, Ministère du Développement Rural, République de Haute Volta. 1982. Eugène Millogo. Rapport d'activités du mois d'avril 1982. Dakoro. Cited in: Groesz, Nelleke. 1992. Dakoro, la plaine perdue? Een analyse van de motivatie van vrouwen om te investeren in de rijstproductie en de cultuurtechnische infrastructuur: het project Opération Riz Comoé, Burkina Faso. MSc thesis Department of Irrigation and Soil and Water Conservation, Wageningen Agricultural University, the Netherlands.

Opération Riz, Organisme Régional de Développement de la Comoé, Ministère du Développement Rural, Burkina Faso. 1983. Rapport Trimestriel 1er Janvier au 31 Mars 1983. Banfora, Burkina Faso.

Opération Riz, Organisme Régional de Développement de la Comoé, Ministère de l'Agriculture et d'Elevage, Burkina Faso. 1987a. Evaluation de la participation des organisations des

producteurs à l'exécution du projet. Rapport des journées de reflexion des 26 et 27 Février 1987. Banfora, Burkina Faso.
Opération Riz, Organisme Régional de Développement de la Comoé, Ministère de l'Agriculture et d'Elevage, Burkina Faso. 1987b. Rapport des rencontres avec les structures organisationnelles sur l'évaluation de leur participation à l'exécution du Projet, Mars 1987. Banfora, Burkina Faso.

Opération Riz, Centre Régional de Production Agro-pastorale de la Comoé, Ministère de l'Agriculture et d'Elevage. 1991. Recensement sur la situation foncière avant aménagement Lomangara, Badini Aval I et Badini Aval II. Banfora, Burkina Faso.

Opération Riz, Projet de Développement de la Riziculture dans la Province de la Comoé. 1992. Suivi Agronomique Campagne 1991/1992. Analysed by N. Groesz and P. van Bronswijk. Unpublished.

Opération Riz, Centre Régional de Production Agro-pastorale de la Comoé, Ministère de l'Agriculture et des Ressources Animales. 1997. Rapport Annuel Janvier - Décembre 1996. Banfora, Burkina Faso.

Ouedraogo, Crys. 1978. Etude sur les plaines aménagables de Banfora. Mars-Avril et Avril-May 1978. Délégation de la Commission de Communautés Européennes en République de Haute-Volta, Ouagadougou.

Ouedraogo, Crys. 1982. Rapport sur l'évaluation des plaines aménagées du Tanion et de Dakoro Projet No. 4100.033.30.25 Développement de la Riziculture dans l'ORD de la Comoé. Délégation des Communautés Européennes en République de Haute-Volta, Ouagadougou.

Ouedraogo, Edith. 1990. Etude socio-économique concernant les exploitants(es) touché(es) par le projet 'Opération Riz Comoé'. Projet Opération Riz Comoé, Ministère de l'Agriculture et de l'Elevage et Association Néerlandaise d'Assistance au Développement, Ouagadougou.

Ouedraogo, Hubert. 1986. Le droit de la terre et les enjeux du développement. Approche comparative des transformations foncières au Burkina (ex-Haute Volta). Thèse pour le Doctorat de 3e cycle en droit. Université de Paris, Pantheon-Sorbonne. Sciences Economiques-sciences humaines-sciences juridiques et politiques, Paris.

Quisumbing, Agnes. 1996. Male-female differences in agricultural productivity: methodological issues and empirical evidence. *World Development* 24 (10): 1579-95.
Richards, Paul. 1986. *Coping with hunger.* London: Allen and Unwin.

Safiliou, Constantina. 1988. Farming systems and gender issues: Implications for agricultural training and projects. Ministry of Agriculture and Fisheries, The Netherlands and International Agricultural Center.

SAED (Société Africaine d'Etudes de Développement), République de la Haute Volta et Fonds Européen de Développement. 1978. Etudes socio-économiques des plaines rizicoles dans l'Organisme Régional de Développement de la Comoé. Juin 1978. Ouagadougou.

SAED (Société Africaine d'Etudes de Développement), Ministère de l'Agriculture et de l'Elevage, Projet Opération Riz. 1988. Etude socio-économique pour l'exécution de la phase II du projet 'Opération Riz Comoé'. Ouagadougou.

Somé, Jacquéline. 1991. Survey Women and land tenure in Gouéra. Banfora, Burkina Faso. Mimeo.

Van Etten, Jacobijn. Field notes, MSc Thesis. Department of Irrigation and Soil and Water Conservation, Wageningen Agricultural University, The Netherlands

Van Koppen, Barbara, Jacquéline Somé, Awa Gnanou, Kadiatou Hié, Fatoumata Koné, Dogotié Sauratié, Marie Somda, Mariam Tiéba, Perpétue Traore, Dambo Zamba. 1987. Champs personnels des femmes dans la Province de la Comoé, Etude socio-économique. Bureau Economie Familiale Rurale de l'ex Organisme Régional de Développement de la Comoé. Banfora, Burkina Faso.

Van Koppen, Barbara. 1997. Allocation and poverty alleviation. A gendered analysis of inclusion and exclusion of the resource-poor in vesting water rights. Paper prepared for the Workshop on Women and Water, International Irrigation Management Institute. Colombo, Sri Lanka: International Irrigation Management Institute.

Van Koppen, Barbara and Simeen Mahmud. 1996. *Women and Water-pumps: the impact of participation in irrigation groups on women's status*. London: Intermediate Technology Publications.

Von Benda-Beckmann, Keebet. 1991. Development, law and gender skewing: An examination of the impact of development on the socio-legal position of women in Indonesia, with special reference to the Minangkabau. In The socio-legal position of women in changing society, guest editors LaPrairie and Els Baerends. *Journal of legal pluralism and unofficial law* 30&31/1990-1991. Groningen, The Netherlands: Foundation for the Journal of Legal Pluralism.

Von Benda-Beckmann, Keebet, Mirjam de Bruijn, Han van Dijk, Gerti Hesseling, Barbara van Koppen and Lyda Res. 1996. Women's rights to land and water. Literature review. The Hague: The Special Program Women and Development, Department of International Cooperation, Ministry of Foreign Affairs, The Government of The Netherlands.