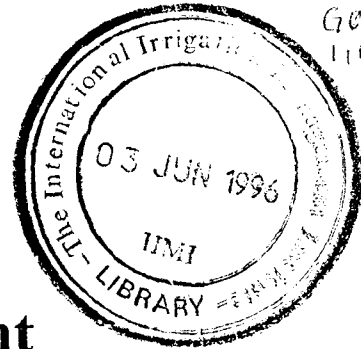


**Gender Issues**  
**and**  
**Irrigation Management**

*Second Annual Progress Report for 1994/1995*



*Submitted to*

**THE DUTCH MINISTRY OF FOREIGN AFFAIRS, SECTION  
WOMEN AND DEVELOPMENT (DGIS/DST/VR)**

*by the*

**GENDER PROGRAM  
INTERNATIONAL IRRIGATION MANAGEMENT INSTITUTE**

Colombo, Sri Lanka

August 1995

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# **Gender Issues and Irrigation Management**

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Submitted to

The Dutch Ministry of Foreign Affairs, Section  
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## **Gender Issues and Irrigation Management**

### **Second Annual Progress Report for May 1994 - May 1995**

**Project Name:** Gender Issues and Irrigation Management  
**Submitted to:** DGIS DST/VR  
**Project No.** DST/VR 242/93  
**Project Period:** Two years, with no cost-extension of one year  
**Submitted by:** Gender Program, International Irrigation Management Institute

#### **Table of Contents**

1.	INTRODUCTION	1
2.	COMPARATIVE ASSESSMENT	2
2.1	Literature Review	2
2.2	Nepal: the Chhattis Mauja Irrigation System	2
2.3	Niger: "Perimetres" of Saga and Tillakaina	2
3.	GENDER COMPONENTS FOR IIMI RESEARCH	3
3.1	Sri Lanka: Participatory Management	3
3.2	Burkina Faso: the Dakiri Irrigation System	3
3.3	Bangladesh: the Grameen Krishi Foundation	3
4.	INFORMATION SERVICES	4
5.	REPORTS AND PUBLICATIONS	5
6.	PLANS FOR THE FUTURE	6
7.	FINANCIAL REPORTING	7
ANNEXES		
Gender Aspects of Irrigation Management Transfer: Rethinking Efficiency and Equity - M.Z. Zwarteveen		
Gender Aspects of Irrigation Management: the Chhattis Mauja Irrigation System in Nepal - M. Zwarteveen, N. Neupane, U. Pradhan		
L'integration de la femme dans les aménagements au Niger: (Les cas de Tillakaina et Saga) - Mme Fatima Massalatchi Dadi		

## 1. INTRODUCTION

This progress report on the Project "Gender Issues and Irrigation Management" covers the second year of the project, from May 1994 to May 1995. The IIMI Gender Program was initiated in March 1992, with the secondment of Ms. Margreet Zwarteveen to IIMI by DGIS. The reporting period was another period of major organizational changes in IIMI, caused (among others) by the appointment of a new Director General. Dr. Sam Johnson III, who was the Program Leader of the Local Management Program (the intellectual home of the Gender Program) moved to the IIMI Latin America Program in Mexico. For the larger part of 1994, the Gender Program has thus been operating as a separate program; since it was no longer clear where it belonged. From September 1995 onwards, IIMI's gender activities will be part of the new Program on Social and Environmental Analysis, which will be headed by Dr. C.M. Wijayaratna.

The activities of the Project, as outlined in the original project proposal (September, 1992) are: (1) Comparative Assessment; (2) Gender Components for IIMI research; (3) Information Services and (4) Training.

The activities and mere presence of IIMI's Gender Program are already leading to greater gender awareness and interest in gender issues, both within IIMI as well as among IIMI's partners. This interest showed in a growing number of requests from national NGOs and government agencies for IIMI support and collaboration in conducting studies and projects related to gender and irrigation; a growing number of requests from inside IIMI to revise and comment upon project and research proposals so as to make sure that gender is properly included; and a growing number of requests to present findings at seminars, workshops and conferences. While encouraging and hopeful in itself, the project was not initially planned to respond to all those requests. The consequence is that part of the work that was planned, and in particular the analysis and final reporting of some of the case studies, has been delayed. To overcome time constraints in the future, an additional full-time staff member has been hired to work in the Gender Program. She will start work from October, 1995.

During the reporting period, one new case study was initiated in Bangladesh, with additional funding from the Ford Foundation. Field work of the Burkina Faso case study was completed in December, 1994, while field work of the Sri Lanka study is still on-going. Draft reports of the Niger and Nepal case studies are still under revision. The Nepal study findings were presented and discussed during IIMI's Internal Program Review.

Networking and information dissemination activities include IIMI contributions to two international conferences; the inclusion of gender articles in IIMI's West Africa newsletter (BRIAO), and various articles in local newspapers in Sri Lanka.

This second progress report describes all these on-going and new activities in greater detail.

## 2. COMPARATIVE ASSESSMENT

### 2.1 Literature Review

The collection, review and analysis of available literature on gender and irrigation was finalized in June 1993. The final report was published as an IIMI Working Paper: "Gender Issues, Water Issues. A Gender Perspective to Irrigation Management".

### 2.2 Nepal: the Chhattis Mauja Irrigation System

The first draft report of the study was completed in March, 1994. The study findings were further analyzed and summarized in a research paper: "Gender Aspects of Irrigation Management: the Chhattis Mauja Irrigation System in Nepal", which was presented at IIMI's Tenth Internal Program Review. A slightly revised version of this paper is now being considered for publication as an article in the Asia-Pacific Journal of Rural Development. Finalization of the draft report as a more elaborate research document has been considerably delayed because of a lack of staff time.

The study investigates the discrepancy between women's high involvement in irrigated agriculture on the one hand, and their complete absence in the irrigation scheme's management. The Chhattis Mauja irrigation system is a system which has always been entirely managed and operated by (male) users. In spite of their non-participation in the organization, many de facto female farmers succeed quite well in getting their irrigation needs accommodated. This is partly due to their very non-involvement, which makes it difficult for the organization to enforce its rules on women. Another reason is that there is social recognition of the specific difficulties and needs of female heads of farms; female farmers are for example often the first to get their irrigation turn, and in some villages they are allowed to pay a lower fee than male farmers. Non-involvement of female farmers does nevertheless endanger the future sustainability of the system's management.

A number of possible follow up activities had been identified for Nepal, and a number of Nepali counterpart organizations were very enthusiastic about collaborating with IIMI on studies about gender and irrigation management. However, the future of IIMI's Nepal office was not guaranteed, and finally a decision has been made to keep the office open only until June 1996. While this does not totally exclude the possibilities of IIMI gender activities in Nepal, it has certainly become less easy. Also, conducting gender case studies in isolation from other IIMI activities would not serve the purposes of gender integration and increasing gender awareness within IIMI. A final decision about future activities in Nepal has for these reasons been postponed until there is some more clarity within IIMI about the choice of research locations.

### 2.3 Niger: "Perimetres" of Saga and Tillakaina

As reported in the previous progress report, a first draft report of the Niger study was finalized in February, 1994. This draft report is currently being revised and rewritten by Ms. Margreet Zwarteveen. It is expected to be ready by the end of September, 1995.

Ms. Fatima Massalachi, who worked on the study during 1993, has now been hired by the IIMI Niger project to assist in implementing some of the recommendations of the study. She has started work in January, 1995. One of her first activities was to write a brief summary article about the gender study for the IIMI West Africa Newsletter. Other achievements are that, as a result of the study, female farmers are now explicitly being invited to farmer trainings and study tours. Ms. Massalachi also gave a course to the Directors of the Cooperatives who manage the irrigation systems, explaining about the situation of women. Ms. Margreet Zwarteveen has paid brief visits to Niger twice, to provide back-up support to Ms. Massalachi.

### 3. GENDER COMPONENTS FOR IIMI RESEARCH

#### 3.1 *Sri Lanka: Participatory Management*

As was explained in the first field report, three parallel studies were initiated in Sri Lanka, in three different irrigation systems, which were selected to represent the three different Participatory Management Programs that are currently being implemented in Sri Lanka. In each of the systems, thirty households are being monitored. The research team consists of three field researchers (Ms. Padma Weerakoon; Ms. Pryanthi Chandrika and Ms. Tanuja Wanigadewa) and one part-time consultant (Ms. Kusum Athukorala). One field researcher continuously lives and works in a village in each of the three systems. In the beginning of 1995, the research team developed an elaborate sets of formats for systematizing and analyzing all the household data. The researchers are regularly supervised by a part-time consultant, and two-monthly review sessions are held with the part-time consultant and Ms. Zwarteveen to discuss findings and progress.

The study was originally set up as a one year study. However, it was decided to continue data-collection for the Sri Lankan case studies with another two seasons, because it was felt by the research team that preliminary findings needed further substantiation. The contract of one of the researchers of the original team was not extended, because her work was unsatisfactory. A new researcher was recruited and trained, but she left after two months. The two remaining field researchers then tried to cover the three systems under study, which proved both difficult and tiring. From May, 1995 onward, one additional field researcher was again recruited, and field work is now shared among the three of them, with the assistance of the part-time consultant.

The research team will finalize data collection by the end of this dry season, which will be around the beginning of October. The three researchers will then do most of the data analysis themselves, assisted by Ms. Margreet Zwarteveen, and will use their reports as MSc thesis for the Agricultural University in Sri Lanka. A final draft of the study findings will be ready by the end of June, 1996.

#### 3.2 *Burkina Faso: the Dakiri Irrigation System*

Ms. Clarisse Zoungrana, the gender researcher who was hired in Burkina Faso, started field work in July, 1994 and finalized it towards the end of 1994. Ms. Zwarteveen assisted with initial data analysis and devising of reporting formats during a two week visit in December. Although a final report was expected by the end of March, 1995, this proved not feasible. Ms. Zoungrana is currently still writing the report, and it is expected that she will deliver a final draft by the end of September, 1995. The report will then be revised and edited by Ms. Zwarteveen.

#### 3.3 *Bangladesh: the Grameen Krishi Foundation*

In the course of 1994, IIMI was invited by the Grameen Krishi Foundation (GKF: the agricultural wing of the Grameen Bank) to assist in analyzing the performance of Deep Tubewells. Since GKF has an innovative program to involve women in its irrigation activities, it was decided to initiate a parallel study which would document and analyze Grameen Krishi's gender strategy. The Ford Foundation in Bangladesh agreed to fund both studies, although a little bit of additional funding came through IIMI. Data collection was mostly done by Ms. Eva Jordans, assisted by the staff of the Women's Support Programme of GKF and GKF field staff.

In collaboration with Ms. Eva Jordans, the leader of GKF's Womens' Support Program, an elaborate research proposal and work plan was developed in July, 1994, during a visit of Ms. Zwarteveen to Bangladesh. First research findings were presented in a workshop in Dhaka in February, and final results of the study were summarized in a report that was presented at a workshop in Dhaka in July. Although major organizational changes within GKF and a somewhat unclear attitude of IIMI Bangladesh with respect to the Gender Component of the study hampered the process of field data collection, still quite some interesting findings could be gathered.

It is being proposed that Ms. Eva Jordans comes to IIMI HQ for about one month, to be able to further analyze the findings together with Ms. Zwarteveen.

#### 4. INFORMATION SERVICES

The working paper : "Gender Issues, Water Issues. A Gender Perspective to Irrigation Management" was widely distributed among some two-hundred organizations and individuals who had previously shown interest in the subject. Results of the Niger case study were summarized in a brief article for BRIAO, the IIMI West Africa Newsletter. Preliminary results of the Sri Lanka case study were published in a brief article for the Sri Lankan journal "Economic Review". On the request of one of the daily newspapers in Sri Lanka ("The Island") this article was later re-printed in this newspaper. This same newspaper also printed two small sections on gender and irrigation, provided by IIMI, at the occasion of International Women's Day. In March, 1995, an internal IIMI seminar was held to discuss, on the basis of research findings, the rational progress and future of IIMI gender activities.

Findings of the Nepal case study were presented internally at IIMI during the Internal Program Review. This evoked a lot of interest and discussion within IIMI. The research paper will be published in the yearly "IIMI research highlights", and a revised version will be published as an article in the Asia Pacific Journal of Rural Development. The 1994 paper "Gender and Irrigation Management: Issues and Challenges" that was presented during the SIDA Seminar, December 1993 was published in the proceedings of the Seminar. Findings of the Niger, Nepal and Sri Lanka case studies were also used for compiling a paper on the gender aspects of irrigation management transfer, which was presented at the International Conference on this subject, organized by IIMI in Wuhan, China (September, 1994). The paper is among those selected for a publication of selected proceedings of the Conference, which will be produced as an edited book.

A more academic paper, discussing the relevance and objectives of studies on rural women, was co-authored with Marina Endevelde (Lecturer and Researcher at the Department of Gender Studies at the Agricultural University in Wageningen) and presented during the International Conference "Agrarian Questions. The Politics of Farming anno 1995" in Wageningen, May, 1995. This paper also passed a first selection for possible inclusion in an edited publication of selected proceedings. Finally, research findings were used to write a paper on Gender and Water Rights. This paper is one among three that will be presented and discussed during the International E-mail Conference on Gender and Property Rights that is currently being held (organized by the CGIAR Gender Secretariat), and in which around 120 people from all over the world participate. The journal World Development has shown interest in publishing the papers.

## 5. REPORTS AND PUBLICATIONS

During the reporting period, the following reports and papers were prepared, some for internal discussion and use only, others for a wider audience. The list of reports and publications is in chronological order.

Zwarteveen, Margreet Z., 1994

Gender Issues, Water Issues. A Gender Perspective to Irrigation Management. Working Paper No. 32, Colombo, Sri Lanka: IIMI.

Jordans, Eva and Margreet Zwarteveen, 1994

Study on Women Farmers and Irrigation. A Study Proposal. Grameen Krishi Foundation, Rangpur, Dhaka Bangladesh and the International Irrigation Management Institute, Colombo, Sri Lanka.

Zwarteveen, Margreet Z., 1994

Gender Aspects of Irrigation Management Transfer: Rethinking Efficiency and Equity. Paper presented at the International Conference on Irrigation Management Transfer, Wuhan, China, September 20 -24, 1994. International Irrigation Management Institute, Wuhan University of Hydraulic and Electrical Engineering. (See Annex 1)

Zwarteveen, Margreet, Nita Neupane and Ujjwal Pradhan , 1994

Gender Aspects of Irrigation Management: the Chhattis Mauja Irrigation System in Nepal. Paper presented at tenth Internal Program Review, IIMI, Colombo, Sri Lanka. (See Annex 2).

Massalachi DADI, Fatima, 1995

L'integration de la femme dans les aménagements au Niger. Les cas de Tillakaina et Saga. In: BRIAO, No. 5, February 1995, pp.23-24 (See Annex 3)

Jordans, Eva, 1995

Study on Women Farmers and Irrigation. Paper for Mid-Term Review Workshop on GKF-IIMI collaborative Studies, 16 February 1995. Grameen Krishi Foundation, Bangladesh.

Zwarteveen, Margreet, 1995

Gender Issues and Irrigation Management: IIMI's program. Short paper prepared for an internal IIMI staff seminar on March, 13, 1995. Colombo, Sri Lanka, IIMI.

Zwarteveen, Margreet and Marina Endevel, 1995

Rural Women's Questions are Agrarian Questions. A Discussion of the Intellectual and Political Construction of Realities of Rural Women. Paper presented at the International Conference "Agrarian Questions: The Politics of Farming anno 1995", Wageningen, The Netherlands, May 22-24, 1995.

Zwarteveen, Margreet and Nita Neupane, 1995

Gender Aspects of Irrigation Management: the Chhattis Mauja Irrigation System in Nepal, in: Asia Pacific Journal of Rural Development, forthcoming.

Jordans, Eva, 1995

Gender Differentiated Impacts of GKF Irrigation Related Activities. Paper presented at the Final Workshop on IIMI-GKF Collaboration, Dhaka, Bangladesh, July, 12, 1995.

Zwarteveen, Margreet, 1995

From Basic Need to Commodity. A Discussion on Gender and Water Rights in the Context of Irrigation. Paper for the International E-mail Conference on Gender and Property Rights, May-December 1994, CG Gender Secretariat.



## 6. PLANS FOR THE FUTURE

IIMI is currently undergoing another major organizational restructuring process. The implications of changes for the role and place of gender in IIMI's activities are not yet very clear. A first decision has been made not to have Gender as a separate Program anymore. Instead, gender is going to be part of a larger program, which is called "Social and Environmental Analysis". Plans for the future are therefore not cast in stone, but will be reconsidered once the new organizational and thematic structures of IIMI are firmly in place.

The short-term plans for the future include:

1. To finalize data collection for the Sri Lanka case study, and to proceed with data analysis and report writing of the Sri Lankan and Burkina Faso case studies. The findings of the Burkina Faso case study will be used for a research paper to be presented at the IIMI Internal Program Review.
2. To edit and partly re-write the Niger and Nepal case studies, and to publish research findings in the form of papers and articles. The Bangladesh study findings will also be written in a format appropriate for wider dissemination and publication.

Longer term plans include:

Formulation of new research activities:

1. One proposal on "Gender and Water Allocation" is in the process of being developed, in collaboration with the International Food Policy Research Institute and the International Centre for Research on Women, as part of the recent inter centre initiative on Water.
2. Two other ideas for proposals have been launched. One is basically on the request of NGOs and government agencies, who want practical advice and guidelines on how to make sure that women participate equally in water users' organizations. The second is dealing more broadly with the linkages between gender relations and irrigation management turnover, and aims to deal with questions of gender equity and efficiency in relation to irrigation management transfer policies.

## 7. FINANCIAL REPORTING

Actual expenditure through June 1995

	US\$
International Staff Salaries & Benefits	4,927
Consultants	23,468
National Staff Salaries & Benefits	19,402
Supplies & Services	7,391
International Travel	8,025
National Travel	2,134
Publications	3,450
Contract Research	845
Indirect Cost	<u>22,481</u>
TOTAL	<u>92,123</u> =====

## ANNEXES

# Gender Aspects of Irrigation Management Transfer: Rethinking Efficiency and Equity

Margreet Z. Zwartveen

## INTRODUCTION

THROUGH IRRIGATION MANAGEMENT Transfer (IMT), governments basically pursue the following objectives:

- \* Improving the management performance and sustainability of irrigation systems.
- \* Reducing government costs for O&M.
- \* Reallocating scarce resources to more technically or more inherently governmental purposes (Vermillion 1991).

Performance improvements and cost reductions are primarily to be achieved through the introduction of quasi market incentives into the management of public irrigation systems (Rosegrant and Binswanger 1993), which is to be accompanied by the simultaneous development of strong grass-roots level institutions and organizations which are to form the link between the numerous small irrigating households and the agencies responsible for management at higher levels of the irrigation system (Small 1989). IMT holds out the hope that by changing the basic structure of socioeconomic relationships among irrigation agencies and farm households, the incentives and behavior of both will change to create more effectively managed irrigation systems (Seckler 1986).

Research results documenting irrigation management transfer experiences are scarce in general (Seckler 1993; Vermillion, 1991), but there are no studies at all about the impacts of these experiences at farm household level.<sup>1</sup> This is worrisome for a number of reasons, the most obvious one being that the gains of IMT are partly to be achieved by changes in the behavior of members of irrigating households.

This paper will explore the meaning of IMT from a gender perspective, i.e., the perspectives of male and female members of irrigating households. It will first argue that it is necessary to clarify who is included in the group of users of irrigation services. In most IMT literature, water users are implicitly assumed to be male individuals, while in reality water users are organized in a household collectivity with members of both genders who have parallel, complementary and sometimes conflicting roles, needs and interests with respect to water.

Gender differences at the level of the household indicate that women and men will be differentially affected by changes in the costs and benefits of irrigation as brought about by IMT. Those changes are to occur primarily through improved markets on the one hand, and improved institutions on the other. Both markets and institutions are known to be gender biased, in the sense that they do not fully recognize that all economic activity works through gendered relationships (see Elson 1993). Based on theoretical arguments that critically examine strategies of economic reform in other sectors with respect to their gender consequences, the second part of the paper will explore how "market gender distortions" (cf. Palmer 1991) affect the success of IMT in terms of effectiveness and impacts on women. In the third section, the fact that women are generally absent as formal and active members of water users organizations is discussed. It is argued that more active efforts to include women as participants in institutions that determine choices that directly affect their lives are justified.

Arguments will be illustrated with examples derived from case studies that are currently carried out by IIMI in Nepal and Sri Lanka, and with examples derived from studies carried out by others.

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<sup>1</sup>This in itself is probably due to the emergence of a more "business like" climate in development thinking and practice of which privatization and turnover are important elements. Policy and research focus has gradually shifted from "individual farmers" to the agricultural sector, from the micro level to the macro level.

## WHO ARE THE USERS OF IRRIGATION SYSTEMS?

Most articles and papers dealing with IMT refer to "farmers" or "water users" without specifying their gender, and some even explicitly deny the possibility of farmers or water users belonging to the female gender by systematically using "he" and "his" (see for examples Lam et al. 1993; Small 1989). This apparent gender neutrality masks the fact that water users may be female, and thus ignores differences that may exist between the needs of men and women.

Women are using water in different capacities. They first of all use water in their roles as co-farmers. Thinking of water users as (male) individuals reflects a deeply rooted and widespread conception of a farming household as consisting of a male head (who is the main farmer, decision maker and income earner) his wife (who is engaged in household tasks, looks after the children and occasionally helps her husband in the fields) and the children. Implicit in this conception is that the decisions and behavior of the senior male adult member of the household adequately reflect an intra-household consensus. This is not true in much of the world. Even in societies where norms and values strongly support the idea of the man as the provider and decision maker, the reality often is that women are actively involved in agricultural work, provide a large share of the household income, and participate in decision making regarding agriculture.

Farming is a collective endeavor of the various male and female members that belong to a farm household. The specific ways in which resources, labor and incomes are divided and shared among female and male household members vary across and within cultures and regions (although women are almost universally the ones most responsible for domestic activities and child care), but almost everywhere in the world women are much more involved in agricultural tasks than is assumed and reflected in official statistical sources.

Even the very task of irrigating is not necessarily or naturally confined to men. In Nepal, irrigating is a joint responsibility of both husband and wife. Men are more heavily involved in field work in the early stages of paddy production, during land preparation and plowing, and this is also the time when they take more responsibility for irrigating. During later stages of crop growth, women predominantly irrigate. Monitoring crop growth and deciding when water gifts are needed are very much linked to the predominantly female responsibility of weeding. When irrigation turns occur at night, both men and women prefer to go together, or with a neighbor or relative, out of fear for snakes (Neupane and Zwarteveen 1994). In Sri Lanka, irrigating of paddy is traditionally thought of as a male task. There are nevertheless quite a number of women that can be found in the paddy fields, opening and closing the bunds and monitoring the flow of water. Women's roles are more important when it comes to irrigating other field crops, such as chilies and onions. And, contrary to the common belief, there are even some women who are actively involved in water management at the level of the field channel (Zwarteveen et al. 1994).

However, whether or not to consider women as water users does not only depend on whether they are physically involved in the task of irrigating. In many cases, male and female farm household members both contribute to the production of irrigated crops and both benefit from the use or sale of these crops. Because of intra-household gender based divisions of labor and responsibilities and because of intra-household income sharing arrangements, women and men do not always and automatically have the same interests and needs with respect to irrigated crop production, and by consequence, are also differentially interested in irrigation services, and thus differentially motivated to invest more time or resources in irrigated production.

In Nepal, when discussing the adequacy of water deliveries, men expressed most concern about enough water being available to allow a timely start of the paddy season. Women shared this concern, but unlike men they also stressed the importance of water being available during the season, because a lesser ponding depth in the paddy fields directly increases the time they need to spend on weeding (Neupane and Zwarteveen 1994). In Sri Lanka, especially in some of the poorer households, women find it difficult to secure a part of the income from the sale of the paddy harvest. Many of their husbands spend part of this income on buying liquor. As a consequence, some women prefer to work as wage laborers on others' field instead of working on the fields that belong to their husband: they themselves can control the wages thus earned (Zwarteveen et al. 1994).

A second way in which women are using water is as heads of farms. Farms may be de facto headed by women as in the case of some villages in the head-end section of the Chhattis Mauja Irrigation System in Nepal, where more than 80 percent of the farmers of irrigated land are women whose husbands are engaged in off-farm employment (Neupane and Zwarteveen 1994). Women farmers can also be widowed or divorced. In the Dry Zone irrigation systems under study in Sri Lanka, it is estimated that about 20 to 30 percent of the irrigated farms are headed by widows (Zwarteveen et al. 1994). What matters here is the fact that the gender of a water user or farmer will make a difference in terms of how water and other resources are used. Female farmers, for example, often have less access to credit, information and other support services. The rationale of irrigated farming may also

change with the gender of the farm manager. This was observed in Niger, where widows who had inherited irrigated land from their husbands (8% of the total number of plot holders) depended much more on the proceeds of the irrigated land for their survival than male irrigators. Unlike widows, male farmers of irrigated plots have access to rainfed land in addition to the irrigated plots (Schaap et al 1994).<sup>4</sup>

The third way in which women should be considered water users relates to uses of water derived from irrigation systems for other purposes than irrigating the main crops. Irrigation water is such a valuable resource, whatever the official principles for water allocation, people will use it for a variety of purposes. Who uses water for specific purposes is often determined by gender. In all the irrigation systems under study, women were found using water from the irrigation canals for washing, bathing themselves and their children and cleaning. In Nepal and Sri Lanka, irrigation water is also used for watering cattle, a task which is often performed by women.<sup>5</sup> In Sri Lanka, some women divert water from irrigation or drainage canals for irrigating their homesteads.

## THE INTRODUCTION OF MARKET INCENTIVES

Researchers and analysts concerned with the differential impacts of economic policies, and specifically of structural adjustment policies, on men and women have questioned the allocative efficiency of the market. The greatest concern is that macro-economic analyses are inadequate because of their neglect of one whole area of production, the unpaid production of human resources; and because of their ignoring the interdependence between this area of production and the areas macro-economics is concerned with. This neglect tells against women in a variety of ways because such unpaid production is largely women's work (Elson 1993). Market gender distortions also include unequal terms of exchange of resources between women and men in households; Palmer (1991) conceptualizes this in terms of intra-household markets in which the terms of trade are biased against women.<sup>6</sup>

IMT from irrigation agencies to farm households involves a shift of financial responsibilities from the agency to the households that make use of irrigation services. The emphasis on users taking on financial responsibility does not mean that policy makers are withdrawing from the irrigation sector. Rather, it means a different choice of policy instrument. Public expenditure organized around budgets is being replaced as the key policy instrument by cost recovery procedures.

The two most common pricing principles for directly recovering operation and maintenance (O&M) costs from users are area based fees and water pricing (see Small 1989; Rosegrant and Biswanger, 1993 and Seckler, 1993). In the case of area based fees, the fee for water is a fixed cost throughout the cropping season, regardless of the actual water use decisions. The amount users have to pay may vary in accordance with the area cultivated, season and type of crop to irrigate, but it does not vary according to the amount of water actually used. Instead, a system of water pricing relates payments to water use decisions. The total amount to be paid depends on the amount of water used, causing the cost of water to become a variable cost of production. This in turn creates a financial incentive for individual farm households to use less water (see Small 1989).

Both of these pricing principles will affect the ways in which farm households arrange labor, land, water and other resources between alternative uses. Also, they will change the way in which water is allocated, using the price response of users to reallocate water, instead of the now prevalent administrative allocation procedures. This entails a shifting from low-value uses to uses of higher value (Rosegrant and Biswanger 1993). Changes in resource mobilization at the household level, and changes in water allocation will be affected by and affect gender relations.

### Changes in household resource mobilization

Payments for irrigation services can be in the form of cash, or in the form of labor. If farm households are required to provide labor to system maintenance, gender based wage differentials may make it economically attractive for households to send women for maintenance work, the opportunity cost of female labor being less. In Nepal, in the Bauraha Irrigation System, farm households had to contribute labor to the rehabilitation of the system, prior to

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<sup>4</sup>Gender, of-course, is not the only, nor necessarily the most important, source of difference between water users or farmers. The source of difference that receives most attention in irrigation management literature is the difference with respect to access to water; or the head-end tail-end difference.

<sup>5</sup>The important role of women in water use for domestic purposes is, in contrast to their roles in using irrigation water, quite well documented and widely acknowledged. The Dublin Statement of the United Nations Conference on Environment and Development (1992)--concerned with the emerging crisis in global fresh water resources--for example states as one of its four principles that: "Women play a central part in the provision, management and safeguarding of water."

<sup>6</sup>This paper does not intend to conduct a comprehensive review of either the theoretical or empirical literature on gender biases in economic analysis. Those interested are referred to the work of Palmer (1991), and the various articles of Elson (1989, 1993a and b).

turnover. The amount of labor to be provided was a function of the land area to be irrigated. About 70 percent of the laborers were women. Women and men were involved in the same types of work: transportation of sand, stones and cement; digging; making of aggregate and mixing mortar. The high proportion of women providing labor was partly because men control family labor, including that of their wives. Men decided on whom to send to the construction site. Women could refuse to go only when they had important tasks to do within the household or in the fields. More important is that many men were engaged in wage labor outside of the village. Women were not reluctant to provide labor, although they experienced considerable difficulties in coordinating construction work with their other tasks. They anticipated to have access to better and more reliable water supplies in return for their labor (Bruins and Heijmans 1993).

The requirement to pay for irrigation services in cash may induce households to change cropping patterns, either because fees are related to types of crops or because higher prices of water may lead farm households to shift to crops that use water more efficiently. Crops that require less water will have different requirements in terms of male and female labor contributions. In System H in Sri Lanka, farm households are asked to grow chilies and onions to make optimal use of the limited amount of water that is available in the dry season. Both these crops require much more female labor than rice does. With the exception of some of the richer farm households, most households in the Mahaweli H do not have the financial means to hire more laborers. Increased female labor requirements will thus be met by increasing labor inputs of female household members (Zwarteveen et al. 1994).

Increased costs of irrigation services may also induce households to save water. If water is freely available, it is often used to partly substitute labor. Examples of this are pre-season water applications to soften soil for land preparation or increasing the ponding depth in paddy cultivation to reduce weed growth and thus the time needed for weeding. At the household level, water savings can thus be achieved by increasing family or wage labor inputs to irrigated agriculture. It depends on the gender division of labor whether these water savings are achieved at the expense of women's or men's time, but also on female and male wages. When family labor is used, the higher opportunity cost of male labor makes it economically more attractive to increase female labor inputs.<sup>7</sup> When laborers are hired, the time female household members need to spend on cooking for laborers and on collecting fuelwood will also proportionally increase.

Instead of increasing production or increasing water use efficiency, it is also possible that increased costs of irrigation services are met through incomes derived from outside agriculture. While the IMT literature discusses the possibility of secondary incomes being generated at the level of the water users' organization (Small 1989; Kloezen 1994), it is also possible that off-farm incomes generated at the household level are used to meet irrigation fees. Where this occurs, it will encompass different sets of intra-household arrangements with different implications. In the Chhattis Mauja Irrigation System in Nepal, the main objective of irrigated agriculture is to ensure household food self sufficiency. Household cash requirements are increasingly met through off-farm employment of mainly men. Often, the income earned by men is not high enough to replace their labor contributions to the family farm with wage laborers. Their wives and children are thus forced to increase their labor inputs to make up for the loss of male labor. And since women are not allowed to participate in O&M of the system, the income earned by men is also used to pay O&M costs which were earlier paid through labor contributions of male household members (Neupane and Zwarteveen 1994).

### Changes in water allocation

Water pricing mechanisms entail a shift from administrative water allocation procedures to allocation of water by the market. This carries the danger that water will only be allocated where the economic benefits are obvious, substantial and quantifiable to the neglect of those cases where the economic benefits are less clear (Cavear and Elson 1993). The very common use of irrigation water for domestic purposes is the most obvious example here. Since women are often responsible for these uses of water, they are the ones most likely to be affected by water allocation principles that prioritize productive uses of water. An example is that of Rajangane, a dry zone irrigation system in Sri Lanka, where the implementation of rotation schedules for irrigation water supply during the dry season immediately affects the time women need to spend on washing, bathing, collecting drinking water and watering cattle. When the canals are dry, the next water point is often about 4 to 5 miles away. Also, wells used for drinking water run dry when canals do not carry water for longer periods of time. The recharge of these wells depends on seepage from irrigation canals (Zwarteveen et al. 1994).

Another aspect of the greater reliance on market principles for allocating water is the issue of property rights and ownership. Efficient market allocation is only possible when property rights are well-defined and nonattenuated (Rosegrant and Binswanger 1993). Most administrative water allocation procedures do not recognize or

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and solving complex distributional issues. The related assumption is that the water users' community is a philanthropic social entity concerned with ensuring distributional equity amongst its members (Cleaver and Elson 1993). There is much to be said against this romantic vision of communities.<sup>8</sup> What matters most here is that a heavy reliance on local communities for managing irrigation systems risks to perpetuate or even reinforce existing gender inequities, in particular because the decision about who should be members of water users' organizations is also relegated to the community.

In many societies, public decision making and attending public meetings are thought of as typical male activities, associated with political gatherings which are often traditionally confined to men. In the Chhattis Mauja Irrigation System in Nepal, women are completely absent as members of the water users' organization, even in the villages with very high rates of de facto female headed farms. Women themselves explain this by referring to the cultural rule that women should remain silent in front of male relatives, and they also say that they lack the knowledge and experience to effectively voice concerns at meetings. A few women said that they would never attend the water users' meetings, because of the hostile and aggressive atmosphere in which the meetings were conducted. Other women referred to their illiteracy as the main reason for their inability to become active in the organization.

Also, the qualities required for assuming official functions in the organization are associated much more with male attributes than with female characteristics. Area and village level representatives should be mobile and they should be able to convincingly negotiate on behalf of the water users they represent in case of water shortages or other injustices. A few years ago, one woman was elected to be the president of a tertiary level water users' organization in the Chhattis Mauja. She was chosen because of her reputation as a leader; she had already been very active in a political women's organization. After half a year, she decided to resign, because she could not find anyone to work with her. Women were not allowed by their husbands to assume public roles, while men were reluctant to work under a woman (Neupane and Zwartveen 1994).

### Costs and benefits of participation

While the nature and degree of their involvement and interests in irrigation may call for the inclusion of both women and men in water users' groups, women and men will often have different perceptions of the costs and benefits involved in participation in users' groups. The attractiveness of participation may be less for women, because the costs and time spent on travelling to and from or attending meetings may be relatively higher for them; because social norms and values are not always supportive of women engaging in public roles and because it is less easy for them to voice their concerns at meetings.

In Sri Lanka, when asked directly whether or not they would like to become more actively involved in farmer organizations, some women (both those with husbands, as well as those without husbands) replied that they do not see the need to participate. This does not so much indicate their lack of interest in irrigation-related matters, as it is the outcome of their assessment of the costs and benefits of participation in farmer organizations. Many farmer organizations are still in the development stage, and with a few exceptions the real benefits of farmer organizations are not yet clear to most of the people involved.

In Sri Lanka, women and men differently assess the costs and benefits of participation in farmer organizations. Although both of them are happy with the official recognition gained through involvement in farmer organizations, most women in addition mention that they expect that membership of farmer organizations will improve communications with irrigation officials. They anticipate that this in turn will help them to quickly find solutions to problems related to irrigated agriculture. Men have a tendency to associate farmer organizations with other community organizations, and justify their own involvement as "doing a social service to the community." Many male office bearers are also concerned with their increased social and political status associated with their position in the farmer organization (Athukorala and Zwartveen 1994).

The non-participation of women in water users' organizations does not necessarily mean that women are left without any means to exert some influence on irrigation-related decisions, nor that they are kept entirely uninformed about organizational matters and decisions taken at meetings. In Sri Lanka, irrigation officials receive relatively more complaints and demands by women than by men (Ibid 1994); in Sri Lanka and in Nepal women often personally meet with local area irrigation representatives to discuss their problems.

It may be that the effectiveness of these "informal" ways of influencing decisions in itself reduces women's motivation to participate more formally. This is especially true when women lack experience and confidence to

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<sup>8</sup>Mick Moore, for example, critically comments on the claims that communities are good managers: "It is an interesting paradox that, in extremis, the practical viability of market principles should be perceived to depend on local, non-market patterns of social interdependence and hierarchy" (Moore, 1989).

express their views and ideas in male dominated meetings, and when norms about appropriate female behavior discourage women to speak up in public.

### The efficiency and equity of organizations

The evidence provided by the Sri Lankan and Nepal case studies shows that at least half of the users of the irrigation system are not formally involved in the operation and management of the system. What does this imply for the efficiency and equity of the organizations?

The exclusion of women can be justified only if men are willing and able to adequately represent women's needs and interests. Unfortunately, this is only partly the case. In Sri Lanka, women do sometimes influence farmer organizations through discussions with men at the household level. Wives of office bearers in farmer organizations sometimes play important roles "behind the screens," by actively supporting their husbands in assuming the responsibilities as office bearers, and by helping them with whatever administrative or organizational work that needs to be done. Some women are also found to be instrumental in their husband's choice to assume official functions in the organization; one husband publicly admitted that he cannot accept a function in the farmer organization unless his wife approves (Zwarteveen et al. 1994). In Nepal, the fact that the local-level organizations to some extent recognize that the provision of labor and cash is more difficult for female farmers shows that women, despite their exclusion from the organizations, somehow do manage to get some of their specific needs looked into.

Notwithstanding women's capacity to get their messages across to farmer organizations, women's peripheral relationship to formal power structures is still deeply constraining. There is little doubt that women's exclusion undermines their capacity to respond to the changes induced by IMT processes. In particular, there is a risk that women lose access to water and other services provided by water users' organizations. While male water users are empowered with respect to their relationship to government agencies, female water users risk becoming disempowered by becoming increasingly marginal in decision making processes that directly affect their lives. The severity of this risk becomes even more apparent when realizing that in many irrigation systems water users' organizations tend to become the focal point for many other development activities in addition to irrigation management.

The fact that organizations function even without female participation cannot be taken as proof of their efficiency. Organizations and institutions do not persist only because they are allocatively most efficient. As institutional economists have begun to recognize: "institutional arrangements may actually be dysfunctional on strict efficiency criteria but persist because of a social ideology that seeks to preserve the status quo" (Evans 1993). A good example is the specific knowledge women can contribute to organizations. In Nepal, the absence of women in the water users' organizations made water stealing go unnoticed. Men thought water stealing did not occur, whereas women systematically reported incidences of water stealing. Stealing of water happens much more frequently when water is scarce, during the later stages of paddy cultivation when women are the ones to irrigate (Neupane and Zwarteveen 1994).<sup>9</sup>

### CONCLUSION

The benefits and costs of IMT cannot be fully understood or realized when no attention is paid to prevailing gender relations, which structure markets as well as institutions. If the anticipated financial accountability between irrigation agencies and users is to become a reality, it should be realized that gender norms and relations may distort the incentive structure by disassociating payments from benefits. The inclusion of gender in the analysis of IMT processes is also necessary to make sure that O&M costs recovery is not achieved at the expense of the production of human resources by implicitly relying on an increase in female labor contributions to irrigation.

The fact that IMT processes entail a relegation of functions and responsibilities to markets and local communities makes it seem justifiable for policymakers, planners and irrigation agency personnel to also shift the concern for women's rights and powers to markets and local community organizations. However, there is no reason to believe that markets or community-based institutions and organizations will be better instruments to address gender inequalities and gender based inefficiencies than government agencies.

On the contrary, there is cause for concern that processes of IMT will in fact increase the time women directly or indirectly have to contribute to O&M of irrigation systems, without at the same time fully benefitting from the benefits produced by maintenance activities. Benefits are distributed within the "intra-household market" where the

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<sup>9</sup>This example also shows that realistic assessments of the performance of water users' organizations cannot be made without considering women. In fact, one such assessment in the case of Chhattis Mauja which uses the absence of water stealing as a proof of the efficiency of the organization (Yoder forthcoming).

terms of trade are biased against women. And there is little hope that gender based market distortions will be countered by institutions, because evidence so far shows that women often have no formal access to water users' organizations in which the rules concerning the management and governance of irrigation systems are developed.

At the same time, the restructuring process that IMT entails increases the scope for critically re-examining some of the interactions and tensions between social institutions, gender relations and economic performance, and—at a more practical level—for exploring ways and mechanisms to make markets and institutions more responsive to specific women's needs. Through a focussed effort of policymakers and planners, IMT processes could in fact be used to redress the perception that irrigation is an all male affair, by explicitly gearing training and awareness programs to all stakeholders, irrespective of their gender, and by identifying and removing constraints to female participation in organizations.

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# **Gender Aspects of Irrigation Management: the Chhattis Mauja Irrigation System in Nepal**

*Margreet Zwarteveen, Nita Neupane, Ujjwal Pradhan*

## **1. Introduction**

Most irrigation related studies, policies and interventions are based on the implicit or explicit assumption that irrigators, farmers and/or water users are individuals, predominantly of the male gender. Irrigating and farming are consequently analyzed as reflecting (male) individual behavior, and the group of users is thought to consist of men only. This assumption is not true in most of the world. Farming is a collective endeavor, involving male and female members of farm households. The specific ways in which resources, labor and incomes are shared and distributed among female and male household members vary across and even within cultures and regions, but in general women are much more involved in agriculture and irrigation than is generally assumed. One important implication for locally managed irrigation systems is that the group of irrigators or water users includes women.

This paper describes some of the results of a case study that was conducted in the Chhattis Mauja irrigation system in the plains of Nepal, for a period of six months (July-December 1993). The objective of the case study was to empirically establish how women's involvement in irrigation and irrigated agriculture relates to the performance of the irrigation system.

The Chhattis Mauja irrigation system has been studied by IIMI and others out of a fascination for the fact that it is entirely operated, managed and maintained by farmers. Successful cases of farmer managed irrigation systems like the Chhattis Mauja are widely used to advocate more farmer participation in irrigation systems that are managed by government agencies. Analyses of the institutions, rules and procedures that govern operation and management are used to better understand the elements of successful local management.

The aim of the paper is to re-examine the Chhattis Mauja management and organization from a gender perspective. The reason for this re-examination is that in all the analyses and descriptions of farmer managed irrigation systems that have seen the light so far, little if any mention is made of women. Persistent claims in these studies that "all users are involved in the irrigation organization" (Yoder, 1994) or that the success of the organization is due to its responsiveness to the needs of "all users" never specify who the users are. Implicitly, though, users are thought of as men only.

The paper starts with an empirical analysis of the livelihood strategies of farm households in the head end<sup>1</sup> of the Chhattis Mauja irrigation system, integrating into it the gender perspective. The objective is to make visible and understand who are the members of the water users' community. Priority is given to understanding the intra-household organization of production, in order to establish which household members are to be considered water users.

The second part of the paper analyzes the performance of the water users' organization from the perspective of women. First, the level and nature of the participation of women and men in the water users' organization will be documented. Secondly, an assessment will be made of the extent in which the formal exclusion of women as representatives and decisionmakers affects their access to irrigation services:

In the third and last part of this paper, the need and desirability of increasing the participation of women, in their capacity as water users, in the Chhattis Mauja organization will be discussed in terms of the performance of the system, and in terms of the responsiveness of the organization to the irrigation needs of women.

## 2. The Chhattis Mauja irrigation system

### 2.1 System description

The Chhattis Mauja irrigation system diverts water from the Tinau River, at Butwal, Nepal. The main canal is 11 km long with 44 branch canals. Irrigation is delivered to about 2,500 households living in the 3,500 hectare command area. The system was originally constructed by local landowners in the mid-1880s. From the late 1940s through the 1970s migrants from the hills cleared the dense jungle and settled in the upper command area.

Diversion of water into the canal is accomplished by two temporary stone/brush structures (*Kannya Dhunga* and *Ittabhond*) on the alluvial fan at the town of Butwal. Since the fan is continually reshaped by floods the temporary wing walls must frequently be modified and maintained. Farm households in the command area contribute the necessary labor and resources for maintaining the system, in return for which they obtain the right to use irrigation water.

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1. Although the study includes a survey of villages in the middle and tail end sections, this paper just focusses on the head end villages. Compared to the middle- and tail end sections there is better access to irrigation water in the head end and cropping intensities are consequently higher. Average landholdings are smaller. One other significant difference is that a larger proportion of settlers in the head end belong to the so-called *lahure* group of settlers: those who bought land with money earned through employment abroad, mostly of male household members working in the army.

Monsoon rice is the most important irrigated crop; during monsoon the whole command area is covered with paddy. Wheat is the most important winter crop. In addition to wheat, lentil and mustard are grown in winter. In recent years, maize is partly replacing wheat because of its higher profitability. The only spring crop (which is only cultivated in the upper part of the command area) is maize.<sup>2</sup>

## 2.2 Farm households

The nature and degree of male and female household members' involvement in irrigated farming in Chhattis Mauja is very much a function of the importance of irrigated farming in a household's livelihood strategy<sup>3</sup>. Taking the varying degrees of importance of irrigated agriculture as the main distinguishing variable, a broad typology can be made of three categories of households: the rich, middle-class and the poor.<sup>4</sup>

*Rich households.* Households belonging to the rich category<sup>5</sup> have access to an amount of land (between 0.67 and 2.0 ha) which, in combination with access to irrigation, is large enough to be able to meet yearly food requirements of the family. In addition, many households belonging to the rich category (56%) have one or more male members who earn some off-farm income, or continue to receive pensions. Many of these men formerly had high positions in the British or Indian army before settling in Chhattis Mauja. They purchased land in the command area of Chhattis Mauja with the money thus earned.

The basic rationale of irrigated production for these households is to produce enough food for the family; none of them have to purchase paddy, although some rich households sometimes do buy some wheat for a change of taste. 67% of the rich households in addition produce some surplus, which most of them sell to finance the following years' agricultural investments. Non-agricultural incomes earned by male members are used for regular cash expenditures (clothes, electricity, school fees, etc.) and invested in off-farm enterprises, such as small shops or busses, or in livestock (67% of the rich households rear improved breed of cattle).

An example of a rich household (~~Shankar Nagar Tola~~) is a family with 20 members. Thirteen of them are living together in Shankar Nagar Tola. They own 2.35 ha of land, while three sons are working in the army. Paddy, wheat and

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2. See annex 1, tables 1 for an overview of cropping patterns in the studied area.

3. The degree of women's involvement in farming is thus not a function of the amount of work they have "at home", but determined by the socio-economic status of the household. See Whatmore (1991) for an elaboration.

4. This typology is based on a ranking of all the households in the village by villagers themselves.

5. 20% of the total number of households in the sample village are in this category.

maize are the major crops they cultivate. Production from their farm is enough for family consumption, and the income earned by selling the surplus almost covers the expenses of next years' agricultural investments. The by-products of crops are used as animal fodder. The cash income received through the son's salaries, and the pensions received by the father (who is retired from the army) have been used to invest in two buses which run from Bhairawa to Pokhara. Part of the money is also used in *dhikuri*, a sort of gambling. They have no intention of buying more land.

*Middle class households.* Among the middle-class households<sup>6</sup> are those who almost entirely depend on farming irrigated land for their livelihood. Land, family labor and irrigation water are the most important productive resources of these households. Landholdings in this category of households vary between 0.20 - 0.57 ha. 25% of the middle-class households gain access to additional land through sharecropping.

For 56% of the middle class households the size of the landholding is big enough to meet the family's yearly food demands, and 10% of all households produce a surplus which they sell on the market. However, the income thus gained is for most households not sufficient for meeting the household's cash needs, and sometimes it is not even enough for purchasing agricultural inputs and paying labor costs. This explains why more than 50% of households <sup>need</sup> have regular access to off-farm incomes, most often through full- or part-time employment of male members. Some of these men work as teachers, others work as rickshaw pullers or in private companies in nearby towns. Cash income is used for supplementing the households' food requirements, and <sup>a/c</sup> ~~or~~ other basic necessities such as clothes and schoolfees. Income is also used to pay for agricultural inputs, hiring laborers and, if anything remains, it is invested in livestock.

A male member of a middle class household in Shankar Nagar Tola showed last year's cost record of the cultivation of 0.67 ha of land. He indicated that he had to spend 27% of his annual salary just on paddy cultivation, the total cost of production being estimated at NRs 7.625/-<sup>7</sup>. In addition, he had to pay an annual fee (NRs 1,400/-) for using Chhattis Mauja irrigation water, because no one from his family is available to do maintenance work. He and his wife explained that if he would lose his job, they would be forced to gradually sell off their land in order to meet their cash requirements.

*Poor households.* The category of households labelled as poor<sup>8</sup> consists of families who own very little land (landholdings vary between 0 - 0.34 ha) and who have no access to a stable off-farm income. Landholdings are too small to produce enough to meet the family's food requirements.

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6. In the sample village this groups constitutes 45% of the total number of households.

7. US\$ 1.00 = NRs 47.50 (at the time of the study).

8. <sup>35%?</sup> ~~49%~~ of the households in the three surveyed villages were ranked as poor.



For their livelihoods, they depend on a combination of sharecropping in land (57% of all poor households), hiring out of labor (70%) and off-farm employment (8%) and other irregular sources of income, such as the (illegal) collection of fuel wood and timber. Female household members are most often the ones that work as agricultural wage laborers, because demand for female wage labor is higher than for male wage labor.

One of the sharecropper households in Shankar Nagar Tola has been surviving through sharecropping for the last 23 years. They do not own any land of their own. The household consists of five economically active members. They earn incomes through agricultural wage labor. Even though sharecropping is less profitable than working on others' farms for wages, they prefer to sharecrop because it at least ensures them of having access to a tangible quantity of food. In addition, the landowner provides them with a house and they have access to loans through the landowner.

### **3. The intra-household organization of production**

#### **3.1 The gender division of labor**

The way in which tasks and activities are shared and divided among the various household members is partly governed by ideological notions concerning male and female roles. One important aspect of this ideology is the distinction between tasks on the basis of supposed physical strength required to carry them out. Basically, all the tasks that are considered physically demanding are thought of as typical male tasks, while typical female tasks are those that require less physical strength, and more care and patience. In general a greater value is attached to male or heavy tasks, which is normally reflected in higher wages for male labor.

The distinction between heavy male tasks and light female tasks appears to be based on cultural norms, rather than on the actual physical strength required to carry out these tasks. Transportation of paddy from field to the threshing floor, for example, is considered to be physically demanding and for that reason carried out by men. Carrying manure from the livestock shed to the field, a task which is at least as heavy, is considered easy and light work to be done by women.

In spite of the rather strict denomination of tasks as being either male or female, in practice men often assist women in carrying out female tasks and vice versa. The ideology thus seems to refer more to the value that is attached to certain works, rather than to a strict assignment of activities based on gender. The table in annex 2 outlines the gender division of tasks according to the ideology; it does not necessarily reflect how tasks are actually divided among household members.

**Paddy** cultivation starts with the preparation of seedbeds in May. Women clean and soak the seeds, while men prepare the seedbeds and do the sowing. Land preparation for paddy cultivation involves plowing and levelling the fields three to four times. Either bullocks or tractors are used for plowing. Land preparation is the only strictly male task, as well as the only real responsibility of men with respect to agriculture.<sup>9</sup>

Transplanting is often done with the help of exchange laborers. The task of arranging exchange laborers is done by women, since it is mostly female labor that is exchanged and also because women have to prepare meals for these laborers. Weeding is done mostly by female family members, although men sometimes assist in this task. If the amount of weeding to be done is high (which is a function of the availability of irrigation water), labor for weeding is exchanged. Irrigating is done by both female and male household members; men often being responsible for the first two or three water turns, and women taking care of this task later in the season. Harvesting and bundling of paddy is predominantly done by women<sup>10</sup>. Transporting the bundles of paddy to the threshing floor is done by men, although women sometimes assist. Threshing again is mostly a male task, but most men try to avoid having to do this task because it is considered the most strenuous one in paddy cultivation. Groups of male laborers coming from outside the system, or from Tharu communities, are hired on a contract basis to do threshing. Storing paddy straw is the responsibility of male household members, while storage of grain is done by both women and men. Manual winnowing is done by men, and winnowing with fans is done by women.

In **wheat** cultivation, land preparation is a very laborious task: fields need to be plowed and levelled three times. Tractors are often hired to do the plowing, and levelling is done with bullocks. Broadcasting wheat is a male task. Weeding of wheat is usually not done, and the tasks of irrigating and applying fertilizer are male tasks, although women do it in the absence of men. Harvesting of wheat is entirely organized and carried out by women. Women either hire laborers, or arrange for exchange labor. If the area cultivated with wheat is large, threshing is usually done by hiring a mechanical thresher. Otherwise, threshing is done manually and it is done mostly by female household members. Cleaning, preparation for storage and frequent drying while it is stored are all tasks of adult female household members.

**Maize** cultivation often starts with the application of manure to the fields. Transport of manure is the task of women, while applying manure is done jointly by male and female household members. Land preparation again is an exclusive male task. If maize is broadcasted, usually men do it, but if it is sowed in lines women do. Weeding of maize is a very labor intensive task, which is predominantly done by women. Harvesting green ears of maize is sometimes done by traders, who come door to door to buy maize. Harvesting of dried maize is done by all household

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9. This is illustrated by the answer a mother-in-law gave to the wife of her husband, who complained about the little assistance she received from him in farming: "Has your husband not done the land preparation? What more do you expect from him?"

10. It is estimated that 70% of this task is done by women.

members together. Post-harvest activities are also done by whomever is available in the household. Preparation for storage and storage are done by women.

**Lentil and mustard** are the two other crops that are important in the area. Both are considered as the easiest crops to cultivate. Lentil is relayed with paddy, seeds are sown around 15 days before paddy is harvested. Broadcasting of lentil seeds is considered a male task. Land preparation for mustard starts immediately after harvesting paddy, and is done by men, who also do the broadcasting. Women sometimes assist, and if there are no men in the household women may do it by themselves. Lentil and mustard require very little if any weeding, and lentil is not even irrigated. Irrigation of mustard is done by both women and men. Harvesting of mustard and lentil are often done mostly by women, but men sometimes provide assistance with these tasks. Threshing of mustard and lentil is done with bullocks, and everybody assists in this task. Cleaning, screening and preparation for storage of lentil and mustard are entirely done by women.

In addition to crop related activities, the care of **livestock** is another time-consuming task, especially for female household members. Milking in the morning is sometimes done by men, since women have many other tasks to do early in the morning. Cleaning the shed (twice or even thrice a day), watering the animals and feeding are also predominantly done by women. Local cows and bullocks are grazed in the forest, and this is often done by men. When the forest is nearby, the animals are simply brought there early in the morning and return by themselves at night. Cutting of grass (in the paddy fields) for animal fodder is mostly done by women.

The collection of **fuelwood** for household consumption<sup>11</sup> is almost exclusively carried out by female household members. Large amounts of fuelwood are collected in winter; during this season men and children often take over the task of cooking early in the morning in order to release women for fuelwood collection. Women leave early in the morning to collect one backload of fuelwood, and come back before lunch to leave again some time after 3 p.m.

All "**domestic**" activities, including home-based food processing, cultivation of vegetables in homesteads, cooking, washing, cleaning the house and childcare, are female tasks. For the production of vegetables, men sometimes help with land preparation.

### 3.2 The actual organization of agricultural production

The actual involvement of male and female household members in agricultural activities is very much a function of the household's livelihood strategy, or more specifically of the amount of off-farm income in relation to the size of the landholding.<sup>12</sup> Households which can afford to do so, will substitute family labor with hired laborers. If households have access to cash income, in

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11. Male members of poor households are sometimes earn some additional income by collecting large quantities of fuel wood and timber, which they sell.

12. Depending on a household's livelihood strategy, crop choices also vary. In annex 1, table 2 an overview is given of the areas cultivated with different crops for the three categories of households.

addition to having a relatively large landholding, they may also decide to sharecrop out the land. Most households identified as belonging to the middle-class and poor categories, try to maximize labor inputs by family members in order to save money.

The organization of agricultural production in the rich households is either a joint affair of husband and wife (22% of the rich households), or it is done mostly by the woman. In some households, male members either have hardly any experience in farming, because they have never farmed (56%), or they are absent for the larger part of the year (11%), being employed elsewhere. In these cases, the responsibility for managing irrigated agriculture lies almost entirely with female household members. Women either organize agricultural production by relying heavily on hired and exchange laborers, or by sharecropping out the land.

An example of a rich household is given by a de facto female headed farm. The woman, when interviewed, recalls how she used to be responsible for carrying out all agricultural activities, because her husband is employed in India, "Once my husband came over for a short visit during the paddy season", she explains, "I had to irrigate the field at night, and my husband decided to accompany me. On the way to the field, my husband saw a snake. This made him realize the hardship I had to undergo while farming, and he instantly decided to return home without even having irrigated the field. He then found a sharecropper to cultivate the field for us." If they were to cultivate the fields by themselves, they would not have had to buy any food. As it is, the husband comes once a year and buys all the necessary supplies enough for the year. He also sends her NRs 1,000/- a month for regular expenditures. The woman is very proud of her husband, and proud of the fact that she is released from doing fieldwork.

If the land is not given out for sharecropping, female household members often continue to do all the "female" tasks, although they are assisted by hired laborers. In addition to doing fieldwork, they are expected to prepare the meals for the hired laborers.<sup>13</sup>

Irrespective of whether male household members work abroad or are still around, all the male labor required for irrigated farming is often replaced by hired laborers. At most the adult man accompanies the plowing team to the fields at the time of land preparation, but even this task may be carried out by a permanent hired laborer instead.

An example of such a rich household is in Naya Chaparrhatti; a family consisting of five members, owning 2.68 ha of land and a small plot in Kathmandu. All the children are in school. They own a store in Bhairawa, and a rice mill. One of their relatives helps them to manage the store. Most of his time the husband is busy with political activities. In his free time he plays cards with village people. He is

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13. This is why many women express their preference for hiring tractors for land preparation rather than bullocks; in the case of tractors they do not have to prepare meals.

an advisor to the Sohra-Chhattis joint committee<sup>14</sup>. His wife spends most of her time at home, except during busy periods in the field: transplanting and harvesting paddy, and harvesting wheat. Then she needs to prepare the meals for the hired laborers. Sometimes, she also goes to work with the hired laborers in order to increase their efficiency. There is a permanent domestic laborer in the house to assist her with looking after the livestock, collecting fuel and fodder and he also assists in the rice mill and sometimes with field work (during land preparation). The daughters sometimes help their mother in the kitchen.

It is in the middle class households that physical involvement of family members in farming is highest; they usually have reasonable large landholdings, but do not have access to a large enough cash income to substitute family labor with hired labor. Family labor inputs are thus maximized, and female household members try as much as possible to arrange for exchange laborers, instead of hiring laborers. The 'real farming couples', in which husband and wife closely work together and help each other in carrying out field activities can be found among the middle class households. In some of the households identified as middle class, agriculture is predominantly done by women, while men earn some cash income. Even though the off-farm income helps to meet the household's cash needs, it often implies that women become almost solely responsible for agriculture, which many of them experience as very stressful. Many of these women complained about the large amount of work they have to do, and expressed the wish to give up farming, or to give out the land for sharecropping.

At the time of land preparation, a visit was paid to one of the middle class households. The senior male member of this household is a village leader (Chairman of the Shankar Nagar Village Development Committee) and very involved in political and social activities. They own 0.36 ha of land. The man does not earn enough income to hire laborers, so his wife organizes and carries out most of the tasks. She arranges exchange laborers, or tries to find laborers who accept wages in kind. For land preparation, a pair of bullocks together with their owner were arranged to come and plough their field. The husband monitored the work, and assisted by digging the borders of the field and levelling. The woman had arranged for transplanters to come at 2 p.m. Suddenly, the husband was called away for an urgent matter by a neighbor. He left, leaving his wife no other option than to the digging and levelling herself.

The start of the paddy season is often an especially stressful time for women belonging to middle class households. Plowing labor and bullocks, irrigation water and transplanters all have to be arranged at the same time in a period when there is high competition for these resources.

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14. The highest level of the organization managing the Chhattis Mauja, responsible for the division of water and maintenance responsibilities between the Chhattis Mauja irrigation system and the Sohra irrigation system.

In Kalika Nagar, one woman relates the difficulties she experienced when trying to arrange for transplanters and plowing labor. Neither her sons, who are in college, nor her husband (who is an ex-army man) know how to plough. On the day she had arranged for draft animals, she could not find transplanters. When she had found transplanters, she could not get bullocks. She tells how she had been crying and swearing in the field, and she is almost certain that she will give out the land for sharecropping next year.

Some middle class households own their own bullocks with which they plough their fields, and often also the fields of others. This provides either some additional income, or labor for transplanting because labor for plowing can be exchanged for transplanters.<sup>15</sup> Rearing of livestock does however require a large amount of female labor, and thus increases the workload of women. As one woman puts it: "Every morning when I have to clean the shed, I am cursing my parents for not having allowed me to study, which would have enabled me to find some off-farm job".

The poor households often have less farm-related activities, because of the small size of their landholdings. All field activities are carried out by family members, and for labor intensive activities such as transplanting and harvesting, exchange labor is arranged. Male members of poor households either earn some cash income through the illegal collection and sale of timber and fuelwood, or they have some low-paid job with the government. Sharecropping households can sometimes earn some additional income by using the landowners' bullocks for plowing others' fields. Female members of poor households may earn additional income through agricultural wage labor.

One of the poor households consists of five members (parents and three children). The father has a low paid job in a bank in a bordering town in India. He comes home every weekend. They own 0.09 ha of land, and have access to an additional 0.12 ha on a sharecropping basis. They also bought two improved breed cows. Because of the investments in land and livestock, they are indebted, but hope to be able to pay back soon. The mother with the eldest daughter (who finished high school; the two other children are still schooling) carry out most of the field activities, and during weekends the whole family works together in the fields.

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15. One day of plowing being equivalent to three to five days of transplanting, depending upon the location.

## 4. Gender aspects of irrigation management<sup>16</sup>

### 4.1 The kulara system

The management of the Chhattis Mauja is based on the use of the *kulara* unit. This unit expresses a certain share, assigned to a member village, and it refers simultaneously to that village's rights and obligations. Water rights and voting rights are in proportion to the number of *kulara* held by the village; but so also are the obligations to provide labor and cash for the upkeep of the system.

The total number of *kulara* is not fixed, and the Executive Committee controls the numbers held by villages according to certain rules and procedures. Each village or group of users of a branch canal can request the number of *kulara* they think is most appropriate for them. Whenever a village wants to increase its share of water, they forward a request to the Chhattis Mauja Executive Committee. Such requests are discussed at the general meeting, as are the implications of the request with respect to water allocations to other branch canals. If the request is approved, the applicants have to pay a fee of Nrs 600/- for each additional *kulara* of water.

A village that receives the right to open a branch canal outlet from the main canal is considered a member of the system. Membership at that level thus refers to villages served by a branch canal rather than individuals, or households. At the branch canal level, the village organizations deal with farm households; most village organizations keep a list of households and their landholdings to assist in determining rights and obligations within the branch, but these lists are not passed on to higher levels of organization in the system.

### 4.2 Levels of organization

Final authority for decisions concerning the Chhattis Mauja is vested with the general assembly, of which, in principle, all irrigators are members. In practice, only male irrigators<sup>17</sup> are welcomed and encouraged to participate in meetings. Each branch canal can designate four voting members for each *kulara* water allocation that particular branch canal is entitled to. There are no women among the branch canal representatives, and thus no female voting members in the general assembly.

Since designation of *kulara* representatives for proportional representation is time consuming and inconvenient for many irrigators, provision for another general level decision making meeting has been made in the constitution. This is simply called a general meeting and is composed of all the village leaders (*mukhtiyars*) and executive committee members. Often so-called "knowledgeable water users" are invited to the general meetings; women are not considered to belong to the group of knowledgeable water users, because they so far have never been invited.

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16. For an elaborate and accurate description of the management, operation and organization of the Chhattis Mauja irrigation system, see Yoder, 1994.

17. It may be that not all male irrigators are de facto members.

The Chhattis Mauja Constitution specifies that a general assembly meeting be held at least once a year. The executive members of the CMEC and two thirds of the *kulara* representatives constitute the quorum for the general assembly. The agenda of general assembly meetings includes; (1) the scheduling of main canal desiltation works, (2) the presentation of the CMEC financial statement, and (3) the election of the CMEC officials. The general assembly meeting is usually held in January or February, before the main canal desiltation works start, at the CMEC office located in Prem Nagar. The users are given a month notice by the *mukhtiyars* of the respective *maujas*. General assembly meetings can also be called by the CMEC for amending the constitution, or whenever there is a need to discuss something that involves more than one branch canal.

Women never attend general assembly meetings, because (according to the men and women interviewed) they are not able to voice their concerns and needs in such meetings.<sup>18</sup> One reason for this is the cultural rule that women are not supposed to speak up in front of male relatives. Women also referred to their illiteracy as a reason for not attending meetings; they are afraid that they would not be able to understand what is being said, and think they have little to contribute.

The Chhattis Mauja organization consists of three tiers<sup>19</sup>. The first tier is the Chhattis Mauja Executive Committee (CMEC) consisting of twelve members. The chairman, vice-chairman and secretary are elected by ballot for two-year terms by voting members (*kulara* representatives). So far, only men have been elected to these positions. A treasurer is appointed by the CMEC from among the male water users. Nine area level representatives (all of whom again are male) bring geographical representation to the CMEC, and are directly responsible to their constituency.

The CMEC employ two *meth mukhtiyar* (main system irrigation leaders; one for the head reach and one for the tail end) to supervise day to day operation and maintenance of the main system. Two messengers are hired to assist the *meth mukhtiyar*. *Meth mukhtiyar* and messengers are all men. This is explained by the fact that the tasks of the *meth mukhtiyar* and messengers are believed to be unsuitable for women: *Mukhtiyar* have to monitor and supervise the emergency maintenance works and are responsible for making sure that water is distributed properly among the *mauja*. The most important duty of the messenger is to communicate information and orders received from the CMEC to the village level *mukhtiyar* and to the area level representatives, which requires a significant amount of traveling, even at night.

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18. One general assembly meeting was attended by the (female) IIMI researcher. She could very well understand the reluctance of women to attend the meetings, because it was conducted in a very chaotic way and the atmosphere was rather hostile. Political differences among water users and leaders influenced the decision making process; many among those present were suspicious about the ideas and proposals of the Chairman. Many men, although they did attend the meeting, also remained silent.

19. Excluding the Sohra-Chhattis Mauja Joint Committee.



At the second tier are the **Area Level Committees**, which form the link between the CMEC and the **Village Level Committee**. An Area Level Committee is composed of the village or branch canal *mukhtiyar*. One of the members is selected to serve as the area level chairman for one year, and during that period he is the area level representative to the CMEC. There are no female *mukhtiyar*.

In Kalika Nagar, a village in a head branch with a very high percentage of de facto female headed farms, a woman volunteered to become the *mukhtiyar*. She thought that she would be able to perform well since she has gained experience in organizational matters by being the local representative of the women's wing of a political party. Other villagers shared this view and she was elected. However, she was forced to resign from her job as *mukhtiyar* after five months. Nobody could be found to assist her; women did not think of themselves as capable and knowledgeable enough, and the few who wanted were not allowed to by their husbands. Men did not want to work under a woman.

When discussing the absence of female *mukhtiyar*, it was pointed out that a very important capacity of *mukhtiyar* is to be able to negotiate with the *meth mukhtiyar* and the CMEC chairman for extra water. People think that such negotiating skills are harder to find in women than in men. The success of a *mukhtiyar* depends very much on whether he has a good relationship with the chairman, and chances of having a good relationship are often better when the *mukhtiyar* shares the same political preferences. Since women are hardly involved in politics, their chances of establishing a good relationship with the chairman are estimated lower. In this respect it is noteworthy that the one female *mukhtiyar* referred to above did have political experience and affiliations.

The **Village Level Committees** form the last tier of the Chhattis Mauja organization. This Committee manages all the irrigation activities within the branch canal. These include 1) Allocating the water they are entitled to receive from the main canal among irrigators in the branch, 2) Monitoring water distribution in the main canal and within the branch, 3) Managing conflicts, 4) Planning and carrying out maintenance within the branch, 5) Assessing fines to irrigators within the branch, and 6) Appointing branch canal representatives to vote in the general assembly. In addition, the village level committee is also responsible for mobilizing labor for main system maintenance as directed by main system officials, and for linking management of the main system with the branch canal. Except for activities that involve other branches or the main system, the village level committees function as autonomous units.

The structure of a village level committee differs from one branch to another. In all cases there is a village leader, or *mukhtiyar*. He (all *mukhtiyar* are men) is either elected by the villagers for a fixed period of time, or he is appointed by the village and is expected to continue to serve as long as they are willing and as long as they carry out their tasks satisfactorily. In some *maujas*, the *mukhtiyar* is the only member of the village level committee. In others, a messenger has been assigned to assist the *mukhtiyar*. In still other *maujas*, officials who are to form a committee are elected by the villagers.

The village level irrigation meetings (which are held once to five times a year, depending on the *mauja*) are the only meetings that are sometimes attended by women. Female household members only go to these meetings when their husbands are not around; they reported that they just go to represent the household. When they go, they usually do not actively participate, but just observe and listen to what is being said. Instead of going to meetings, women prefer to directly meet with the *mukhtiyar* whenever they have an irrigation related problem. In most *mauja*'s the *mukhtiyar* is trusted person, who is well known by all the villagers.

#### 4.3 Water allocation

If women, because of their non-participation in the organization, are systematically disfavored with respect to the quality and quantity of irrigation services they receive, this can become apparent: (1) At the level of the irrigation system, villages with a high number of de facto female heads of farms receiving less water (or experience greater difficulties in obtaining their fair share of water) than other villages; (2) At the level of the *mauja*, female farmers receiving less or less quality irrigation services than male farmers; and (3) At the level of the household or farm, women's specific irrigation needs being less well accommodated than men's.

*System level.* At system level, and as explained earlier, water is allocated among the different branch canals according to the *kulara* system. If there is a continuous flow of water, water distribution is monitored and controlled by adjusting the width of the outlet from the main canal to each branch canal.<sup>20</sup> Whenever water becomes scarce (which occurs most often during paddy seedbed preparation and transplanting, and for spring season crops) water is distributed according to a rotation schedule.

Although, in principle, water allocation is based on the number of *kulara*, in practice a number of other factors govern water distribution. The *mukhtiyar* of a branch canal frequently appeals to the chairman for extra water when water users in his branch canal complain of water shortages. In the head-end, water users sometimes even directly appeal to the CMEC chairman for more water. Many water users were, for instance, still upset about the fact that the chairman had given in to a request by a woman for more water to irrigate her maize field.

To answer the question whether villages with a high percentage of de facto female heads of farms are systematically disfavored, Kalika Nagar was studied.

In West Kalika Nagar, about 80% of the actual farmers are women. Many of them have husbands who are retired from the army and never work in the fields. Women in Kalika Nagar reported that the management of the Chhattis Mauja had created problems for them, referring to two instances. In 1992, just after sowing of wheat, the CMEC decided to reconstruct the dam beyond one of the intakes,

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20. The width is calculated so that the ratio of the outlet width to the width of the main canal is the same as that of the ratio of the number of *kulara* served by the branch canal outlet to the total number of *kulara* served by the main canal downstreams of the outlet.

close to the intake of the Kalika Nagar branch canal. Water flow in the branch canal was stopped during the whole construction period, which seriously affected wheat production. In 1993, at the time of paddy seed bed preparation, the CMEC again repeated the same mistake. Paddy seeds were already broadcasted in the nurseries, but could not be irrigated. The women related that they had to lift water from the river with buckets to water the seedbeds. The seedlings did not grow well, so they had to buy seedlings from other areas to transplant in their fields.

It is difficult to know whether these problems would also have occurred when the majority of farmers in Kalika Nagar would have been men. It is definitely true, however, that communication between Kalika Nagar and the CMEC is weak due to gender related factors. The *mukhtiyar* in Kalika Nagar is a very weak person; he is a drunkard and does not perform his task well. It is partly because of the high number of female farmers in Kalika Nagar that it is difficult to find a good male *mukhtiyar*; the one woman that volunteered to become a *mukhtiyar* in Kalika Nagar had to give up for reasons explained earlier. Female farmers in Kalika Nagar do not like to approach the *mukhtiyar*, because of him being a drunkard and also because his wife becomes suspicious when her husband meets with other women.

At the same time, Kalika Nagar is among the four head end villages which have constantly created problems to the Chhattis Mauja management for taking more water than their legal share without at the same time contributing their share of labor to system maintenance. A former chairman reported in the General Assembly meeting: "When we went to adjust the inlets to get more water during periods of water scarcity, we were often kept in the goat pen by the women of these villages" (cited in Yoder, 1994). This suggests that the non-involvement of female water users in the organization, rather than being a disadvantage to women, actually enables them to become free-riders.

*Level of the mauja.* Another indication of whether water distribution is biased against women, as a result of their marginal position vis a vis formal decision making bodies, is that de facto female heads of farms within a village or *mauja* systematically receive less water or poorer quality irrigation services, or have greater difficulties in obtaining their fair share of water, than farms that are jointly managed by men and women. In the head-end villages studied, almost the opposite appears to be the case: female farmers are positively discriminated with respect to water distribution: they are the first to receive water.

The rules for water distribution differ within each *mauja*. In the villages studied *mukhtiyars* use proportionality criteria as a starting point in adjusting irrigation deliveries from the main canal, but during continuous water flow crop status, notions of fairness and reduction of farmer complaints are the main criteria used, rather than exactness of allocation as according to official *kulara* entitlements.

One such notion of fairness adhered to by many *mukhtiyars*, which is not disputed by irrigators, is that female headed farms are given priority in water distribution. Female farmers reported that when they have arranged for bullocks and transplanters, they inform the *mukhtiyar* that they need

water. Their fields are often among the first to be irrigated. The *mukhtiyar* confirmed this. The reason given is that for female heads of farms it is more difficult to arrange for plowing and transplanting labor than for jointly managed farms.

*Farm level.* Water distribution may also be skewed at the level of the farm or household; men's irrigation needs being prioritized or better accommodated than women's. To answer this question, it needs first to be established whether women have specific irrigation needs, different to those of men.

Women and men basically share the same opinion with respect to the objectives of irrigated farming: both expect to obtain yields high enough to feed the family. Differences in opinion between men and women<sup>21</sup> occur basically about the amount of inputs required for irrigated farming, women being especially concerned with the amount of their labor that is required for certain crops. This is why many women are eager to reduce the area cultivated with wheat, in favor of maize.<sup>22</sup>

When discussing criteria for assessing irrigation supplies, male farmers stressed the importance of having enough water to transplant in time. Female farmers did not disagree with this, but in addition they mentioned that water should also be sufficient during paddy season to avoid weed growth. Women explained that the inadequacy of water gifts during the season leads to frequent stealing of water; when they go to irrigate the fields and close all the upstream field inlets, it often happens that these are closed again by upstream users before water actually gets to the field.

Whether women's non-involvement in the organization ~~is to be~~ negatively affects the amount of water being available during the paddy season is not very likely. On the one hand, both women and village *mukhtiyar* report that there is nothing to prevent women to meet with the *mukhtiyar*. In fact, when they have a request or complaint to make regarding the quality of irrigation services, women do go to meet with the *mukhtiyar*. The *mukhtiyar* is aware of their need for more water and tries to accommodate this need by appealing for additional water to the chairman. On the other hand, women are the ones to steal water, if there is scarcity during the season. There is a fine for stealing water, and women thus have an interest in not being noticed. Their absence in the organization may make it relatively easier for them to steal water. The fact that it is mostly women who steal water was even given by one of the interviewed village *mukhtiyars* as a reason for increasing the involvement of women in the organization; now women can hardly be punished, because they can always claim not to be aware of the official rules.

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21. These differences of opinion are not open or articulated, but expressed in different preferences for crops, and areas to be allocated to different crops.

22. In addition, women often express their wish to expand the area grown with mustard, since this is the only oil seed crop, and they attach a high importance to having enough oil for cooking. However, this hardly affects irrigation requirements, because water is not a constraint for growing mustard.

Unlike men, women also said that it would be easier for them if some water were available in the canal permanently, because this would facilitate the use of water for a number of non-agricultural tasks they are responsible for. Many women wash their clothes and clean the pots in nearby irrigation channels, and they also use this water for feeding and watering livestock and cleaning the livestock shed. In Shankar Nagar Tola, women explained that there is a domestic water supply system, but it only operates a few hours a day and at times that are inconvenient for them. In Naya Chapparhatti, most households have access to handpumps for domestic water, but women said that it is very difficult and time consuming to pump the water for washing and cleaning, and even more so for feeding and watering livestock, so they prefer to use irrigation water.

The problem of water being available for domestic uses and livestock is a specific problem of women that maybe would have been better addressed were women to be better and more involved in the organization. However, it is partly the inadequacy of the domestic water supply systems that induce women to go for irrigation water; and it is thus debatable whether the Chhattis Mauja organization can be held accountable for these problems.

When discussing gender related irrigation problems with the *mukhtiyar*, many of them referred to night irrigation as being especially problematic for women, and as being a topic that is frequently brought up at meetings. When discussing this with male and female farmers, it was found that both men and women are very reluctant to irrigate at night, mainly out of fear for snakes. However, both women and men accept the fact that it is unavoidable to have to irrigate at night once in a while. Both women and men most often try to find someone to accompany them when their irrigation turn is at night. For women it is nevertheless easier to avoid having to irrigate at night, because *mukhtiyar* and male villagers tend to believe it is worse for a woman to have a night shift than for men.

#### 4.4 Resource mobilization

Labor is mobilized in the Chhattis Mauja for the maintenance of the head dam, for maintenance of the main canal and for maintenance of the village canal. Regular maintenance of the head dam is mostly carried out during winter months, and emergency works are carried out whenever the need to do so arises. Each *mauja* has to contribute a fixed number of *kulara* for maintenance works. The *mukhtiyar* informs the villagers when and where to go for maintenance works. The number of *kulara* to be contributed by each household is determined at the village meetings.

In case of non-participation or failure to contribute the required amount of labor, penalties are levied. Offenders have to pay a fine of NRs 30/- per working day. Fines form the major source of income of the CMEC. This income is spent on paying the staff salaries and on buying construction materials. The amount to be paid as a fine is less than the existing wage rate for men (NRs. 45-50 a day), which was explained by the CMEC chairman as a measure to ensure cash income to the Chhattis Mauja organization; if fines would be higher, than nobody would pay anymore.

Construction and maintenance of the irrigation systems are male domains in the Chhattis Mauja. Actually, the CMEC constitution even officially stipulates that labor contributions for emergency maintenance, maintenance of the head dam and maintenance of the main canal can only be made by men. The main reason given for this by the Chhattis Mauja office bearers is that women are physically less able to carry out construction and maintenance activities. Women's labor, in other words, is considered to be of less value and sending female laborers for maintenance work would thus imply contributing less, which would be unfair. Male villagers also explain that male laborers, when carrying out maintenance activities, make jokes which are embarrassing to women. The explanations most interviewed women give for them not being allowed to contribute labor refer to the socially undesirable situation of women having to work alongside strange men. Women from the middle and tail end sections also stated that it would be inappropriate for them to contribute labor to maintenance of the head dam, because it would require travelling and working in places unknown to them.

For households in which men work abroad for long periods of time, the rule that refrains women from carrying out maintenance work implies that women either have to hire male laborers to do the work, or they have to pay the fine. This amounts to a large amount of money and a large share of the total household income; women belonging to middle-class and poor households explained that it posed difficulties for them to pay this. Some households have given out their land for sharecropping only because they could not afford to pay the fines; by giving land to a sharecropper family, the sharecropper household becomes responsible for contributing labor. In other households, women make arrangements with a male neighbor to go in their place, in return for which they work in the neighbor's field.

However, in many *mauja* special arrangements are made to accommodate households facing difficulties in complying with the *kulara* rules. In some *mauja* a provision is made to pay a cash contribution instead of providing labor. Whether or not such a provision exists depends on the total number of *kulara* to be contributed by the *mauja* in proportion to the availability of labor. The amount to be paid is determined by the village level committee; in the villages studied it varied between Nrs.670/- per hectare and Nrs. 940/- per hectare. Who among the irrigating households should be allowed to pay instead of providing labor is decided in the village level meeting; it was observed that female heads of farms were often given priority in this decision. In one village (Pedrahani) female heads of farms were even allowed to pay only half of the amount others had to pay, because it was recognized that it was difficult for them to pay the full amount.

In West and East Kalika Nagar, both of which are close to the main intake, the rule that women should not provide labor for maintenance is not adhered to, because it is impossible to mobilize enough male labor from these villages (around 80% of the farms are headed by women). Women from these villages do participate in the maintenance of the head dam: actual construction works are carried out by men, while women carry the construction materials (mainly logs and wood). Since these villages are close to the intake, women do not have to travel very far to contribute labor, which makes it easier for them to go. Another reason for the fact that women, despite of the rule, do participate in maintenance work is that many of them belong to the *Magar* ethnic

group. *Magar* women are often less shy, and more open. Around 80 to 85% of the total *kulara* from these villages are provided by women.

It is noteworthy that the villages of Kalika Nagar and Shankar Nagar, for many years did not contribute any labor to maintenance of the main canal. Their reasoning was that maintenance in the lower reaches of the canal would not benefit them, so they should be released from doing this work. After several years of conflict about this, it was decided that these villages have to provide relatively more labor for maintenance of the head dam. A former chairman reported in the 1989 General Assembly Meeting how difficult it was to have head end villages (among which is Kalika Nagar) contribute labor for system maintenance and repairs, while at the same time they receive an higher share of water than they are entitled to.

## 5. Should women be more involved in the Chhattis Mauja organization?

Although there are no official or written rules preventing women from participating in the Chhattis Mauja organization, there is not one female representative, *mukhtiyar*, *meth mukhtiyar* or office bearer in the Chhattis Mauja organization, nor do women ever attend general meetings or general assembly meetings. Their participation in village level meetings is very low, and when they do attend meetings they are inactive. At the same time, women (at least in the head end section of the Chhattis Mauja) constitute more than half of the user group. Female members of farms that are jointly managed by men and women are very much involved in irrigated agriculture, and there are a large number of farms that are entirely managed by women.

### 5.1 Performance

According to the literature on participatory management of irrigation systems, all users should be involved in the management for the system to operate efficiently. In the Chhattis Mauja set up, the prevailing gender division of labor underlies a division in irrigation related tasks, men being primarily responsible for the provision of water (organizing water allocation; and mobilizing and providing labor for irrigation system maintenance) while women are primarily responsible for using the water in their capacity as farmers. In the Chhattis Mauja, (and unlike what earlier studies claim) the group of users is thus not identical to the group of managers.

Yet, management performance does not appear to suffer a great deal from the lack of participation of the real users in management. Performance assessments of Chhattis Mauja, completed in an earlier IIMI study<sup>23</sup>, claim that under the given conditions, i.e the physical condition of the irrigation system and the market conditions, the Chhattis Mauja organization is doing extremely well. Yields are higher than average yields obtained for similar irrigated areas, and are not likely to increase significantly with changes in irrigation delivery. Irrigated areas or cropping intensities are not likely to increase much through better or more irrigation being made available. The study also claims that distribution efficiency cannot be increased through better management practices.

While the present study basically confirms the findings of this earlier performance assessment, it also reveals two potential areas of performance improvement in terms of distribution efficiency. The fact that head end villages receive more water than their official entitlement is likely to be related to the fact that the proportion of female headed farms is higher in the head end. The described case of Kalika Nagar suggests that the absence of the majority of the users in the organization contributes to the difficulties experienced to stop these villages using more water than they are entitled to, and to the problems encountered to mobilize the stipulated amount of labor from these villages. And, although a more systematic assessment of water delivery performance at the level of the *mauja* would be needed in order to establish performance weaknesses at this level, difficulties experienced by *mukhtiyar* to punish women when they steal water also suggest a potential performance weakness, which can be attributed to the non-participation of female water users in the organization.

## 5.2 Responsiveness of the organization to the needs of women

According to strategies and theories related to the role of women, exclusion of women from formal participation in decisionmaking bodies is on women's ability to get their needs accommodated. In the Chhattis Mauja, the opposite is true. Women, despite of the fact that they are entirely excluded from formal management, succeed extremely well in getting their irrigation needs accommodated.

Women, including female heads of farms, see absolutely no need of, and completely lack interest in, formal participation in the organization. Their marginal position vis a vis the organization is based on an ideology which gives little importance to women in terms of their contributions to the provision of household food and income, and in terms of their involvement in community matters and politics. Women are seen to be dependent on their husbands for survival, and in need of support and protection from men. This ideology, although it neither reflects reality nor the way in which most women perceive themselves, makes that social transaction costs of participating in meetings are higher for women than for men, while at the same time the effectiveness of meetings for women is less. It is far more effective, and less time consuming, for women to personally meet with the village mukhtiyar whenever they have a problem.

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23. See Yoder, 1994.



It is probably because of their absence as formal members in the Chhattis Mauja organization that women succeed so well in getting their irrigation needs accommodated. The same ideology that prevents them to formally participate enables female heads of farms to reduce their contributions to the maintenance of the system, without risking a reduction in the amount of water they receive. Female headed households are allowed to pay less irrigation fees, women are among the first to receive water and they steal water without being noticed or punished. Women's short term interests with respect to irrigation are thus not served by challenging the prevailing gender ideology, nor by promoting their formal participation in the organization.

### 5.3 A future scenario

At present, the inability to control the branches with a high number of female head of farms is a source of irritation to the Chhattis Mauja organization, but not a real threat to the efficiency of the system's operations. The fact that de facto female headed farms still are in a minority makes it possible to allow them special favors. However, if the number of farms de facto headed by women increases, the absence of women in the organization may very well become a threat to the sustainability of the system.

When analyzing households' livelihood strategies it becomes clear that irrigated agriculture is heavily subsistence oriented. Rather than aiming to produce agricultural surpluses for generating household income, households increasingly seek and rely upon off-farm incomes. This trend is accompanied by a shift from labor to capital as the organizing principle of the internal social relations of the family farm. The shift from labor to capital is structured by and structures gender relations: men predominantly go for off-farm employment and non-agricultural businesses and enterprises, while women become increasingly responsible for farming. As the importance of irrigated agriculture in terms of its contributions to a households' livelihood decreases, irrigated agriculture is likely to become more and more the responsibility and the domain of women.

The fact that many parents strongly support and push their sons to get a good education in order to be able to find well-paid jobs outside of agriculture contributes to this trend. Rather than investing in agriculture (buying land, livestock or agricultural implements) parents prefer to invest in the education of their children, giving first priority to sons. This goes even to the extent that some families sell all or part of their land in order to be able to pay for the education of their children, or to cover the expenses of their son's migration abroad.

This trend may lead households who succeed in finding good sources of off-farm employment to abandon agriculture all together. It may, however, also be that they will try to maintain a foothold in agriculture, leaving it to women to be managed.

If this happens, for the Chhattis Mauja organization to continue to effectively enforce the rules and regulations regarding water allocation and resource mobilization, it will probably be necessary to formally involve women in the organization. Female farmers' interest in becoming involved is also likely to increase when problems related to an increased incidence of free-riders or to a low mobilization of resources for maintenance become more apparent.

It is likely that mobilization of labor for maintenance will become more difficult, because of the decreased availability of male labor. Parallel to the shift from labor to capital in the intra-household organization of irrigated production, a shift to mobilizing cash instead of labor for irrigation system maintenance may occur. As a consequence, cash investments in system improvements to reduce maintenance requirements that as yet seem economically unjustifiable may become attractive.

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## Annex 1.

### 1. Cropping patterns

Monsoon	Winter	Spring
paddy/lentil	wheat	maize
early paddy	mustard+pea/gram	maize
paddy/lentil	maize	maize
paddy/lentil	vegetables	maize

Note: / indicates relay cropping and + indicates mixed cropping

### 2. Percent area of total cultivated land, per crop and per category of household

	Wheat (winter)	Mustard (winter)	Lentil (winter)	Maize (winter)	Maize (spring)
Rich	20%	51%	13%	1%	67%
Middle	25%	36%	36%	0	72%
Poor	23%	35%	12%	2%	47%

Annex 2: Gender division of tasks

	hill migrants		
activities	women	men	both
PADDY			
preparing seeds	X		
seedbed preparation		X	
sowing		X	
plowing		X	
levelling		X	
food preparation	X		
transplanting	X		
weeding	X		
irrigating			X
harvesting	X		
bundling	X		
transporting		X	
threshing		X	
storing straw		X	
storing grain			X
manual winnowing		X	
fan winnowing	X		
WHEAT			
plowing		X	
levelling		X	
sowing	X		
irrigating			X
fertilizing		X	

harvesting	X		
threshing			X
cleaning	X		
storing	X		
MAIZE (winter/spring)			
manure transport	X		
manure application			X
plowing		X	
levelling		X	
broadcasting		X	
line sowing	X		
weeding	X		
harvesting			X
removing seeds			X
storing	X		
LENTIL			
broadcasting			X
harvesting	X		
threshing			X
storing	X		
MUSTARD			
broadcasting			X
transport of manure	X		
applying manure			X
irrigating			X
harvesting			X
threshing			X

storing	X		
LIVESTOCK			
milking			X
cleaning shed	X		
watering			X
feeding			X
cutting grass	X		
herding		X	
OTHERS	X		
collecting fuel	X		
cooking	X		
cleaning	X		
child care	X		
kitchen gardening	X		
MAINTENANCE of IRRIGATION			
maintenance work		X	

# L'INTEGRATION DE LA FEMME DANS LES AMENAGEMENTS AU NIGER : (Les cas de Tillakaina et Saga)

*L'intégration de la femme dans les aménagements hydro-agricoles (AHA) au Niger est engagée différemment selon les aménagements. Si à Saga la seule voie d'accès des femmes aux parcelles est l'état de veuvage, à Tillakaina elles sont nombreuses à être attributaires d'une parcelle. L'histoire des AHA au Niger et les mentalités expliquent cette différence.*



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## SPECIAL NIGER

Au moment de l'attribution des parcelles aménagées, les femmes ont eu malheureusement des difficultés à s'en faire octroyer ou bien n'en ont pas eu du tout. Dans le premier cas, le mode d'accès à la parcelle aménagée est principalement l'état de veuvage. Mais depuis la réhabilitation des AHA, des parcelles ont été attribuées aux femmes qui ne sont pas seulement veuves mais capables d'exploiter une parcelle.

### LE ROLE DE LA PARCELLE

Toutefois, la présence des femmes dans l'AHA de Tillakaina (maraîcher) est plus importante que celle des femmes dans celui de Saga (rizicole) : 10 % contre 0,5 %. Ceci est probablement dû au rôle que joue la parcelle rizicole chez les paysans. Celle-ci est perçue comme un champ collectif produisant le complément en vivres des champs dunaires et dont la responsabilité incombe aux hommes. Tandis que la parcelle maraîchère est destinée à produire des cultures de rente (haricot vert pour l'exportation). Une part importante du riz produit à Saga est consommée par les exploitants eux-mêmes. Cette proportion représente 55 % de la récolte du riz chez les hommes contre 45 % chez les exploitantes à Saga. Par contre, la parcelle rizicole produit 68 % de l'ensemble des vivres autoconsommées par les femmes contre 38 % chez les hommes qui possèdent des champs dunaires au détriment des femmes qui n'en ont pas.

La participation des femmes à la culture irriguée est plus importante à Tillakaina où les exploitantes effectuent elles-mêmes l'essentiel des travaux agricoles. Elles se font aider par la main-d'oeuvre journalière pour des tâches bien définies qu'elles ne peuvent exécuter elles-mêmes ou toutes seules (préparation de terrain, traitements phytosanitaires, etc.). Pour cela, elles payent moins de frais de main-d'oeuvre que les exploitants qui engagent en général la main-d'oeuvre mensuelle.

Les épouses participent aussi activement à l'irrigation et remplacent parfois le mari à la parcelle en cas d'absence. Elles font la récolte, le premier tri et le remplissage des cartons de haricot vert destiné à l'exportation. Elles apportent à manger au mari sur le périmètre et s'occupent de l'écoulement des produits non vendus à la coopérative (manioc, melon) ou bien non acceptés à la coopérative pour défaut de calibrage (haricot vert). Elles profitent de la récolte car elles tirent leur propre revenu de l'écoulement des produits sur les marchés locaux. Elles sont spécialisées dans le petit commerce.

### UN TRAVAIL HONTEUX

A Saga, les exploitantes n'entrent pas dans les parcelles pour travailler comme par le passé. De nos jours, elles considèrent que c'est une honte que de

Au Niger, les femmes de la région du fleuve avaient une tradition d'irrigation (maraîchage et riz traditionnel). Celles de la région de Niamey, particulièrement les Djerma, étaient et demeurent encore de bonnes rizicultivatrices selon les méthodes traditionnelles quand il leur reste des terres dans les bas-fonds. Les femmes de Tillakaina avaient, quant à elles, un passé maraîcher et possédaient même des champs dans les bas-fonds dont certaines d'entre elles avaient hérité. La plupart des AHA avaient été créés sur l'emplacement des champs appartenant aux hommes mais aussi aux femmes dont beaucoup avaient perdu des champs de case.

retrousser le pagne pour faire le désherbage ou la récolte. Même la préparation du sol qu'elles exécutaient avant avec leur grande houe, se fait maintenant avec des unités de culture attelée guidées et manœuvrées par leurs enfants ou la main-d'oeuvre.

Les femmes préfèrent engager la main-d'oeuvre pour effectuer toutes les tâches agricoles. Raison pour laquelle les frais de main-d'oeuvre sont plus élevés pour elles que pour les exploitants : en moyenne 30.000 F par campagne pour 0,25 ha contre 15.000 F par campagne pour 0,25 ha pour les hommes. De plus, elles ont moins accès à la main-d'oeuvre familiale que les hommes (les grands fils qui peuvent les aider à faire le désherbage et la récolte).

Les épouses ne participent pas à la culture irriguée. Leur contribution se limite au vannage et au repas qu'elles apportent à manger à leur mari sur la parcelle. Très peu de femmes (exploitantes ou épouses) font le commerce du riz. Les épouses qui le font achètent le riz paddy auprès de leur mari qu'elles décortiquent tout blanc ou après étuvage. Le commerce n'est pas très développé et les femmes épouses profitent moins de la récolte en dehors du don remis par le mari pour les récompenser du vannage.

### UNE PRESENCE POSITIVE

- La présence du réseau d'irrigation à Saga et à Tillakaina a permis aux femmes dont les champs de case sont situés près des canaux d'arroser leurs cultures en période de sécheresse.
- A Tillakaina, certains exploitants prêtent 2 à 3 planches de légumes à leurs épouses pour qu'elles cultivent du gombo ou du sésame en hivernage.

En plus des activités champêtres, les femmes pratiquent l'élevage des petits ruminants. Mais celui-ci est plus développé à Tillakaina qu'à Saga à cause de la diversité des résidus de cultures. Les 2/3 du troupeau à Tillakaina appartiennent aux femmes. Malheureusement, l'intégration des femmes dans les structures coopératives n'est pas encore réalisée. En effet, aucune femme n'a été élue membre de la coopérative de Saga. Il y a une évolution à Tillakaina où, depuis 1993, deux femmes ont été élues parmi les délégués GMP.

Leur intégration s'impose puisqu'elles participent activement à l'irrigation. Elles doivent être incorporées à certaines structures de gestion afin qu'elles puissent faire un apprentissage à la gestion car, à bien des égards, les femmes ont montré leur preuve et leur sérieux dans ce domaine.

F.M.D

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