Gender Analysis and Reform of Irrigation Management

Gender Analysis and Reform of Irrigation Management: Concepts, Cases, and Gaps in Knowledge

Proceedings of the Workshop on Gender and Water, 15–19 September 1997, Habarana, Sri Lanka

Douglas Merrey and Shirish Baviskar, Editors

IWMI

INTERNATIONAL WATER MANAGEMENT INSTITUTE

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The International Irrigation Management Institute, one of sixteen centers supported by the Consultative Group on International Agricultural Research (CGIAR), was incorporated by an Act of Parliament in Sri Lanka. The Act is currently under amendment to read as International Water Management Institute (IWMI).

Cover illustration by Yutaka Matsuno showing domestic use of irrigation water.

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Foreword

The September 1997 Workshop on Gender and Water was one of the most significant recent milestones in the evolution of IWMI's research program.[1] To date, our research outputs have consisted largely of individual case studies supplemented by literature reviews and interesting, but essentially speculative pieces on the possible implications of irrigation reforms for women. This work captured the attention of the Institute's staff and management as well as of many of our clients. It made a significant contribution to our decision to emphasize the Gender and Water program in the Medium Term Plan for 1998-2001.

The Workshop was intended to bring together some of the best researchers in gender and water issues from around the world, to help us establish and plan the next few years of research. I am pleased to report that the Workshop was very successful in achieving these objectives. IWMI's researchers, and I believe all the participants, learned a great deal about the issues and gender analysis concepts and methodologies as they apply to water; and most important, the serious gaps in knowledge were exposed clearly.

Building on the foundation laid at the Workshop, IWMI recently recruited a senior gender specialist who will join the staff in September 1998, on the first anniversary of the Workshop. We have also initiated new field research programs to address gender issues; and we have built gender analysis into several ongoing projects, which might not otherwise have had this dimension.

I want to thank the participants in the Workshop, whose vigorous and fascinating discussions combined with excellent papers made the Workshop exciting and interesting. Their contributions have taken us quite a ways further in the understanding of Gender and Water issues.

David Seckler
Director General
April 1998

[1]The Institute is in the process of changing its name from the International Irrigation Management Institute (IIMI) to the International Water Management Institute (IWMI).

Acknowledgments

Holding an International Workshop, even one that was not very large, always involves the support, cooperation, and hard work of many organizations and people. The International Water Management Institute (IWMI) wishes to acknowledge the support and assistance of some of the institutions and individuals whose efforts made the Workshop possible.

As we planned the Workshop, we became increasingly concerned about financing it, as we had only the limited unrestricted funds allocated by IWMI. In this context, we are very grateful to the Swedish International Development Agency (SIDA) for a generous grant, which covered a substantial portion of the costs of holding the Workshop. The Ford Foundation in New Delhi provided a grant that enabled participants from South Asia to attend. The United States Agency for International Development (USAID) generously provided travel support to two participants. Finally, we wish to thank the Netherlands and Danish governments, which had been supporting some of the work at IWMI that made this Workshop possible; a small amount of the balance Netherlands funds has been used to cover part of the cost of this Proceedings.

The Workshop itself was the "brainchild" of Margreet Zwarteveen who, as a Dutch Associate Expert in gender at IWMI, laid the foundation for the Institute's Gender and Water Program, and originally conceived of holding this Workshop. One of the papers in this volume was authored and another coauthored by her, and the numerous references to her papers by the other authors are testimony to the importance of her work.

Finally, we thank all those IWMI support staff who did much of the real work. Ms. Neelanganie Hidellarachchi as Secretary to the Workshop was responsible for formatting papers and getting them reproduced. Mr. Mohan Abayasekera did much of the logistical work to get the workshop organized. We also wish to thank Ms. Veronica Lumanauw who has taken the responsibility for preparing the papers to be sent to IWMI's publications office. There are also others too numerous to mention at IWMI to whom we extend our thanks.

Douglas J. Merrey
Shirish Baviskar
Editors

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[1]Editorial: Re-sounding the Alert—Gender, Resources, and Community Action. *World Development* 25 (9):1373–1380, 1997.

Introduction

In a recent editorial entitled "Re-sounding the Alert—Gender, Resources, and Community Action," Bina Agarwal[1] asserts that in spite of all the recent attention to gender inequities, things may actually be getting worse: "Indeed as new institutions, new property rights, and new social relations are being fostered, many old gender inequities are not just being perpetuated, they are becoming more deeply entrenched, and additional ones are being created."

During the week of 15-19 September 1997, IWMI hosted an international workshop on Gender and Water in Sri Lanka that brought together some of the best known researchers on gender and water, key IWMI staff, and a number of practitioners, to try to clarify the major research questions of importance to IWMI's work, and how they could be addressed more effectively. The workshop was built around thirteen research papers specially written for the workshop, which together provide a useful picture of the 'state-of-the-art' for both research and implementation guidelines. Discussion of the papers was combined with organized exchanges of ideas with IWMI staff to explore how gender issues can be more effectively addressed by the larger research program, and with field visits to sites in Sri Lanka. A principal point of agreement at that workshop was the paucity of good research—and competent researchers—in the general area of gender and natural resources management, and particularly gender and water.

The workshop focused particularly on gender analysis of rights to land and water, the implications of privatization and water markets for women's access to resources, how women (as well as men) can participate fully in collective action projects, and the relationships between problems like water scarcity and pollution, multiple uses of water in irrigation systems, and gender. Important observations underlined by the workshop are: the paucity of reliable gendered quantitative and qualitative data at both the micro and macro levels; and the need for a clearer understanding of the linkages among policies, project implementation strategies, and the diversity of social, cultural, and economic contexts of irrigation. Every paper in these Proceedings draws attention to the very large research gaps which need to be filled to provide a scientific basis for future water development and management policies. The interactions of participants with other senior staff at IWMI led to important insights into how gender questions can be more effectively integrated into a variety of other projects. And the nucleus of an international research network on Gender and Water was established.

The authors have revised their papers based on comments during and after the Workshop and all the papers presented at the Workshop are included here. These Proceedings are organized as follows:

Section 1 provides an overview of the major gender and water research issues in the larger context of gender and development in a paper prepared by Rekha Mehra and Simel Esim. Section 2 includes two papers, by Cecile Jackson and Frances Cleaver, which question the "received wisdom" of some of the standard social science approaches, based on their work in

multiple use water systems in Africa. Section 3 includes two papers, by Margreet Zwarteveen and Sonia Dávila-Poblete, that examine the implications for women and men of currently popular programs to transfer irrigation system management to local user-based organizations. The next two sections address related issues. The papers in section 4, by Barbara van Koppen; Carmen Deere and Magdalena Leon; and Judith Carney, analyze the gender implications of property rights in land and water. In section 5, papers by Ruth Meinzen-Dick and Margreet Zwarteveen; Rhoda Kweka; and Jeanne Illo examine the gender implications of collective action programs. Finally, in section 6, two papers, by Eva Jordans and Felicity Chancellor, explore the gender dimensions of implementation strategies and suggest ways of improving gender equity in irrigation development projects.

The editors have provided a brief introduction to each section, noting what they regard as the significance and major thrust of the papers in each section. The introductions to sections 3, 4, and 5 draw heavily on unpublished materials written by Margreet Zwarteveen. But the papers speak for themselves. They reflect the diversity of issues and topics, perspectives, and areas requiring further research.

SECTION 1

Introduction

Overview of the Issues

Recently, at various international fora, the urgency of addressing water scarcity issues around the globe has been highlighted. Until recently, water development projects, especially for irrigation and hydropower, constituted the bulk of public investments in many countries. Now, attention is shifting rapidly to problems of water pollution, competition for water among different sectors that will inevitably reduce the amount of water available for irrigation in the future, and environmental sustainability issues. This is so not only in those countries located in arid regions such as northern Africa, but also in monsoonal Asia, and indeed in all regions of the world. These changes have important implications for the lives of poor people, including women.

How can gender analysis contribute to better understanding of these and other emerging irrigation-related issues in developing countries? The overview paper by Rekha Mehra and Simel Esim sets the stage by linking gender analysis to growing water scarcity issues, the concern for increasing food production to keep pace with rising populations and incomes, and the pressures to use water more productively. Its value is that it places gender and water issues into this larger developmental context. The authors strongly advocate improving water management through user participation, and pilot testing of ways to enable women to participate actively in irrigation management so they can contribute to increasing production, and share in the benefits of these improvements.

What Gender Analysis Can Contribute to Irrigation Research and Practice in Developing Countries: Some Issues

Rekha Mehra and Simel Esim[1]

ABSTRACT

This paper attempts to demonstrate the contributions that gender analysis can make to improve our understanding of irrigation system operations and management in the context of the concern researchers have for enhancing the impact of irrigation. The authors examine three issues—women's roles as farmers and irrigators, irrigation management, and cost recovery and pricing. Because so little gender-related research has been done thus far, much of the discussion is conceptual. It briefly reviews the literature that is currently available on the three issues and, more importantly, explores promising issues for future research.

Because of the urgency associated with growing water scarcity, the concern for expanding food and agricultural production to keep pace with growing populations and rising incomes, and the need to use water more efficiently, researchers are exploring new ways to achieve these outcomes. The focus on improving management through increased user participation is especially favorable for implementing research that contributes to a better understanding of the current and potential roles and contributions of women in irrigation. It is also a good time to pilot test and document the ways in which women can better contribute to irrigation management, cost recovery, and improved agricultural production. The challenge, now, is to seize these opportunities in research and practice to improve irrigation performance, enhance agricultural productivity, and improve the well-being of people.

INTRODUCTION

Demand for food in developing countries is expected to more than double by 2025, requiring more than a doubling of average yields of food grains to ensure food self-sufficiency. Over the past 50 years, irrigation development has been a major factor in enabling the yield increases necessary for food grain production to keep pace with rapid increases in demand. The

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[1]International Center for Research on Women (ICRW), Washington, D.C. The authors woud like to thank Ingrid Arnò for her research assistance.

area under irrigation grew between 15 and 25 percent in different regions of the world between 1980 and 1994 (World Bank 1997). In the future, however, growing water scarcity is likely to pose a serious challenge to the needed expansion in food production and, by extrapolation, to meet other development objectives such as poverty alleviation and employment generation (Kijne and Bhatia 1994; Postel 1996). In particular, the scope for increasing area under irrigation is limited. Most of the best sites have already been exploited, costs of new irrigation development are rising, and funds for new schemes are dwindling (Kijne and Bhatia 1994; Rosegrant 1997). It is unlikely that much new irrigation development will be undertaken in the future (IIMI 1995).

There is growing concern that the area under irrigation has actually declined in recent years, and may continue to do so. Factors responsible include increased competition for the use of irrigation water for urban and industrial consumption, depletion of groundwater and other alternative water sources, and increased salinity. The productivity of irrigated areas is also declining because of salinization. It is estimated that more than 10 percent of the world's irrigated area may have enough salt buildup to lower yields (Postel 1996).[2] These developments suggest that future increases in food production will have to come from sources other than expansion of irrigated area such as new technologies and improved use of available water supplies and irrigated areas. Irrigation researchers believe that improvements in water use efficiency in irrigated areas are essential for the future (Kijne and Bhatia 1994).

Major problems in the irrigation sector include the inability of farmers to fully realize the planned potential of irrigation, inadequate maintenance of irrigation infrastructure, poor management of systems, the high cost of operations and maintenance (O&M), limited success with cost recovery, and the poor performance of irrigation bureaucracies. Until recently, most irrigation systems were managed by large governmental bureaucracies that were responsible for operating and maintaining the systems and that are now held largely responsible for the current difficulties. For instance, part of the explanation for farmers' failure to achieve anticipated productivity results is that they have learnt water delivery is unreliable and beyond their control. This is often due to the failure of irrigation agencies to properly manage and deliver water in response to farmer needs and prevailing conditions. Also, because systems were not properly maintained, over time rehabilitation and maintenance became very costly and now command large proportions of development budget outlays (de Graaf and van den Toorn 1995).

In response to these problems, over the past 20 years researchers and irrigation agencies have been experimenting with newer and more flexible approaches to irrigation management. These experiments started with paying greater attention to the farmers or "users" of irrigation and involving them in O&M. More recently, efforts have been directed at privatizing functions, including transfer of management functions and cost recovery to water user associations (WUAs). Privatization also involves experimenting with the establishment of water markets and pricing water in an effort to increase efficiency of water use. Current research on improving irrigation system performance, therefore, focuses on issues related to irrigation efficiency, management transfer, cost recovery, and efforts to retain irrigation water for agri-

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[2]Rosegrant (1997) gives further estimates of annual global losses of agricultural land due to waterlogging and salinization, ranging from 160,000 hectares to 1.5 million hectares, most of which have accrued in irrigated croplands with high production potential.

cultural uses in the face of increased competition in higher-valued uses. While efforts are being exerted to strengthen irrigation agencies and enhance the skills and capacity of irrigation staff, a great deal of the focus is on users.

The growing emphasis on users in irrigation research necessitates identification of the varieties of users and uses of irrigation water. An accurate picture of who uses water and for what purposes is necessary to develop appropriate policies to improve system performance and to bring about desired development impacts, especially those of enhancing agricultural production. The scant literature that is available demonstrates that gender is an important factor determining differences in the uses and intensity of the application of irrigation water (Agarwal 1981; Cloud 1984; Jones 1981; Zwarteveen 1994). As such, it may be an important variable as well in explaining levels of performance and irrigation impacts and offering insights into the improvements currently being sought in efficiency and management.

This paper attempts to demonstrate the contributions that gender analysis can make to improve our understanding of irrigation system operations and management. In the context of the concern researchers have for enhancing irrigation efficiency and impact, the authors examine three issues—women's roles as farmers and irrigators, irrigation management, and cost recovery and pricing. Because so little gender-related research has been done thus far, much of the discussion that follows is conceptual. It briefly reviews the literature that is currently available on these issues and, more importantly, explores promising issues for future research.

By way of introduction, it is important to clarify a few key assumptions. First, it is assumed that the objective of development policy and actions is to improve the welfare of people, women and men alike. Second, improving the welfare of people entails increasing the availability of goods and services, i.e., enhancing output. Third, it is assumed that one of the objectives of development is to ensure that increases in output are more equitably distributed both among socioeconomic groups and between the sexes. Equitable distribution is not automatic because of unequal power relations and entrenched vested interests between classes and sexes. It follows, therefore, that promoting equitable distribution must itself be an explicit goal of development. Finally, because irrigation is an important input into the development process, it must contribute to increased agricultural output and productivity, and the resulting benefits must be equitably distributed among women and men and between social classes.

WOMEN, AGRICULTURE, AND IRRIGATION

An important focus of the early literature on women and irrigation was to demonstrate the failures of irrigation schemes because they did not take account of women as farmers. Thirty years later it is still true that women are not "officially" recognized as farmers and irrigators. As has often been the case with other farm technologies, women were not initially provided direct access to irrigation and now, therefore, little empirical data are available to show that women do use irrigation water for farming. Nevertheless, there is enough information on women's contributions to agriculture and on women irrigators to warrant reexamination of assumptions about women and irrigation and to obtain a more accurate picture about the users and uses of irrigation.

Women as Farmers and Irrigators

Twenty years of research on women's roles in agriculture has provided convincing evidence that women are farmers and that their contributions to farm production and household support are significant (Mehra 1995). Given the scarcity of water in many places and at particular times and the widespread availability of irrigation, it is hard to imagine that, whatever the official rules, women do not use irrigation. Although information is difficult to obtain because of the nature of the rules that exclude women from irrigation use and their understandable desire not to admit to flouting rules and norms, in fact, evidence is beginning to emerge that women use irrigation water for farming. Studies in countries such as Bangladesh, Burkina Faso, Nepal, Pakistan, Peru, and Sri Lanka provide direct and indirect evidence of women's use of irrigation (Lynch 1991; van Koppen and Mahmud 1996; Zwarteveen 1993a; 1994; 1997a).

Official statistics show that women represent 54 percent of the agricultural and related labor force in sub-Saharan Africa and 65 percent in Southern Asia, and their participation may be growing (United Nations 1995). Actual participation by women is likely to be much higher because formal labor force statistics have been found to underestimate women's participation in agriculture. In Malawi, for example, Saito (1991) found that women perform 50 to 70 percent of all agricultural work and account for 69 percent of all farmers. An earlier study in Western Kenya found that women provided the majority of the agricultural labor and managed two-fifths of the farms (Staudt 1985). Even in places where it is often assumed that women's roles in agriculture are limited, more detailed examination shows that women are intensively involved in a wide range of activities. In Madhya Pradesh, India, Marothia and Sharma (1985) found that women performed many of the tasks and contributed at least half the labor used in rice production on medium and large farms. Mowbray (1995) found this to be true in Indonesia, Thailand, and the Philippines as well. Mowbray also found that, in Bangladesh, landless and poor women do as much as 80 percent of the work in rice production.

Women's farm roles vary by region, economic and political conditions, cultural beliefs, norms, and personal circumstances. They also change over time. The extent to which women are involved in decision making, the division of labor between women and men in the actual tasks performed, the production of cash or subsistence crops, whether women provide paid or unpaid labor, and the extent to which women retain income from farm production also vary greatly between and within regions and subregions (Bullock 1994). Very generally, women have greater responsibility for independent farming, particularly in the production of food crops, in sub-Saharan Africa, whereas in Asia, they are more likely to contribute labor to family production or to work as wage laborers if they belong to landless households.

A common pattern of production in sub-Saharan Africa is a gender division of labor between cash and food crops, with women primarily responsible for food or subsistence crops while men grow cash crops with a share of the labor provided by women. In food production, men may clear the land at the outset of a cultivation cycle and women frequently do the planting, weeding, harvesting, and processing of food crops with little or no intervention from men. Women thus cultivate and manage their own plots by themselves or with the help of their children, make their own decisions, and have control over their own earnings (Koopman 1993). In addition, they may contribute labor on their husband's or senior male kinsmen's plots.

In Asia, where the gender division of labor may be less well-delineated between crops, and women play more of a co-farmer role, they may still exercise varying degrees of influence over farm management and decision making. In parts of Nepal, for example, where farmers use high-yielding crop varieties, Ahmed (1987) found that women made 81 percent of the decisions pertaining to seed selection and 60 percent of those concerning the use of improved seeds. They also made 40 percent of decisions (versus 32.5 percent by men alone) about fertilizer use.

Each of these differences has important implications for irrigation research and practice. Thus, women's demand for and uses of irrigation water for agricultural purposes can be very varied, and this demand differs from that of men. These are important considerations for irrigation management, as will be shown below.

In households headed and/or managed by women across regions, women are often the primary farmers, often solely responsible for day-to-day decision making. Rural women become responsible for maintaining households for a variety of reasons that include widowhood, divorce, or separation, and because men migrate in response to employment opportunities in urban areas or overseas. Women who are left behind, sometimes for long periods at a time, become directly and often solely responsible for farm production and decision making. Approximately one-fourth of rural households in sub-Saharan Africa, for example, are estimated to be headed by women and, in some countries such as Burkina Faso, rates can be as high as 50 percent (United Nations 1995). Female headship of households is also growing in other regions (Buvinic and Gupta 1997, Mowbray 1995). In Thailand, the percentage of households headed by women increased from 12 percent in 1975 to 22 percent in 1990 (United Nations 1995).

The few available studies show that women irrigators are more likely to be found in women-headed households or those in which men are absent. Lynch (1991) found that most women who participated directly in irrigation in Cajamarca, Peru, were de facto wives of male migrants or the infirm or de jure heads of households (single women, widows, etc.). In the Mahaweli System H in Sri Lanka, Zwarteveen (1994/1995) found that widows own 20-30 percent of the irrigated farms. In parts of the Chhattis Mauja system in Nepal, more than 50 percent of the users of irrigation water were de facto women heads of households (Zwarteveen and Neupane 1996).

Implications for Farm Productivity

A key contribution made by researchers who studied the intra-household and productivity impacts of irrigation as early as the 1980s was to show the inappropriateness of the widely held assumption that the household is a unitary decision-making unit. They demonstrated that the consequences of this assumption could undermine the output objectives of irrigation (Jones 1983, 1987; Carney 1988a; Carney and Watts 1991).

Carney (1988a; 1988b) for instance, showed that an irrigation scheme in The Gambia almost failed because it assumed unified decision making within households. In particular, irrigation planners assumed that women would be willing to supply, without compensation, the incremental labor needed to make crop production successful on the irrigated areas allocated to men. In fact, women did not. Women themselves traditionally grew rice and were unwilling to provide labor on men's plots because they lacked appropriate incentives and/or

had competing demands on their own plots, which yielded them a personal income over which they had control. Consequently, farm productivity was undermined on irrigated plots as well as on those of women.

On an irrigated rice scheme in Cameroon, Jones (1983) found that intra-household conflict over women's remuneration for the labor contributed to men's rice production depressed total rice production. Women benefited because the bargaining process yielded them increased employment at higher rates of pay. Although most women did not have access to irrigated rice land directly, and many of those who were cultivating their own dryland rice had to abandon it, they managed to secure a larger share of income from irrigated rice production by working for their husbands.

The evidence provided in these and other studies shows that women, like men, are rational actors who attempt to use their labor optimally. When women have choices (which is not always the case because of unequal power relations between genders), they bargain for the allocation of their labor, deploying it to its highest-valued uses. This allocation is likely to be efficient.

That women and men have separate but interdependent responsibilities has implications for improved water delivery and management. Because women and men grow different crops, their demand for irrigation water may differ. Women may require irrigation for their crops at different times and in different quantities than do men. Even when women and men are jointly involved in producing the same crop, their demand for irrigation water may differ because they perform different tasks. Thus, Zwarteveen and Neupane (1996) showed that in Nepal where both women and men were involved in rice production, men were more concerned about irrigation availability at the start of the season when they were responsible for land preparation. Women were also concerned about water availability during the season because they were responsible for weeding and the task was more difficult if field water levels were low.

As these differences are seldom taken into account by irrigation agencies, if water is available, women may withdraw it for their own crops as needed. Alternately, they may use drainage water for irrigation (Zwarteveen 1993b). These officially unscheduled uses of irrigation by women for their own crops may conflict with the official water allocation strategies, and could pose problems for water management, such as unavailability of irrigation water at the time and in the quantities demanded. These problems arise because planning processes do not adequately take account of women's irrigation needs. Such failures could undermine agricultural production.

If increased productivity is a goal of irrigation, as it should be, the fact that women heads of households comprise a growing share of irrigation users has important implications for planning and management. Irrigation schemes often provide supporting services and complementary inputs to farmers to achieve output goals. It is well known that women's access to such services and inputs is a major constraint on their productivity, and problems are even greater for women heads of households. They frequently have fewer resources and greater labor constraints. In an example from Sudan, widows who were allocated irrigated land failed to use these plots productively because they faced great difficulty in hiring labor and obtaining agricultural extension advice and inputs (Bernal 1988). The efficient use of irrigation in places where women are involved may require addressing these constraints and ensuring that women have access to the required inputs, services, and training. Studies have shown that women farmers, with equal access to productive resources and inputs, are as efficient as male farmers or more so (Moock 1976; Quisumbing 1995).

Research Needs: Issues and Approaches

A crucial first step in integrating women into irrigation research and practice is to document their uses of irrigation water more systematically. We know, indirectly, from the literature that is currently available that women use irrigation water for farming even when it is not intended for them. It is important to begin to quantify these uses in a variety of irrigated areas and by the nature of women's farming—as independent producers and as joint producers with their families. Information is needed on the patterns of women's involvement in irrigation: the number of women involved, levels of their involvement, the purposes of their use of irrigation water and the results that are achieved. Fuller documentation is also needed of women's participation in construction, repair, and maintenance of irrigation infrastructure for which there is currently some, but very limited, evidence (Athukorala and Zwarteveen 1994; Dok, Putri, and Zulaicha 1992 cited in Jordans 1997; Lynch 1991).

Once women's use of irrigation is acknowledged it is relatively simple to obtain this information. Questions about who does what in crop production and irrigation are the basis of many household and sociological surveys conducted in irrigation research. It is a simple matter to add a column that records women's responsibilities in cropping and irrigation. This can be done at very little cost and, if added as a routine matter to household surveys, would yield a great deal of the basic information needed to understand women's roles as irrigators.

More difficult to address is the question of how to obtain information about women's activities. Traditionally, surveys are administered to male heads of households who are asked to represent the family. In some cases, this may yield the information being sought if the researcher asks item-by-item what each family member does by crop and activity. On the other hand, this procedure may not always work and it may be necessary to ask women directly about their activities. Of course, both women and men may subscribe to the prevailing norms and not admit that women farm or irrigate. They may be especially reluctant to admit to the use of irrigation water if women are using it without official approval. These issues have to be addressed through observation and pretesting. Researchers would then have to devise ways to ask for information in a nonthreatening manner and to assure and maintain strict confidentiality.

This basic information about women's uses of irrigation water is needed to understand the broader impacts of irrigation on farm productivity, labor allocation and incomes, and the design of improved policies. As we know, both women and men are involved in farm decision making and their separate and joint choices and bargaining processes affect the ways in which technologies (including irrigation) are used, and their success or failure. While Zwarteveen (1997a) found land and labor productivity and women's incomes were higher when both women and men owned irrigated plots in Burkina Faso, Bernal (1988) showed that access to irrigated plots was not a sufficient condition for improving women's farm productivity.

Related literature on the gender-differentiated impacts of technologies (including irrigation) shows that the outcomes depend on a variety of mediating factors. Sanders, Shapiro, and Ramaswamy (1996), in seeming contradiction to Carney (1988b), found that technological change improved the welfare of the entire household even when introduced only on family lands. Women benefited more from a combination of new technology on family fields and increased off-farm employment than from measures to introduce new technologies specifi-

cally to them. A contributing factor in women's inability to use new technologies as effectively on their own lands was the fact that women's plots were less fertile than household plots. Of course, women could be made better off by giving them access to more fertile plots. However, if this is not possible in a particular context, it is useful to know that the range of policy alternatives may extend beyond that of land transfer.

The results reported by Sanders, Shapiro, and Ramaswamy (1996) suggest that both households and individuals within them (i.e., women) can be made better off even if women are not given direct access to the technology, but if other employment and production options are available to women. In this case, because women's lands were less productive, they benefited more (as did households) by combining labor on the newly mechanized family fields with off-farm employment than by gaining direct access to new technology on their own fields. Whether or not women (and households as a whole) benefit from women's direct or indirect access to irrigation may vary. The results depend on other intermediary variables and alternative employment options for women, and must be determined empirically. Many more studies are needed on the impacts of irrigation on households and women using a gender-differentiated model of household decision making to better inform policy and practice.

IMPROVING IRRIGATION MANAGEMENT

Governments, through large centralized irrigation bureaucracies, have for long been primarily responsible for irrigation system operation and maintenance, including the provision of water to farmer fields. Increasing costs, low performance, and the deterioration of both structures and systems prompted experimentation with more decentralized management in which users of irrigation have a growing role. The failure of technological and other approaches to bring about the desired improvements has also led to a greater emphasis on proper management, including greater local involvement (Subramaniam, Jagannathan, and Meinzen-Dick 1997).

An important focus of irrigation research in recent years has been on improved management. A key strategy being pursued is system turnover to users—irrigation management transfer (IMT). The process involves devolution of some or all management responsibilities from government irrigation agencies to users, generally, water user associations (WUAs). Transferred responsibilities can include infrastructure maintenance, organization and management of water delivery, setting fees, allocating water rights, and conflict resolution (Plusquellec, Burt, and Wolter 1994).

The results of the decade-long experiment with IMT have been mixed. While some systems such as those in Colombia and Mexico have succeeded, others have had many problems (Jones 1995; Vermillion and Garcés-Restrepo 1996; Merrey 1996). The difficulties of making IMT work involve irrigation agencies and their staffs as well as the WUAs. Being used to bureaucratic and "official" roles, irrigation staff may lack the attitudes and approaches required to work more collaboratively with farmers (e.g., greater political commitment, more fiscal autonomy, openness and trust in dealing with farmers). Their new roles may be unfamiliar and they may lack the skills needed to nurture farmer participation—the latter, an important element of making WUAs work. Farmers, on the other hand, may have little experience in

running an organization and may lack the knowledge and skills required to undertake some of the specific tasks involved in operating and managing an irrigation system. Successful transfer, therefore, is a complicated task that requires significant institutional and attitudinal changes among both irrigation agencies and farmers (de Graaf and van den Toorn 1995).

A great deal of research has focused on developing and strengthening WUAs as a mechanism for implementing successful management transfer (Johnson, Vermillion, and Sagardoy, eds. 1995). WUAs are expected to improve the performance and sustainability of irrigation systems in a number of ways. First, they may provide better water delivery because farmers have greater incentives for better management, a greater stake in good service, and better information about local irrigation needs. Second, system maintenance might improve and damage might be reduced when farmers are responsible for the cost of repairs, as they often are with WUAs. Third, cost reductions may be possible through reductions in government staff, increased fee collection, and reduction in destruction of facilities. Expectations of the success of WUAs, thus, center on the management benefits that derive from improvements in information and the incentives of user ownership as stakeholders (Subramaniam, Jagannathan, and Meinzen-Dick 1997). When a set of users is not involved in management, as women often are not, expectations of success based on user incentives and improved information may be inaccurate.

In fact, expectations of improved management based on user participation have been higher than actual accomplishments. Many factors are involved. Some, as noted above, involve the interaction between irrigation bureaucracies and WUAs; others are more specific to the structure and functioning of the WUAs themselves. The limited data currently available suggest that the exclusion of women may be a factor hampering management—whether by users or irrigation agencies. On the other hand, there may be some lessons to be learned through gender analysis about improving irrigation management and the functioning of WUAs.

Water Management, User Associations, and Gender

Worldwide, women are either not represented at all or are greatly underrepresented in WUAs. Numerous factors account for this. The most basic explanation is the failure of irrigation agencies to acknowledge women as farmers and irrigators. In addition, women are excluded because membership is generally predicated on holding title to land, having official irrigator status or being the head of a household. These conditions are more likely to apply to men. The few exceptions are women heads of households, who are sometimes offered membership (Athukorala and Zwarteveen 1994). There are a few cases in which women do participate in WUAs and may even hold office (Athukorala and Zwarteveen 1994; Illo 1988). Some Philippine WUAs, for example, offer joint membership for women and men (Illo 1988; Quisumbing 1994 cited in Jordans 1997). In the Philippines, women were included because they controlled family finances and it would have been difficult to collect fees without their cooperation and consent.

Even when women have membership, however, researchers have found that they are reluctant to participate in meetings. Sometimes, they choose to send male relatives to meetings to represent their interests or, if women do attend, they are reluctant to speak for themselves. Reasons for women's nonparticipation may include their lack of skills, training, and experience in participating in male-dominated public fora, the belief that their views would not be

taken into account anyway, and male resistance to their participation. Also, an important incentive for user participation in organizations is that the benefits of participation outweigh the costs. Given women's multiple productive and reproductive responsibilities, the opportunity cost of participation is high and may not exceed the current benefits (Athukorala and Zwarteveen 1994; Zwarteveen 1994).

There is some evidence that lack of female representation in WUAs and the failure of management (more broadly defined) to take account of gender-based differences can pose management and efficiency problems (Bruins and Heijmans 1993; Schrevel 1989 cited in Zwarteveen 1993b). The failures to acknowledge gender-based differences in crop production and women as users of irrigation result in the failure to take account of women's irrigation needs (timing, seasonality, quantities). Nevertheless, if the water is available, women will use it and their uses could disrupt planning and scheduling (Zwarteveen 1993a).[3] Zwarteveen and Neupane (1996), for instance, found that village committees in the Chhattis Mauja irrigation scheme in Nepal were unable to prevent women farmers from taking more water than they were allocated or from stealing it outright because they were not members of the committees.

Another important factor that influences irrigation management decisions is that both women and men use irrigation water for multiple purposes—as noted above, an insight from the early literature on women and irrigation (Agarwal 1981; Cloud 1984). The use of irrigation water by women for domestic purposes has been acknowledged and accepted, sometimes to the exclusion of recognition of women's uses of water for crop production. There is evidence of the use of irrigation water for drinking and cooking, watering cattle, washing, bathing, homestead crop production, household industries, etc. In Sri Lanka, for example, village irrigation tanks, which are constructed mainly to provide water for rice cultivation, are also used for drinking water, bathing, washing clothes, and for other sanitary and hygienic purposes. Village cattle and buffaloes also use tank water for drinking and women use it for watering homestead gardens. The pattern is for women to establish specific points around the tank for each type of water use (Sri Lanka Resource Centre for Indigenous Knowledge 1995).

Although the use of water for drinking is generally acknowledged and accepted, few irrigation schemes were designed with these multiple uses in mind. As a result, multiple uses tend also to be regarded as nonofficial or even "illegal" uses of irrigation water. Sometimes, irrigation officials ignore these uses because they believe that very little water is used. On the other hand, because some of these uses are not officially provided for, the users often take it upon themselves to obtain the water as and when they need. In some cases, these unplanned and unauthorized uses can pose management problems or if canals are damaged, as can happen when cattle drink from parts of canals not intended for such use, other uses can be curtailed or disrupted and costs may rise.

Because of their lack of representation in management, women often resort to informal alternatives to make their needs known, with mixed success. In Ecuador, women were successful in obtaining the right amount of water at the right time but in Alto Piura, Peru, they

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[3]In fact, Brewer, Sakthivadivel, and Raju (1997) show that users, more generally, can have crop preferences conflicting with water distribution rules and that they find ways to circumvent them. The authors argue, therefore, that distribution rules ought to be reviewed periodically, with users, and revised if necessary and when technical realities permit.

were not (Zwarteveen 1997b). In Chhattis Mauja, women became very successful at negotiating their demands informally. They were actually given priority in the rotational water delivery system adopted during times of scarcity (Zwarteveen and Neupane 1996). It is important to note that, in this case, although women's actions posed a management problem, it did not affect the success of the user organization. In other cases, however, the exclusion of women can be more significant for the functioning of the WUA. An extreme case is documented in Indonesia where a WUA functioned poorly because women did not have official membership even though they were the main irrigators and farmers!

A potential contribution of gender analysis in irrigation research may be to help identify opportunities for better management. Such opportunities may arise from understanding and acknowledging gender-based differences in factors such as crop production (both types of crops and tasks in the same crop), information networks, skills and abilities, and informal channels of communication and influence.

If women as joint farmers of irrigated crops need water at different times than do men because of their differing tasks, and catering to this need contributes overall to successful crop production, better management may involve taking different decisions. Alternately, if women grow crops that are not considered the main irrigation crop but their production or the joint production of both crops maximizes household output and income, once again, different management decisions than those that currently prevail may be more efficient (assuming adequate water availability). For instance, if the vegetable crops grown by women yield higher returns than the cereal crops grown by men and women jointly, contrary to water distribution rules that always give priority to the favored irrigation crops, it may be more efficient to make water available for both types of crops. As it stands now, this is seldom done. Moreover, increasing the portfolio of irrigated crops cultivated by households may spread risk and minimize crop loss; and maximizing the production of household consumption and cash crops by delivery of irrigation water to both may reduce household food insecurity and simultaneously increase revenues. Whether or not changes in water management and delivery due to differences in women's cropping needs make economic sense has to be empirically determined, taking into account the different motivations mentioned above.

Since women's information networks are often quite different from those of men, they may be able to provide management committees useful information that all-male committees may not be able to access. For instance, in Nepal, water-stealing went unnoticed by the all-male WUAs. Men thought that thefts were not occurring until women reported specific incidents (cited in Zwarteveen 1995). In certain cases, women may be more effective in mediating conflicts over water. In the department of Cuzco, Peru, women were assigned the task of policing ditches because men thought it was necessary to keep the peace between themselves, whereas women were freer to "fight," as needed, to resolve water disputes (Lynch 1991). There may be important lessons that can be applied more generally in what works when women use informal means to successfully obtain consideration of their water needs in a system that is officially closed to them.

Finally, there may be lessons for group formation applicable to WUAs in examining successful cases of women's organization for water management. The success of the Women Cultivators' Association of Kalimangalam village in Tamil Nadu, India, in managing irrigation water provides some insights. Members, who number about fifty, are mainly women whose husbands have off-farm employment overseas or locally. The majority are Muslim women who

are traditionally regarded as conservative. Women are the primary rice cultivators and decision makers for agricultural operations. They are also responsible for water management including water delivery, water use, and maintenance of the tanks from which irrigation water is drawn. Members also make and enforce regulations and resolve conflicts. Rice yields have increased significantly during the period since the association was created. Jayasekhar, Karunakaran, and Lowdermilk (1992) explain its success as follows: small size of holding and a common interest in obtaining reliable supplies of water, voluntary creation of the group, and its clear purpose that provides visible benefits to its members. In addition, the technical support and mediation provided by staff at the Tamil Nadu Agricultural University have also been important.

The factors contributing to the success of the Kalimangalam Women's Association validate some of the conditions identified by Subramaniam, Jagannathan, and Meinzen-Dick (1997) as contributing to the success of WUAs more generally. They include motivation for creation of the group from among its own members rather than from an external impetus; member benefits exceeding costs; and a common goal or interest among the group's members. The example also lends partial support (in terms of increased yield and customer satisfaction) to Merrey's (1996) hypothesis that the best performing and most sustainable irrigation organizations are likely to manage a single system, to be fully autonomous, and to be accountable to their customers.

Research Needs: Issues and Approaches

With the limited information currently available, it is possible to show that gender analysis can provide useful insights for improved O&M and more effective user participation. For such an analysis to be compelling, it must be based on greater empirical evidence. More studies are needed on the nature and extent of women's formal and informal participation in irrigation management in various countries and on different types of systems. Descriptive information is also needed on the types of O&M tasks in which women are involved.

Analytical answers are needed to questions such as: what are the factors that compel/permit women to participate in O&M and, if women do not participate, why not? It is particularly important to know and understand cases in which women are the primary irrigators but are not consulted on water management issues, and/or are excluded from user management. What are the effects of this on irrigation performance, agricultural output and productivity, and on household and individual well-being?

In specific irrigated areas, it may be important to know and understand gender-differentiated patterns of crop production and potential returns to determine water requirements and allocations between crops. Once the potential values of all crops grown and of each are individually computed, the costs of not providing irrigation water for alternate uses may be assessed differently and may result in different and more efficient water management decisions. Valuations of other alternative (nonagricultural) uses of irrigation water may also be applied to improve O&M.[4]

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[4]It is important, however, to note that it is much more difficult to value certain nonagricultural uses of water, such as for drinking, because water quality and health implications come into play.

As user participation in management is the cornerstone of management transfer programs and reliance on WUAs is the main means of transfer, greater participation by women as irrigation users in their own right is necessary to make IMT work as planned. Intervention research is needed to identify the constraints that prevent women from participating in WUAs in particular places so that appropriate solutions can be devised. Identifying the constraints will require answers to questions such as the following: are women deliberately excluded from WUAs because men want to retain local power? Are women reluctant to participate because they lack the skills and confidence to act in public fora? Do the benefits of participation exceed costs in women's perceptions? Different solutions will be needed, depending on the responses obtained. In some cases, the solutions may involve providing training for women; in others, creating women-only associations as a preparatory step for women's integration into male WUAs or working with men to overcome their objections to sharing power. Since irrigation management transfer is relatively new and experimental in many places, it provides a good opportunity to experiment with alternative approaches to better integrating women.

Finally, studies are needed of women's successful participation in irrigation organizations in women-only and mixed-sex groups to obtain lessons learned for wider application. It is sometimes difficult to obtain information about women's participation in organizations, especially mixed-sex groups, because people are reluctant to admit it or because women regard themselves as proxies for their husbands, the official members (Mehra, Margaret, and Baling 1993; Zwarteveen 1995). Their contributions may be important, nevertheless, and should be sought out.

Qualitative studies are also needed for a deeper understanding of the ways in which women use informal channels of communication and influence to address their water needs.

Such information may provide insights into whether and how these strategies can be institutionalized to make WUAs perform more effectively in responding to the needs of all users.[5]

FINANCING, MARKETS, AND COMPETITION FOR WATER

Growing concern for water scarcity, more efficient water use, and improved water management have contributed to a shift in financing strategies. Instead of treating irrigation water as a "free" good, the emphasis now is on water charges. With declining government and donor resources, smaller budget outlays, and increasing O&M costs as systems age, irrigation agencies are turning towards privatization and market mechanisms to finance irrigation O&M. While fees have long been in use as a means to finance a portion of costs, they are becoming even more important as governments reduce budgetary support (Johnson, Vermillion, and Sagardoy, eds. 1995). Thus, fee collection is an important component of irrigation management transfer

[5]The most notable success of the application of lessons learned from the functioning of informal markets has been in the field of micro-credit. Lessons such as the willingness to pay relatively high rates of interest and the high value of accessibility to sources of credit have since been applied, along with other strategies, by micro-finance institutions to offer more reliable services on better terms to millions of poor women (Mehra, Drost-Maasry, and Rahman 1995).

and user-based management systems. Water charges are also favored by those concerned with water conservation, pollution mitigation, and with allocative efficiency, whether between crops or between competing uses such as industrial and agricultural uses (Postel 1996; Rosegrant 1997).

Two common types of fees charged for irrigation are area-based fees and water use charges. Area-based fees may vary with area cultivated, type of crop, and season and represent a fixed cost for the cropping season regardless of actual water use. Water use charges or volumetric fees are charged for the actual amount of water used. Volumetric pricing and water markets first developed around groundwater supplies because the water in these systems can be more easily controlled and measured than surface water. Although water pricing is more complicated on surface irrigation systems because the water is more difficult to control, these fees have, nevertheless, been imposed on users in surface irrigation systems as well. Volumetric fees are often the preferred alternative of managers because they create financial incentives for reducing water use per crop (Rosegrant 1997). Such fees can also promote allocative efficiency, as they can induce farmers to shift production from low- to high-value crops and to more water-efficient crops.

Fostering the development of water markets is a relatively new phenomenon about which there is still much to be learned. Many of the difficulties associated with the shift to market-based financing arise from the lengthy experience with state-owned and operated systems that got farmers accustomed to subsidized water. Bureaucrats and farmers treated water as a "free" good without the responsibilities involved in managing a common property resource, although it was being used as such. Nevertheless, the experience in shifting to market-based systems is growing slowly and there are successes to guide the future (Garcés-Restrepo and Vermillion 1995; Brehm and Quiroz 1995). Non-market (but private community-managed) and partial market solutions are also being examined as alternatives to ease the transition (Kemper 1996).

Very little research has been done on the gender implications of alternative systems of irrigation financing and cost recovery and on the potential impacts of the shift to market-based pricing and incentives. We offer below a few ideas about the possible implications of these changes. We also suggest questions that might be worth exploring in future research.

Financing, Cost Recovery, and Gender

The few available hypotheses currently available suggest that the likely effects of user charges will be to induce women to substitute more unpaid labor in irrigated agriculture (Zwarteveen 1997a; Cleaver and Elson 1995). However, we have shown above that women have varying degrees of control over their own labor and different bargaining skills to negotiate the use of that labor. It would be interesting to explore whether a more market-oriented environment (i.e., a shift in opportunities) would enable women to use their endowments of power and bargaining skills within the household more effectively in obtaining better access to irrigation water than they have now. It would also be interesting to know how changed incentives due to a market orientation affect women's choices, output, and productivity given the current distribution of household and public power.

There are few references in the literature about fee payments by women. If women are using irrigation water as they appear to be doing and they do not pay fees, a potential source of financing is not being tapped. Potential earnings are lower because fees are being collected

on a smaller base than is actually using irrigation water. The converse of this argument is that women who want and use irrigation water, because they are not officially recognized users and do not pay fees, may not obtain water at the time and place required and this may impact negatively on farm production. The other hypothesized benefits of volumetric fees (e.g., lower and more efficient water use, investments in improved technologies) also may not be realized.

Most state-administered (and now private user-based) water allocation procedures currently do not officially recognize women's rights to water. A key question is whether increasing reliance on markets and pricing will facilitate women's access and thereby "legitimize" their use of irrigation water with the expected advantages—greater security of water availability. In a system based exclusively on price, women could purchase water like anyone else, assuming there were no legal or administrative barriers and women have adequate financial resources. However, women's disproportionately smaller income and liquidity constraints may limit their ability to pay. Lack of cash is a bigger problem for women than men because so much of women's productive labor is unpaid. But, as more of it becomes remunerated, as for example, through expanded opportunities offered by access to irrigated production, their capacity to pay fees may increase.

A number of research questions arise with respect to women as a potential source of fee collection: if women use irrigation water for domestic purposes, and are doing so unofficially, what would they be willing to pay to ensure continued official access? If women are drawing water for agricultural purposes, what is their willingness to pay if they are assured a legal, regular, adequate, and timely water supply? If they do not have access to water now, would farm production be enhanced by extending water rights to women, and how could this be done?

Water Markets and Gender

The development of water markets should result in greater efficiency. If water is saved in the process, perhaps more would be available for currently unrecognized users and distribution would be more equitable. Such a scenario could potentially benefit women. In an example from Mampur village in the state of Uttar Pradesh, India, Pant (1995) reported that turnover of a state-owned tube well to a user-managed cooperative lowered water costs to farmers and increased water availability. As a result, more water was available for scheduled (low) caste women cultivators who previously grew only dryland crops, but after turnover planted wheat as well.

On the other hand, women may not benefit from an increasing market orientation. Markets may not to perform as intended for a variety of factors that include, but are not limited to, unequal gender relations. Water markets may not result in socially or politically acceptable patterns of water allocation and/or delivery because other conditions and institutional arrangements are not in place, for example, access to adequate information or the initial allocation of rights may be skewed, or property rights not clearly defined.

Finally, growing competition for water at the macro level—agricultural/rural, urban/industrial—has heightened research interest in valuing water in order to compare the value of competing uses. A water valuation exercise may help generate critical information about the incidence and severity of external costs. Such information may be a sine qua non for the de-

sign of user fees that ensure the efficient (and equitable) allocation of water for both domestic and productive purposes. Creating a market for irrigation water may ensure the more rational and efficient allocation of water rights. Without an understanding of the social and environmental costs of water provision, however, such a market may fail to capture and distribute the potential efficiency gains by failing to ensure that full compliance is met or that all users face an equal cost of accessing water resources. There may also be interesting gender dimensions to the distribution of these external costs which may further illuminate the gendered nature of access rights.

Another important component of research for valuing water is to account for the multiple uses of water. The first steps in determining the multiple uses of irrigation water, particularly in rural areas, were undertaken by researchers who showed that women use water for a variety of nonagricultural purposes including domestic uses. Many of these "domestic" uses include activities such as watering cattle and watering homestead gardens that yield income and subsistence. However, because they are not the "officially" intended uses of irrigation or because women perform many of these activities, or because it is believed that they add so little value to irrigated production, they have generally been ignored. More recently, increasing competition for water and mounting pressure for environmental sustainability have provided the impetus to attempt to value the full benefits and costs (as, for example, of pollution) of irrigation systems. Studies are underway by IWMI in Sri Lanka and Pakistan to determine who uses irrigation water and for what purposes, and to value these multiple uses.

CONCLUSION

This paper has attempted to suggest ways in which gender analysis can contribute to a better understanding of three critical issues in irrigation—women's roles as farmers and irrigators, improved irrigation management, and financing. Because of the urgency associated with growing water scarcity, the concern for expanding food and agricultural production to keep pace with growing populations and rising incomes, and the need to use water more efficiently, researchers are exploring new ways to achieve these outcomes. The focus on improving management through increased user participation is especially favorable for implementing research that contributes to a better understanding of the current and potential roles and contributions of women in irrigation. It is also a good time to pilot test and document the ways in which women can better contribute to irrigation management, cost recovery, increased efficiency of irrigation and agricultural production, and to integrate women into water user associations. The challenge, now, is to seize these opportunities in research and practice to improve irrigation performance, enhance agricultural productivity, and improve the well-being of people.

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SECTION 2

Introduction

Rethinking Gender and Social Theory

All research is based, explicitly and implicitly, on broad theories that, in turn, have built-in assumptions. It is important to return constantly to examining our theoretical approaches, and to identifying, illuminating, and questioning the underlying assumptions of these theories and the resulting biases and implications for understanding. The major contribution of the papers by Cecile Jackson and Frances Cleaver is that they both raise questions about the 'received wisdom' of current social science theories as they apply to gender and water issues.

Cecile Jackson begins by noting that there is a tension between 'structural' and 'materialistic' approaches to gender analysis on the one hand, and those which emphasize the capacity of individuals to make voluntary choices—'agency'—on the other. Women and men live their lives subjectively, and Jackson argues for bringing this 'embodied subjectivities' dimension of people's lives back into gender analysis, as a corrective to more deterministic approaches found in some eco-feminist writings. Conventional structural approaches to gender analysis of land and water rights, for example, emphasize the impacts on women of socially sanctioned rules and principles that deny them formal rights. Conceiving of women and men as rational actors, on the other hand, allows us to address additional questions: Why do women often appear to go along with such a bad deal? Are they really as powerless as the structural model suggests? How do they understand and represent equity and inequity of access?

Frances Cleaver's paper follows a similar line, in that she raises questions about the 'normal' policy prescriptions derived from institutional analyses, especially the 'new institutional economics.' Modeling incentives as being the product of norms and organizational designs leads to prescriptions advocating formal manifestations of collective action: participating in committees and meetings, applying formal rules, and basing relationships on contracts. Cleaver draws on her detailed research in an arid district in Zimbabwe to show how such formalized organizational 'solutions' to problems would be and are counterproductive in the cultural context of this area. This district is characterized by a variety of water sources, each with its own advantages and disadvantages, and the multiple use of these sources. They are managed by a set of informal institutional arrangements whose principles are deeply imbedded in the local culture, and women, in fact, play key roles in these arrangements.

Gender, Irrigation, and Environment: Arguing for Agency

Cecile Jackson[1]

ABSTRACT

This paper is not a critique of water policies or an advocate of alternatives, themes that other papers in this collection address extensively, but rather suggests a shift of emphasis in the ways in which gender analysis is applied to water, development, and environmental issues. It briefly argues that feminist political ecology provides a generally stronger framework for understanding these issues than eco-feminism, but cautions against a reversion to materialist approaches in reaction to eco-feminism which, like eco-feminism, can be static and ignore the agency of women and men. The paper draws attention to the subjectivities of women and their embodied livelihoods as a more useful approach to understanding the ways in which women relate to water in both irrigated agriculture and domestic provisioning.

INTRODUCTION

In her paper comparing the progress made in integrating gender analysis into water sector projects and policies, Kusum Athukorala (1996) observes that domestic water supply interventions have a much better record than irrigation. She suggests many reasons for this, including the 'traditional' role of women in domestic water supply, which lessens the cultural barriers to increased participation by women, and the tensions in irrigation development, which are seldom so compatible with 'traditional' gender divisions of labor. A review of the literature on women and water certainly supports this contention.[2] Without suggesting that the other reasons, such as the differing organizational character of domestic water supply and irrigation institutions, are less important, I think this should make us pose a question about how to address the central question of understanding gender relations in this most resistant arena.

I think we also need to consider a question confronting gender analysis in general: How to deal with the tension between approaches to gender and development which emphasize the

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[2]The author wishes to express her gratitude to Patricia Tan who helped her survey the state of knowledge on women and water in preparation for this workshop.

social structural constraints on women (which for convenience I will call here 'structural' approaches), and those which emphasize the agency of women as acting subjects, called here 'agentic' approaches as shorthand. This distinction is made not to suggest that they are always opposed and distinct—many gender analysts would see women as acting subjects living within social constraints of varying flexibility—but simply to suggest that we need to be mindful of this balance, and that, as I argue here, there are potential insights to be gained from a shift towards greater analytical emphasis on agency. By this I mean a focus on the person as a social actor with a capacity for willed and voluntary action, which is not simply determined by social structures. Such acts may be resistant—or not. Other papers at this conference argue for related attention to the cultural embeddedness of water institutions (Cleaver, this volume), and for recognition of women's agency in informal water access (Zwarteveen, this volume).

The structure of the paper is as follows; first I consider competing approaches to gender and environment and their implications for water resources, before going on to a brief exposition of gender analysis of irrigation and environmental change. Next I argue that the concepts of gender analysis are not usefully applied with a structuralist emphasis, which too readily assumes the absence of choice and the presence of overwhelming constraint, and implies therefore that women are helpless in the face of patriarchy. Gender analysis, deserves a more considered application in recognition that women are fully acting human subjects, whose lives offer choice as well as compulsion. Towards this end I suggest that we need to think about the idea of the embodied subjectivity of men and women in relation to irrigation and environment issues. The remainder of the paper explores what this might entail.

GENDER, ENVIRONMENT, WATER: COMPETING APPROACHES

Radical Environmentalism: Eco-Feminism and Gendered Political Ecology

Eco-feminist understandings of the causes, consequences, and meanings of environmental degradation are distinctive and are based on an essentialist view of women as a transcultural and transhistorical category of humanity with an inherent closeness to nature, and sharing with nature a violation by patriarchy and capitalism.[3] Environmental degradation is linked to patriarchy. Thus eco-feminists see water scarcity as caused by 'man,' both in the broader sense of anthropogenic causation and in the narrower sense of patriarchal social relations. Vandana Shiva (1989:179) writes: "The drying up of India, like that of Africa, is a man-made rather than a natural disaster." Dankelman and Davidson (1988:30) write that "more and more evidence ... suggests that these [droughts] are not entirely natural," emphasizing anthropogenic causes instead. Irrigation is attacked for the volume of water it consumes and for poor efficiency such that 70-80 percent of water drawn from rivers for irrigation never reaches the crops (WRI and IIED 1986), for the salinization and waterlogging that result from poor management, and for groundwater depletion that is seen to desiccate and impoverish thousands

[3]Eco-feminism is a diverse body of thought, necessarily treated in summary fashion. An account of some of this diversity is given by Mellor (1992).

of villages in Asia. Shiva (1989:179) claims that "the number of villages facing water famine is in direct proportion to the number of 'schemes' implemented by government agencies to 'develop' water." She argues that these water development programs are "anti-nature and anti-women" (1989:182), and urges us to think like a river, to refuse thinking about water as a resource; and to reject the damming and diversion of water and energized pumping and tube wells, in favor of human- and animal-powered water lifting devices.

For Shiva (1989:184), dams, tube wells, water-intensive cultivation, and technology-intensive solutions to the drinking water crisis are "destroying the feminine principle and sustaining power of water, and destroying women's knowledge and productivity in providing sustenance." Canal irrigation is particularly reviled as a "favorite masculinist project" (1989:192) as are dams. Shiva (1989:194) claims that the practice of female infanticide amongst Kallars of Tamil Nadu was caused by a dam and irrigation scheme; with prosperity came the devaluation of women and dowry practices, and then infanticide, such that "[T]he devaluation of the work of the river is associated with the devaluation of the work of women, and both arise from the commoditization of the economy which forces violence on nature and women."

Women are portrayed in eco-feminism as the sole water collectors and managers who, over centuries, have acquired extensive knowledge of water.[4] Their gender interests are always seen as compatible with environmental conservation, and they are identified as the primary environmental managers and carers, with instinctive understandings of nature.[5] Eco-feminist positions on water resources development are overwhelmingly negative about dams, irrigation, and domestic water development, other than very small-scale activities based on human energy and local knowledge which they see as beneficial to women and to nature.

Eco-feminist approaches have been seen as problematic for a range of reasons (Jackson 1993a; Nanda 1991; Agarwal 1992), which cannot for reasons of space be pursued here. But it is important to briefly outline how alternative approaches to water resources degradation, styled simply gender analysis (Jackson 1993b), feminist political ecology (Rochleau 1995), feminist environmentalist (Agarwal 1992), and micro-political economy of gendered resource use (Leach 1991)[6] offer a different understanding of what is agreed to be a serious environmental and human problem of the greatest urgency. These alternatives share a more historically specific and class-disaggregated view of gender in the place of eco-feminist essentialism, a more grounded materialist perspective than the culturalist emphasis in much eco-feminism, an attention to the tensions and contradictions in the ways in which women and men

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[4]Exaggerating the knowledge of women about water is potentially dangerous. A study of women's perceptions of the modes of transmission of water-related diseases in northern Ghana revealed a very uneven picture, but one in which there was very little knowledge of the role of water, and in which nature and evil spirits were frequently blamed for the diseases (Akuoko-Asibey and McPherson 1994). This is hardly surprising. Women undoubtedly have considerable environmental knowledge but unrealistic beliefs about the extent of this knowledge, and the implied redundancy of health education, are potentially harmful.

[5]Such 'instinctive' understandings often seem to revolve around menstruation, and no doubt the water project in Colombia in which women knew when to refill the pot chlorinators for water purification by using their menstrual cycles as indicators is destined to become another eco-feminist icon.

[6]What is feminist and what is gendered is of course different, but since many of these writers use the terms interchangeably I will not confuse this discussion with a further set of distinctions.

are positioned in their environmental relations, and a rejection of the idealizing impulses of eco-feminism. Critics of eco-feminism have argued that essentializing women as environmental carers sets the scene for their further exploitation. In water resources development this is evident—for example a FINNIDA-funded project in Kenya to train women hand-pump mechanics has been accompanied by a transition from paid work when pump maintenance was done by a man, to unpaid work when done by a woman. Along with all other residents, these women mechanics must even pay the monthly water tariff which is used to pay for wages to male mechanics if they are called out (Hoffman 1992).

There are more questions and fewer certainties in feminist political ecology. Since universal generalizations and givens are eschewed in favor of a locally specific analysis, a feminist political ecology offers not a set of generalizations about women and nature but a set of questions to guide such an analysis. A selection of these for water resources development might include: Does large-scale irrigation always and everywhere lead to environmental degradation? Are women always the most negatively affected? How do divisions of labor place different groups of women and men in relation to water work? How much time is devoted to water collection? Have women accumulated specialist knowledge about water? Are small-scale water technologies always preferable to women? How does the commodification of water as a common property resource affect different groups of women and men? What eco-feminism assumes, gender analysis makes problematic.

A gendered political ecology/economy of water resources degradation would emphasize a context-specific analysis of women and water rather than universal generalizations. It would be rooted in the livelihood realities of particular groups of women, differentiated by age, ethnicity, class, or other relevant social divisions. It would assume, not an unchanging character of womanhood, but dynamic and complex gender identities in which men and women experience both shared and divided interests, and it would understand environmental relations as primarily social relations.

The concepts central to such an analysis include gender divisions of labor, of rights (including property), and of responsibilities, for example in the 'conjugal contract.' These concepts have proved powerful ways to understand gender differentiation at both household and community levels. Unlike eco-feminists, who are generally favorable to, and uncritical of, community management, gender analysts have raised objections to the micro-politics of devolution and community management (for example see Meinzen-Dick and Zwarteveen, this volume), on the basis of work suggesting that women have few rights but many responsibilities in local water management institutions.

Gender analysts need to take some care in application, to avoid separation of genders rather than their integration and interdependence. We would do well to develop a stronger analysis of the significance of culture and of meaning as a response to eco-feminist challenges, rather than painting ourselves into a materialist corner. These are not entirely new themes, but the arguments made in much of the gender and water literature show little recognition of what is possibly the greatest conceptual contribution of gender analysis—that, unlike classist approaches, it seeks to elucidate not just the clear and separate social interests (similar to worker and landowner) of men and women, but also their deep interdependencies. We need to insist on a broader understanding of the 'resources' which are struggled with and for, to develop a stronger analysis of the significance of culture and of meaning, in addition to land and labor.

The application of gender analysis, with its political economy standpoint, has been very fruitful. It has offered a critique of eco-feminism, and it has also offered a methodology for policy analysis of water interventions in mainstream development discourses, or what may be categorized as technocratic environmentalism, which I briefly review next.

Technocratic Environmentalism, Water, and Gender Critique

The second main strand of contemporary environment and development thinking is the loose consensus in multilateral development agencies around a recognition that environmental resources have economic value and that future generations have rights to environmental resources. Documents such as the 1992 World Development Report (World Bank 1992) insist that development is not opposed to environment, but synergistically connected. The experience with water resources development (World Bank 1993) is used to argue that wastefulness, which Shiva (1989) puts down to reductionist, masculinist mindsets, and commoditization, is actually due to insufficient commoditization. This approach to water stresses economic efficiency as a means of conservation and reallocation of water, property rights as incentives to conservation, decentralized provision with user participation, and a special role for women in providing, managing, and conserving domestic water; issues which other contributors to this volume discuss. Whilst eco-feminists are deeply opposed to the commodification of water based on perceived ecological and feminist principles, feminist political ecologists are also skeptical about this, on the basis of decades of research into gendered rights and responsibilities.

Gender critics of this approach have observed that gender analysis reveals cracks in the development-environment synergy; that the water resources consensus is problematic because it immobilizes, rather than empowers, women in domestic roles of water providers and disregards their productive use of water; that water pricing is more likely to undermine than to expand women's access to water; that the attempts to reduce pollution through lower subsidies on agro-chemicals are likely to have perverse effects on women farmers by increasing their labor inputs and decreasing their returns; and that decentralization and community management amount too often to increased use of women's voluntary labor (Green and Baden 1995). Further, it has been argued that the emphasis on economic valuation will shift priorities towards that which can more readily be economically valued, and away from those such as health benefits which are less easily measured and valued; that the turn to the market ignores the evidence that women engage in markets on less-favorable terms than men; and that devolving 'ownership' to local communities is no guarantee of equality of access (Cleaver and Elson 1995).

Margreet Zwarteveen (1997) argues however, that the empirical evidence for the negative impact of the commodification of water is both slight and ambiguous. What is needed is not a negative or positive position on commodification, but a set of methodological tools for exploring the issue anew in specific project contexts.

A less contentious, because more consensual, area of the new water consensus, is the favorable view of small-scale technology. Eco-feminists have, as we saw above, taken a strong line on technology and rejected the use of non-renewable energy in water resources development, arguing for small-scale technologies based on human energy. Gender analysts of the water consensus have been less exercised with this aspect of the new water consensus. Women in Development (WID) traditions since the 1970s have emphasized appropriate small-scale

technology despite continuing acceptance problems (Stamp 1989:57-61), and latterly the New Poverty Agenda (Lipton and Maxwell 1992), with its primary emphasis on labor-intensive growth, has added to this consensus. However, in the approach set out below the issue of technology reemerges in a more problematic light.

ARGUING FOR AGENCY

I return to the issue of gender and technology in water development below but, first, with a slight excursion to reflect on how, within the broad and deep discourses of gender analysis, the social relations of gender may be understood in different ways.

Gender analytical tools have evolved out of discourses of political economy and socialist feminism, and the parentage shows in the key concepts outlined above: Gender divisions of labor, rights and responsibilities, gender divisions amongst women, e.g., of class, and age, and the politics of gender struggles. These concepts have been critical to establishing gender differentiation as a widely accepted expression of social power and subordination. Some of these concepts, however, can be used to suggest that gender is a set of social relations, which always and everywhere disadvantage women, that women are helpless objects of pity in the face of overwhelming male power, and that their lives are determined primarily by their gender identities. Some critics have seen this tendency as an expression of a white western feminist need for an 'Other' (Mohanty 1988), and some as an unavoidable legacy of modernist thought (Hirshman 1995). It is a serious objection that in our attempts to recover women as subjects in social change we can, perversely, deny them subjectivity by representing them as passive recipients rather than active instigators of social change. Understanding the personhood of women, and gender as lived and personal experience as much as a membership of a social category, has remained a neglected element of gender analysis, and one which, I argue here, offers insights into the encounters of women with water resources interventions. The limitations of structuralist approaches can be briefly indicated with reference first, to property rights, and second, to divisions of labor.

Property Rights

As Margreet Zwarteveen (1995:2) points out, "women often have no formally or legally arranged access to water; water rights (much like land rights) are often attributed to male individuals only." Gender advocates have seized the opportunity to argue the inconsistency of the shift to increasing community rights to water as means of improving the incentives for long-term conservation, by creating local stakeholders in water quality and quantity, whilst failing to address the exclusion of women from water rights. If clearly defined rights lead to greater responsibly in water use then women should be included in these rights, especially given their significance in water management.

Water rights like land rights are social, in that they define legitimate access on the basis of socially sanctioned principles. Such 'entitlements' may be guaranteed by the state, religious, customary, or local institutions, extend over varying durations (seasonal, lifetime, in perpetuity) of use, and offer varying levels of control and conditions of use (over sale or trans-

fer, for example). A structuralist approach to land rights might, crudely, suggest the following: Women need formal land rights, they are constrained by patriarchy from exercising the limited rights they have, they must struggle (preferably collectively) to obtain and exercise land rights, and states should ensure the formal rights of women and support their ability to exercise those rights. This is hard to disagree with, but it does leave the impression that the social institutions of 'patriarchy' serve to prevent women from having what, it is argued, is strongly in their interests to have, and that women are therefore powerless in the face of patriarchy, or deluded as to the real nature of their interests. If women are conceived of as rational actors, one has to ask further questions: Why do they appear to (mostly) go along with a deal which appears to offer them so little? Are they as powerless as this model suggests and is the deal as bad as the model suggests? How do they understand and represent equity in gender relations? What are the discourses which convince women of the legitimacy of their exclusion from land rights? In this, it is helpful to move beyond structuralist approaches to consider multiple identities, life cycle effects on gender identities, and the tension between cooperation/conflict and shared/separate interests in order to conceptualize gender relations as more than structures of constraint.

Thinking about these questions requires less argumentation on the basis of a 'what's good for men must be good for women' stance, and more consideration of how particular women experience land and water access and control as a particular part of their livelihoods and gender relationships. An example of such an approach to water rights can be found in Margreet Zwarteveen's and Nita Neupane's (1996) study of women irrigators in Nepal. They describe a situation in which women find nonparticipation in formal water management groups to offer advantages: They have greater freedom to break rules and to 'steal' water, and they, as female headed households, find discourses of vulnerability effective in securing water access. Foucauldian notions of power as fragmented and dispersed are more useful here than the dualistic opposition of the powerful and the powerless in many structuralist gender analyses.

A study of a community-managed hand-pump project in Niger hints at a similar local discourse of female vulnerability which may be quite attractive to women. In almost all the pumps surveyed, women paid less per capita than men in maintenance fees; in some, only men paid. In 1990, men contributed 77 percent of the pump funds and women 33 percent and in 1991 men contributed 60 percent and women 40 percent (Niger Ministry of Water and Environment 1992). In this scheme as in others, women may prove in the long run to be the most committed payers, and too much cannot be read into values like these, but it is possible that the label of vulnerability has some real value to women in their survival strategies if it lowers community expectations of their contribution to collective endeavors.

Last, the study by Paula Roark (1984) in Burkina Faso also shows that, although women were formally excluded from community groups that were apparently in control of water resources decision making, in practice decisions about digging new wells were made in prior women's meetings. These generated demands for new water sources, which were requested to be discussed at the elders' council meeting, which women attended but did not speak at, and "it was almost unheard of for the council not to concur with the women's petition or request" (Roark 1984:59). If the subsequent pace of work was too slow, the women would ask the elders to review the progress, but usually the implied rebuke was sufficient to speed up the work without further action. "It was the women who decided whether to use the water

source, and whether it was worth the needed expenditure of effort to maintain it" (Roark 1984:59).

The issue of visibility is complex. On the one hand, both women and men devalue and invisibilize women's work, as the following suggests:

> *A woman who spent four hours of the early morning walking a total of some eight kilometers to fetch water for domestic use was interviewed ... about her contribution in water management. She said, "Nothing really..."* (Bhatt 1995:254).

But at the same time, whilst it is desirable to make women's work visible and to make their rights to resources more formal and less conditional on relations with men, we also need to recognize that invisibility and ambiguity may have strategic advantages for women. They may arouse less male resistance and yet deliver subtle forms of influence and power, for silences speak, and invisibility can be excellent camouflage.

Understanding processes of power and exclusion that disadvantage women requires attention to struggles over meaning as much as struggles over resources, as Pauline Peters (1984) has demonstrated so convincingly, and as Judith Carney's more recent research (Carney and Watts 1990) has so thoroughly substantiated. Resources are not only material assets, they are effective arguments, symbolic constructs, labels, texts, and information; and these are as significant to gendered water rights as titles and tenure. Thus to say that "women have been omitted from both large and small scale irrigation schemes in Africa, often because of land tenure issues" (Rathgeber circa 1995:12) is to echo some of the early gender analyses, which suggested that women were omitted and must be integrated, and which was much criticized for failing to see how women are always and everywhere 'integrated,' but in distinctly specific ways. The fact that women rarely have titles to irrigated land is only the beginning of an understanding of gendered resource relations and of what might be more gender-equitable alternatives.

Gender Divisions of Labor

Divisions of labor is another example of a central concept in gender analysis which can, however, find overly structural application. The dead hand of structuralism is evident in the treatment of several questions: How does one describe gender divisions of labor? What do we assume about how they are produced? How do we identify inequity in gender divisions of labor? To take the description questions first; many accounts of gender divisions of labor in water work are content with generalizations drawn from western expectations and local norms, although ethnographic studies show considerable variation in how men's and women's work is divided and distinguished, and societal norms about gender divisions of labor are representations which not everyone contributes or subscribes to, let alone complies with, and from which everyday practice diverges considerably. It is often said that women do all the water collection for domestic use, although many studies of actual practice show considerable variation, but insights are to be had from looking at the circumstances in which they are not. Even where it is the case that women collect all the water, we need to know more about how women experience this work, as one task amongst many.

What processes give rise to a particular gender division of labor? This issue has been approached in many gender analyses from a perspective of exclusion and exploitation without very much attention to the connections between forms of work in gendered livelihoods, and the potentially contradictory implications of complete inclusion of women in all work for their well-being. Thus we find arguments from gender analysts for what amounts to more work for women, in labor markets, in income-generating activities, in community work, on committees and in public fora, alongside arguments that women are overworked and underrecognized, with the trade-off being most clearly recognized in nutrition studies (McGuire and Popkin 1988). It might be argued that it is not more work for women but more opportunity that is sought, but why then is the absence of women from labor markets, community organizations, and so on, taken as evidence of the exclusion of women? Whether particular women are excluded or over-included, and whether this is the workings of exclusionary social relations, or bears the imprint of the preferences of women, is obscured by mechanistic interpretations of gender divisions of labor in which women's voices and actions are not considered.

Last, structuralist approaches offer little basis for understanding what is inequitable in gender divisions of labor since we do not know whether the absence of women from a particular arena is exclusion or choice. Gender specialization in work is generally taken as a separation on which subordination rests, for example justifying unequal wages by differentiation of tasks, or differential valuation of domestic and nondomestic work. Yet the absence of specialization can also be problematic for women's well-being. This is a complex tension in gender analysis, which cannot be readily resolved but which would perhaps become clearer with greater attention to agency.

Clearly, the goal of gender-equitable social change means having more of some kinds of work and less of others, and it would seem preferable that distinctions about desirable and undesirable forms of work are not deduced from nutrition science or western feminist principles alone but discovered in dialogue with those involved in and affected by such work. This is not only an ethical standpoint, but also a consequence of seeing women as fully acting subjects and as actors whose preferences and actions are capable of subverting both progressive and regressive social change. Gender divisions of labor are also deeply politicized and entwined with the exercise of power and authority, and the apparently straightforward provision of a labor-saving technology for women may be perceived as a challenge to male authority. Research in several locations of the Indian subcontinent record men objecting to a reduction in water collection time and effort for women and children on the grounds that "it was feared that less work would make them idle and provide opportunities for undesirable behavior" (van Wijk-Sijbesma 1985:44). All of this suggests the importance of greater attention to the subjectivities of women and men, and to the self-conscious perspective of women as people.

It is now nearly 10 years since Moore (1988:38) argued that feminist anthropology makes a significant contribution to gender analysis through its emphasis on women as persons, "on actors' models of the way the world is, and on how they influence social action." Although ideas of persons and individuals are cross-culturally varied, and western concepts of persons

are not universal, we need to consider women as experiencing selves, with powers and preferences.[7]

Thinking about women's personhood reveals an important element of the social identity of 'woman,' which is that it is lived through and alongside other identities of class, age, nationality, occupation, race, and so on. The socialist feminist antecedents of gender analysis have ensured a detailed attention to class as integral to gender relations exemplified in the work by Bina Agarwal. Nevertheless, we have tended to a categorical approach to class-gender, for example by constrasting poor women and prosperous women, rather than one which examines processes and contradictions, for example between gender and poverty (Jackson 1996). Nor have we really taken up the analytical challenges that have emerged from recent feminist theory, of women as social actors with multiple identities, and of the need for a dynamic approach to how the lived experience of being a woman changes through a life course, and is to some extent performed and enacted in the routines of daily life.

Rather than consider embodiment and subjectivity as separate phenomena (in the characteristically dualistic manner of western thought), it is the connectedness between these which I would like to emphasize here. The next section speculates about the implications of such an approach for gender analysis of water.

EMBODIED SUBJECTIVITIES AND WATER WORK

In turning from an exclusively social approach to one which includes personal perceptions, we need to recognize that work has personal rewards as well as social rewards, and is a personal as well as a social burden. That work represents sets of social relations is fairly obvious, but there is also a personal experience of work in its physicality, as well as in its creativeness and sociability to consider. We tend to assume a 'disutility' of work, yet it has many qualities (rewarding, dangerous, boring, dirty, health-giving, or threatening) attached to the ways in which individuals experience particular kinds of work, and which remain absent from considerations of why and how men and women end up doing what they do within their livelihoods, and divisions of labor.[8]

Work[9] is therefore not just 'effort,' it is also 'reward.' Does the personal and embodied experience of work enter into the perceptions of 'effort' and 'burden' and are these linked to the positions taken by, and the interactions of, men and women within households in evolving patterns of activity which add up to a gender division of labor? I strongly suspect they do. What might this approach mean for the ways in which we analyze gender relations in

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[7]To attend to the self is not however to neglect the social, for as Moore (1994:3) argues more recently, experience is a form of embodied intersubjectivity, i.e., bodily identities are linked to social interactions, and experience "is not individual and fixed, but irredeemably social and processual."

[8]For example, a study of Bedouin women weavers in the Sultanate of Oman (Heath 1996), which investigated why women continued to weave despite the very poor financial returns, concluded that the enjoyment of the creativity of weaving was a significant feature in the continuation of weaving.

[9]It may be unhelpful to regard any activity producing value as work, since arguments can be constructed for the social value of almost any activity, but it is also problematic to see work simply as activity which requires effort, since it has its pleasures too.

irrigated agriculture and in domestic water programs, and the ways in which we approach policy and intervention alternatives in environment and development discourses?

The policy relevance of such an approach lies in the better understanding of the likely directions in which women's agency might be exercised—an issue of central importance in any attempt at policy formation or analysis. The next section illustrates this with some speculation about two issues which may be better understood with such an approach. First, to return to the question raised at the start of this essay, the relative progress of the gender agenda in domestic compared to irrigation water development, which may require much more attention to the interests and preferences of women as actors, as well as to the organizational comparisons conventionally made. Second, the evaluation of scales of technology in irrigation and domestic water interventions, which may necessitate knowledge of how technologies are experienced by women.

Participation in Water Work

Could it be that the greater 'success' in domestic water development is connected to aversion by women to irrigation work or to greater commitment to domestic water improvements? In other words, is it women's agency as much as exclusionary male-dominated social structures which 'explain' such outcomes? If so, what is it about the differences between forms of water work which make them differentially attractive to women? Would it not be wise to consider how to make irrigation work more attractive to women as a strategy for greater involvement by women? Or, possibly, to accept that the absence of women from irrigation work may be a 'success' in terms of the actors themselves, where a withdrawal from certain forms of labor might be desired?

It is quite interesting to reflect on the 'withholding' of labor and the 'withdrawal' of labor; the former used to suggest women's preferences (e.g., in Jones' classic 1986 study in Cameroons) and the latter usually (but not always) to suggest male will. There has been a certain ambivalence about the issue of the withdrawal of women from agricultural work, noted in many studies of technological change. On the whole, gender analysts have emphasized the negative connotations of labor withdrawal; the visibility of participation in public rather than private work, the effect of women's earnings on their well-being (both direct, through higher incomes and greater personal control of money, and indirect, through strengthened bargaining positions within households), and, in some cultural formations, the association of withdrawal from agriculture with seclusion practices and the limitation of women's physical mobility.

However, the significance for gender relations of withdrawal from agricultural work for gender relations cannot be read off from a set of prior assumptions in this way, and I would suggest that it only has meaning in the context of both the specific wider cultural, ideological, and material circumstances of individual women, and their personal perceptions and feelings, including their experience of bodily well-being. Thus for example, in my early work on a large-scale irrigation project in Hausaland, northern Nigeria, the comparison of secluded Muslim Hausa women and non-secluded non-Muslim Hausa women suggested that Muslim women effectively used discourses of seclusion to legitimize their interests in limiting family farming labor demands made on them, in extending their specialized and commoditized petty trading and food processing, and 'perversely' developing greater personal autonomy (Jack-

son 1985; see also Mbanyiman 1997). Women's resistance to labor intensification by withholding labor is widely reported and should raise questions about how far women's agency is involved in labor withdrawal.

Issues we need to know more about what this perspective suggests are: How onerous is intensified irrigation work perceived to be by men and women who are directly involved? How are discourses of strength/weakness and heavy/light work used in negotiating divisions of labor, and by whom? What other qualities of work (repetitiveness, riskiness, creativeness, sociability) are valued or devalued and how are they experienced in the tasks of irrigation? What is happening to women's involvement in farm work in general beyond the irrigated sector? In a study of work expectations and performance in India, work that was perceived to be heavy or risky was categorized as unsuitable for women, even though most farm operations, including the heavy and the risky, were undertaken by women (Bhople and Patki 1992). In such a cultural context it is likely that, given a choice, many women might express their agency by opting out of such work. Men commonly seek to escape from manual labor when livelihoods permit—why should not women experience the same aversion to heavy physical work?

In other words, it would be misleading to assume that women's lack of involvement in irrigated agriculture is entirely a matter of exclusion. Or similarly, that it is only on the insistence of men, seeking higher status through emulation of higher class practices such as seclusion of women, that women give up farm work when household incomes rise. Sanskritization[10] is undoubtedly a feature of changing gender relations in India, but it characterizes both men's and women's aspirations, and it is not the only explanation for changing patterns of work. The pleasure and the pain, or what Scarry (1985) calls the "controlled discomfort" of different kinds of work is part of the subjective preferences of individuals and therefore part of the stances they adopt in intra-household negotiations. And of course, the perception by other household members of how demanding a task is, will also affect the extent to which help is offered; for example, in a number of projects (in Kenya, Guatemala and Mexico) women have reported that improved domestic water technologies have not saved them time and effort because "men and children no longer assisted in collecting drinking water when trips were shorter and less taxing" (van Wijk-Sijbesma 1985:99).

Discourses of strength have a prominent place in a great many folk accounts of gender divisions of labor, but they were discarded in mainstream gender analyses during the 1970s and have since received very little attention. This deserves reexamination in the spirit of taking local discourses seriously, neither imagining that they are free of gender ideology or mystification, nor rejecting outright the significance of actual bodily strength, of social constructions of strength, and of the lived experience of tiring and health-threatening forms of labor. Irrigated agriculture involves tasks widely differentiated in their bodily demands, and the involvement of women in, say, the maintenance of irrigation structures requires an interrogation of actions and meanings rather than assertions of exclusion.

In her paper on the impact of a water program in Vietnam on women, Linda Hitchcox describes the transition from collective to largely privatized production, and from the high level of involvement of women in all farm work during the war, when men were absent, to the situation on their return when women "gladly stepped down from these tasks, handing over to men, whom they described as being stronger, more skilled and experienced" (Hitchcox

[10]Here meaning the phenomenon of low castes aspiring to coform to the behavioral patterns of high castes.

1992:30). Discourses of strength and their counterpart, endurance, are gendered. Women's tasks, "though not so heavy physically, require considerable endurance—transplanting, weeding, harvesting—leaving men to be responsible for work requiring upper-body strength—transporting manure, ploughing and helping with the harvesting." Furthermore, men's contributions to 'female' gendered tasks, such as domestic work, depended on "their strength and state of health in relation to their wives" (Hitchcox 1992:30). Discourses on strength can also declare women's greater 'natural' ability for particular heavy work too. An East African study reported men saying:

> *Firewood and water are women's responsibility. Men can and do, of course help, but it is not their job. It is a woman's job for they have stronger necks than men.* (Skonsberg 1989, cited by Bryceson and Anderson 1993:14).

Where feminism of the 1970s was content to ignore folk models, or dismiss them as mystification, contemporary gender analysis cannot be, not because, say, strength does or does not 'explain' subordination, but because local world views are ingrained in the lives of actors and set the terms of compliance or resistance.

Moving on from irrigated agriculture, and thinking about domestic water and environment as an embodied female subject, raises issues of how women and men experience water degradation, and decline in water availability. The energy demands of water-carrying are substantial. Loads can weigh up to 40 kilograms—considerably more energy-intensive than even the heaviest agricultural work done by women—and carrying water accounts for 12–17 percent of the daily energy intake in some East African research (van Wijk-Sijbesma 1985). In a context of environmental degradation (Chiduku Communal Area), which is by no means at the extreme of environmental stress, where water supplies are increasingly unreliable, the task of water collection has been estimated to require over 30 percent of average daily per capita calorie intake (Mehretu and Mutambirwa 1992).[11] The ergonomics of water carrying has also been shown to place serious strains on the bodies of carriers, leading to spine deformities, arthritic disease, and occupational injuries (Page 1996).

Women undoubtedly play a major role in domestic water provisioning, but a gender analysis, unlike eco-feminist approaches, is also interested in relations between women and other women, and here we often find that relations of power between women in households frequently gives rise to patterns of delegation of water work within households. Older women characteristically shift the more strenuous tasks to young women, daughters before marriage and young wives of sons, who are expected in many cultures to obey their mothers-in-law. Acts such as these suggest that, when possible, women seek to divest themselves of domestic water work, which may well speak of a dislike of strenuous labor. How have we understood the burden of water collection and how adequate is this? Whilst in early gender analysis the term 'domestic drudgery' was common, it came to be applied less as a description of physical arduousness and more as a description of domestic work as unpaid and undervalued, since

[11]The methodology for measuring energy use in tasks with any accuracy is remarkably intrusive and resource-intensive—this study made fairly crude estimates.

a concern with commodification loomed large in socialist feminist influenced gender analysis of the mid-1970s. It may be timely to think again about drudgery and physical effort.

A second feature of the conventional approach to understanding the burden of water collection is the emphasis on time input studies (e.g., Whittington, Mu, and Roche 1990), in which time serves as a proxy for effort. The reasons for this are several, and include the instrumentalism which has characterized many arguments for gender to be integrated into development policy and planning. In the case of water, there is a large literature which estimates the time taken for water collection by women, and argues that if this time were released, women would spend more time in 'productive' activities like farming, which would be to the advantage of their families and their nations. By contrast to argue, as Carr and Sandhu (1988) have done, on the basis of considerable evidence, that women do not use time saved on agriculture but on other work and more leisure, and that "an increase in women's free time constitutes a benefit in itself, however it is spent" (Carr and Sandhu 1988:44), has been seen as a 'welfarist' argument, both somewhat despised by gender analysts (Moser 1993; Buvinic 1986) and not expected to cut ice in arguing for gender with skeptical development policy makers.

However, as Bryceson and McCall (1997) have pointed out, there is considerable evidence to suggest that women themselves often seem to value time less than escaping arduousness and high physical effort. Thus they are willing to make long time-consuming journeys to grinding mills to avoid manual processing. Understanding the embodied experience of work is likely to involve an understanding of the characteristics of work as much as the time spent on it, which would greatly enrich time input studies. The significance of this for water policy, and development policy more broadly, is considerable. It might suggest that, rather than the high motivation of women hand-pump mechanics in Kenya and because "any additional time spent in water collection means less time for sleep at night" (Hoffman 1992), they are moved by the desire to escape peaks of heavy and damaging labor.

After an early focus on both time use and energy expenditure in water work and gender studies, there has been a discursive shift towards time use as a proxy for effort (Cairncross 1980; Leslie 1989). This is possibly connected to the interest in valuing water-collecting time as an element in attempts to treat water as an economic good (Cleaver, personal communication, 1997). But to understand the perceptions of women, I would argue that we need to renew our research into effort, burden, and the ways in which women strategize around avoiding some tasks and not others. Research findings abound on the willingness of women to reject water pumps of poor ergonomic design, to refuse to contribute heavy labor to pit digging for latrine construction (Perrett 1985:11), and to travel to distant but preferred water sources. They may suggest that time expenditure is too simple a metric for understanding how women act in relation to water resources.

Many studies also suggest that seasonal variations are significant: In the dry season when agricultural demands are lower, women are concerned more with reliability of water provision, whilst in the rainy season proximity of provision is most valued (Roark 1984). In research into the use of improved wells in Sierra Leone it was found that water collection at closer new wells took around double the time of water collection at more distant old wells, because of the queuing required, yet the preference for the new wells suggested that women possibly valued the time spent queuing more than the more energy-expending time spent walking to the older sources and carrying back heavy loads. In this location, 60 percent of water

collection was done by girls and boys, which may also suggest the popularity of the improved technology with small-bodied individuals (Bey 1988). It may be that time is of varying value to women and that saving time is not as significant as saving effort in many circumstances. The implications of this might be to prioritize effort-saving elements (ease of use for relatively small-bodied individuals) of domestic water provision, rather than time saving per se.

Embodiment and Technology

Thinking about water, environment, and irrigation technologies as an embodied female subject raises fresh interest in how women and men experience small-scale irrigation. Consider the case of treadle pumps in Bangladesh, which are operated by manual treadling, and which have been promoted as environmentally sound with pro-poor technology used originally for home gardens but now increasingly used for rice production. It has been suggested that human energy powered technologies can be damaging to women, who report exhaustion, injury, and pain after using them for some time, and pose particular problems when menstruating or pregnant. Despite the labor abundance in rural Bangladesh, which is taken to vindicate labor-intensive technologies, it has been argued that labor has to be understood as an embodied experience, rather than simply as a time allocation, in which the gender distribution of the physical burden of work and the work intensity of this technology suggest that for poor rural women this may be a very inappropriate technology (Palmer-Jones and Jackson 1997). The most damaging effects were experienced by particularly poor women who treadled pumps as hired labor for low wages, and the least damaging effects were felt by those who treadled for relatively short periods for their own vegetable production.

The physical experience of work, in this case of effort and burden, enters into intra-household bargaining over labor in complex ways. The aversion to pain and the discomfort of heavy labor, is a powerful incentive towards negotiating oneself out of such labor. On the other hand, the remarks made by women about this were revealing: One said that they "do not like to admit to tiredness and pain," another that "people do difficult things for their families" and another that "it is tiring and painful but what is to be done?" whilst a fourth exclaimed that "men try to use women like slaves for working!" (Palmer-Jones and Jackson 1997:47). These comments suggest an unwillingness to be seen as 'frail' at tasks expected of women, a sense of shared sacrifices, a lack of alternatives, and an anger at explicitly recognized inequity in gender divisions of labor. They indicate some of the individual experiences of burden, the simultaneously shared as well as separate interests of spouses, both willing acceptance and angry resistance. Whether the experience of burden translates into silent self-exploitation or articulated objections at the extremes, or forms of subtle refusal and obstruction in between, depends on many factors. This much is clear, the quality of work is experienced bodily (as well as through social valuation); these experiences have meaning and affect action; and women justify the work they do with diverse narratives which draw on gender ideologies and personal loyalties as well as socially legitimated refusals.

CONCLUSIONS

I have argued here that eco-feminist approaches to water relations are flawed by their essentialism and structuralism and that a feminist political ecology offers a more fruitful analysis, in which, however, we need to focus on agency; and I argue that rethinking the embodied experiences of women and men in water work with water technologies may be a useful entry point for such a focus. It seems to me that a focus on embodied subjectivities brings together discourses too often separated, of labor and production, on the one hand, and health and well-being, on the other. Thus I argue that physical work intensity is a characteristic of the bodily experience of work which influences well-being, both physical and perceptual, generates working experiences which pattern the subjectivities, preferences, and perceptions of individual women, and feeds into the social relations of gender in intra-household 'bargaining', producing divisions of labor, and extra-household gendered social relations of work. Moving gender analysis in this direction, it is suggested here, is part of a larger redirection of thinking more seriously about agency and dynamizing gender analytical concepts towards a better understandings of why women do what they do in relation to water.

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Gendered Incentives and Informal Institutions: Women, Men, and the Management of Water

Frances Cleaver[1]

ABSTRACT

I briefly outline theoretical approaches to institutions as solutions to collective-action problems and indicate the linkages with policies regarding participation in water resource management. I then go on to suggest that, whilst offering considerable insights, such approaches are limited and may result in policy prescriptions which do little to involve or empower women. In particular, I suggest that the modeling of incentives is impoverished in its 'economism' and in its abstraction of the individual from a life world. I suggest that the conceptualization of institutions is primarily an organizational one, which, whilst alluding to the role of norms, practices, and conventions, focuses primarily on formal manifestations of collective action; contracts, committees, and meetings. Where women's participation is concerned, I illustrate that incentives to cooperate may be devised from reproductive concerns and the minor exigencies of daily life (as well as from productive concerns) and that alternative models of institutions may better reflect the way in which decisions are made and implemented within a social context.

INTRODUCTION

In this paper I consider the contribution which theories about common property resource management and policies relating to participation can make to our understanding of communal water resources management. Common to theoretical and policy approaches are the ideas that incentives are important in defining the problem of collective action, and that institutions apparently offer a solution to it.

There is a growing literature about the place of institutions, formal and informal in development. Great claims are made in theory and in practice for the empowering nature of increased participation of women in the institutions of local decision making and management of natural resources, including water (UNDP 1990; UNCED 1992). However, there is little work on how such empowerment is effected, or on the perception that women and men

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have of the decision-making process at local level and their role within it. The models of institutional development that are commonly offered tend towards formalization and bureaucratization and are gender neutral (Ostrom 1990; Uphoff 1992). As has recently been pointed out, there is little gendered analysis (Folbre 1996) of the differing ways in which men and women may approach and contribute to such institutions.

COMMON PROPERTY RESOURCE MANAGEMENT AND NEW INSTITUTIONAL ECONOMICS

The theorists of common property resource management discussed here can be characterized as those adopting an 'institutionalist' approach. Deriving their model of human behavior from theorists who suggest the 'boundedness' of individual rationality (Simon 1976; March and Simon 1958) they devote much energy to determining how to establish effective management regimes for collective resources. Such an approach has been characterized as an 'institutional rational choice' as epitomized by Ostrom (1990), taking account of the role of institutions in shaping individual and collective behavior. Modeling of incentives combines rational choice clarity with more socially informed complexity. Although it is generally assumed that people's prime motivation is to secure an income, attempts are made to place people within a social context that shapes this motivation. Faced with imperfect information and the associated risks and uncertainty, the individual is considered likely to adopt 'satisfying' rather than profit-maximizing strategies.[2]

Institutions, it is claimed, help to formalize mutual expectations of cooperative behavior, and allow the exercise of sanctions for noncooperation and thereby reduce the costs to the individual of transactions. Social institutions are perceived as clever solutions to problems of trust and malfeasance in economic life as they can make cheating and free riding too costly an activity to engage in (Granovetter 1992: 59).

Institutional approaches are often evolutionist in the assumption that there is a possible and desirable progression from weak and inefficient forms of collective action towards stronger more sustainable forms (Ostrom 1990). There is a strong tendency to assume there are certain abstract qualities and forms of collective organization and decision making that are transferable across contexts and that will promote desirable outcomes (Nelson 1995: 70).

Such writings on common property resource management fall within the paradigm of the 'new institutional economics' (NIE) which considers the institutional context of individual decision making. There is no consensus about the definition of institutions. Nabli and Nugent

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[2]Ciriacy-Wantrup and Bishop (1975) offered an early institutional critique of the rational choice theory of the 'tragedy of the commons' in which they emphasized the difference between unregulated open access to communal land, and common property where resource use is regulated by institutional arrangements. There have followed a number of explorations of the nature of such arrangements, of the formal and informal institutions shaping the motives and actions of the bounded rational individual (e.g., Berkes 1989; Bromley, ed. 1992). These are not confined to considerations of property rights alone, although a great deal of attention has been devoted to this. The also refer to other social and organizational practices which might determine behavior and regulate resource use. People are seen to 'behave or choose in an institutional context' (Bromley ed. 1992:6).

(1989:1335) suggest a working definition of an institution as 'a set of constraints which concerns the behavioral relations among individuals or groups.' This definition could be challenged for its emphasis on 'constraint;' others emphasize institutions as a form of social coordination (Folbre 1996) and as enabling rather than constraining individual action. While NIE is rarely gendered there have recently been suggestions that it could be extended to models of household resource distribution and decision making (Folbre 1996) and to the analysis of policies to involve women in the water sector (Wakeman et al. 1996; Davis 1996). In this paper I consider how some of the concepts derived from 'institutional' approaches (encompassing common property theorists and new institutional economists) might be applied to local-level decision making about the management of collective water resources and how this might impact upon development policy. The limitations of such analyses are considered, particularly in respect of the lack of a gendered focus.

In the next section I consider the policy background for the collective management of water resources and indicate how institutions are seen to play an important part in this. In the subsequent sections, drawing on data from research in Zimbabwe, I demonstrate how the common 'institutional' approaches are too narrow in their conception of incentives and institutions.

Policy Background

There are strong links between the institutional theories of collective action and policies promoting local participation.

> *Since common property systems provide, in effect, long term and "grassroots" institutions, these systems are the most important candidates for popular participation in development decision making ... there is now abundant evidence from detailed case studies that these institutions play a crucial role in economic development* (Berkes and Taghi Favvar 1989:13).

During the past decade there has been a trend for water resources management policies to emphasize the participation of women in the planning and management of projects in the interests of efficiency and empowerment (UNDP 1990; UNCED 1992; UNICEF 1995). Such involvement is held to improve the likely effectiveness of projects, for example through enhanced operation and maintenance, and to be beneficial to women in terms of building on their skills and increasing their access to decision making (Narayan 1995).

Policy statements of agencies involved in the sector are increasingly emphasizing the need for a more complex gendered approach, which takes into account the complexities of livelihoods, the social relationships between men and women, and the potential costs to women of participation (DAC 1994). There is now a suggestion that the NIE may offer useful insights for analyzing the role of women in the water sector, and for deriving policy prescriptions (Wakeman et al. 1996; Davis 1996). Some prominent ideas in new institutional economics include the prime role of incentives and institutions in motivating and regulating individuals' contributions to collective action.

In terms of communal water resources, incentives are defined as those mechanisms that motivate individuals' water use and their participation in collective arrangements for its management. Institutions are the structures of rules, roles, and authority through which individual participation is translated into collective action.

There is a danger, however, that the application of such an analysis may be oversimplified. A concern with incentives fits neatly with the 'demand driven' approach to planning in which users are seen to express their needs and preferences for improved water supplies through their willingness to pay (Najlis and Edwards 1991; World Bank 1993; Klumper 1995). The incentives that shape such willingness are claimed to be the potential for time savings, lower-cost water, or the increased opportunity for productive activity through improved water supply.

Institutions, or more usually organizations, are increasingly considered important as the structures through which participation is mediated. User organizations for water resources management are seen as the forum for decision making, and the location of the generation of rules and regulations, punishments, and rewards for collective action in water. They are therefore considered important in channeling the contribution of individuals and in regulating the way in which the resources are managed. Substantial attention has been paid both in policy and practice for increasing the number of women represented in institutions concerned with water resources management, particularly on committees (Davis 1996).

This twin approach to incentives and institutions has previously been characterized as one which prioritizes markets and meetings as the primary mechanisms through which women's participation is mediated in water resources management (Cleaver and Elson 1995). I suggest that whilst institutional approaches to collective action for water resources management offer a useful framework for analysis, they are too often translated into 'design principles' and policy interventions which oversimplify the approach, and substitute formal organizations for institutions as manifestations of collective action. This type of approach can be criticized for a focus on individual actors divorced from social context, its narrow conception of transaction costs, and a reductionist and functionalist view of institutions. It is over-economistic and under-socialized, and does not recognize the complexity of livelihoods and the social context in which decisions about participation and resource management occur (Cleaver and Lomas 1996).

Incentives

Institutional theories suggest that incentives encourage people to cooperate. Incentives are defined by Seabright (1993:117) as mechanisms, formal or informal, which may induce users of a common property resource to undertake collectively beneficial but individually costly actions. Two themes predominate: it is the individual upon whom the incentives act and the strongest incentives are likely to arise from concerns about the maximization or defence of production (Wade 1986). Where insufficient incentives exist to secure collective action, institutions in the form of property rights, rules and regulations, norms and expectations, committees and contracts can supplement or substitute for these.

Incentives may arise from the pressures of scarcity (Wade 1988) and the desire to maximize the use of a resource (Ostrom and Gardner 1993). They may also be related to transaction costs; cooperation in an institutional context may be less costly to the individual in terms

of time and energy invested than in individual negotiation and possibly conflict with resources use (Nabli and Nugent 1989).

Such a view of incentives can be criticized for being over-economistic in its concentration on production and focus on efficiency. It isolates individual acts of purposive choice, and models direct causal relationships between identified incentives and such acts. Social factors relating to incentives are admitted but rarely analyzed, and the household is not deconstructed to show differing incentives operating on its members. Moreover, little attention is given to noneconomic incentives or to the place of commitment, altruism, or 'self-actualization' in motivating collective action (Douglas 1987; Giddens 1984).

In considering incentives further, here I will limit my analysis to illustrating how, in the case of water resources management, a focus on productive incentives is too narrow and does little to reflect complex livelihood concerns.

There is a commonly held view that women are predominantly motivated to improve their 'domestic' water supplies in order to save time which can then be used for income-generating activities. Women are thought to be willing to pay either in cash or labor to secure a water source closer to their home (Wakeman et al. 1996) and there has been substantial emphasis in the water sector on securing this. This view claims to recognize the multiple roles of women in reproductive, productive, and community management activities (Moser 1989; Wakeman et al. 1996) and identifies the constraints on women's lives primarily in terms of time available for productive tasks. It implicitly deals with poverty concerns through the suggestion that, with release of time, poor women will be more able to secure an income (World Bank 1993). There are a number of implicit assumptions, such as that women primarily use a single water source and that they are strongly motivated to take action to bring this source closer to their home. It is assumed that those collecting water are also the managers of water supplies and will be the women who participate in water projects.

There is a contradiction in these approaches in that women are recognized as being important due to their domestic roles as the prime fetchers and carriers of water. However, incentives to improve such water supplies are modeled primarily in terms of enhanced economic productivity. Such an approach is inadequate for a number of reasons as will be illustrated below.

Institutions

There is a tendency in the institutional literature to recognize the importance of social and informal institutions, but nevertheless to concentrate on the analysis of formal organizations (see for example Uphoff 1992). Here there is a concentration on contracts, committees, and property rights as mechanisms for reducing transaction costs and institutionalizing cooperative interactions (Brett 1966; Folbre 1996). Such a focus is often prescriptive, formalized institutional arrangements being considered more likely to be robust and enduring than informal ones. Features that are thought to enhance the success and sustainability of institutions for resources management include, for example, a clearly bounded user group, a system of graduated sanctions imposed on those who offend the rules, and public conflict resolution mechanisms (Ostrom 1990). Such a formalization of collective action, it is suggested, will clarify and make transparent such arrangements.

In the water sector, a concern with institutions has been manifested through much work on water committees, water user groups and associations, that is, with the organizations for water resources management. Gendered approaches to these have largely concentrated on increasing the number of women represented in such organizations. The justification is that involvement in decision making and management will ensure that resources management more accurately takes into account women's priorities, is more efficient (women are there more of the time), and is empowering to those who take part (Narayan 1995; UNDP 1990; UNCED 1992; SDC 1994; Danida 1992.)

However there are several difficulties with this approach. There are, as discussed below, a number of constraints on women's involvement, in particular in terms of time and money. Second, the model of institutions proposed is a formal one based on organizations with an emphasis on explicit forms of decision making, rules, and contracts. I will suggest below that the very culture of committees may be a barrier to women's involvement and also overlook the informal systems for managing resources in which women play a major role (Mayoux 1995; Cleaver and Elson 1995).

NKAYI DISTRICT, ZIMBABWE[3]

Nkayi District is located in the province of Matabeleland North in the western part of Zimbabwe. It is entirely situated in Natural Region 4, characterized under the national land classification system as having low rainfall (450-600 mm per year), a mean temperature of 20–25 °C and seasonal droughts. Such areas are considered suitable only for the growing of drought-resistant crops and semi-extensive livestock production. Due to the huge amount of forest land unsuitable for cropping, severe land and water pressure is felt in the district. Water is scarce, the main rivers running dry for much of the year and a large proportion of the population (informal estimates suggest up to 90 percent) depending on boreholes and hand-dug wells. Not all of these produce water throughout the year and many of the small dams dry up and are subject to silting. The district has had a troubled history this century. A substantial proportion of the population was forcibly settled there in the implementation of racial land division policies in the 1940s and 1950s. It was a hotbed of political and guerrilla activity during the 1960s and 1970s and the site of conflict between the Zimbabwean army and 'dissidents' in the 1980s. As a result, development activities have been minimal. Due to outmigration in the war years and male labor migrancy, many Nkayi families have an urban as well as a rural base and it is estimated that up to 75 percent of families are receiving re-

[3]Research in Nkayi was undertaken in three periods between 1992 and 1994. The research was qualitative in nature, involving the investigation of local-level institutions for water resources management in three areas. A case study approach was adopted using a variety of techniques including structured and participant observation, semi-structured interviews, resources mapping and seasonal diagramming, and the keeping of field notes and diaries. The aim was, through an initial focus on the construction of detailed cases for individual waterpoints, to build up more extended cases of water management in the three areas. In doing this I hoped to reflect the minutiae of water management, the variety, richness, and diversity of the ways in which people relate to their water sources. By doing this in the more general context of village life and resources management across the three areas, through the collection of supplementary data, I intended to identify continuities and regulations that might exist.

mittances. The strong emphasis on cattle production has shifted slightly in recent years with the opening of a commercial market for grain in 1986.

Incentives and Complex Water Preferences

Whilst the policy literature emphasizes the priority which women place on securing an adequate supply of water for domestic purposes within as little time as possible, there are a number of qualifications to this principle in practice. In Nkayi, women have strong preferences for particular types of water for different purposes. The soft water of the sandy river beds is favored for washing best white clothes and for drinking because of its taste. Borehole water, often described as "sticky," "salty," or "oily" is generally disliked for its taste and for washing because of its hardness (it "finishes the soap!") but is considered convenient for watering gardens and livestock. In addition, certain water points or sources are known to be highly energy-consuming and there is a balance between the time and effort taken in traveling there and pumping water with the actual quality of water obtained. Traveling longer distances to a borehole may be considered worthwhile if the pump is easy to use and the water flows out fast, but not if heavy pumping, team pumping, or queuing is required. Walking several kilometers to the river with a load of laundry is considered energy-consuming, but there is no need to pump water when you get there and the effort may be worthwhile if other tasks can be carried out at the river, such as bathing and garden watering (the vegetable gardens being sited on the river banks). The reliability of waterpoints affects women's perceptions of them; they may prefer traveling further to a well-maintained borehole where a supply is assured than risk queuing at the nearby hand-dug well notorious for breakdowns and intermittent water supply.

As a precaution against drought, women rarely rely on one source of water but maintain access to a number of different supplies, often through reciprocal social networks. Incentives to cooperate may therefore be indirect and relate to the need to maintain good relations with neighbors and kin in a more general sense. Perceptions and priorities in relation to different sources change seasonally, according to the demands placed on users by agricultural activities and environmental conditions. These complexities, the changeability of preferences over time and the use of multiple sources would make it difficult to construct a simple hierarchy of preferences. An example of such complexity is provided by the profile of one household's water use and preferences as shown in box 1. The principle of the prime importance of time saving as an incentive for women can then be qualified by the importance of other considerations arising from domestic concerns.

Household Structure and Gendered Priorities

The model of incentives and water that is commonly proposed does little to recognize the complexity of water use and decision making within the household. Institutional literature is often gender-neutral in terminology (Cleaver and Elson 1995) and seems not to recognize the intricacies of water use and decision making within and between households. Policies suggesting time saving as the major incentive operating on women do not consider potential complementarities and conflicts among the priorities of household members. Significantly,

Box 1. Household of Mrs. T. Nyoni, Eguqeni: Water use preferences.

First preferences	For domestic water: Mtswirini well, 5 minutes' walk across the road. Reasons for preferring this are convenience and assured access, this household being a regular user. Acknowledged disadvantages are the 'oily' quality of the water and the slightly metallic taste. For livestock, the river or the dams are used according to the restriction imposed by seasonal grazing rules. Mtshayebhuma is a perennial livestock watering source, while Mpakabili and Mpofu are seasonal.
Primary backup supplies	Habahaba (Maboleni) well at the pre-school, 5 minutes' walk and Patrick 2 well, over 10 minutes' walk away. There is no assured access to Habahaba as the small amounts of water available are often reserved for the pre-school and the one or two adjacent households. The Nyoni household will therefore more commonly use Patrick 2 as a backup, which although further away, is managed by members of the Nyoni extended family and therefore access is assured. If labor is available, Patrick 2 may be used to avoid the closed hours and queuing at Mtswirini.
Secondary backup supply	Manyabe borehole, 20 minutes' walk from the household, is considered the serious backup supply in times of drought or pump failure as it has never dried up. Before the wells were dug in the 1980s this was the regular source of water for all purposes. Now it is only used if a donkey cart can be sent with drums so as to collect more than one day's water at a time.
Intermittent supplies	The Shangani river, at 40 minutes walking distance, is occasionally used for the washing of best white clothes. During the rainy season water is collected from the tin roof of the main house and this water is strongly preferred to well water because of its sweet taste and softness. Also due to the long hours worked in the fields in the rainy season, there is little time to go to the wells for water.

the literature offers us no model for the resolution of competing priorities over resources use at household level. In suggesting time saving as the major incentive operating on women, it does not consider the likely priorities of men, differences within and between households, changes over time, and the working out of compromises to meet differing priorities amongst members of households.

In Nkayi, men and women were found to have some similar and some differing priorities regarding water use, and these are changing over time as the livelihood system changes. The gender division of labor is not static, but shifting and negotiable as new income-generating opportunities, through the sale of crops, open up and old ones, through employment, decline.

In this research, it was found that men are primarily concerned with securing access to a variety of water sources for cattle watering. Due to the limitations on moving cattle they

are concerned with distance to the water source and the quantity of water available from it. By way of contrast, women are primarily concerned with securing water for a variety of domestic purposes. For them, major concerns were the time and effort taken to collect the water balanced against the appropriateness of the water obtained and its quality for various purposes.

However, a focus on men's and women's priorities separately fails to recognize the need to balance water use priorities within a household. This is reflected in the practices we found at many water points where there are informal sharing conventions to balance the need for watering livestock and obtaining domestic water. Differing incentives in terms of time saving between men and women enable women collecting water for domestic purposes to obtain priority over cattle watering in queues at busy boreholes. Conversely, when vital cattle-related tasks such as dipping are taking place, domestic water collectors are delayed by the requirement to pump some water into the cattle dip before they take some for their own domestic purposes.

The model of incentives and women's involvement we have, then, fails to account for the impact of wider household concerns on women's perceptions and offers no model of household negotiation or compromise over resources use and decision making. It also oversimplifies the division between 'domestic' and 'productive' activities at the household level. For example, women are likely to collect 'domestic water' for purposes such as vegetable growing, beer brewing (for sale), watering of sick animals, and for brick molding. All these activities could also be classed as 'productive.'

It is therefore not very helpful to see women's interests as entirely different from men's, or to see the household as having uncontested unitary interests. Rather, differing priorities of men and women are balanced and negotiated in an attempt to ensure that the main needs of households in terms of water use are met. In Nkayi district we came across numerous examples of negotiation between men and women, often at waterpoints, over usage priorities. At community meetings, agreements to balance competing needs for water use at particular waterpoints were forged.

Institutional approaches generally focus on non-household institutions such as local organizations and markets and analyze incentives in relation to these. As individual participation in the activities of collective action may be mediated by household dynamics, more analysis of this would be welcome.

The model of women's concerns prevalent in policy, whilst claiming to recognize both domestic and productive concerns, is oversimplified abstracting women both from the household decision-making context, and, as we shall see later, from wider social concerns.

Labor Delegation, Poverty, and Participation

Let us pursue this point by returning to the issue of time saving as an incentive for women's participation and illustrating how the social location of women, both within the household and in wider community terms may crucially affect this.

Despite the qualifications to the time-saving principle, we cannot disregard it as an incentive in women's water use and participation. Time was an explicitly stated factor in many women's definition of water problems as expressed by this woman:

> *Water is a real problem. If I want more water I will have to wake up at 5 a.m. To collect four buckets will take me about 11 hours (from 5 a.m. to 4 p.m.). We queue, especially on Fridays if the livestock is being watered because then I must fill my bucket and empty it into the cattle trough before I can collect one for myself. We also queue when the dip cattle are queuing. I do my laundry after every 2 weeks* (Mrs. M. Nkubini Dip).

Women's explanations for their lack of time are primarily labor shortage and the labor required to use a particular water point. However, not all women are short of labor. Women are not a homogeneous group and wealthier women may not be the direct fetchers of water supplies themselves but may delegate it to others such as teenage girls, younger wives, poorer relatives, or paid helpers. In this study, households which had an advantageous position in respect of water use were those with a large number of children or young adults or hired labor. One woman respondent, when asked to characterize wealthy households in her village described them as those with a donkey cart specifically for water collection. Women from households with a labor surplus may well have few incentives for contributing to improved supplies as they are well able to secure their needs anyway.

Poor households are often those with large numbers of small children and relatively few able-bodied adults. This places huge pressures on labor availability and time of the adult women of the households. It affects their ability to fetch water, to contribute to community decision making, and to engage in productive activity.

> *I don't attend any meetings, my husband only goes as I have all these small children. They all go to the fields with me and the larger girls can carry some gallons from the dam* (Mrs. C.N. Eguqeni).

As we will explore further below, those women with the heaviest time constraints are least likely to be able to contribute to the collective decision-making process that might secure water supplies closer to their homes. In addition, the concept that mere time saving may significantly improve their position is debatable; poverty is multicausal and epitomized by a complex lack of resources. This same woman explained how 2 years of plentiful rain and adequate water availability made little difference to her livelihood status compared to a previous drought year:

> *I am still suffering the same problems now as in the drought year—that is I can't grow enough to feed the family.....we have enough land but we can't use it. We have no cattle, no plows, nothing.*

Labor constraints affect men and women differently. The division of labor is such that rural resident men mostly have fewer demands on their time, with possible seasonal exceptions, than do many women. Men's concerns about water relate primarily to cattle but cattle owners themselves are least likely to be watering the cattle in person. This task is commonly delegated to boys, poor relatives, or hired herders. Such herders may have little interest in

saving time in watering cattle and also little influence or authority in shaping community-level institutions.

A further qualification is required of the time-saving principle for women. Much domestic water is collected by children and teenage girls who may no longer be at school. The motivation to save time may not be as strong amongst these water collectors as it is amongst adult women. Moreover, they have no way of contributing to the collective decision-making process. The much-vaunted link between incentives, participation, and effective management is questionable if we recognize the delegated nature of much water collection and the substantial involvement of children who are rarely included in decision-making processes about water either at the household or the community level.

In summary, the policy and literature on incentives for water resources management make little attempt to discriminate between individual water users and to identify the differing strengths of incentives operating on individuals according to their place in the social structure: their age, gender, wealth and kinship status, personal history, or other social characteristics.

The Opportunity Costs of Participation

As indicated in the section on incentives above, some women may find it difficult to participate in collective decision making. Mrs. Nyoni's constraint is echoed elsewhere; the examples from Lesotho in box 2 illustrate that poor women with small children are unlikely to participate in village decision-making activities (Cleaver 1994).

Poor women are also less likely to be elected to positions on water point committees or village development committees. When asked the criteria they use in electing people to positions of responsibility in the village, interviewees repeatedly mentioned two qualifications: someone they could respect (for position, influence, hard work, or their ability to forge a consensus over difficult issues), and someone with resources of his own such as a bicycle or cash so that they could represent the village at district headquarters when required.

Mayoux (1995) suggests that membership criteria and the requirements of participatory projects are often based on the ownership or pooling of resources, so excluding very poor women. Amongst my interviewees, most stated that they would like to belong to a savings or income-generating club (often sewing) but that they had neither the entry fee required nor the time to qualify for this. Similar constraints are likely to apply to other collective activities.

As we will see below, the village model of decision making in Nkayi is lengthy and time-consuming, depending on everyone having his say and on the achievement of consensus. In addition, the water-related tasks that are promoted for women, as caretakers of pumps, as managers of funds, and as monitors of distribution and use, are all intensely time-consuming. Yacoob and Walker (1991) found in a community-managed water and sanitation project in Rwanda that women carried a disproportionate share of the work involved and spent more time in collecting water fees than in collecting water. In Tanzania, a water project that aimed to relieve women's labor burden actually resulted in their taking on most of the digging and maintaining of wells (Davis 1996).

We have seen that poorer women generally have less access to water supplies and greater constraints on their time and labor resources than other women. They are likely to be in poorer

Box 2. The marginalization of the poorest households in a water and sanitation program in Lesotho.

Household One

The household is headed by a young woman recently widowed who has three small children. She has one very small field and no animals and was previously dependent on the remittances her husband sent from his work in the South African mines. The woman is unable to participate in community labor on the water project as she has the small children to look after and spends all her time trying to do casual labor such as laundry and weeding in order to get cash for food. She does not attend village meetings for the same reason. The children are unable to go to school because she cannot pay the fees and she does not attend the local clinic when they are sick for the same reason. The family is therefore excluded by its poverty not only from participating in the community water project (and possibly in its benefits) but also from participating in decision making and from receiving health and education.

Household Two

The adult members of the household are a woman and her teenage son who support a number of smaller children. Neither the mother nor the son attends community meetings as they are usually out laboring and the son has therefore missed the opportunity to be chosen for training as a latrine builder under the water and sanitation program.

Source: Cleaver 1994.

health and their children at greater risk of water-related diseases. They, therefore, could benefit most from improvements that bring water supplies closer to their homes. However, as the examples quoted above illustrate, they are least likely to participate in the collective decision making that will bring this about. Such women depend more on casual labor and also on the support of kin in securing their livelihoods. They, therefore, spend a considerable amount of time either working on other people's fields or investing in their social and kinship networks to secure inputs such as cattle for plowing and assistance with school fees.

Mayoux (1995) has noted the mixed record of women's involvement in participatory projects and criticizes their implicit assumptions that there can be a consensus among participants about priorities and that the benefits of participation are self-evident and outweigh any costs to participants. She raises the concern that such projects may merely result in shifting the costs of development to women and cites evidence from Nicaragua to suggest that some women would prefer employment to the added responsibility and insecurity of involvement in a participatory organization. Folbre (1996) has suggested that participating in social institutions requires resources and it is only when they have these that women are able to challenge oppressive norms and customs.

Projects that emphasize women's participation through involvement on committees and in the decision-making process do not necessarily benefit those women most in need, nor do they always reflect the priorities of such women.

Committees Versus Consensus Decision Making

One of the implicit assumptions underlying policy about institutional development for water resources management is that such management should be formalized. Two aspects of this are significant here: the emphasis on committees and contracts (and women's involvement in these) and the concern with formal structures of authority, rules, and ownership arrangements as manifestations of successful community management. Such a model of participation is believed to be linked to higher levels of efficiency and effectiveness of water projects (World Bank 1993).

There is a common assumption also amongst implementing agencies that failures of participation can be attributed to the lack of clarity and formalization in institutional arrangements, as this example from a UNICEF evaluation suggests:

> *a formal model of procedures needs to be followed in engaging community participation in well projects ... a more vigorous set of implementation procedures for community participation would undoubtedly secure a more uniform response ... the collective roles of well committees, VIDCOs (Village Development Committees) and other local committees such as school committees, need to be formally established and related to project structures* (UNICEF 1986).

The assumption that formalized management is necessary is unquestioned in the water sector in Zimbabwe (and elsewhere) where it is government policy to have a 'water-point committee' for each well or borehole, comprising representatives of the users, preferably in the combination of three women (as the main drawers of water) and a man (as chair and representing 'authority'). The committee is supposedly a manifestation of the democratic process (the members must be elected) and is seen as representing the community, with 'ownership and responsibility' replacing a perceived traditional lack of such qualities in relation to new water supplies. Such an approach is ahistoric and socially ill-informed.

Whilst the empowering effect of successful collective action on women is asserted (Mayoux 1995), there is little evidence that participation on committees is either empowering to women or necessarily efficient in terms of water resources management. Single purpose committees may not be particularly important or influential and there is a danger that in promoting women's involvement on these they are spending time participating in institutions with little power or real decision-making capacity. If effective local decision making is actually performed at larger meetings, then it is important to facilitate women's involvement in them and the skills that are necessary to participate effectively. These points are elaborated below.

Appointing women to committees may just be reinforcing their role as 'housekeepers' of the water sources rather than enhancing their decision-making capacities. Previous research in the same region indicated that women's names were being put forward for committees to meet donor and government requirements but that such women actually perform few managerial tasks (Cleaver 1991). Woronuik (1994) suggests that the establishment of maintenance committees as part of a policy of community management can restrict participants to being operators rather than managers.

In my study villages, the exclusionary nature of committees was not easily compatible with the inclusive nature of decision making. Decision making is not commonly confined to single purpose committees but is a rather more integrated and overlapping process involving larger numbers of people. In two of the villages studied in-depth, records of all village meetings were kept in the same book whether they were meetings of the Food For Work Committee, the Parent Teacher Association or the Village Development Committee. Meetings were often attended by a large proportion of community residents, not just committee members, and there was considerable flexibility about the subjects discussed at any one meeting. The terminology used in relation to community-based activities is not structured according to single purposes and committees. For example, instead of speaking of the need to establish a water point committee maintenance fund, local leaders mentioned the need to discuss with villagers the establishment of a 'community purse.' In interviews and conversations, meetings were always referred to as 'calling the people together' regardless of the particular committee under whose name the meeting was held. Meetings were only held when there was something to discuss.

In Nkayi, most water matters are decided at meetings of the Village Development Committee, which are all-inclusive and multipurpose. The meetings are not actually restricted to committee members but include all adults in the community. Attendance at them is vital as decisions are taken on the basis of consensus, to ensure commitment and compliance. Tasks such as planning, reviewing and monitoring progress, imposing sanctions, and constitutional matters are all therefore subject to a decision-making process in which any adult member of the community can participate. Our evidence suggests that critical decisions about the rationing of water from particular sources are only successfully enforced in those communities where the decision has been taken at a meeting of the whole community rather than that of a committee alone.[4]

Despite little formal representation of women in authority positions, they do, through inclusive decision making, have a significant influence on the shaping of water resources management institutions. In Nkayi, women participate prominently at the community meetings, being the majority of resident adults in the village, and issues discussed at such meetings reflect their many livelihood priorities: food for work, pre-school facilities, and collective vegetable growing arrangements being at least as prominent in discussions as 'male' concerns about cattle and grazing land.

The most obvious implication of the consensus decision-making model is that it is very important to be able to attend village meetings which may be lengthy and time-consuming. We have already noted the constraints operating on poor women which prevent them from doing this. However, people's general willingness to participate in such meetings offers another qualification to the idea that they are primarily motivated by time saving. People are willing to spend more time if the result is a social consensus about resources use and management. Although lengthy and initially high on transaction costs, this model of decision making by establishing social consensus may be a more efficient way of managing a resource

[4]Committee members played an additional role in carrying out some actions decided upon by the meeting: lobbying the ward councillor or district administration, collecting funds, drawing up lists and rotas for Food for Work schemes, and so on.

than the committee model. Consensus may enhance collective management as it reduces the need for compulsion, monitoring, and sanction.[5]

We have, then, a qualification to the idea that collective action may reduce transaction costs. There is a rather vague assumption in the institutional literature that (unspecified) social norms and customs may facilitate cooperation. This research suggests that the generation and maintenance of such norms and of social consensus is not cost-free and indeed that people may invest a considerable amount of time and effort in this.

Informal Management

If the focus on committees tends to over-formalize institutional decision making, it also ignores the type of management of water resources that already takes place through custom and practice. The committee approach is justified by the idea that hierarchical structures are efficient in reducing transaction costs (Brett 1996) and that management through explicit authority structures and rules is most likely to lead to efficient resources management (Ostrom 1990; Ostrom, Schroeder, and Wynne 1993). Integral to this approach are the ideas that exclusive group ownership of certain water points leads to a greater sense of responsibility by users and that there is a prime need for regulation of the distribution of water where this is scarce. However, this model overlooks the very real role of women in informal water resources management and in doing so ignores some of the strong principles of water resources use and management derived from their livelihood priorities.

If we look beyond the committees and contracts proposed by many government and donor agencies for the management of water, an alternative model can be detected. This is based on the importance of informal structures and networks, on discussion and agreement, and on management through custom and practice and through 'rules in use.' It is in these areas that we can clearly see women's contributions to water resources management. Whereas conventional management principles put emphasis on ownership of water sources, which is deemed to foster and generate a sense of responsibility and likely compliance with rules and regulations, these were found to be inimical to the principles on which access to water sources was organized in Nkayi.

Custom and Practice

Much water resources management takes place through custom and convention, continuously adapted through negotiation and action to meet changing circumstances. These often remain

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[5]One problem was apparent in the collective decision-making process. People who were not present at meetings where collective decisions were made often grumbled about the decisions and felt less committed to abide by them. The logistical problem that this posed was pointed out by Mrs. Nyoni, who being a school teacher often missed meetings. She said that meetings were often held on Wednesdays (the rest day when people are prohibited from working in the fields) when anyone with other work to do cannot attend them. If they try to hold meetings on Saturdays the Seventh Day Adventists complain because it is their sabbath and if they hold them on Sundays those who go to other churches cannot attend them. Those who cannot attend such meetings may therefore feel less committed to the decisions taken at them.

invisible because they do not exclusively involve productive sources of water and because management is largely through rules-in-use and compliance is almost universal. Three examples of culturally sanctioned conventions from Nkayi can be cited.

Whereas the advocates of formalized management principles such as committee structures emphasize restrictions on access and the importance of distributional rules, the informal management principles that we actually found fit far more neatly with local women's livelihood priorities for assured access to good quality water. Distributional problems are largely avoided in normal years by the common culture of minimal water use, a culture which women play the greater part in perpetuating.

There is a strong and deeply embedded culture of minimal water use inculcated into children at an early age. Children are taught never to waste water, to collect it in wide brimmed containers so as to minimize spillage, to use the smallest possible amounts for domestic purposes and to recycle wherever possible, for example washing water being used to water vegetables. In normal non-drought years, rather than rules about quantities of water to be taken from a particular water point, conventions exist about the appropriate uses for particular water points, avoiding the need for regulation or rationing. 'Everyone knows' that sources with limited supplies are not used for livestock and watering, and that water for building should only be taken during the rainy season. Deeply embedded in people's perception of the right way of doing things, and monitored by women users who chastise children for deviance from these norms, such conventions normally bypass the need for explicit distributional rules.

A second convention is the ideal of open access to water sources for all to enable them to secure at least minimal water supplies. It is considered undesirable, indeed socially unacceptable to exclude anyone from a water source; a sensible survival strategy in very dry lands. In normal years, such access is restricted only by norms relating to the appropriate use of the water; as drought progresses however, such access rights become more restricted. Restrictions on access are also introduced in compliance with government or donor agency policies on water point ownership. Where such restrictions are introduced they adversely affect poor women who have struggled to gain entry rights. Their households are often spatially peripheral to the main water sources and often they have not contributed to implementation, an activity which 'buys' the right to use the water source according to the policy of implementing agencies. They often therefore depend on kinship relations to gain some sort of access to water.

Despite their occurrence, restrictions on access to water are considered deeply undesirable by both users and local government officials and are deemed likely to result in increased conflict and inequitable outcomes.

Third, by far the greatest number of unofficial rules we found relate to the preservation of good condition of the water and the water point. These rules are mostly significant to women who are securing water for domestic use, where we have seen that water quality plays an important part in their perception of water sources. At water points used almost exclusively by men for watering cattle few such good condition rules exist. Examples of good condition rules are those relating to preventing contamination of the water (restrictions on bringing animals or dirty pots and pans to the site), those maintaining the good condition of the pump and surroundings (no banging of the pump, no pumping when the well is dry), and those relating to keeping the surroundings clean (exclusion of animals, sweeping and cleaning).

Principles of Decision Making

The institutional literature stresses certain principles of collective decision making, namely the need for decision-making fora, clear resources and user boundaries, rules and authority structures to enforce compliance, and graduated systems of sanctions, rigorously applied and enforced (Oakerson 1992; Ostrom 1990).

However in Nkayi, there are a number of socially embedded principles of decision-making which may sometimes contradict these. The most prominent of these are the strong desire for conflict avoidance, the acceptability of approximate compliance with collective rules, and the desirability of minimal management and intervention.

There are a number of implications of such principles for poor women in relation to their access to water and their other livelihood priorities. Both men and women are critically concerned with conflict avoidance both in the general activities of daily life and in resource management in particular. Men are particularly concerned with avoiding conflicts arising over the watering and grazing of cattle and tell stories of a local leader dying as a result of the pressures of disputes over cattle. Women are equally concerned with avoiding conflict and present many of the rules and conventions at water points as conflict avoidance (rather than distributional) mechanisms; "we queue to avoid quarrels."

Evidence abounds from interviews that people regard conflict as extremely distressing and its avoidance as desirable. Conflicts are perceived as being deeply threatening to communities and disputes between people and a failure to live together peacefully are considered likely to incur the wrath of the ancestors and result in punishments through lack of rain, disease, and crop failure. The legacy of years of guerrilla war reinforces people's awareness of the dire consequences of disputes within a community.

There is also an instrumental element to conflict avoidance. Berry (1989) sees institutions in rural areas as mechanisms in which people participate to mediate access to other resources. Livelihoods in rural areas are still intensely bound up in relations of reciprocity. Because of their reproductive concerns, women may have more dense reciprocal networks than men (Slocum et al. 1995). In Nkayi, noncash forms of exchange are particularly important to poorer women who often provided labor (of themselves or their children) to wealthier households in exchange for assistance with plowing and harvesting, with agricultural inputs such as seeds and with food in hard times. The poorest women rely on access to richer women's fields to pick wild okra in the dry season. Women are strongly concerned with avoiding conflicts that might adversely affect such reciprocal relationships, and this manifests itself in the kind of rules and decision making they adopt in water resources management.

The relevance of conflict avoidance to water resources management, as we shall see below, is that people are unwilling to impose rules and regulations that are likely to give rise to confrontation, that consensus is sought at all times, and that compliance with rules is interpreted generously. None of these are necessarily compatible with a formalized committee and contract model of management.

Habitual conflict avoidance reduces the need for monitoring compliance with rules and regulations and it is highly likely that most people comply as the path of least resistance and greatest peace. Thus symbolic locking of wells (by removing a simple bolt) is sufficient to indicate the need for compliance with 'closed hours' rules despite the ease with which these can be broken.

Associated with this is the acceptability of approximate compliance. Minor breaches of the rules or even persistent breaches within certain boundaries are unlikely to be perceived as deserving of sanction as this would increase both the requirement for monitoring and the necessity of unpleasant and probably conflictful relations in accusation, trying the offenders, and exacting punishment. An alternative to a strict system of active monitoring and frequently utilized sanction is one where a broad socially based interpretation of compliance reduces the need for such mechanisms.

Moreover, the informal management system tends to allow poorer women with less labor to break or bend the rules to secure their minimum water supplies. The recognition of approximate compliance both allows poorer women to secure their needs and reduces the need for monitoring of rules. Poor women are seen to benefit from generosity in interpretation of compliance with water use rules. For example, one woman, living far from the water point and with several children too small to collect water for her, used the well at times when it was supposed to be 'closed.' She did this by replacing the disconnected bolt on the pump mechanism with a stick. She attracted no criticism or punishment for this; other women commented that this was the only way she could meet her basic needs within her labor constraints.

A principle of water resources management clearly related to the previous two is that of minimal intervention. Rules are only imposed when absolutely necessary and meetings are held only when there is something to discuss. Enforcement is largely left to socially constructed compliance and punishment to supernatural sanction. Regulation and rationing are imposed only when absolutely necessary. Such minimal management does not fit with official policies regarding water point committees that frequently stress monthly meetings, minute taking, and regular activities. Nor does it conform to the model of institutions proposed in institutional economics that emphasizes the regularization of decision making, the need for clearly graded sanctions for breaches of the rules, and the careful monitoring and application of these (Ostrom 1990; Ostrom, Schroeder, and Wynne 1993)

The informal management system, then, appears to well reflect women's concerns in water resources management, to be compatible with their livelihood priorities in terms of use of time and labor, and to optimize access to the resource, even of the poor. This raises the question as to whether we should be looking more closely at existing forms of management before imposing water resources management through committees that may do little to empower women or ensure efficient water resources management.

CONCLUSIONS

In this paper I have suggested that we need to take a broader and more complex approach to looking at the incentives and institutions that shape water resources management. The model commonly offered in literature and policy oversimplifies incentives and motivations, giving primacy to economic and productive considerations and assuming direct causal linkages between such incentives, individual behavior, and collective action. In terms of institutions, such a model emphasizes the desirability for formal organizations and the management of resources through committee and contract.

This view does little to illuminate the multiple interactions that shape water resources management, or to account for the positions of men and women within it. Evidence from Zimbabwe and elsewhere suggests that men and women may be subject to different but overlapping incentives to participate. The effect of incentives is also shaped by the socioeconomic status and spatial location of a household, by changing livelihood priorities over time, and by seasonality. An individual woman with strong incentives to participate in collective decision making to improve water supplies does not necessarily have the resources that enable her to do this.

A focus on the formal institutions for water resources management may overlook informal institutional arrangements in which women play a major role. Moreover, the proposed desirable features of efficient and effective formal organizations may be contradictory to the principles by which local people prefer to interact and take decisions. Such principles, deeply embedded in relationships of reciprocity and the social structure, may be better adapted to the resources constraints facing many women than those of formal institutions.

To better understand gender issues in the collective management of resources such as water, there are a number of areas which require further investigation and analysis.

a. Gendered Analysis of Water Use and Management

Recognizing that men and women may have differing priorities and perceptions regarding water use and management, we need to be able to contextualize this generalization. Rocheleau (1995) suggests that techniques such as gendered resources mapping may assist in identifying gendered differences in resources use at different levels of analysis. She suggests that such resources mapping can help to raise questions in relation to a particular resource about who uses it, whose labor is employed, who is responsible for it, and who controls it.

b. Gendered Analysis of Institutions

There is a need to recognize both formal and informal institutions at the local level and to identify commonalities and differences between them. Looking at informal institutions involves identifying social networks, local forms of decision making, and conflict resolution. Kabeer (1994) suggests analyzing the rules, resources, and activities relevant to institutions as well as the different people involved and the command that they have over such factors. Institutional diagramming and analysis (Slocum et al. 1995) may help identify the roles of local institutions and the perceptions that men and women have of them.

The household should not be neglected as an institutional unit of analysis. We need to be able to recognize both intra-household dynamics and the relation of household members to wider forms of collective action in resources management. Folbre (1996) suggests the need to investigate the distribution of resources within the family if we are to understand the constant process of realignment between production and reproduction. Rather than seeing the household either as a single unit, or as the site of inevitable gender confrontation, we might recognize the overlapping elements of conflict and cooperation that inevitably form household resources management strategies.

c. Complex Incentives

A static view of gender interests, household priorities, and local-level institutional capacity is of little use when planning interventions. Rather, we need to recognize the shifting and changing priorities of individuals and households over time, that individual men and women have complex social identities, and that both individual and collective action are likely to be shaped by both economically 'rational' incentives and socially embedded motivations.

In modeling the incentives operating on individuals, a greater emphasis on noneconomic motivations for resources use and collective action would be appropriate (Uphoff 1996). The influence of psycho-social motivations for example, may be significant (Papanek 1990) in explaining apparently noneconomical rational actions.

Finally, in understanding water resources management at the local level, we need to be aware of the different but overlapping interests of men, women, and children and the ways in which these interests might change with time and circumstances. An awareness of the accepted principles of local decision making, and the part that men and women play in such arrangements, could also assist in the design of sustainable and effective institutional interventions.

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SECTION 3

Introduction

Gender and Irrigation Management Transfer

Irrigation management transfer (IMT) is the term used to describe a variety of initiatives to devolve management responsibility and authority from the state to irrigators. The transfer movement has been largely fueled by financial pressures, both internally and externally imposed on governments, which have been unable either to finance the recurrent costs of irrigation or to recover costs by collecting water fees from users. The IMT recipe lists the following ingredients: turning over operation and management (O&M) responsibilities to water user organizations; water users taking on financial responsibility at least for routine O&M; and reductions in staff and budgets of government agencies. Pricing of water and establishing water markets for buying and selling water are also often proposed as part of the IMT reform package. An appropriate mix of these various ingredients is expected to change the basic structure of socioeconomic relationships among irrigation agencies and users, which will in turn positively influence the incentives and behavior of both, and lead to a more effective and efficient management of water.

IMT processes entail a reallocation of functions and responsibilities to local organizations and sometimes to markets. This transfer of responsibilities makes it seem justifiable for policy makers and planners to also shift resources distribution and conflict resolution concerns to markets and community-based organizations. As yet there is little empirical evidence that markets or community-based institutions are better instruments than government agencies for addressing gender inequities and gender-based inefficiencies in distribution of resources. On the contrary, there is cause for concern that processes of IMT will in fact increase the time women need to contribute to O&M of irrigation systems, while there is at the same time a greater risk of their losing access to and control of irrigation services.

Increased participation of users and stakeholders in management is one of the cornerstones of most irrigation management transfer programs. However, "participation" is a concept full of ambiguities, and achieving real and meaningful participation is not a straightforward and simple exercise. Transfer of irrigation management responsibilities to users will only be effective if users are equipped with the powers and rights to implement them. This requires political will to (re-) distribute control over resources, not only from state agencies to users but also among users themselves. In the case of gender relations, the equation between women's time and resources inputs and the benefits they enjoy are generally mediated by power relations within the community and the household. This mediation cannot be undone simply by ensuring numerical representation of women in organizations. It requires explicit recognition of gender equity as a legitimate concern. For instance, it needs to be recognized that women

may be less educated and less mobile and that they may have less free time. It should also be recognized that social norms and values are not always supportive of women engaging in public roles.

In this section, Margreet Zwarteveen's paper develops these themes further. The main message of her paper is that we know very little about the implications for women of the transfer of management responsibilities to local user-based organizations. There are no gender-disaggregated data to show whether the claimed benefits of IMT accrue equally or inequitably to women and men. The lack of attention to the gender dimension in impact studies reinforces the idea that gender does not matter, in a sense reinforcing our ignorance.

Mexico is now justly famous for the rapid and radical nature of its IMT program, initiated in the early 1990s. About 90 percent of all previously government-managed systems have now been turned over to local organizations. Sonia Dávila-Poblete's paper examines Mexico's reform policies from a gender perspective. Her examination of the provisions of the new laws and how they are being implemented in one particular water-scarce river basin raises serious questions about the long-term implications of this policy for rural women.

Both papers emphasize the need for good gender-oriented field research to understand what is really happening in IMT programs. This is expected to be an important theme in IWMI's own research in the next several years. It should be noted that IMT programs are usually based on the assumptions of the formal 'institutionalism,' which is criticized by the Jackson and Cleaver papers in the previous section of these Proceedings.

Identifying Gender Aspects of New Irrigation Management Policies

Margreet Z. Zwarteveen[1]

ABSTRACT

The search for solutions to management problems in irrigation systems is increasingly sought in organizational and institutional reforms rather than in technological policy prescriptions. There seems to be an emerging consensus that water and money savings can be brought about by 1) treating water as an economic good; and 2) decentralizing the management of irrigation water. Policies based on this consensus are being implemented in a large number of countries. On the basis of insights derived from feminist economics, this paper identifies and discusses gender biases of these new irrigation management policies. The paper shows that policies do not explicitly consider the possibility that women are water users, and are implicitly based on a belief that all users are equally able to pay for water. Calculations about expected increases in efficiency may be wrong, because they do not take women's unpaid contributions to the economy into account. Existing evidence on the impacts of irrigation programs shows that these have provoked changes in the costs of irrigation or users, in water use practices, and in the accountability between users and providers of water. No empirical information exists to ascertain whether these changes are gender-specific. Impact studies do not address gender concerns, and methods employed in impact studies do not allow a critical reassessment of the theories underlying new irrigation policies. This reinforces the idea that gender or women do not matter and seriously limits the understanding of the determinants of irrigation management performance.

INTRODUCTION

Two compelling facts are forcing water managers and policy makers to drastically change the ways in which they allocate and manage water. Both are related to scarcity. The first is a scarcity of public funds for investments in new irrigation infrastructure and for operation and maintenance of existing infrastructure. This reflects changes in political and economic priori-

[1]IWMI. The author wishes to thank Rhodante Ahlers, Robert Smit, Eva Jordans, Doug Merrey, and Ruth Meinzen-Dick for critical reviews of earlier drafts of this paper.

ties, and in ideas about the appropriate role of the state in a country's economy. The second is a scarcity of fresh water resources. In view of these two facts, the challenge for water resources managers is to use both water and money more effectively and efficiently. In place of technological prescriptions driven by the availability of external funding, the search for solutions to management problems is increasingly sought in organizational and institutional reforms. On the waves of neoliberalism and privatization, there is an emerging consensus that water and money savings can be brought about by treating water as an economic good and decentralizing the management of irrigation water. Irrigation management transfer (IMT) is the term commonly used to describe the large variety of initiatives undertaken in a number of countries based on this consensus.

IMT programs entail major changes in the mechanisms available to farm household members for accessing water. Administrative allocation of water is being replaced by quasi-market allocation, with a central role for organizations representing users. Maintenance responsibilities are also shifted from public agencies to community organizations and markets. The call for the introduction of market principles in the management and allocation of water has been accompanied by an increase in the importance of the role played by economists in the analysis of water management questions. The group of professionals traditionally dealing with irrigation and its management consisted mainly of engineers. As a result, irrigation problems are no longer phrased in mere technical terms, but are instead increasingly interpreted in economic and organizational concepts. This, at least in principle, may offer advantages to gender analysts and feminist scholars who are interested in the linkages between irrigation performance and gender equity. Economics being a science of human behavior, the analysis of irrigation realities in economic terms allows a more explicit questioning and conceptualization of how irrigation practices of users relate to overall irrigation management performance than was possible in engineering terms. Hence, the possibilities for formulating (and thus creating legitimacy for) social equity concerns, including gender equity, may also have increased.

The objective of this paper is to carefully explore these new possibilities of linking gender concerns with the irrigation management debate. The main aim of this exploration is to better understand the potential gender biases and gender implications of IMT programs. Increased understanding, in turn, is expected to facilitate establishing the legitimacy of these concerns as well as the identification and realization of their 'gender-equity' enhancing potential. The exploration will be done from two different perspectives. The first deals primarily with an identification of gender biases in current irrigation thinking. It focuses on the ideas and concepts introduced by economists for understanding and improving water management. Second, after a brief overview of these ideas and concepts, insights derived from feminist economics are used to formulate and discuss hypotheses about the gender impacts of new policies.

The second part of the paper attempts to validate these hypotheses on the basis of existing evidence about the impacts of IMT programs. There is no direct and automatic relationship between gender biases in thinking about irrigation and the effects of irrigation programs on women or gender equity. The flows of information, money, and water do not neatly follow economic prescriptions. Existing studies, however, do not allow a reassessment of the assumptions that underlie policies, including gender assumptions. Although the evidence makes it possible to discard some feminist concerns as less important, there is to date no information on the basis on which to confirm the formulated hypotheses.

The third and last part of the paper presents some thoughts about the potential of increasing the gender awareness of new irrigation policies, and some recommendations on how to better incorporate gender concerns in research on the impacts of IMT.

CAN WOMEN AND WATER BE MADE SUBJECT TO MARKET FORCES?

Irrigation Problems and Proposed Solutions

Two concerns dominate the current irrigation policy debate. The first is a concern with the poor performance of government agencies in managing large-scale canal irrigation systems. The dissatisfaction with the performance of agencies is partly based on the fact that water deliveries rarely correspond in timing and quantity to crop requirements, resulting in low irrigation efficiencies, low cropping intensities, and low productivity. Another indicator of mediocre management performance is the lack of investments in maintenance, resulting in rapidly deteriorating infrastructure and reducing the quality and reliability of irrigation water deliveries. In addition, irrigation management agencies are criticized for not being very cost-effective. Many of these performance weaknesses are commonly attributed to the specific characteristics of the bureaucracies responsible for irrigation management. These are argued to be too hierarchical and centralized (Uphoff 1991; Vermillion 1991), overstaffed, corrupt, and subject to political influences and favoritism (Wade 1982; Repetto 1986). The absence of financial accountability—or the fact that there is no relationship between the quality of the services delivered by irrigation agencies and the amount they earn—is central in this problem diagnosis.

The second concern assuming an increasingly prominent place in the irrigation debate is the scarcity of fresh water resources (Frederiksen 1996; Seckler 1996). Inter-sectoral and international competition for water are rapidly increasing, because of growing industrial and urban demands for water and as a result of environmental degradation of agricultural regions through salinity, pollution, and desertification. Agriculture is generally believed to offer the greatest potential for water savings, because the economic value of water used for irrigating food grains is low (Briscoe 1996) compared to the value of urban and industrial uses. In addition, irrigation is considered an inefficient water use, and agriculture is by far the largest consumer of water, consuming about 80 percent of the total global developed water supply (Seckler 1996:10). The increased awareness of the scarcity of water, and the belief that irrigation systems waste water have put enormous pressure on irrigation managers to increase the efficiency of water used in agriculture.

The search for solutions to these two sets of concerns is influenced by the worldwide trend of liberalization and structural reform, and the corresponding reconsideration of the role of the state in the economy. The failure of centralized government agencies to provide reliable water services in a cost-effective manner has led to an emphasis on decentralization and cost recovery. Increased participation of users and stakeholders who will demand responsiveness and accountability from the agency is one of the cornerstones of this policy emphasis. Cost recovery and financial autonomy constitute the other. The reasoning is that irrigation agencies will be induced to provide better services if a substantial part of their revenues di-

rectly depends on the quality and quantity of their services. Similarly, irrigators will be better able (because of better yields) and more willing to pay for irrigation if irrigation services are reliable and adequate. IMT programs basically entail a change in the basic structure of the social and economic relationships among irrigation agencies and farm household members, with the objective of creating those incentives that will lead to responsible behavior of both parties. Hence, according to the theory, the success of IMT programs fundamentally depends on changing the behavior of both irrigators and agency staff (see Meinzen-Dick, Manzardo, and Reidinger 1995; Merrey 1996).

The concern about the scarcity of water, on the other hand, has shifted the focus of irrigation policy makers from extending supplies through development of new infrastructure to conservation and reallocation. Water pricing is proposed as a mechanism to limit waste and inefficient resources use. The aim is to institutionalize mechanisms for the allocation of water that approximate a conventional market. This includes a direct relationship between services provided and fees, charges for water that approach marginal costs, and the establishment of a mechanism for (re-)allocation of water from lower- to higher-value uses (see Rosegrant and Binswanger 1994; Rosegrant and Gazmuri 1994; Perry, Seckler, and Rock 1997).

The premises on which these new irrigation management policies are based are relatively simple: the first is that water is an economic good, no different from any other, and should be treated as such. As there is little that governments can do to improve the efficiency of free markets, it should move out of the way and let the market decide water uses. Toward this end, water (or water rights) should be capable of being bought and sold like any other commodity. The second premise complements the first in that it argues that appropriate and effective incentive and accountability structures can best be created through financial mechanisms. If a substantial part of the revenue of the irrigation agency directly depends on the quality of their services, the agency will be strongly induced to improve its services to clients. Similarly, clients will be more motivated to pay for irrigation services, if these services are reliable and adequate.[2]

The widespread call to treat water as another economic good does not go uncontested. There is disagreement both about *values*, questioning whether water should be considered a basic human need rather than a purely private good, as well as about *facts*, questioning whether and how market allocation of water can be achieved technically and institutionally (Perry, Seckler, and Rock 1997). For the purpose of this paper, it is not necessary to reiterate all the arguments and counterarguments of this debate.[3] Suffice it to note that although the treatment of water as a purely private good offers an internally consistent and powerful analytical framework for making water policy, there remain many unanswered (and as yet unanswerable) questions on how to implement such policy and even as to whether it is at all desirable or possible.

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[2]For an elaboration of these arguments, see Small and Carruthers 1991; Sampath 1992; Merrey 1996.

[3]For overviews of these see, for instance, Rosegrant and Binswanger 1994; Frederiksen 1996; Moore 1989; Gould 1988; Briscoe 1996; and Perry, Seckler, and Rock 1997.

Feminist Economists' Concerns about IMT

The work that has been done by feminist economists to unravel the gender biases and implications of Structural Adjustment Programs (SAPs) is likely to provide important entry-points for identifying and analyzing gender aspects of new irrigation management policies.[4] The most important conceptual contribution of the feminist critique of adjustment policies has been to look beyond markets in two directions—one, the structures of property and endowment with which people enter markets, and two, the structures of reproduction that govern domestic divisions of property and labor, and thereby shape people's relationships to markets (Sen 1996). The conceptual framework developed by feminist scholars to understand the gender implications of market liberalization (and SAP)

> *rests on the argument that production and reproduction, market and non-market activity are intrinsically linked and organized by relations of power. Factors affecting one tend to affect the other. The labor of women is critical to both, but women have relatively little autonomy to make decisions about either. Thus it is women's work day that is most elastic, stretching or shrinking to meet the needs of both income earning and the maintenance of the household. Increased involvement in income earning rarely means that women are freed from the tasks of reproduction, although tasks may alter and be performed to different rhythms. Major economic processes ... alter the demand for women in markets, but also affect the resources available for household maintenance* (Sen 1996:823).

The application of the feminist critique to new irrigation management policies allows the formulation of a number of hypothetical doubts regarding the equity and effectiveness of these policies. Most of these doubts relate to the treatment of water as a private good, and in particular to the difficulty to quantify and properly value what happens in the 'nonmarket' sphere of the economy. This section reviews and reformulates the concerns as formulated by feminist economists from an irrigation perspective.

Access to Water

A first doubt concerns the principle of consumer's sovereignty on which the 'water as an economic good' reasoning is based. This principle embodies the idea that goods and resources should be allocated to those who are 'ready, willing, and able to pay for them' (Perry, Seckler, and Rock 1997). Feminists are not the only ones who have questioned the validity of this allocation criterion. What causes concern is that it totally ignores the distribution of income in a society: "If the poor cannot pay as much for a unit of water as the rich, they should get

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[4]Elson 1989; and Palmer 1991 were among the first to 'genderize' the SAP debate. The November 1995 issue of World Development is entirely devoted to a review of the 'Gender and Economic Adjustment' work.

less water, even if the marginal value to them in terms of other values (or utility) is greater" (Perry, Seckler, and Rock 1997). Based on the assumption that women have less ability to mobilize financial resources, feminist scholars have hypothesized that making 'ability to pay' the primary rule for allocation of water will discriminate against women:

Women might be 'willing' to pay for improved services (indeed to a greater extent than men) but, because of patriarchal decision-making structures and/ or biases in intra-household resources allocation processes, they are personally unable to commit resources to such an investment (Green and Baden 1995:96).

The validity of this hypothesis ultimately depends on whether access to money is more or less gender-skewed than access to existing mechanisms for getting access to water. There are examples in the literature (e.g., Brunt 1992; Krol 1994; Zwarteveen and Neupane 1996; Kome 1997) that show that access to water in public irrigation systems may be heavily dependent on access to male-dominated and politically influenced social networks and administrative structures. In comparison to such mechanisms, money can be a more neutral and accessible way for women to access water.

The Value of Water

A second and related doubt is about whether it is possible and desirable to stimulate allocation of water to its highest market value. This doubt is based on the concern that the market value of water does not necessarily adequately reflect the benefits of its use in terms of poverty alleviation, or in ecological, environmental, or aesthetic terms. The feminist elaboration of this argument is based on the assumption that most of those less easily quantifiable and marketable benefits of water are those derived from uses of water by women (Cleaver and Elson 1995; Green and Baden 1995). The health benefits of domestic uses of irrigation water, for instance, will be difficult to capture in economic terms, as are the benefits of water used for watering and washing cattle or for irrigating homestead crops intended for home consumption. If indeed many of these seemingly 'unproductive' uses of water are predominantly done by women,[5] strict market allocation of water risks being gender-biased, such gender bias may not only negatively affect gender equity, but may also have considerable costs in terms of health and nutrition.

Although the importance of taking 'nonproductive' uses of water into account when allocating water is valid in itself, evidence from irrigation systems shows that where women do use water for such 'nonproductive' uses (with the exception of domestic uses), these uses of water in most cases are nonrecognized and not incorporated in official water distribution schedules. Rather than rules or markets, the fact that irrigation water is physically available and accessible seems to be the main factor to determine whether or not people use it for these

[5]There is very little information to establish to what extent uses of water are gender-specific, and whether uses are determined by gender roles or by gender differences in access to water. See also Zwarteveen 1997 for a discussion on this issue. As part of the System-Wide Initiative on Management of Water (SWIM), IIMI, International Food Policy Research Institute (IFPRI), and International Center for Research on Women (ICRW) are currently involved in a research project aimed at better understanding the (policy implications of) multiple uses of water in irrigation systems.

other uses. As far as domestic uses are concerned, there is quite some evidence that existing water allocation rules give a very high priority to domestic uses of water[6] (Zwarteveen 1997).

When anticipating or predicting changes in water allocation priorities, it is important to note that property rights in water are typically insecure and ineffective, a fact which is most commonly manifested by the ability of some irrigators to take more water than they are entitled to (Moore 1989; Perry, Seckler, and Rock 1997). The introduction of market mechanisms to allocate water will not by itself improve the security of water tenure, or the degree of managerial control over water. In fact, the relation is more likely to be the other way around: effective water markets and water pricing are dependent on well-formulated, clear, and enforceable water rights (Seckler 1993; Sampath 1992). The absence or fuzziness of formal rights does not always imply that water distribution is totally chaotic, but it does imply that its logic often escapes the notice of those who tend only to look for written rules to understand what happens.[7] It also implies that actual access to water and possibilities for gaining access to water may not be neatly reflected in formal rights, rules, and procedures. Access to water is often based on the perceived social and political legitimacy of existing formal or informal claims. Which claims are considered legitimate and who receives water are subject to negotiation, and are likely to reflect the existing social organization and the prevailing relations of authority and power.

Efficiency

A third feminist concern relates to the invisible costs to the economy of female labor, or to the difficulty to adequately value female labor in economic terms. Like most economic policies and theories, IMT policies lack explicit consideration of the process of reproduction and maintenance of human resources. Female family labor contributions to productive enterprises likewise escape the notice of mainstream economists. Because of this, terms like 'cost,' 'productivity,' and 'efficiency,' which play a large role in the discussion about new water management policies, are ambiguous: "What is regarded by economists as 'increased efficiency' may instead be a shifting of costs from the paid to the unpaid economy" (Elson 1989:58). This concern is valid for irrigation, irrespective of whether increases in efficiencies are to be achieved through markets; what matters is that those efficiencies are expressed in economic terms. One possible example of how increased *water use efficiencies* may be achieved at the cost of increasing (female) labor inputs is when water, before market allocation, was used to partly substitute labor. Examples of this are preseason water applications to soften soil for

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[6]Some examples do nevertheless exist of competition for water between irrigation and 'domestic' uses. Those examples do not directly relate to IMT or to water being allocated through market mechanisms, but instead refer to the installation of deep tube wells for irrigation. Irrigation may lower groundwater tables to such an extent that the hand tube wells used for domestic water run dry (for Pakistan, see Basnet 1992 and for Bangladesh, White 1992).

[7]In this regard, Ostrom (1992:23) notes that observing institutions frequently results in two errors. "The first is the assumption that the rules-in-use are always the same as formal laws or procedures. The second is the assumption that no institutions exist except for those that have been formally created through governmental actions. Both errors reflect a lack of understanding of how to create, maintain, and use social capital."

land preparation and increasing the ponding depth in rice 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. Another example is the now frequently propagated shift (in rice cultivation) from transplanting to broadcasting as a means to save water. If transplanting was a female task, this shift will reduce demands for female labor. The introduction of sprinkler irrigation systems for increasing on-farm water efficiencies can likewise be expected to have an effect on the quantity of labor used. It depends on the gender division of labor whether these water savings[8] are achieved at the expense of women's or men's time, and also on male and female wage rates (Zwarteveen 1995). An example of how increased *water delivery efficiencies* may be achieved at the cost of (female) labor inputs or gender equity is when the water saved through minimizing water distribution losses, for instance through canal lining, was previously used for other beneficial uses, such as watering cattle or irrigating homestead crops.

Increased *efficiency in the use of cash resources* may likewise implicitly depend on increasing female labor contributions (Green and Baden 1995). IMT policies emphasize that irrigators have to pay for water services, either in the form of irrigation fees or in the form of labor contributions to canal maintenance. Unequal terms of exchange of resources between women and men in households, that have been conceptualized by Palmer (1991) as intra-household markets in which the terms of trade are biased against women, may directly or indirectly make women responsible for such payments (Zwarteveen 1995; Green and Baden 1995).

Accountability

Although feminist critiques are based on a concern about gender equity, they also directly question the efficiency and effectiveness of IMT policies. The feminist critique particularly questions the principle of financial accountability: those who pay in return obtain a better service. The expectation of better services would in fact provide the main incentive for people to pay (more). This principle obviously only works when those who pay are the same as those who benefit from better services. If, because of gender-biased market distortions and unequal intra-household exchange of resources, women end up paying more without receiving more, this implies that accountability structures may be (or become) distorted and even dysfunctional, undermining the success of IMT programs.

As a matter of fact, there is a likelihood that women are not the ones to receive better services, because their access to formal decision-making structures and meetings is likely to be less. This is the next point of feminist critique of IMT policies: the fact that all users are assumed to be equally able to demand accountability. Theoretically, gender differences in the ability to demand good irrigation services can be hypothesized to be a function of gender differences in the ability to enter and to bargain in markets and meetings. These differences are known to exist, and are rooted in gender gaps in skills, information, and education, but

[8]The usefulness of on-farm water savings as a means to free up water for other uses depends very much on the specific hydrological context. Water savings may be illusory if the previously applied excess water was recycled and reused. In that case, the only effect of water pricing is the shift in the demand for labor (cf. Perry, Seckler, and Rock 1997).

are also caused by women's domestic responsibilities (which for instance reduce the available time women have), by assumptions regarding women's abilities (for instance ideas that women cannot irrigate or operate water control structures), and by cultural specifications of appropriate female behavior (for instance norms regarding female seclusion and mobility, or the view that women should not speak up in mixed public meetings), and so on (cf. Agarwal 1997). Gender differences in access to markets and meetings will not only create differences in the ways in which men and women are able to demand good irrigation services, but will also affect the ways in which irrigation organizations can enforce their rules on men and women.

Human Behavior

Another feminist-inspired critique regarding IMT policies refers to the rational choice theories on which IMT policies heavily depend, and more specifically on its concept of human agency. Rational choice theory postulates that political decisions are the product of interactions of individual agents each rationally pursuing individual material self-interests (Ostrom 1990). There is much to be said against this conception of decision making. What matters most from a feminist point of view is that individuals (and mothers are notorious examples) may also have altruistic motivations for behavior, and that the identification of one's own interests is not always a simple and straightforward exercise. People's perceptions of their interests and of what they want are shaped by their upbringing and by the social context in which they find themselves (Sen 1990; Woolley 1993; Agarwal 1997). Also, decision making cannot be understood (or predicted) as just stemming from (perverse) incentive structures which can be influenced by institutions, laws, and markets. Decisions and behavior may also be stemming from processes of negotiation, struggle, and social interaction which are permeated by social relations of power, that are not as easy to manipulate by economic or institutional reforms. The effectiveness of water management reforms, and their impacts on social and gender equity, will crucially depend on the relative weight of the different factors in influencing individuals' (both managers and users) decisions and behavior.

DREAMS AND NIGHTMARES: A REALITY CHECK

A Preliminary Overview of Issues

Feminists' concerns regarding the gender impacts of IMT and water markets are based on the assumption that flows of water and money and people's behavior in irrigation systems will neatly follow the theories and policies as formulated by 'water economists.' It is a critique of *thinking* about irrigation problems. In reality, the behavior of people, water, and money is different from what economists think it is. A first important fact in this respect is that many countries that have adopted IMT programs have really not had a choice. Many governments decided to transfer irrigation management responsibilities to private entities simply because they could no longer afford to publicly finance the recurrent costs of irrigation, or because they were unable to collect water fees from users. They often adopted IMT following the pre-

scriptions of major lending agencies (Turral 1995) rather than on the basis of "validated expectations about enhanced performance" (Vermillion 1997:29).

The second important fact is that there is a large variety across and even within countries in the way in which IMT policies are formulated and implemented. There are, as a consequence, many variations in what tasks and responsibilities are shared, turned over to farmers, or retained by the government, as there are large differences in the success of IMT programs. The most frequent IMT pattern in Asia is one in which the government retains control over the water resources, reservoirs and main canals, and overall ownership and financial responsibility for the system. Maintenance and (perhaps) operation of lower-level canals are turned over to water user associations (Merrey 1996). In the Asian model, the primary management unit employed is 'community-based' and often results from a more or less intensive grass-roots organizational campaign involving hired community organizers. The primary management unit is often small (less than 100 hectares) and relies primarily on voluntary labor in carrying out its functions, and the most important relationships among members of the unit are social (Svendsen, Trava, and Johnson 1997). In countries like Mexico, Turkey, Colombia, and Argentina, the organizational form of the irrigation systems can be termed "Irrigation Districts." Irrigation districts are typically larger (several thousand hectares), rely principally on paid employees to perform their functions, and attempt to link members together mainly through ties of economic self-interest (ibid.). The implication of this large variety is that an analysis of any IMT program requires a detailed specification of what the program entails.

There is very little evidence about the process and impacts of IMT programs, and existing evidence is often weak (Turral 1995; Vermillion 1997). In all fairness, it is not easy to make a meaningful comparative assessment of IMT programs.[9] This is so, first because of the aforementioned variation in the ways in which IMT programs are formulated and implemented. This makes it necessary to determine whether what was promised in formulated policies was actually delivered. Second, many of the observable (and quantifiable) results and effects of IMT programs are a direct function of factors external to irrigation management. World market prices of crops, for instance, or the prevailing political climate in a country are likely to have a considerable effect on the degree of success of IMT programs. Third, the implementation of IMT programs is often accompanied by other neoliberal reforms, such as the removal of input subsidies, which may drastically change the terms of trade and profitability of irrigated agriculture. It is therefore difficult to know which observed changes are to be attributed to these external factors and other economic reforms, and which are caused by IMT. And finally, it is virtually impossible to do a 'with-without' comparison, which is why many IMT impact evaluations face the fundamental methodological problems of not knowing what would have happened in the absence of IMT programs. A different type of problem is that most countries lack reliable performance data. The records maintained by irrigation agencies or farmer organizations are at best based on 'guesstimates.'

The review of evidence to date does nevertheless provide some insights into the type of changes IMT programs may cause. A first important and remarkable insight is that there are very few surface irrigation systems in the world that are operated, based on free market prin-

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[9]Assessment of irrigation performance is always difficult and full of controversies, particularly with respect to the disaggregation of the different factors which affect results that are causally removed from irrigation (agricultural productivity and poverty alleviation, for example).

ciples. There are many countries (more than 20, according to Vermillion 1997) that have adopted IMT programs, but few have made a deliberate attempt to create markets in water or to make allocation of water subject to market forces. The case most often cited by water market advocates is Chile (Rosegrant and Binswanger 1994). Although Chile has indeed created the legal possibilities for trading water, there are serious doubts about whether water trading does occur (Bauer 1997). The only existing cases of water being treated as a commodity are from the sale or rental of groundwater by owners of pump sets, mostly in South Asia.[10] In surface irrigation systems, trading or renting of water does sometimes occur, both among farmers and among larger units. However, these water transfers are very restricted in space and by topography, and water prices in these markets may still be indirectly subsidized. As yet, there is little evidence and there are few documentable experiences to support or refute the belief in the superiority of markets as water allocation mechanisms. Treatment of water as an economic good remains primarily an economist's dream. Are most of the feminist concerns and doubts, as a result, no more than nightmares?

Evidence to Date on IMT Programs

IMT programs have often provoked important changes in the socioeconomic relationships between agencies and farm households, and in the ways and mechanisms available to water users for demanding and obtaining irrigation services. This section carefully examines the available evidence in an attempt to understand whether and how these changes are structured by gender relations, and whether their impacts are gender-specific. This examination is done on the basis of the hypotheses identified in the previous section.

Access to Water

Changes in water distribution are recorded as a result of IMT programs, most often through the introduction of cost-recovery mechanisms. In many developing countries,[11] increases in the cost of irrigation to farmers are recorded after transfer (Vermillion 1997). Reported increases vary from 1,500 percent in the Dominican Republic, with a third payable in labor (Yap-Salinas 1995), 500 to 700 percent in Indonesian pump schemes (Johnson and Reiss 1993), to around 50 percent in Nepal (Mishra and Molden 1995) and Mexico (Johnson 1996). In addition, water fee collection rates usually increase significantly. However, although users have to pay more for irrigation services, there are still very few places in the world where water allocation is entirely dictated by the laws of the market. The cases of privatization of groundwater in India and Bangladesh most closely approach a market allocation of water.

Evidence so far suggests that market allocation of groundwater has increased the possibilities for persons and land-poor groups to access water (van Koppen and Mahmud 1996;

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[10]See for examples from Pakistan: Strosser and Kuper 1994; from India: Shah 1993; Shah et al. 1995; and Pant 1995; and from Bangladesh: Wood et al. 1990; and Mandal and Parker 1995.

[11]The case of the privatization of public tube wells in some Indian states is an exception to this trend: privatization decreased the cost of irrigation water to farmers. This is possible because costs of electricity were subsidized by states. See Shah et al. 1995; Pant 1995.

Jordans and Zwarteveen 1997). In both India (Shah 1993) and Bangladesh (Hartmann and Boyce 1983), public schemes are notorious for their inefficiency and inequity, primarily because politically well-connected large farmers are able to assume complete control over these wells. In both countries, privatization of public wells and reduction of import constraints for smaller pump sets opened up the possibility of 'owning' water for a much larger group of poorer people (Wood et al. 1990). Many women benefited from this, although most depended on the mediation of NGOs for credit to buy pumps and for technical support on how to use them (van Koppen and Mahmud 1996; Jordans and Zwarteveen 1997).

Other than in these groundwater cases, 'ability to pay' is not a primary determinant of one's access to water. Conditions of access to water may nevertheless have changed as a result of IMT, first because some IMT programs do (at least on paper) entail a redefinition of water rights (Rosegrant and Gazmuri 1994), and second because of the increased costs of irrigation. Not much evidence is available to determine whether a redefinition of rights embodies a reallocation of water, but it seems likely that in many cases new rights will be based on traditional and existing rights. In theory, a redefinition of rights would seem to offer an important opportunity for negotiating rights for female water users.

Conditions of access to water may also have changed because of the increase in the costs of irrigation. For instance, increased irrigation expenses may lead some farmers to rent out or sell their land to other farmers or to industries. Where there is a gender difference in ability to mobilize cash resources, such changes may be gender-specific. However, none of the available studies allow such an analysis; for instance, no attempt is made to assess whether there have been changes in the composition of the group of irrigators.

Many studies do show that equity of water deliveries has remained equal or has improved (Vermillion 1997; Kloezen, Restrepo, and Johnson 1997). The data, however, refer to the uniformity of water applications across a particular area (and thus say that the amount of water that goes to a particular plot as compared to what goes to other plots has not changed over time), and not on information on who (or which people) receive this water.

The Value of Water

Water fees most often still do not fully reflect the opportunity cost of water in alternative uses. Pricing is rarely based on measured volumes of water consumed or diverted and more rarely still is it actually volumetric, in the sense of linking marginal deliveries to incremental payment (cf. Vermillion 1997). Rather, the level at which irrigation fees are set is usually a reflection of the cost of providing the service. This implies that prices in most cases do not determine priorities among uses. Therefore, the concern that domestic uses of water will receive less priority because of IMT programs does not as yet seem empirically justified.

Efficiency

Even though prices of water are not directly volume-dependent, the increase in the costs of irrigation to farmers through area- and crop-based pricing seems in some cases to have influenced farmers' water use practices. Nguyen and Luong (1994, cited in Vermillion 1997) report an increase in irrigation efficiency from 50 to 80 percent in a medium-sized irrigation

system in Vietnam, and a decrease in water consumption per hectare from 8,000 m^3 to 5,120 m^3. Pant (1995) reports the case of the turnover of a public tube well in India an increase in irrigation efficiency by reducing average pumping time per irrigation, and Azziz (1994, cited in Vermillion 1997) also reports a post-transfer reduction in irrigation time for an irrigation system in Egypt. Data from two irrigation systems in China likewise suggest that the introduction of payments for irrigation services reduced the use of water per hectare (Vermillion 1997).

None of the available studies, however, provide disaggregated data that would allow a better understanding of which farmers changed their water use practices and why. Data are usually given in averages, and although some studies present farmers' perceptions, none try to explain why some farmers are less or more satisfied than others.

The available information also does not reveal how improvements in water efficiencies were achieved. Was water for instance substituted for labor, or did increases in water delivery efficiency result in less water being available for 'nonrecognized' uses?

Neither is the information about the impact of increased costs of irrigation on farm households very revealing in a gender sense. Figures usually show that the cost of irrigation as a percentage of total production costs remains rather small for an imaginary 'average farmer,' suggesting that payment of irrigation fees is not a problem. However, none of the studies have made an attempt to look beyond this fictitious 'average farmer' in order to find out whether there are farm households for which payment of irrigation fees does present a problem, or to investigate who within a household is, directly or indirectly, responsible for payments.

Accountability

The evidence suggests that the IMT model, through a combination of financial and institutional controls, does offer an alternative to centralized bureaucratic management. Irrigation fees are an important component of the IMT model. Fees, however, do not so much serve economic resources allocation functions (as advocates of 'water as a private good' suppose), but rather operate as 'political signaling devices:' as a mechanism to create accountability between providers and receivers of irrigation services (Moore 1989; Kloezen, Garcés-Restrepo, and Johnson 1997). One clear example of this is given for the case of an irrigation district in Mexico, where farmers reported the most remarkable positive impact of IMT to be the improvement in their relation with the ditch tenders (Kloezen, Garcés-Restrepo, and Johnson 1997). Another example comes from the privatization of state tube wells in India. While state tube well operators were not accountable to anyone, for a private tube well owner, selling water often is an important commercial operation: "his superior performance results from the incentive to stimulate the demand for water among his neighbors and to maximize the utilization of his well" (Shah 1993:30). An increased accountability has been reported in some, though not all, cases to improve the reliability and accuracy of irrigation services to farmers.

Again, the available evidence about improvements in accountability is mostly presented at the aggregate scheme level, without specification for groups or categories of users. It is therefore not possible to assess empirically to what extent women are more or less able than men to demand good irrigation services (or to what extent agencies are more or less able to demand responsible irrigation behavior from women than from men). The question whether there are (likely to be) differences between female and male users as regards their ability to

demand good irrigation services can nevertheless partly be answered on the basis of information provided by a number of case studies on female participation in water user organizations and on female access to irrigation services.[12]

These studies show that women as individuals and as a group have much less access to formal decision-making structures. Formal membership of water user organizations is most often reserved for official title holders, most of whom are men. Even those women who are members do not automatically participate at an equal level with men in water user organizations. Evidence nevertheless suggests that even in the absence of formal titles and without being able to participate in meetings, female water users do sometimes succeed in accessing water, making use of informal means or going through male intermediaries. In the absence of formal rights, women's access to water may (more than most men's) depend on good relationships with ditch riders, representatives of the water user organization, or other officials. If IMT entails a change in the actors involved in water management, this may make it more difficult for women to demand and obtain good services, at least in the short term.[13]

Human Behavior

The methods employed in most studies of IMT processes and impacts are borrowed directly from neoclassical economics. Studies tend to rely heavily on the deductive method, and to place greater emphasis on formal modeling and relations than on the validation of the behavioral and institutional assumptions employed. The produced data, therefore, do not allow a critical reassessment of rational choice theories and the concept of human agency which underlie IMT policies. The same theories and models that underlie IMT policies are used to explain the observed effects. However, the fact that the behavioral predictions made on the basis of assumptions about motivations coincide with observed behavior does not mean that the IMT model explains actions. Other explanations may be valid. One hypothesis, which specifically requires testing, is the extent to which irrigation practices and behavior are a function of prevailing social relations of power (including gender relations).[14] Evidence needs to be collected about actual irrigation-related practices and attempts should be made to link real motives and means on the one side and outcomes on the other.

Dream or Nightmare?

What is the conclusion of this review? Are the feminists' concerns just nightmares? IMT programs do in many cases lead to important changes in the socioeconomic relationships between agencies and farm households, and in the ways and mechanisms available to water users for

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[12]These case studies are: Illo 1988; Lynch 1991; Brunt 1992; Pol, van de 1992; Krol 1994; Zwarteveen and Neupane 1996; Kome 1997. A more detailed analysis of gendered access to irrigation services and organizations is given in Zwarteveen 1997.

[13] For a more detailed analysis of this in the context of South Asia, see Meinzen-Dick and Zwarteveen 1998 (this volume).

[14]The fact that actual water distribution practices often reflect social power structures is well established. The most famous example is Wade 1982.

demanding and obtaining irrigation services. The reported improvement in accountability between users and providers does indicate an opportunity, also for women, to increase their ability to demand good services. However, there are not enough empirical data available to asses whether IMT programs are a threat or an opportunity to gender equity. Questions about social equity implications of IMT programs are seldom asked, while the methods used to study IMT processes and impacts do not permit a critical reassessment of the assumptions on which these policies are based.

Addressing Gender Concerns in Irrigation: Some Final Thoughts

Much of the past research on IMT seems to have been led by the desire of researchers to come up with an informed statement about whether or not water should be privatized or treated as an economic good. While the resulting analysis can produce an answer to the question whether a policy works or not (or under which conditions it works) in terms of stated objectives, it does not reveal why or through which mechanisms. The produced data do not allow a critical reassessment of the theories underlying IMT policies, because the same theories that underlie the policies are implicitly used to explain their effects.

There exists no universal answer to the question about the desirability and possibility of water markets or treating water as a private good. Conditions are fundamentally different at different places and at different times, while the choice of a particular water management system also depends on the relative importance placed by policy makers on various objectives. Policies that work in one environment or contribute to the achievement of one set of goals, may not be successful in another environment or undermine the realization of other goals. Also, the apparently clear distinction between market and nonmarket allocations of water blurs on closer examination. Real water allocation rules and practices often involve a combination of both. The real question, therefore, is not whether or not markets can allocate water, but rather which water allocation mechanism is best, in which circumstances, and for which objectives.

This paper has tried to specify this question for the objective of gender equity. Based on feminist economics and on the available knowledge about gender and irrigation, it is possible to formulate a number of hypotheses about the linkages between gender equity and new water management policies. The two basic mechanisms for water allocation on which new water management policies are based—meetings and markets—are known to be fundamentally gender-biased. Although concerns to the contrary have been formulated, meetings and markets may well be more accessible to women when compared to the previous administrative allocation of water.

Available data confirm that new water management policies have generated important changes in the socioeconomic relationships between agencies and farm households, and in the ways and mechanisms available to water users for demanding and obtaining irrigation services. The reported reduction of rent-seeking possibilities and the increases in accountability between providers and users of water do indicate important potential for improving women's possibilities to access water. This potential may not materialize without explicit policy attention and without additional measures to overcome prevailing gender barriers (as is suggested by the experience of the privatization of groundwater in Bangladesh and India), and effects

of IMT programs may even turn out to be negative for women if gender considerations are not explicitly incorporated in policies and programs.

Information to date does not allow a more sophisticated assessment or analysis of whether the changes (and their impacts) provoked by IMT are structured by gender, or by any social variable for that matter. To better understand the effects of IMT programs on social equity, studies are required which make a more explicit attempt to differentiate findings for relevant social categories of users. Gender is likely to be a recurrent source of differences in users' ability to demand and access irrigation services.

The lack of information seems to partly reflect a lack of interest and concern about social equity issues in the current irrigation discourse. While reforms inspired by neoliberalism in other sectors have generated and continue to generate research and debate about their implications on social and gender equity, IMT and other economic and institutional policy reforms in the irrigation sector appear to be merely led by (and assessed on the basis of) their potential for increasing efficiency and productivity. There is a stark absence of efforts to assess and analyze whether the effects of new management policies and programs are different for different categories of users. There also does not appear to be any serious attempt to incorporate equity-enhancing measures into new policies.

Whatever the reason for the current disregard for social equity concerns, it should be realized that an understanding of whether and why irrigation programs affect different people differently is not just important on the basis of equity concerns. Instead, such an understanding is *fundamental* to improving the effectiveness and efficiency of water management reforms, and thus to solving the global problem of water scarcity. This is so, because the success of these reforms ultimately depends on whether they bring about the right kind of changes in the behavior of both users and providers of irrigation services.

A realistic and less gender-biased assessment of changes in water-use and cost-recovery efficiencies as brought about by IMT crucially depends on:

- *A sound assessment of real costs and benefits, to different actors implicated in or affected by water management, and to 'society' as a whole, of both the provision and uses of water.* Benefits and costs that fall in the 'female' domain have traditionally tended to escape the notice of irrigation and economic analyses. Tools to properly value those costs and benefits are continuously being refined and further developed. Important progress has, for instance, been made in quantifying women's time, which provides an important avenue to explore further when attempting to 'price' water. However, there also remain important aspects of gender equity and gender relations that are difficult to quantify and measure, in the same way as, for instance, the concept of environmental sustainability remains difficult to define and quantify. This should not lead to the tendency among some economists to consider those aspects of gender equity as non-important or even nonexistent, but rather implies that qualitative indicators for assessing costs and benefits should sometimes be allowed for.

- *A sound assessment of the 'incentives' of different actors involved in the management and use of water.* These incentives are partly, but not uniquely, created by the laws, institutions, and markets that govern water management. They are also the result of processes of negotiation and bargaining that may partly take place

outside the realm of influence of policy makers and managers. Women and men are not just puppets whose moves are dictated by policy makers pulling strings, or passively responding to external development beyond their control. Instead, they actively shape the implementation and therefore the impacts of these policies. The possibilities that different categories of people have in doing so are structured by social relations of power and the norms and values surrounding those. Women, in general, have structurally fewer resources at their disposal than men.

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Mexico's Two Principal Hydro-Agricultural Policies from a Gender Perspective

Sonia Dávila-Poblete[1]

ABSTRACT

This paper considers some of the changes that have occurred in the Mexican rural land tenure pattern, resulting from the recently established policies geared to the hydro-agricultural sector, and how these policies could affect women's roles as rural landowners and, consequently, as water users. The economic model adopted in Mexico as well as in other Latin American countries has as its main objective the reduction of the government's role in economic activities and the increase in participation of private enterprises, as the necessary means to reduce public investment and attain economic growth of the country.

As part of this objective, the Government of Mexico has implemented several decrees such as the National Plan for Development: 1989-1994 (*Plan Nacional de Desarrollo*) that was later included in the National Program for the Modernization of the Rural Area: 1990-1994 (*Programa Nacional de Modernización del Campo*), the Amendment of Article 27 of the Mexican Constitution (*Artículo 27 Constitucional*), and the National Water Law (*Ley de Aguas Nacionales*). Each of these laws affects the traditional land tenure system called *ejido* or the so-called social sector, because it was this social group that had the right to inherit and work a small plot of land. Individuals and families that established themselves in these ejidos received the land under a concession. Therefore, the land could not be sold, mortgaged, or embargoed. But in January 1992, the Government of Mexico decreed that all land belonging to the ejidos would no longer be under concession but rather would belong to the individual *ejidatarios*. This legal amendment did away with all the decrees that protected this social sector and their families.

Another law that has had a great impact is the National Water Law under which the transfer of the irrigation districts to the users is a major objective. This transfer establishes a new legal system that allows users to operate, maintain, and administer the infrastructure through a user association, organized by the users in each district, to encourage involvement and district financial self-sufficiency.

This paper points out the effects of these decrees on the rural areas, especially in those areas where ejidatarios and small landowners work together in irrigation districts, to see how

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[1]Mexican Institute for Water Technology (IMTA). The author thanks Carol Johnston and Dianne Hayward for their comments and corrections.

it is leading to important transformations in the socio-organizational behavioral patterns of the producers, and especially in the land tenure relationships in which women have been at a disadvantage from the very beginning.

INTRODUCTION

Mexico, as well as other Latin American countries, has an urgent need to reduce public spending to achieve economic growth. Consequently, the federal government has decided to reduce the state's role in all economic activities and, in its place, to stimulate the participation of private entrepreneurs. To achieve these objectives, the government has seen a need to change its economic policies for the rural areas. For example, since the beginning of the decade, there has been a clear reduction in the financing of all agricultural projects, a suspension of almost all rural loans, and the privatization or closure of several state enterprises. These strategies can be understood as an invitation to greater involvement of the private sector. However, the absence of government-financed technical assistance in the management and administration of water and soil used by peasants in the implementation of modern technological projects, as well as in support of the rural sector, is notable. Such technical assistance is essential to prevent a widening gap between agricultural productivity and the needs of national and international markets.

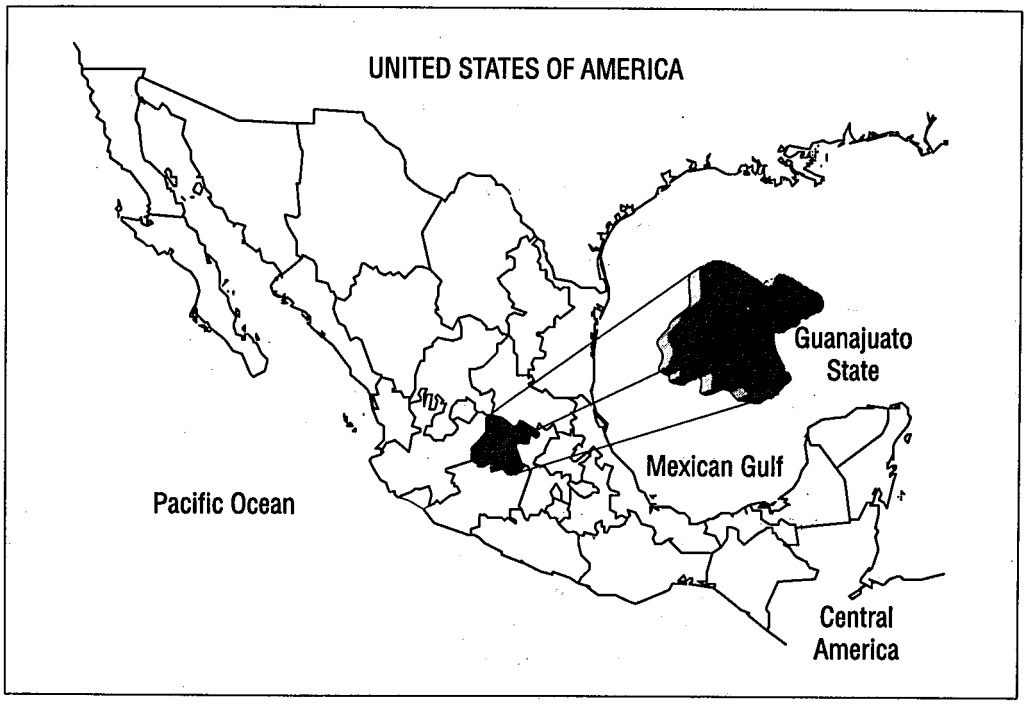
These changes were reinforced through several decrees and constitutional amendments such as the National Program for the Modernization of the Rural Area: 1990-1994 (*Programa Nacional de Modernización del Campo*); the National Plan for Development: 1989-1994 (*Plan Nacional de Desarrollo*); the Amendment of Article 27 of the National Constitution (*Artículo 27 Constitucional*), the National Water Law (*Ley de Aguas Nacionales*), and others.

This paper starts by describing the amendment to Article 27 of the Constitution or the land tenure inheritance pattern, then proceeds to briefly analyze the National Water Law, to see how and which of these laws has a greater impact on the rural sector, and especially on the right of women to inherit land with access to irrigation water.

THE LAJA RIVER BASIN

The Laja River Basin begins in the northeastern part of the State of Guanajuato and runs through the southeastern part, covering a small part of the State of Queretaro; its waters join the Lerma River in the southern part of the State of Guanajuato (see figures 1 and 2). The population that lives in this river basin is settled in places that fluctuate between 2,430 and 3,650 meters above sea level. Its atmospheric conditions are predominantly dry, with an annual precipitation of 450–600 millimeters and a temperature that fluctuates between 12 °C and 24 °C.

Figure 1. Guanajuato State.



The Laja River Basin has a total area of 25 km^2 and provides water to 18 municipalities: 14 in the State of Guanajuato and 4 more in the State of Queretaro (see figure 2). Because of the great social diversity among the water users of this river basin, the Laja River Basin was divided into four main areas called: the Upper Laja River Basin, the Dried Lake River Basin, the Lower Laja River Basin, and the Huimilpan and Queretaro River Basin. This division took into consideration aspects such as the river's watercourse as well as population density and socioeconomic factors.

In this paper, I use examples of what is happening to the rural sector in the Lower Laja River Basin or the municipalities of Celaya, Apaseo El Alto, Comonfort, Apaseo El Grande, and Juventino Rosas de Santa Cruz (see figure 3). The reason for selecting the Lower Laja River Basin is because it best represents the entire river basin. It has the highest population density and the greatest concentration of economic activities, as well as different types of water users: from urban users to industrial sectors as well as the agriculture sector with its small irrigation units and Irrigation District 085.

Within the municipality of Celaya, I focus on Irrigation District 085, La Begoña, which is located in the mid-eastern part of the state of Guanajuato (see figure 4) and covers an area of 12,390 hectares that are irrigated with an allotment of 124 million cubic meters from surface streams and 60 million cubic meters from underground streams.[16]

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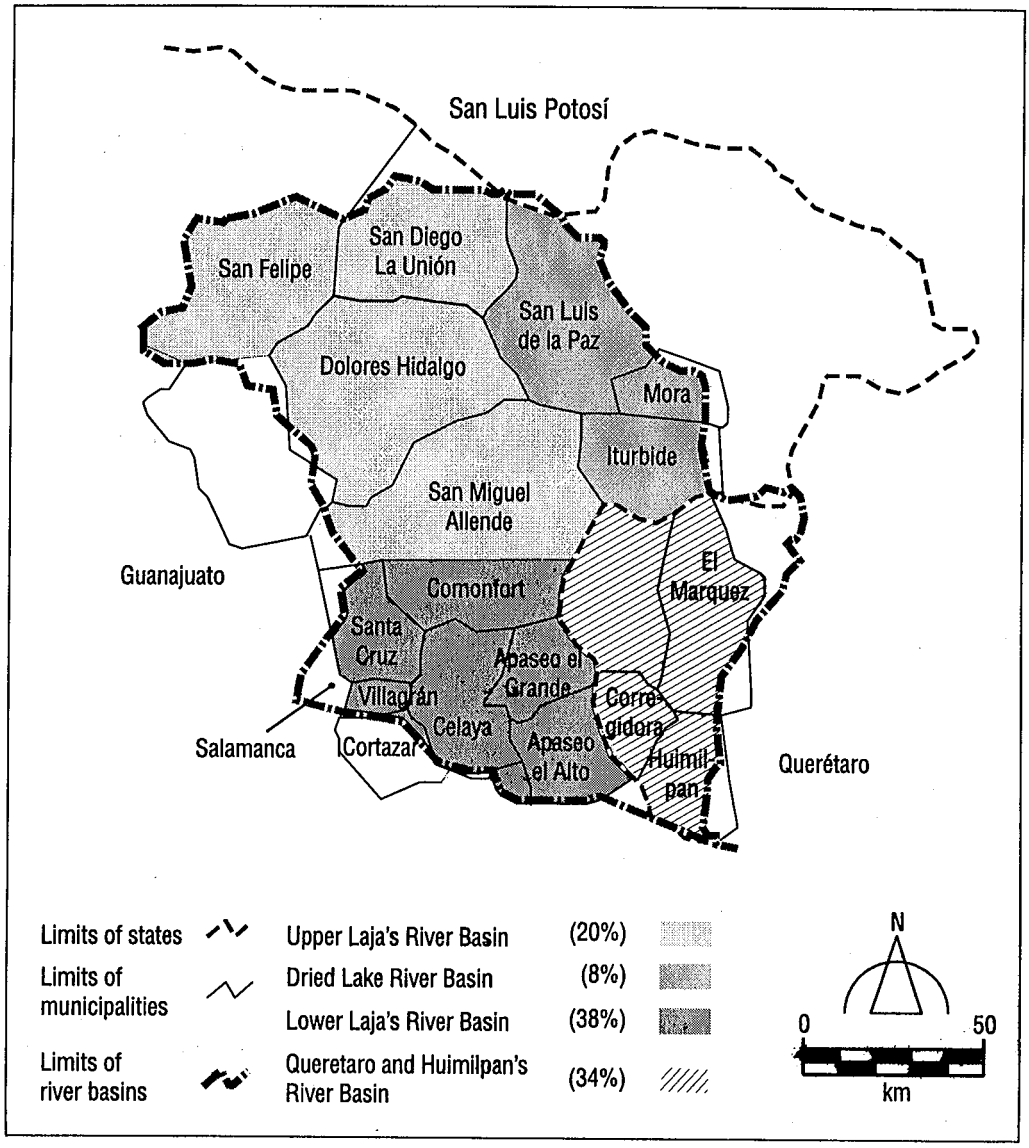
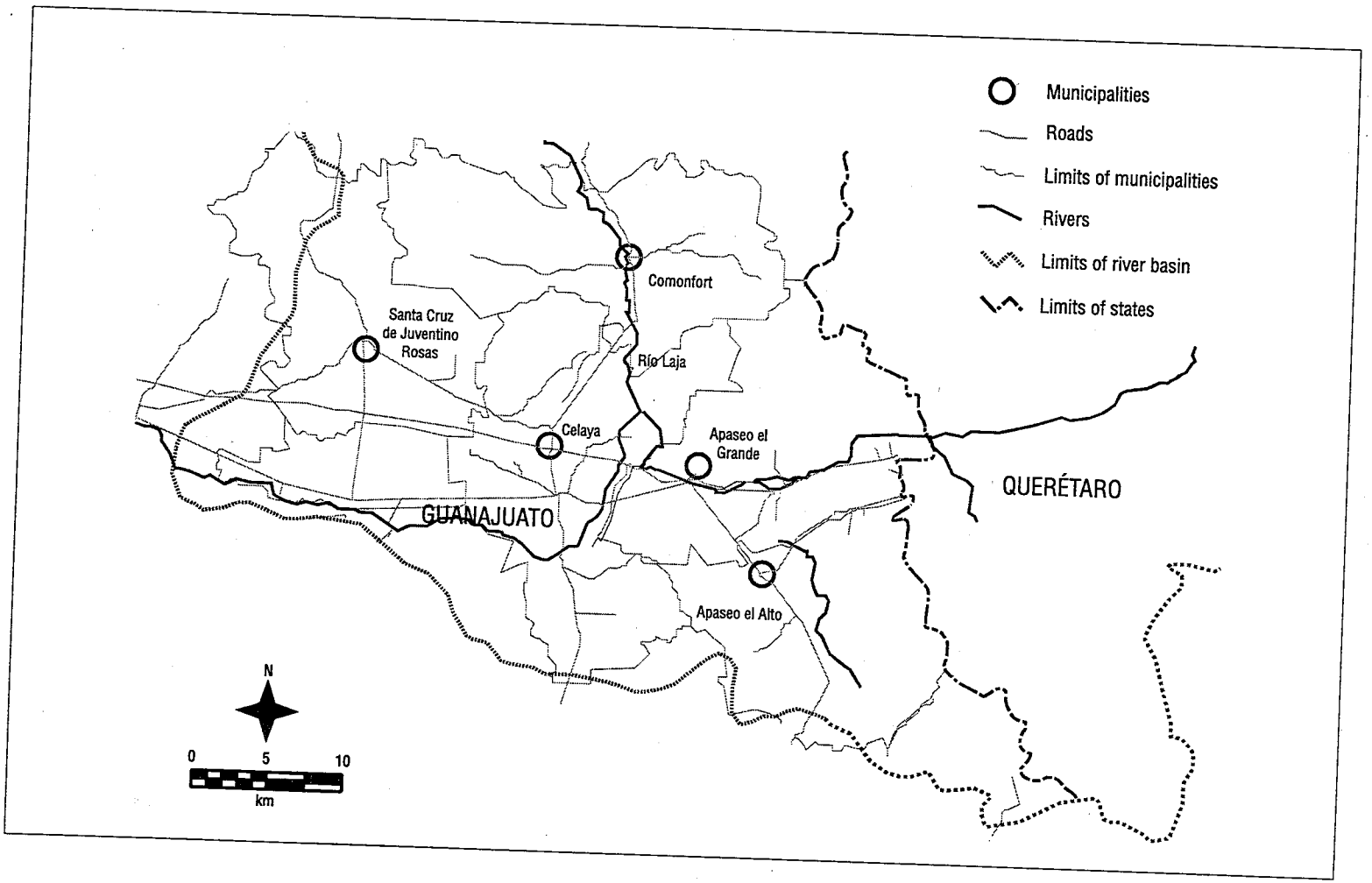
[16]Data from the National Water Commission for State Headquarters (Gerencia Estatal) of the State of Guanajuato. Results of the agricultural cycle 1992–1993, Irrigation District No. 085 "La Begoza, Guanajuato," February, 1994.

Figure 2. Municipalities within the Laja's River Basin.



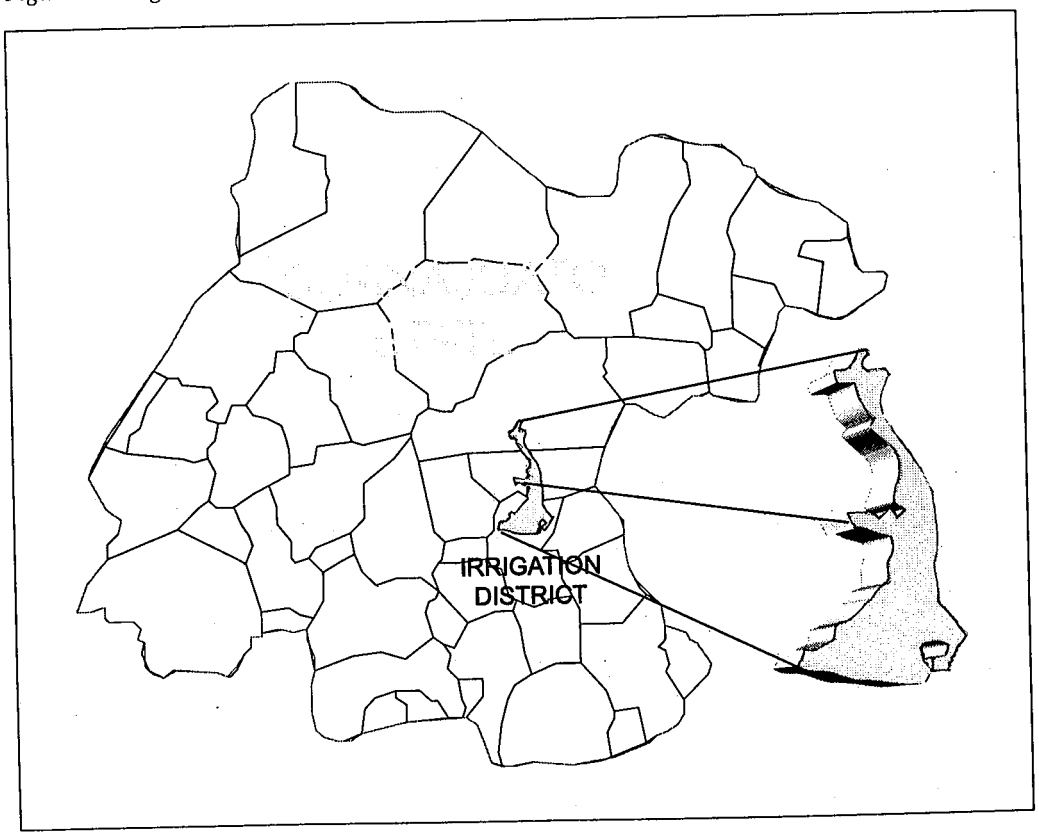
Irrigation District 085 began operations in 1969. Its main sources of water are the Ignacio Allende Dam with a storage capacity of 251 million cubic meters for the Celaya Valley, and the Isidro Orozco Portugal (Neutla) Dam with a storage capacity of 5 million cubic meters conveyed for the users of Irrigation Module 1. The District receives the overflow from the Laja River, an annual average of 182.6 million cubic meters, and 38 million cubic meters from 132 wells (21 wells operated by government agencies and 111 wells owned by the private sector). Furthermore, it has two diversion dams (Soria and Guadalupe), 164 kilometers of main and secondary canals, 155 kilometers of drains, and 1,262 structures.

Figure 3. Lower Laja River Basin.



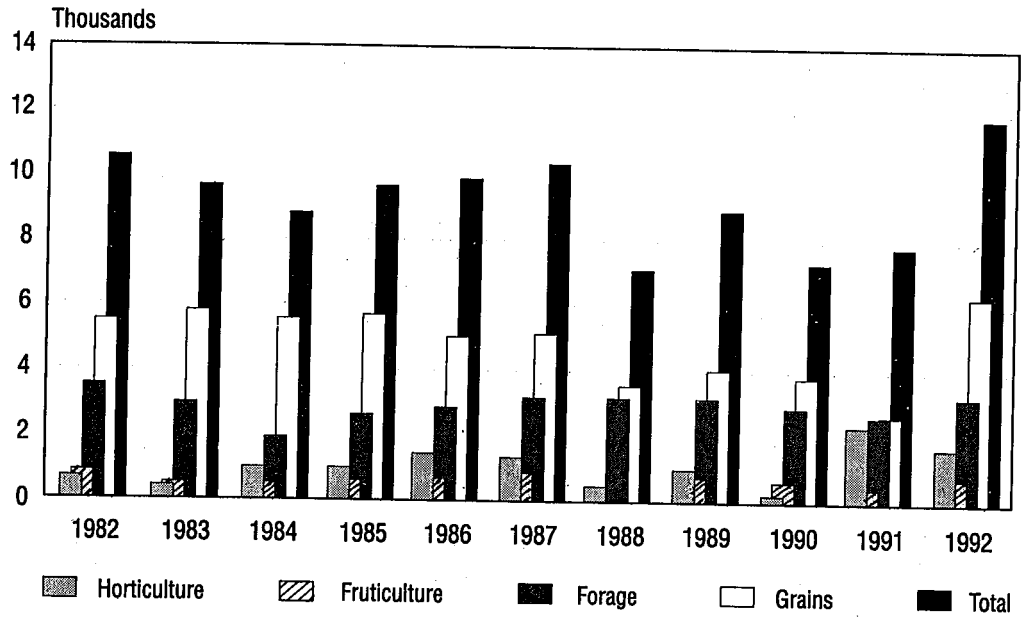
Within the transfer program for the district, four irrigation modules were created: Neutla, Comonfort (with water pumped from Laja River), Left River Bank, and Right River Bank (see figure 4).

Figure 4. Irrigation District in Guanajuato State.



One peculiarity of this irrigation district is that the social stratification of the users is mainly determined by access to water sources. Another is the overexploitation of the underground water. In other words, the potential of farmland within the district is determined by the use and management of the surface water and the extraction of the underground water. As a result, users farm an average of 4 hectares, irrigated with surface water. Any amount of land above or below this average places them in a higher or lower status. Another characteristic of this district is that most of the farm surface is used for horticulture and perennial farming (see figure 5). These products require great volumes of water in a state where the scarcity of this vital fluid is a critical factor.

Figure 5. Irrigation District 085, LA Begoña, cropped area (ha).



Source: Irrigation District Headquarters, CNA. Agricultural Statistics System (Sistema de Estadistica Agricola, SEA).

THE AMENDMENT OF CONSTITUTIONAL ARTICLE 27

After several coup de etats and peasant uprisings under the slogan: "the land belongs to those who work it," on January 6, 1915, Mexico was the first Latin American country to institute agrarian reform, through the creation of Article 27 of the Mexican Constitution. In this article, the State declared itself the owner of the land, while the ejidos and comunidades or indigenous communities had the right to use the land in usufruct.

This kind of land tenure pattern, called ejido, and the formation of indigenous communities, were seen as the legal entities that had to integrate the productive, social, and cultural dimensions, and provide for the economic growth of the peasant families. Therefore, from 1915 to 1983, there were 25,589 ejidos and 1,486 indigenous communities throughout the country, with 2.8 million heads of households that benefited from 103 million hectares (Arizpe and Botey 1986:135).

In the Lower Laja River Basin, the total population is 594,400 of which 48 percent are men and 52 percent women, and an ejido population of 89,359, of which 49 percent are men and 51 percent women (see table 1). The large number of ejidatario women is because most of these ejidos observe an inheritance pattern for the productive land in which traditionally, the first heir was the wife, then the oldest son, and only if there were no males in the family, could the oldest daughter be the heiress of the land.

Table 1. Population by municipalities.

	Population			Ejido's Population		
Municipalities	Total	Men	Women	Total	Men	Woman
Apaseo el alto	54,190	26,456	27,734	14,017	6,874	7,143
Apaseo el grande	62,225	30,270	31,955	22,025	10,800	11,225
Celaya	354,085	171,265	182,820	25,688	12,703	12,985
Cómonfort	61,995	29,756	32,239	15,999	7,877	8,622
Santa Cruz de Juventino Rosas	61,905	30,423	31,482	11,130	5,489	5,641

Source: Instituto Nacional de estadística, geografía e Informática. Anuario estadístico del estado de Guanajuato 1996 and from INEGI. Datos por ejido y comunidad agraria VII censo agropecuario, 1991.

When women inherited the land, usually as widows, they had to decide when and what was going to be sown, to determine who was going to work the land—having the possibility to choose among any of their family members or to give it to somebody else—as well as who should inherit their land. When a daughter inherited the land, there was a similar phenomenon, because all young men saw the heiress as the most eligible fiancée, because it gave them a chance to improve their position within the ejido, either as ejidatarios or as peasants without land. In either case, the husband took care of the plot and decided when and what was going to be planted, but the women retained the right to decide who was going to inherit their land.

This land tenure inheritance pattern gave women a way of becoming empowered within their families and among the ejido members, because it gave them a chance to participate with men in the community at the general meetings, where decisions were made about the administration of the ejido. At the same time, they bore the responsibility of deciding all the administrative aspects concerning their plot of land. This turned out to be a kind of guarantee for the women, since all the possible inheritors took care of them, even if it was with the only purpose of obtaining the first place in their will.

On November 14, 1991, the then President Carlos Salinas de Gortari, in a speech to the Permanent Agrarian Congress, mentioned ten reasons for introducing an Amendment to Article 27 of the Constitution. The core of his speech was geared to show that with these changes the rural sector would have greater justice and liberty. For example, he said that the ejidos as well as the indigenous communities would have more protection with this amendment, because the village area—where the people live—could not be sold.

To support this, he argued that if this area could be sold, the community's identity as well as its traditions would be jeopardized. He went on to say, "for these reasons we will give our support with health and educational services, with loans for productive projects, with financial resources to all equitable associations, with answers for peasant women" (*La Jornada*, November 15, 1991). At the same time, President Salinas said that the plot used for agricultural production could be sold if two thirds of the qualified people from the ejido or community approved the sale of his or her plot of land. To support this argument, he said, "the purpose of amending this Article is to give the ejitarios the freedom of choice to decide over his or her plot of land" (*La Jornada*, November 15, 1991).

This example shows us, once more, that the private or domestic issues are still considered to be women's sphere of action. This is why Salinas' speech ends with the phrase that says his government will give *answers* to peasant women without specifying what their needs are. Furthermore, he takes for granted that women are responsible for the identity of communities as well as their traditions, and, therefore, he took for granted that by protecting the piece of land where the village is settled, his government would be responding to women's needs.

On the other hand, the fact that the agricultural plot of land—which is the profitable area—can be sold, gives us an idea of how the land tenure inheritance pattern, previously described, could leave women completely unprotected, since the legal and mercantile sphere of action is entirely unknown to them, even to their spouses, who for the first time have the possibility of selling their land. To this we must add that since 1994, Mexico has been going through one of the worst depressions in its history.

On January 6, 1992, exactly 77 years after the implementation of agrarian reform, President Salinas finally obtained Congressional approval of the Amendment to Article 27 of the Constitution, in which Paragraph VII specifies:

> *Considering the need to strengthen the community life pattern of the ejidos and indigenous communities, the law will protect the land where there are human settlements, and will regulate all productive land, the forests and the water for common usage. It will also provide the necessary actions to encourage and improve the living conditions of its people.*
>
> *With respect to the desire of the ejidatarios and indigenous groups to adopt the conditions that are more appropriate to the use of their productive resources, the law will regulate and enforce their rights over the plot of land* (Diario Oficial, 6 de enero de 1992).

When this amendment was made public, most of the young male ejidatarios and peasants considered the possibility of selling their plot, while the older people—men and women—were against it, because as an ejidatario said, "our ancestors had to fight for many years to obtain this plot, how could I sell it and leave my family without the only dowry I can give them?"[3]

With respect to the decision to sell or rent the land, Miguel Murmis states that the agriculture sector in Latin America is going through the process of accumulating more capital, and he goes on to explain the different strategies implemented to achieve this objective. Among these strategies, Murmis analyzes a variety of hiring procedures, from family labor to paid work, in several countries. He also mentions the buying and renting of land. In discussing the sale of land, he only gives an example of wealthy farmers who are stimulated by the increasing demand for their products to extend their properties and therefore are willing to buy the land of their poor neighbors. With respect to the phenomenon of land rentals, he recalls the case of an ejido in the State of Michoacan where ejidatarios had rented up to 10 or 20 additional plots of land (Murmis 1986:51).

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[3]Interview of an ejidatario in the State of Guanajuato, November 20, 1994.

All of the above, coupled with the severe economic crisis as well as the unequal competition in the production and marketing of the agricultural goods, seem to have discouraged many people from buying land, and instead, they prefer to rent land that has water for irrigation. As we can see in table 2, out of 11,276 irrigated hectares given to the Right Bank Module in 1992, only 4,895 hectares were cropped and from this amount, 1,152 hectares (24 percent) were rented.

Table 2. Total and rented surface Irrigation District 085.

	Total	Total irrigated	Cropped area		Rented area	
Section	hectares	hectares	hectares	%	hectares	%
1	1,178	1,176	554	47	168	30
2	804	804	404	50	226	56
3	1,730	1,730	380	22	138	36
4	1,704	1,704	495	29	78	16
5	892	892	511	57	3	1
6	889	889	373	42	114	31
7	1,183	1,183	435	37	25	6
8	2,952	2,898	1,743	60	400	23
Total	11,332	11,276	4,895	43	1,152	24

Source: Data from users' association of Irrigation District 085.

Although it seems to be true that only a few ejidatarios have sold their land, our main concern is related to the possibility of selling the land and leaving the women unprotected. However, this is not the only issue, because there are other parts to this Amendment, such as Paragraphs IV, VI, VII, and others, that allow the creation of Mercantile Societies between ejidatarios and private entrepreneurs or government enterprises, that warrant close scrutiny since they can seriously jeopardize women's land tenure.

These Mercantile Societies are slightly different from other kinds of business associations, due to a clause that establishes a legal requirement for their constitution. This clause specifies that anybody who does not belong to the ejido cannot own a plot of land. Furthermore, the participants who are not ejidatarios can invest capital and offer technology, while the ejidatarios have to participate with their land and labor (Dávila-Poblete 1996:178-181). This kind of association may seem fair at first glance, if as partners they could deal under equal circumstances. But that is not the case. Ejidatarios and small landowners are at an educational disadvantage in dealing with professionals involved in business who are knowledgeable about the law. In addition, the recently introduced amendment states that the ejidatarios' and the small landholders' land can be mortgaged or taken over by their creditors.

The first experience of this kind was in a vast area that shared a common watershed in the States of Sinaloa and Sonora. At the beginning, many people wanted to participate in these associations, but as soon as they learned that in the constitutional decree of these societies, there was a clause that said that their land was their contribution and guarantee within the association, they realized that they could lose their land. At that point, many people decided to look for other alternatives.

All these considerations have led many ejidatarios to pursue different kinds of strategies. The most prevalent one is to rent out the land. The second most common is to participate in associations with private entrepreneurs, and the last is to obtain a loan by mortgaging their land (Hoffman 1996:53-62).

The need to follow one of these strategies is common to almost all the ejidatarios—men and women. Therefore, we can see how the option of renting the land and settling for a salary is the least detrimental for them and for their heirs. The other options are a way of losing their land, because on the one hand, they are completely dependent on their partners, and on the other, their possibilities of paying off their loans are minimal. This scenario allows us to understand the migration that is part of a process of expelling the labor force from the rural area to the cities or to other countries, including Mexico's neighbor to the north, the United States of America.

NATIONAL WATER LAW

In 1926, Mexico promulgated the first Law for Irrigation which was in effect until 1972, when the government replaced it with what was called the Federal Water Law. Twenty years later, on December 1, 1992, the National Water Law was officially declared to supersede it. The new law had two goals. The first was to provide for "administrative modernization, planning and programming," and the second, to reinforce a more "efficient and rational use of the natural resources" (CNA, Ley de Aguas Nacionales 1994:8)[4]

The National Water Law has ten titles or sections. Here I consider title six which deals with the transfer of the irrigation districts, and title four, which is concerned with the creation of a water market. Before the transfer of the irrigation districts, the agriculture sector was suffering a significant deterioration in productivity. Some of the main socioeconomic problems included: farm productivity stagnation, shrinkage of harvested areas, constant price decreases of several agricultural products, and reduction of available water for the irrigated areas resulting from poor maintenance of the hydraulic infrastructure. Some causes of these problems were the income reduction in the agriculture sector resulting from constantly falling profits (lower prices for the products and higher prices for inputs), little or no access to credit and technological renewal, distancing of farm production from national and international market requirements, inefficient management of water and soil resources and, last but not least, lack of user involvement in operational costs, as well as in the maintenance and administration of the irrigation districts (FAO 1994 a–f; Marsh and Rusten 1996; INEGI 1990a, b, 1991, 1995, 1997).

Under these circumstances, the government assigned the National Water Commission (Comision Nacional del Agua-CNA) the task of creating a program to stimulate farm production, giving special consideration to the need to decentralize the irrigation districts, to rehabilitate the infrastructure, and increase water user participation in administrative procedures as well as in the water use efficiency programs.

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[4]Introduction to the National Water Law given by its Director, Fernando Gonzalez Villareal.

With this fundamental responsibility, the new legal system was established on December 1, 1992. A decree allows users to operate, maintain, and administer the infrastructure through a user association, organized in each irrigation district. Initially, the transfer was viewed with skepticism because the water users knew that once the government transferred the irrigation districts, the repairs of the deteriorated infrastructure would be their responsibility. The users felt that their first task was to stimulate users' involvement and to ensure the district's financial self-sufficiency.

To better understand the transfer process and its relationship with the National Water Law, I mention here a few examples of what happened in Irrigation District 085, La Begoña, in the municipality of Celaya, Guanajuato. The Begoña Irrigation District's Users Association, in conjunction with other associations, decided that to achieve its goals, it had to begin by updating its list of the irrigation water users. In the process, they asked themselves who had the right to be on the lists and who was going to pay the quota: the people who owned the property rights or those who worked the land? These questions were raised because in the case of the women and the elderly, these were not necessarily the same individual. As discussed earlier, women and the elderly had the right to decide what they were going to plant and to whom they were going to give their land, but for reasons of age and gender, they did not work directly on their plots.

Furthermore, with the Amendment to Article 27, these questions had greater significance, because now the ejidatarios and the small landholders could rent or sell their land, the new renter or owner would decide what to plant, and she or he (instead of the legal owners) had to pay the irrigation water quota assigned. The second task that the user association had to perform was the distribution of water according to the type of product permitted for the plot of land. This task was made more difficult because Irrigation District 085, La Begoña, had to implement a series of restrictions in response to an ongoing water shortage. Each plot was assigned a volume of water based on the type of crop the owner was going to cultivate. In addition, it was only in long-standing plots of alfalfa and others with a higher water demand that cultivating these crops was permitted. Alfalfa needs to be irrigated at least seven times a year, while corn is irrigated only twice.

Because the Irrigation District 085, La Begoña has water restrictions, the owners and renters have to abide by the new water permits given to the plot of land, which brings a new dimension to the question of land. Now, in places where there is water scarcity, the rental price has to be coupled, not only with the access to the resource, but also with the type of permit assigned to it.

All of this is complicated because today anybody working a plot of land in an irrigation district no longer has to prove ownership. The only requirement is to register his or her name with the user association and to specify the periods in which he or she will be using the water. The implications of this can be seen by examining the overall demographic figures of the ejido population in Mexico as well as in our area of study (the Lower Lajas River Basin). While women represent more than half of the population in this irrigation district—as well as in others—only 708 (22 percent of) users are women, out of a total of 3,171 users (see table 3). This can be understood as a way of pushing ejidatarian women out of the irrigation districts from the very beginning when they have to register in the user association, and it can also be seen as part of an overall process in which the small and poor ejidatarios or peasants

Table 3. User classification and irrigated areas in irrigation district 085 "La Begoña."

Module No. and Names	Users			Surface Total	Users			Surface Total	Users			Surface Total
	Men	Women	Total		Men	Women	Total		Men	Women	Total	
No. 1 Neutla	203	38	241	831.67	8	1	9	45.38	211	39	250	877.05
No. 2 Comonfort	106	17	123	338.08	296	107	403	834.16	402	124	526	1,172.24
No. 3 Left River Bank	372	113	485	1,760.29	36	12	48	292.68	408	125	533	2,052.97
No. 4 Right River Bank	1,349	385	1,734	6,098.96	93	35	128	2,188.28	1,442	420	1,862	8,287.24
Total	2,030	553	2,583	9,029.00	433	155	588	3,360.50	2,463	708	3,171	1,2389.5

Source: Form C-1. State headquarters (Gerencia Estatal), Irrigation District 085, Feb. 1994.

have to abandon their land to sell the water that is paired to that given plot of land, and work as field workers in the same ejido or somewhere else.

This leads us to the last issue we wish to underscore: title four of the National Water Law, concerning the creation of a water market. While this title has not yet come into effect, it has the support of some wealthy landowners and some governmental officials. The core of this policy is to introduce water as an exchange commodity, subject to market supply and demand,[5] in which the owner of a plot of land could sell his or her water supply.

With respect to the water market, Dourojeanni states that "societies around the world necessarily (explicitly, implicitly, or by default) establish institutional arrangements that govern water use. Some systems utilize markets with various degrees of imperfection and efficiency." Furthermore, he mentions the far-reaching doctrine of "absence of damage;" according to him, "this principle dictates that the appropriation of a new water right cannot in any way damage existing rights ... existing water users can be secure in the knowledge that subsequent right holders cannot adversely affect the quality or quantity of stream flow available to them" (Dourojeanni 1994:24).

Chile is one of the first Latin American countries to establish water markets with the following broad characteristics: government authorities assign permanent water rights to the users; the amount of water given is not a fixed amount but is rather determined by its availability; these rights are subject to commercialization; and the trading transactions are the responsibilty of the water user associations (Roemer 1997:254).

The Mexican case is similar to the Chilean, because their administrative structures are very similar and laws in both countries stipulate

> *the water rights acquired by the concessions or the assignations given for the exploitation, usage and utilization of the national superficial waters within the same river basin or the water used from the same groundwater, can be transferred when this can be recognized and registered in the Public Register for Water Rights* (Reglamento de la Ley de Aguas Nacionales 1994: Chapter V, Art. 62).

According to Dourojeanni, the implementation of the water market in Chile has created several problems such as social conflicts within the associations, as well as with other users who live in the upper and lower part of the river basin. Other problems arise when some water users who have a given amount of water agree among themselves to store the greater amount of water and release it when it is really scarce. These experiences underscore the possibility of creating a system of secure water rights. (Course given by Axel Dourojeanni in Lima, Peru, July 1996).

If such water markets were to operate in Mexico, above all in places with restricted water supplies, we would face one of the most serious economic gaps that can occur between the wealthy and the poor. In other words, even though it seems logical to believe that this is a way in which the ejidatarios or small landholders can obtain a certain amount of extra income, the Chilean experience and the lack of a secure water rights system have shown that a natural resource cannot become a commodity, because in places where there is scarcity or in

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[5]Chile had created a water market. In 1996, the majority of the Chilean Congress representatives requested that this law should be studied and, if necessary modified or replaced.

the dry seasons, it will be regulated by the law of supply and demand. In this scenario, the wealthy sectors will be able to buy the resource at higher rates than all the other agricultural producers combined (Roemer 1997; Economic Commission for Latin America and the Caribbean 1996).

I believe that with the implementation of this kind of water market, many—if not all—small landholders and ejidatarios will be left out of the market, because they cannot buy water at high prices. At the same time, the agricultural producers who buy expensive water will pass on these costs by increasing the price of their products. All these factors will increase the cost of living for the Mexican population. Once again, women and the lower income groups will be the hardest hit.

HYPOTHETICAL CONCLUSIONS

Throughout this paper, we have seen that the implementation of these new policies imply important transformations in the legal, productive, and economic sectors. At the same time, they represent a serious disruption of traditional and organizational patterns of the producers' families as well as in the lives of the ejidatario women.

These changes are reflected in the diversity of organizational strategies developed by the producers and their families, all of whom live around and within the irrigation districts. Another significant change is the transformation of the usual traditional inheritance pattern at the local, regional, and national levels, which does not bode well for women and small producers.

Yet, all the efforts and strategies implemented by the ejidatarios and small landowners can become meaningless and ineffective under the current economic model implemented in Mexico as well as other Latin American countries. This model is geared to eliminating the State's participation and, at the same time, increasing the private entrepreneurs' involvement in economic activities. The negative aspects of these goals are magnified by the recent world globalization process, in which the lower income social sectors cannot compete with large-scale entrepreneurs. At the same time, small-scale producers face the possibility of a water market that would force them to sell their water and land and become salaried employees on their own land. And as has been true so often in the past, women would once again be left with no possibility of owning land with access to irrigation water.

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SECTION 4

Introduction

Gender and Property Rights

The theme of 'property rights' relates to systems of entitlements and explores the ways in which formal and customary rules and practices structure men's and women's rights and access to resources. The fact that women's lack of independent entitlements is central in determining their social and economic vulnerability is increasingly recognized. This is a move away from the earlier focus on employment and labor force participation. Attention to equity in entitlements is also a departure from often implicit assumptions that the underlying basis for women's social subordination is the cultural values of the community to which they belong. A focus on gender-based access to resources is a recognition of the strong dialectical link between the material context and gender ideology.

Water rights have also reemerged on the irrigation agenda. Current thinking about water rights is intimately tied up with the privatization and management transfer discussion. For privatization efforts to succeed, clearly defined and enforceable water rights need to be in place. In particular, water rights are a crucial condition for water markets to emerge. It is argued that allocation of water through markets in tradable water rights will lead to empowerment of water users, will induce users to use water more efficiently, and will provide incentives to users to take account of external costs imposed by water use.

Irrigation and gender scholars use different concepts and theories to analyze and define property rights. Where the current concern of many irrigation scholars is with water rights as a mechanism for the introduction of water markets, gender analysts' main preoccupation is with women's access to property rights as a mechanism for bringing about gender equity. These two ways of looking at water rights, either as an essential ingredient of sound water management or as a tool for more equitable allocation of water, are intimately linked. The exact nature of these links, however, has not been analyzed so far. There is no empirical basis, for instance, for knowing whether a more decentralized and market-based allocation of water increases or decreases women's access to water. And, more important, no easily transferable methodology has been developed for obtaining this empirical information.

The three papers in this section examine different dimensions of the gender implications of property rights. The paper by Barbara van Koppen systematically analyzes existing data on the gender outcomes of different approaches to creating and vesting water rights. In public irrigation schemes, vesting these rights in household heads or based on preexisting formal registered rights tends to exclude resources-poor people, especially women. On the other hand, developing systems through induced investment such as participation in construction or making private infrastructure available to resources-poor people does seem to enhance their rights and incomes.

The paper by Carmen Deere and Magdalena Leon explores the gender implications of changing land laws in Latin American countries, and relates these to changes in water laws where possible. As the feminist movement has grown in Latin America, in some countries the state is now making deliberate attempts to provide rural women access to land rights. More field research on the actual outcomes of these efforts would be useful, especially since these efforts may offer lessons for other regions in the world.

Judith Carney's paper is a case study from The Gambia which confirms some of the main conclusions of van Koppen's paper. Ignorance—or willful ignoring—of preexisting rights and practices through which women exploited the variable wetland common property resource systems for rice cultivation has led to the dismal failure of major investments in rice schemes in that country.

Section 4 benefits a great deal from the valuable insight provided by Bina Agarwal who led a lively discussion at the workshop on this subject.

Missing from this section are an analysis of the gender outcomes of current programs to create a market in water (such as in Chile and Mexico), and analysis of the results of the few deliberate attempts by nongovernment organizations to redistribute water rights in a gender-equitable manner. These and other topics require urgent investigation, and will be included in IWMI's future research program.

Water Rights and Poverty Alleviation: Inclusion and Exclusion of Resource-Poor Women and Men as Rights Holders in Externally Supported Irrigation Development

Barbara van Koppen[1]

ABSTRACT

Poverty alleviation is the ultimate aim of external agencies supporting irrigation development. However, information on processes by which resource-poor women and men are included or excluded as legitimate rights holders to irrigation water is still scattered. This paper attempts to systematize existing evidence of interventions in both public and private irrigation. This evidence reveals that in public irrigation, vesting water rights in household heads and allocation on the basis of formal, registered land rights tend to exclude the resource-poor, especially women. On the other hand, allocation to individual producers based on former land and water rights and/or on participation in construction work is likely to vest water rights in the resource-poor, provided these legal arrangements have already crystallized before the construction phase or turnover starts. In private irrigation, water rights accrue to the owners of infrastructure. Ownership is only within the reach of the resource-poor if appropriate infrastructure and financing facilities are available. On private water markets smallholders have access to water as buyers too. Groups of landless men and women can obtain a direct income from irrigation as water sellers.

INTRODUCTION

Core Issues

Poverty alleviation is the ultimate aim of most governmental and nongovernmental agencies supporting irrigation infrastructure development and management (cf. World Bank 1990; IIMI

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1996). In this light there are four relevant questions within the core competence of these irrigation agencies.

1. *Does external support improve access to water specifically for smallholders, enabling them to improve their agricultural production, incomes, and food security?*

   Improved production, incomes, and food security during a longer period of the year are essential aspects of poverty alleviation for smallholders, the world's largest group of resource-poor (cf. Jazairy, Alamgir, and Panuccio 1992; World Bank 1990).

2. *Are opportunities to strengthen access to irrigable land for the resource-poor optimally used?*

   Access to land, and especially high-value irrigable land, is a primary condition for sustainable poverty alleviation (cf. World Bank 1990; Agarwal 1994).

3. *Do women's access to water and land, and women's incomes, get priority?*

   Women are a priority group in poverty alleviation efforts for several reasons. They represent 70 percent of the poor in the world (UNDP 1995). Moreover, the absolute number of women below the poverty line has increased by 47 percent in the two decades before 1988, whereas for men this is 30 percent (Jazairy, Alamgir and Panuccio 1992). Women's incomes are crucial for the well-being of their households. In poor male-headed households, men's incomes alone are not sufficient. In the poorest households in Bangladesh, for example, women contribute one-third to half of the household income (Safiliou and Mahmud 1989). Moreover, a larger share of women's incomes than men's benefits their dependents, as reported in Asia (cf. Agarwal 1994; Safiliou 1991) and in Africa (cf. Safiliou 1988). Female-headed households depend even more upon women's incomes. These may constitute up to one-third of rural households and are generally among the poorest. Lastly, women's improved economic status is strongly related to lower fertility rates (Safiliou 1986).

4. *Are indirect benefits for landless people from external irrigation support optimal?*

   Fully landless people have no functional access to land, not even informal or temporary access. By definition this second largest group of the world's resource-poor (Jazairy, Alamgir, and Panuccio 1992) has no opportunity to use water for its own production. However, landless men and women can benefit indirectly from irrigation mainly by on- and off-farm employment generation (cf. Chambers 1994) and relatively lower food prices (cf. Mellor and Desai, eds. 1985).

This paper attempts to assess what answers have been found to the first three questions on a global scale in the last three decades. It explores whether a body of 'generic' knowledge has become available by now. Second, it identifies working hypotheses to orient future research to 'help the world's poorest people to make lasting improvements in their lives' (IIMI 1996). The fourth question is only partly dealt with here, though it remains important.

The review demonstrates, above all, that in the mainstream literature there is a startling lack of empirical data to confirm the claims of agencies that their support alleviates poverty. In the first place, data on the composition of the farmers in a scheme and their access to water are rarely differentiated according to class, gender, and ethnicity. Instead, the water user is often thought to be a man, or a more abstract 'universal farmer.' Equity considerations in water distribution usually refer to equal distribution of a limited quantity of water among as many people as possible, both the head enders and the tail enders. No attention is paid to the social characteristics of these users.

Second, there are only a few empirical studies that assess the relationship between access to water and irrigable land and sustained increases in incomes of the resource-poor (Hanger and Morris 1973; Illo et al. 1988). Poverty alleviation has never been operationalized as a performance indicator in the literature on irrigation performance. As long as that analysis is lacking, one just does not know if the other conditions needed for poverty alleviation, like access to markets and inputs, are fulfilled. Given the lack of data, this paper takes access to water and irrigable land as a proxy for poverty alleviation.

A third omission in the mainstream literature is that projects' choices to vest one group with water rights and not another, are rarely a subject of public debate, and even less documented. In reality, however, such choices are always made. This paper explains how. Although the empirical evidence on the relationship between external irrigation support and access to water and land by the resource-poor is still limited, scattered, and fragmented, some patterns, main issues of concern, and needs for further research emerge. These generic insights and working hypotheses are presented below. The next section highlights the general ways in which external support agencies influence who is getting access to water and who is excluded. Public and private irrigation are distinguished. The following sections discuss public irrigation by elaborating respectively the five main allocation principles emerging from the literature, and the projects' planning procedures. The penultimate section deals with poverty issues and intervention options in private irrigation. Conclusions and needs for further research are summarized in the final section.

VESTING OF WATER RIGHTS IN EXTERNALLY SUPPORTED IRRIGATION DEVELOPMENT

Vesting Water Rights

Access to water is a vague expression referring to multiple aspects of water rights, or 'a bundle of water rights.' One aspect is the vesting of water rights, the basis on which one person, group, or institution obtains a right and becomes eligible to exert claims on a benefit stream of water and to participate in the system, and another not (Von Benda-Beckmann et al. 1996; Ostrom 1994). This paper focuses on processes by which the resource-poor are included or excluded as legitimate rights holders according to the prevailing pluralistic legal systems (Von Benda-Beckmann 1991). Legitimate rights holders have a stronger bargaining position in situations of water scarcity than persons without rights. The difference is usually critical, and will in-

creasingly be so, but there may be other interacting factors and exceptions (Zwarteveen and Neupane 1996).

There are multiple dimensions of water rights, which specify the precise contents of a claim. Thus there are the rights to use water; to construct, operate, and maintain the scheme; to decide on scheme affairs and to represent the scheme to third parties; to formulate and change regulations on use and management; to enforce rules; and to occupy a position of water authority (Von Benda-Beckmann et al. 1996). These other aspects also entail important class and gender dimensions. For example, women may have water use rights, but they are excluded from the boards of water user organizations that govern the collective water source (Meinzen-Dick and Zwarteveen 1998). Very few empirical data are available on these aspects. Another important issue, which cannot be dealt with here, is the realization of rights one has. Especially for resource-poor women and men, having rights is only one step. They may encounter considerable obstacles in realizing them. For instance, they may only get the night turns.

Public and Private Irrigation

Investments in infrastructure are crucial for water rights. Water in the form in which nature offers it has little use value for humans, except as rain on the fields. In virtually all other situations infrastructure is needed to bring water in the right quantity and quality at the right moment to the right spot. Throughout history rights to water conveyed by infrastructure are primarily vested in those who invest in and maintain this infrastructure. Either the agency or the farmers can be the main investor. This paper distinguishes two types of irrigation development accordingly: public and private irrigation.

Public irrigation is irrigation in which the external agency bears most of the costs of investments in the construction or rehabilitation of infrastructure. As the main investor, the agency has a strong stake in the definition of the water rights. This concerns the division of rights and obligations between agency and users, on the one hand, and (our concern here) the necessity to define and implement water rights of potential users, on the other. This allocation of water rights to users occurs in two ways. Physical site selection, layout, and division structures of the infrastructure largely determine which land can be irrigated and how well. Those with former or potential access to that land become the potential water rights holders. All persons beyond the command area are excluded. This allocation is indirect and can be called 'hardened' allocation. Within selected command areas further allocation choices are made by selecting particular groups of potential land users, and not others, as rights holders. From the literature five grounds emerge on which water rights are vested in a certain category of potential rights holders. They are: class and gender characteristics; former land and water rights; productivity; type of land rights; and co-investments in the infrastructure.

Two types of public irrigation need to be distinguished. In the most common type only water rights are allocated. The agency does not interfere directly in land tenure, although gradual changes over time are likely to occur with increasing land value. In particular cases, on the other hand, irrigation development is accompanied by expropriation and reallocation of the whole command area. Drastically improved farming possibilities, opportunities for reallotment, and technical necessities to change plot boundaries warrant such project-steered, radical changes in land tenure. The world's settlement schemes and also small-scale irrigation schemes in West Africa are examples. Usually, the new land rights automatically imply

rights to the water, so land-cum-water rights are allocated. Other project services, such as inputs, credits, marketing facilities, and extension are often linked to these land rights too.

Water rights or land-cum-water rights are basically defined at two moments in public irrigation. The moment at which water is planned to become available in new ways is the very moment to define the rights to this water, or to the water and land. Hardened allocation through the physical design and further allocation based upon social characteristics largely take place before construction starts. Design and construction are 'technical' phases only, as mainstream literature may suggest. During the use phase, after handover, changes in water rights are relatively minor. The other important moment for (re-) defining water rights is during irrigation management transfer and privatization (cf. Seckler 1993). Public irrigation is further discussed in the next sections.

Unlike public irrigation, there is no dichotomy between investor and user in private irrigation. Private farmers construct or pay, own the infrastructure, select the site which obviously is their own land, and obtain the rights to the water conveyed. In practice, such private owners abstract and dispose of the water as they consider best, at least in regions where regulations for water abstraction are still absent or ineffective. Small-scale mechanized pump irrigation is the most important form of private irrigation nowadays. In the past, larger-scale investments in, for example, canals to take water from distant sources in mountains or in dikes to protect polders were often private initiatives too. Currently, the upgrading of these latter schemes is typically financed by external agencies, and is seen as public irrigation here. Agencies supporting private irrigation can improve the access to water for the resource-poor by facilitating the availability of appropriate technology, financing facilities, and training. Institutional measures to regulate technology use may also be warranted. Private irrigation is further discussed below.

ALLOCATION PRINCIPLES IN PUBLIC IRRIGATION

From the empirical evidence on public irrigation worldwide it appears that allocation criteria adopted in interventions are combinations of five basic allocation principles. Allocation principles are defined as legally and socially accepted justifications to endow particular potential users (and not others) with water rights. These five grounds are the following:

1. *To the resource-poor to alleviate poverty.* Agencies select the resource-poor a priori, directly and explicitly, as the persons to be vested with rights to the water conveyed by planned infrastructure.

2. *To former rights holders to respect the pre-project situation.* In the rights to newly available water or improved land pre-project claimants or elements of pre-project claims are incorporated.

3. *To efficient producers to increase production.* Water rights are allocated to those farmers who, given the social production relations, are able and motivated to make productive use of the irrigation water and other services rendered.

4. *To land rights holders to link water rights to land rights.* Water rights are vested in land rights holders in the command area. In cases in which the whole command area is expropriated and reallocated, land-cum-water rights are allocated. Alternatively, if tenure in the command area does not change drastically under infrastructure development, the existing land rights are the basis to vest water rights under this allocation principle.

5. *To participants in construction to link water rights to investments.* Participation in the construction of the infrastructure, and in later maintenance and/or payment of water fees, is the basis for rights to the water conveyed by the infrastructure.

All five principles may be valid in a specific intervention, but their relative importance differs. Only the first principle is explicit in targeting the resource-poor. In the other four, the selection of rights holders is implicit and the inclusion or exclusion of the resource-poor has to be made explicit. Below, specific cases are discussed under the most dominant principle.

Allocation principles are at the heart of the contents of title criteria in any public irrigation project. In each time- and site-specific project the definition of title criteria, their implementation and realization are highly dynamic processes. The forum of decision makers, the structuring of the process of decision making on the allocation criteria, and their implementation strongly shape the outcome. Therefore, the inclusion of resource-poor women and men in the planning procedures during initiation, plan formulation, and implementation is also critical for poverty alleviation.

ALLOCATION TO THE RESOURCE-POOR

The Principle

Under the principle of direct allocation to the resource-poor, agencies select the beneficiaries from the very start and straightforwardly as the persons to be vested with rights to the water conveyed by new infrastructure.

Such direct and explicit targeting of agency's services to the resource-poor occurs when NGOs set admission criteria for general membership; when governmental and nongovernmental agencies decide to implement women-only irrigation schemes; when the selection of the target group is based on maximum landholdings; or when a gender-balanced representation is required. Targeting infrastructure to people implies that first the people are selected and organized, and only then the physical characteristics like site, layout, and institutional aspects are decided upon. In larger settlement schemes, or in land reclamation, however, selection criteria for settlers may also be based on poverty characteristics (Merrey, D., personal communication).

Empirical Evidence

This principle of direct allocation to the resource-poor is increasingly applied not only by nongovernmental organizations but also by state agencies. Cases are elaborated in detail under land-cum-water rights, participation in construction, and planning procedures. This evidence confirms the potential to reach resource-poor men and especially women, once the nongovernmental or the governmental agency decides to do so. Long-term impacts are difficult to assess because most of these interventions are recent. However, the nominal inclusion of resource-poor women or men by the better-off to gain access to external support, or overoptimistic feasibility studies at field level to satisfy central instructions, are current but poorly documented phenomena. The influence of the agency and the proneness of its own procedures to such behavior are largely a black box.

Research Issues

It is hypothesized that explicit targeting to the resource-poor is the most effective allocation principle for poverty alleviation. More systematic comparative research should identify the success factors of these approaches and assess to what extent results can be generalized. Focus should be on the long-term effectiveness of the agency's own procedures.

ALLOCATION TO FORMER RIGHTS HOLDERS

The Principle

Under the principle of allocation based on former rights, names of pre-project claimants and elements of pre-project claims are incorporated into the rights to newly available water or improved land. Pre-project water or land rights can be never fully reproduced in the new arrangements because the very purpose of infrastructure development is to change water flows and to improve potential production on specific sites. The change from the old to the new can roughly vary between endowing those who already have resource rights with more rights, maintaining existing divisions of rights, and redressing existing divisions towards more equality. In general, the latter will contribute most to poverty alleviation.

As already mentioned, pre-project claims on land in the selected command area are an important condition to be able to benefit from the newly available water, in case the intervention does not change tenure directly. If the command area is expropriated, on the other hand, the new rights depend upon the expropriation and reallocation or on compensation arrangements. Expropriation and forms of compensation are also important with regard to pre-project claims on water downstream or the same water reservoir. Expropriation of these rights is intrinsic to the construction of new infrastructure and to a lesser extent to rehabilitation. Construction also requires the expropriation of land on which the land-bound infrastructure is constructed. A specific form of expropriation occurs when water is used for multiple purposes before an intervention but reallocated for irrigation only. This renders these other uses, as far

as the new physical infrastructure still allows for those, formally illegal (cf. Meinzen-Dick and Jackson 1996).

It is noted that most state agencies are formally empowered to implement any form of expropriation because statutory law has declared water as state property. Similarly, changes in land tenure in command areas for the purpose of agricultural development are normally justified in statutory law.

Empirical Evidence

Expropriation issues have not received much attention yet in public irrigation, except when massive deplacement was required. In the majority of cases there are no data on the resource's rights expropriated, let alone any legally recognized registration. Local legal systems may even be considered illegal. Expropriation is especially delicate for the resource-poor who have no means to contest and negotiate compensation, either as new rights or otherwise. The available evidence confirms this vulnerability, especially for women. Women often lose substantive land rights while the new land-cum-water rights are allocated to men (see below). Moreover, while local law used to endow women with water rights through participation in construction work, women are reported to have lost these rights under intervention (see below). A later section describes the social organization of such expropriation, and also procedures to incorporate former rights. In most cases reported, even existing divisions of rights of women deteriorate. Only one case is reported in which the agency challenged existing norms in favor of the resource-poor (see below).

With regard to indirect allocation by site selection and layout, it is commonly known that the well-off who have more contact with the implementing agencies are also better able to influence decision making on these design aspects to include their own land.

Research Issues

It is hypothesized that in public irrigation projects, currently, the resource-poor tend to lose more rights and receive less compensation than other social categories and that, therefore, projects tend to skew existing inequalities in resources rights even further. This risk will increase with growing water and land scarcity. For poverty alleviation, therefore, all existing rights, both formal and informal, should be recognized. These rights should be incorporated into the site selection and layout and in the further allocation arrangements. This approach is still conservative. More study on proactive site selection in favor of the resource-poor and on practices in which current norms are challenged provides a basis for an approach that empowers the resource-poor relatively more than other people.

ALLOCATION TO EFFICIENT PRODUCERS

The Principle

Under the principle of allocation based on production relations, water rights are allocated to those farmers who, in the given social production relations, are best able and motivated to make productive use of the irrigation water and other services rendered. This supposes that these persons are farm managers who have at least use rights to land, decide on cultivation and irrigation, and mobilize the inputs needed. They also control the output, so they are most motivated to improve this output. Producer-based allocation is strongly adhered to by irrigation interventionists. This is the direct implication of another main objective of irrigation intervention, which is improved production.

Empirical Evidence

Whether this allocation principle as such includes or excludes the resource-poor depends upon their relative productivity. There is considerable evidence from South Asia and elsewhere on the inverse relationship between land productivity and farm size, including after the introduction of irrigation (Jazairy, Alamgir, and Panuccio 1992; Boyce 1987; Hossain 1989; Lipton 1992, cited in Agarwal 1994). In all these situations allocation of water and land rights would be to smallholders, if in reality allocation were based upon productivity considerations as projects claim.

Numerous studies have also highlighted women's roles in agricultural decision making both in their own productive units and as substantive contributions to irrigation and irrigation-related farming on men's fields (cf. Safiliou 1988, 1991; Bruins and Heijmans 1993; Hulsebosch and van Koppen 1993; Zwarteveen 1995, 1997a; Zwarteveen and Neupane 1996; PATA 1996). In de jure, and the increasing number of de facto, female-headed households women are the only farm managers. These studies also indicate that female smallholders are as responsive as men to prices and market opportunities to invest in increasing production. More realistic concepts to understand the social organization of agriculture have been developed, such as the classification of farming systems into male, dual, and female farming systems. As a corollary, this concept distinguishes women's and men's autonomous but interrelated productive units within the farm household. Each household member responsible for a productive unit tries to 'get the best deal' for his or her own unit through exchanges and negotiations with other household members managing their productive units (Safiliou 1988). Further, comparative studies on women's and men's productivity on own irrigated plots underline women's productivity. In Burkina Faso, both land productivity and labor productivity are higher when both women and men have their own irrigated plot compared to households where only men get a plot (Zwarteveen 1997b). In Senegal, women's schemes appear to be cultivated more intensively and crop diversification is greater than in men's schemes (Deuss 1994). A related issue is the capacity for collective organization of water management if technical services are limited, for example if the number of outlets is less than the number of small individual plots. In Senegal schemes, women's organizations are reported to be effective (De Fraiture 1991). The motivation of women to invest in profitable agricultural enter-

prises to improve their own income is strong, due to the relative lack of other opportunities for them. So substantial evidence would also support women's inclusion under the principle of allocation of water rights to those who can and are willing to make productive use of the water.

If women or men smallholders are found to be less productive than larger farmers, this is likely to be due to their relative lack of access to water, other inputs, and marketing facilities. Instead of targeting the larger farmers, agencies can conceive accompanying measures to solve these problems.

In spite of these empirical findings, in mainstream irrigation intervention, hardly any traces can be found of preferential inclusion even of resource-poor men under this allocation principle. Women are found to be explicitly excluded. In the large majority of irrigation interventions planners assume that only men are agricultural decision makers and this has justified allocation of water and land rights only to men. This occurred even in the wetlands in southwest Burkina Faso where rice cultivation is almost exclusively a female cropping system, while men's farming interests are in upland cultivation. For example, the project Opération Riz assumed that men are main decision makers in rice cultivation or should become so (van Koppen 1990). Many other cases are described in the next sections. Thus 'being female' has become the exclusion criteria from legitimate water and land rights par excellence.

The concept of the farm household as a unity represented by the male head who decides on all pooled family resources and output has been most instrumental in this biased image of agricultural production relations and 'household-based' allocation of rights. By adopting this model, agencies redefine social exclusion along gender lines, and generation lines as well, as a so-called private and culturally embedded intra-household issue beyond their responsibility. The persistency of this household concept in allocating water rights is also due to the tendency of state bodies to vest water rights in groups rather than in individuals, such as tertiary units, blocks (cf. Bolding, Mollinga, and Van Straaten 1995), or in whatever collectivity (cf. Sengupta, forthcoming). One member, almost always a man, is considered to be the group's representative. Vesting water rights in group or household representatives rather than in individuals seems to simplify organization and administration for centralized water providers.

In all regions female-headed households are grossly underrepresented when men as assumed household heads are taken as the norm. The position of these women in decision-making bodies is often weak and in many situations they have to send male relatives as their representatives (cf. Projet Sensibilisation 1993; Zwarteveen 1995; Lynch 1991).

Research Issues

It is hypothesized that poverty is alleviated and production is increased by allocating independent rights to resource-poor women and men producers. More research on the conditions under which this hypothesis is valid, or not, is needed, taking into account access to inputs, markets, and other institutions. The necessity to abandon the unitary household concept to understand production relations and to avoid women's blunt exclusion from independent water and land rights has been conclusively proven. Instead, allocation should be producer-based. More realistic concepts of gendered production relations need to be developed, based upon substantive empirical research into the intra-household organization of production and the intra-household division of rights and obligations, for both irrigation and control over the output.

More insight into current and potential technical and institutional solutions of water delivery to multiple small plots has to be generated.

ALLOCATION OF LAND-CUM-WATER RIGHTS TO NEW LAND RIGHTS HOLDERS

The Principle

Under the principle of allocation of land-cum-water rights, water rights are vested in the people who obtain new land rights after expropriation of the command area. Given the large changes steered by the agency, the feasibility to include resource-poor women and men in the new property regimes is optimal.

Empirical Evidence

In reality the potential to establish equal access to water and land is hardly used. On the contrary, opposite impacts are reported. In India, both small farmers and women have lost their multiple rights to land and other natural resources in large-scale irrigation schemes (Agarwal 1994). Worldwide, women smallholders have been especially marginalized because planners rigidly adopted the model of the unitary household as the basis for allocation. Dramatic loss of land rights without compensation has affected women in matrilineally inherited rice lands in West-Africa (Dey 1990; Carney 1988; van Koppen 1990) and the normally bilaterally inherited land in the Mahaweli Ganga Scheme in Sri Lanka (Kumar 1987; Schrijvers 1985). In all these schemes land was almost exclusively reallocated to males as the head and only household member eligible. Similarly, among the farmers who entered settlement schemes or small-scale irrigation schemes as new producers only male heads of households got land rights. Original land use rights of women settlers were ignored, as in the Mwea scheme in Kenya and the Office du Niger settlement scheme in Mali. In the latter, 11,842 male tenants and 68 female tenants were registered in 1995. Most of these 68 women are (ex-) government employees. Two have been registered because their husbands could not pay the water fees (Klaver and van Koppen forthcoming). In about fifty small-scale rice schemes in central Burkina Faso, less than one percent of the irrigated land is allocated to individual women (Projet Sensibilisation 1993). However, in that same region up to 20 percent of the land in rain-fed agriculture is farmed independently by women (Burkina Faso, Ministère de l'Agriculture et de l'Elevage 1989). It was only in one of these village schemes that women obtained 11 percent of the plots. These women had former land rights and participated in construction. The active support of the agency's field workers explains this exception (Projet Sensibilisation 1993).

Women's motivation to work on men's fields in the new schemes where they do not control the output is limited. So whenever alternative employment is available for women, they are reported to withdraw their labor power once they have fulfilled their culturally defined obligations on men's fields (Carney 1988; Dey 1990; Jones 1986). Women even returned

to their original villages from the Mwea scheme in Kenya (Hanger and Morris 1973). Evidently, this has reduced scheme productivity.

Producer-based allocation of irrigable land to individual women, irrespective of their marital status, is still very rare. Only where allocatable irrigated land is not scarce have women obtained plots in their own names. It is also reported in female cropping systems (van Koppen 1990; Dey 1990) and sometimes in dual farming systems in Africa. Among the Wolof and Soninke in the delta and upstream in Senegal both women and men obtained own irrigated plots, but women's plots are only half the size of men's (Diemer 1990). As a reaction to the criticism against exclusive allocation of land-cum-water rights to men, some mainstream agencies started small-scale schemes targeted explicitly to women in countries like The Gambia (Carney 1994), Senegal (Deuss 1994), Burkina Faso (van Koppen 1990), and Kenya (Povel 1990).

Joint land rights to husband and wife are allocated by the Swamp Reclamation Project in Rawa Sragi in Sumatra, Indonesia. In the prevailing local land tenure system, women have certain land rights, though weaker than men's. Initially the project registered new land rights exclusively in the names of the men, but changed them to joint rights later. Women welcomed this change (Van Hussen, personal communication). However, joint land rights rather than independent rights may still limit women's say on land use choice and control over output and on land division with divorce and inheritance (cf. Agarwal 1994).

In projects other than those in which land is expropriated and reallocated, land tenure is likely to change in more gradual and spontaneous ways after the introduction of irrigation. Irrigation agencies or land reform agencies can strengthen the land rights of the resource-poor in several ways. Lower land ceilings for irrigated land in India, for example, would release land for distribution. This is at least to a certain extent used by the poor, although the better-off still gain more, according to an example in Karnataka, India (Epstein 1973 in Chambers 1994). On formerly barren land at the foot of the mountains in Tanzania, lowland schemes are constructed. They attract increasing numbers of farmers. In these schemes the Traditional Irrigation Improvement Program supports women's groups in their negotiations with local governments for land rights (TIP 1993).

Research Issues

It is hypothesized that infrastructure development accompanied by expropriation of the command area and reallocation of land-cum-water rights provides the best opportunity for agencies to achieve unconditioned allocation of new irrigable land to the resource-poor and to women, the same extent as of men. With better documentation of the few positive cases they can serve as examples for new schemes in which this potential needs to be realized. In existing schemes the possibilities to redress the former skewed situation during rehabilitation, scheme extension or management transfer need to be explored. Opportunities for the resource-poor to gain access to irrigable land when changes are more gradual need to be identified more systematically.

ALLOCATION TO EXISTING LAND RIGHTS HOLDERS

The Principle

Under the principle of allocation based on existing land rights, water rights are vested in land rights holders in the command area while the irrigation agency does not interfere directly in these land rights. This linking of water rights to land rights is sometimes unavoidable. For example, in the case of the 'PATA Project of Integrated Agricultural Development' in Pakistan (PATA 1996), property rights to the newly installed small-scale irrigation pumps could only be vested in the formal landowners. Here irrigated agriculture was new and tenants had only started to settle in the region. Water rights can also be intrinsically linked to land rights through the payment system, for example, if water fees are paid via land taxes. However, in most other situations there is no need to link water rights to land rights, and allocation can be based on participation in construction, or on de facto cropped land, whatever land rights the water user has.

Land rights are often taken as the criterion to vest water rights in statutory law or centralized regulations and bylaws, as in parts of India or Pakistan (Byrnes 1992). The gap between formal, paper regulations and reality may be wide. The people concerned may even ignore the existence of formal rules, as noted in Pakistan (cf. Byrnes 1992). Formal rules are also reported to be ignored in factual decision making in the Tungabhadra Left Bank Irrigation Scheme in India. Here tenants have a strong de facto say in water distribution although they are not formally recognized (Mollinga, personal communication). However, in the longer term, the formal rules will increasingly steer water allocation.

The critical issue under this allocation principle is that allocation of rights on the basis of assets tends to exclude the asset-poor. This concerns both the type of land rights and the relation between the quantity of water one is entitled to and the size of the land.

Empirical Evidence

With regard to the type of land rights that are the condition to obtain water rights, exclusion of the resource-poor takes place if only formal, registered, and longer-term ownership rights are recognized. This excludes those whose land rights are temporary, informal, and unregistered. These are typically resource-poor tenants and sharecroppers. Women's land use rights in their husbands' clans, or their inherited rights or the rights they obtained otherwise, also easily remain unrecognized (Agarwal 1994; Deere and Léon 1997). For landowners, registration requirements may still entail another bias against the resource-poor, especially women (Agarwal 1994).

This exclusion is disadvantageous for farmers with temporary land rights because they could benefit from longer-term water rights by exchanging or selling the water rights, until they need the water again for their own production once they inherit land, buy it, or sharecrop it in. Such evidence of allocation of water rights to landless people comes from traditional systems in Portugal (Van den Dries, Hoogendam, and Portela 1996). In some villages near Chandigarh in Haryana, India, the Sukhomajri Project intervened. Here the equity principle also allowed landless families to get equal access to small surface reservoirs. They gained

by sharecropping land and using their own water, or selling their water or otherwise trading or giving it for goodwill or other benefits (Malhotra 1982 in Chambers 1994). Investments by landless people to secure water rights for future land acquisition are also reported in Ecuador (Krol 1994). The Small Scale Irrigation Program Dodoma in Tanzania also encouraged equal allocation of water rights in quantities sufficient for one acre, to both men and women, regardless of ownership of land. Now landless women and men hire land for irrigated agriculture from landowners (SNV Tanzania 1996). Last, in Mexico, users of a local scheme with limited land resisted successfully the new statutory law in 1966 that linked water rights to land rights. By the proposed extension of right-holdership to large landowners, these water users would not only lose their opportunities to exchange or sell water which they themselves had in surplus, but also the power to enforce advantageous sharecrop arrangements with these large landowners, because the tenant provides the water (Nederlof and Van Wayjen 1996). Thus, having longer-term water rights not only provides an income as such, but it also strengthens access to land. The latter, however, may also invoke tenant eviction. The case of inverse tenancy, on the other hand, needs more study. Here disconnecting water and land rights may lead to accumulated control over water among large farmers and further induce inverse tenancy and the selling of land by the resource-poor.

The second bias against the resource-poor concerns the relationship between the water quantity to which one is entitled and land size. Access to a relatively large quantity of water in relation to land size can be used for more intensive cropping, as many resource-poor farmers are reported to be doing. It gives more assurance against water scarcity and helps to avoid such things as night irrigation (Ambler 1990). Water scarcity is likely to occur when the few large landowners consume all the water they are entitled to under proportional allocation. In India, the principle of proportional allocation has been challenged since the eighties and a water rights reform is proposed. This implies that quantities allocated to larger farmers would be relatively smaller and bound to a maximum quantity sufficient for, say, five acres (2 ha) as reported for the West Banas Project in Rajasthan (Chambers 1994). Such implementation of equal or progressive allocation rather than proportional or even disproportional allocation (Chambers, Saxena, and Shah 1989) is still rare. The complications in the enforcement of ceilings are well known for land reform. In Bolivia, an NGO also tried to introduce ceilings to the quantities of water per farmer to prevent a few larger farmers from accumulating water rights. However, these farmers circumvented the measure at least to a certain extent by putting rights nominally in the names of family members (Prins 1996).

Research Issues

It is hypothesized that poverty is alleviated by linking water titles and upper limits to the quantity of water given to an individual land user, whatever precise land rights he or she has. More research is required to assess the advantages and the feasibility of disconnecting land and water rights under different forms of irrigation, payment systems, and tenancy.

ALLOCATION TO PARTICIPANTS IN CONSTRUCTION

The Principle

Under the principle of allocation to participants in the construction of infrastructure, the investments in the infrastructure are the basis for rights to the water conveyed by that infrastructure. Investments in labor or cash are linked to rights. Either one carries out work himself or herself or a laborer works in the name of someone else who is the rights holder. During the use phase these rights are confirmed by participation in maintenance and fee payment. Such water rights remain, in principle, independent from land rights. This way of vesting water rights has been practiced throughout history in local schemes in the Andean regions, Africa, and Asia (cf. Coward 1986). According to the very limited evidence available, this regulation is equally open to women in countries like Ecuador with bilateral inheritance of water rights to both sons and daughters (Krol 1994; Noordholland de Jong, personal communication), and Bolivia (Prins 1996). In the mountainous areas in Tanzania, however, women are hardly allowed to vest water rights in this way (Kitunga 1989).

The same principle of linking rights to investment is applied by irrigation agencies that delegate part of the investments in labor or cash to the farmers, either as the only principle or in combination with other allocation principles. Other agencies delegate construction work to farmers and compensate both in cash or kind and in future water rights. In projects accompanied by expropriation and reallocation of the command area, participation in construction gives land-cum-water rights instead of water rights only. By arranging users' investments and compensating these with water rights, the purpose of minimizing public expenditures is served at the same time. In a third form, agencies compensate laborers for construction work merely in cash or kind.

Empirical Evidence

External irrigation agencies are found to exclude women from establishing water rights through participation in construction work, even in regions where women used to obtain independent rights in this way in prevailing local law. The following cases report women's triple exclusion. Agencies either forbid women to participate in construction work, or do not link women's work to rights as they do for men. The latter occurs by not counting women's work, or by counting it in their husbands' names, or by counting it in their own names but ignoring this as a basis to vest rights.

Women's exclusion from participation in construction work is fostered by middle-class stereotypes of women's inability to carry out construction work properly or the low status for women attached to construction work. These stereotypes are widespread and may even be adhered to in official government policy as in the Philippines (Illo et al. 1988). Local governments may also have them. For example, the village government in Malolo, Tanzania, suddenly decided to prohibit women to continue maintaining the canals as they used to do. Now women state that they can hardly protest anymore when they do not get their water turn (Van der Grift 1991).

Agency-steered limitations on women's participation in construction work also weakened women's former water rights in the Laka-Laka small-scale irrigation scheme in Bolivia.

In this region independent land and water rights for women are socially accepted traditionally. Moreover, male out-migration has substantially increased. When people were mobilized for the construction of a new irrigation reservoir, women came in large numbers. The Direction of the new water user association, which was just created under the instigation of the project team and with the strong voice of this team in it, feared that too many people would claim water rights. They therefore decided that women with capable male relatives who could do construction work or who could finance paid laborers from off-farm employment, as well as youngsters under sixteen, would be excluded from construction work. The women protested in vain (Prins 1996).

Exclusion also took place in small-scale schemes of the Projet Sensibilisation et Formation des Paysans autour des Barrages in Burkina Faso. Here land-cum-water rights could be obtained by construction work. Women were often not informed about this possibility, in the first place, or their labor contributions were counted in the name of their husbands. Or, as the author observed in 1989 in Gaskaye, women's individual labor contributions were registered, but then the project suddenly decided not to apply the rule to women and allocated only half the land they were entitled to.

The biased linking of women's investments to benefits compared to men was also noticed in the Bauhara Scheme in Nepal. Women contributed 70 percent of the construction work. However, initially women were absent from the decision-making bodies like the Construction Committee and Water User Committee. Only after some months did the male members start to stimulate women to increase their informal involvement in the management for smoother operation of the scheme (Bruins and Heijmans 1993).

Lastly, it is common that agencies adopt a much narrower definition of labor contributions than is done by local women, and often by local men too. In these local definitions labor almost always includes the provision of food and drink and child care on the construction site, for example in Nepal (Pradhan 1989), Tanzania (SNV 1996), and in regions in Peru (Lynch 1991).

As a result of the growing criticism against these practices, some recent projects adopting this principle have been better adapted to local reality. Construction projects in Latin America have started to incorporate prevailing local allocation principles. In the Licto Project in Ecuador about 80 percent of all construction activities are carried out by women in working groups (mingas). These activities have been registered and new water certificates will be in the names of the investors, mainly women. Pregnant women also obtain water rights, but they are granted dispensation from carrying out construction work (Noordholland de Jong, personal communication).

There are very few projects that include women in construction work and vest water rights in them where such a principle does not prevail in local law. As mentioned, such exclusion used to prevail locally in the mountainous regions in Tanzania where land pressure is high. Recently, the Traditional Irrigation Improvement Program introduced women's inclusion in construction there. It is expected, but this has to be validated in the future, that as a result of this participation women will be able to cultivate their own plots and intermixed crops more effectively. Intensive legal training on women's existing land rights is already given (Van der Grift 1995). Moreover, women's intra-household bargaining position on the use of crops cultivated on men's irrigated fields but with substantive labor input from women, is likely to improve too, especially in de facto female-headed households (Mallya et al. 1996).

An issue that remains unclear in the literature concerns the so-called 'household representation' in construction and maintenance duties on the one hand, and in decision making on the fruits obtained, on the other. If each household is reported to be obliged to send one member to fulfill the duties, this suggests that water rights are vested in households in the sense that women can exert claims on the water on the basis of investments by their male relatives, and vice versa. Remarkably, this is not referred to as 'joint title.' The study of the Aslong Irrigation Scheme in the Philippines by Illo et al. (1988) is one of the few studies that analyzes its meaning in-depth. In this scheme the National Irrigation Administration had imposed the one-member-per-household criterion and had stipulated that this representative should be male. Although men accepted to do the construction work, several male farmers' associations tried to convince the irrigation community organizers of the National Irrigation Administration that their wives should also become members of the irrigators' associations, or at least represent them there as proxies (Illo et al. 1988). Household representation by one member is also reported where women do most of the construction work. In Nepal, women claimed this would enable their husbands to work elsewhere in paid jobs. It is not clear what rights, if any, women get in this way (Vos 1994).

In all the case studies cited above labor was compensated by water rights. Often, construction labor under public irrigation is fully paid by the agencies, and water rights are allocated in other ways. In principle, this form of employment is also open to the landless. However, both women smallholders and landless women are largely excluded from this paid employment, or wages for women are substantially lower than for men. In countries like Bangladesh this is changing now for landless women. These experiences also confirm that women perform as well as men in construction work (Duyne 1994; Jordans 1991). It is an unexplored issue whether smallholders who carry out paid construction work also exert claims on water and land on this basis, without the agency being aware. If so, this would be another reason to include women smallholders in paid construction work.

Recently, a combination of paid employment which also entitled participants to membership in the water user association was experimented with by the pilot project of tertiary unit development in the Tangerang Region in Indonesia through the Cidurian Upgrading and Water Management Project. Since 1992, both men and women have been invited for construction activities and later water user associations. Women responded positively (Van Dok, Putri, and Zulaicha 1993).

Investments in construction are mainly made in the form of labor, but contributions in cash are also common in construction, maintenance, or water payment. With increasing privatization these cash contributions will become more important. In most cases, irrigated agriculture is profitable and cash contributions are generated by increased production. Therefore, this does not exclude the resource-poor, unless prefinancing is required.

Research Issues

It is hypothesized that the principle that investors should benefit from the fruits of their investment, substantially supports the resource-poor in obtaining and realizing water and land rights, provided the link between investments and rights is guaranteed. The opportunity to invest in construction work should explicitly be opened up to women too, whether this is already current in local law, or not. Their willingness to carry out this work and their performance should be assessed empirically. Definitions of contributions should include all labor

provided. Intervention procedures to that end need to be developed, studied, and tested. More insight is needed at intra-household level in the links between investments, vested water rights, and intra-household negotiation on the benefits from these rights. This will clarify the gender and age dimensions of so-called household representation in the fulfillment of obligations. If cash payment is required, appropriate payment arrangements and loan provisions should be designed for the resource-poor.

INCLUSIVE PLANNING PROCEDURES

Planning Procedures

The inclusion and exclusion of the resource-poor as legitimate water rights holders in public irrigation according to five allocation principles have been discussed in the foregoing sections. This section complements these insights from the dynamic perspective of the process of negotiations in the specific projects. Negotiations on allocation criteria, their implementation, and the possibilities to enforce the rights one has obtained, depend on project planning procedures. These procedures, first, influence the composition of the forum of decision makers and, second, structure the timing of decision making during the subsequent plan formulation, plan realization, and reaping of the benefits from the investment. This happens whether the procedures are well-formulated and transparent, or not. Forum composition and timing are especially considered more in-depth below.

In any intervention process, specific people at local level organize and invest their time and other resources to become informed, to discuss, contest, endorse, or change project plans, and to arrange the works needed for implementation. Often, these same people have a strong stake in the local organization for water distribution during the subsequent use phase. This more or less structured communication network at the interface of agency and potential water users for major endorsement of project's plans and decision making at local level is called a 'forum' here. Basically, recognition as rights holder starts with the inclusion in the local fora of decision makers on project matters between the project and local people. Inclusion of the resource-poor as rights holders implies their effective inclusion in this forum.

Agencies strongly influence the composition of this forum by contacting and organizing some local people and not others. Depending upon a project's structuring of this network in a given social context, fora can vary from small groups of male political elite that decide in untransparent and authoritarian ways, to democratic bodies with effective representation of priority target groups.

Inclusion of the resource-poor should start from the very first contacts between the project and local people. The importance of early inclusion follows from the logic of collective investments, which is that claims on the fruits of investments are negotiated before the investments are made. This is most evident if allocation of water rights is based on participation in construction work. Definitions of allocation criteria and procedures for implementation need to be clear before construction starts. The importance of the design phase is also clear if the infrastructure is designed in a participatory way (cf. Vermillion 1990). Local participants establish their own future water claims in the 'hardened' form by influencing the

site selection, layout, and water distribution devices of the infrastructure. However, the simultaneous establishment of future claims simply by participating in a process of investments may be even harder. Obviously, the arrangements of expropriation and compensation of resource rights require an early inventory of existing rights and further arrangements for implementation.

The need for early inclusion of the resource-poor also follows from another logic of collective investments. This is that the investors tend to exclude others more and more when their own investments are accumulating, unless political or social favors can be negotiated in return. The scarcer water and irrigated land are, and the more precious the fruits of investment in irrigation infrastructure, the stronger the tendency to exclude others. The vaguer the agency itself is on the precise allocation of water rights among the users and the stronger its announcement of the withdrawal of most of its staff after construction, the stronger the local fora will act on their own. The agency may not even be aware of this.

The implication of the above is that democratic local fora and sound planning procedures are especially important for poverty alleviation. If water rights of the resource-poor are not transparently and explicitly on the agenda of local fora in the design phase before the investments, it is too late: the resource-poor have no other means to claim access to water later.

Empirical Evidence

The importance of early inclusion of the resource-poor in fora is confirmed by past experiences. Exclusion of the resource-poor was due to project field staff who contacted exclusively the male elite and used them for a minimal acceptance of the project construction plans, for quick expropriation, and for paid or unpaid labor mobilization. In the Jahally Pacharr project in The Gambia, for example, the male elite was persuaded to sign the lease of the land to the state and free it for construction activities. At that moment many women with land rights were not even informed about the project nor about the fact that expropriation of those rights had already been endorsed by this elite. Later, land allocation committees were dominated by the same elite. Although an objective of the project was to respect women's land rights, the plots, designed by the engineers as 'household plots' (sic), were only allocated to men until they were satisfied (Verkruysse 1991).

The expropriation of women's rice land in the first two schemes of the already mentioned project Opération Riz in southwest Burkina Faso, where rice cultivation is a female cropping system, was implemented as follows. During the design and construction phases the agency and the male elite raised false expectations among the women who formerly owned the rice lands, but they kept final decision making on allocation in suspense. Just before finalizing construction works the agency proposed to allocate land-cum-water rights to men, in a small forum of male elite and male paid-construction workers. These men accepted the proposal (van Koppen, forthcoming).

In both the Jahally Pacharr project and Opération Riz, and in other construction projects as well, the projects primarily aim at quick implementation of their construction plans. Indeed, funds have already been allocated on the basis of tight construction schedules. It is easily assumed that allocation issues can be postponed until the so-called 'technical' construc-

tion phase is almost over. At handover, allocation arrangements are also easily left to 'the village,' which, in reality, is just this forum.

On the other hand, if agencies include the resource-poor in a democratic forum at the start of a planning process, it does not necessarily require much time; it enables further planning and saves really time-consuming misunderstandings and conflicts later. Three cases given below illustrate such inclusive planning. It is noted that in all these cases representation is producer-based and not household-based.

The actual planning procedures of the project Opération Riz in Burkina Faso are one example. These new procedures crystallized in later schemes bottom-up by the initiatives of field staff, male elite, and women rice cultivators. Nowadays, in each new scheme the project starts to organize extensive meetings to inform all producers in rice valleys that are planned to be improved, about the project's plans and expropriation and allocation procedures. Then a detailed inventory of existing producers and their land rights is made in the field and cross-checked with the male and female local land chiefs. Improved plots are first allocated to the producers with former land rights. If the project has designed more plots, any farmer can submit a demand. Among the new candidates male cultivators are still a minority, unless in places where soil fertility in the uplands where men grow their crops, has strongly declined (van Koppen, forthcoming).

The eighteen-step Scheme Development Process of the governmental 'PATA Project of Integrated Agricultural Development' which installs groundwater pumps in Pakistan, is a second example. PATA rejects requests for assistance, unless three conditions are met: the group consists predominantly of smallholders; men accept women's inclusion during the whole process; and there is no political interference. Men are reported to accept women's inclusion in the process, women's suggestions on domestic water uses, women receiving agricultural training, and even women's visits to other schemes, provided an elder man accompanies them. This approach is compatible with the strong cultural norm that women should not talk to strange men (PATA 1996; Zigterman 1996).

Another way to create an equitable forum which reflects production relations, was developed by the Provincial Irrigation Unit, Nyanza Province in Kenya. In this region, women contribute over 60 percent of all hours spent in rice farming, including irrigation, and manage 64 percent of all plots (Hulsebosch and van Koppen 1993). A minimum of 50 percent attendance by women at the preparatory meeting of new water user organizations is required. Parallel to this, women are organized in women-only groups and trained to articulate their interests and to participate effectively in meetings that were formerly dominated by men. Women's attendance in the preparatory meetings and committees improved. Furthermore, their knowledge of project matters increased, as well as their relative participation of women in project activities. Performance of women leaders is similar to that of male colleagues (Hulsebosch and Ombarra 1995). The Small-Scale Irrigation Program Dodoma in Tanzania also starts activities only if the target composition of 50 percent women and 50 percent men is reached (SNV Tanzania 1996).

Research Issues

It is hypothesized that inclusive planning procedures which allow resource-poor women and men to plan investments, establish expropriation arrangements, and define title criteria are

pivotal for their improved access to water. More knowledge on inclusive planning procedures and democratic fora will contribute to agencies' expertise on time-saving structuring of local decision making in which the investments of the resource-poor optimally lead to their rights to the water. Indicators for such early inclusion of the resource-poor in local fora need to be developed.

ACCESS TO WATER BY THE RESOURCE-POOR IN PRIVATE IRRIGATION

In small-scale private irrigation the owners of infrastructure are automatically entitled to the water, so ownership of equipment is the primary condition for the resource-poor to have access to water. Such ownership is mainly steered by the availability of technology and energy sources that fit the specific needs and potentials of the resource-poor (cf. Chambers, Saxena, and Shah 1989; Shah 1993; Kahnert and Levine 1993; van Koppen and Mahmud 1996). Current technology for private ownership tends to be biased towards the scale, cropping pattern, and financial means of larger farmers. Under state-supported development and distribution of equipment these larger farmers have better access to the government too. In regions of water scarcity the equipment is more expensive and, hence, ownership of equipment is increasingly skewed. It is noted that water scarcity itself can be the result of disproportional water abstraction by these better-off owners of equipment. For example, owners of deep tube wells may lower groundwater tables to a level at which the lower level technology of the resource-poor, like hand pumps, becomes ineffective. Most legal restrictions on technology use, such as siting or licensing, are not effective yet, or exclude the later entrants, who are often the less well-off. In this situation, external agencies can decrease this intrinsic bias of private irrigation against the resource-poor, especially via the technology. The main conditions of such external support for poverty alleviation are the following (cf. Mandal and Parker 1995; van Koppen and Mahmud 1996):

- The equipment should fit the crops and scale of farming systems of resource-poor men and women. Mobile equipment such as low-discharge pumps to be used with cheap wells, and use of bamboo pipes bring mechanized equipment within the reach of tenants and sharecroppers.

- Distribution channels of pumps and spare parts should reach the resource-poor, especially women. Distribution via NGOs and the private market is performed better than through government agencies, at least in Bangladesh.

- Last but not least, equipment should be low-cost. As financial investments often remain substantial, middle- and long-term loan facilities are crucial. The loan conditions should assure the resource-poor against the risks involved.

Private owners of infrastructure dispose of the water as they want and they may sell excess water. This is yet another way to get access to water: as water buyers in private water

markets. Such markets have developed in Bangladesh, India, and Pakistan. The water interests of the pump owners themselves generally prevail (cf. Strosser and Meinzen-Dick 1994). Increasing competition in the offer of water, however, often leads to low water prices and adequate service. This is in the interest of all water buyers, but especially of small and marginal farmers who cannot afford their own equipment (Shah 1993).

This commercial demand for water under private irrigation also makes direct access to irrigation water attractive for landless people who have no fields of their own to use it on. They can sell it and generate an income in this way. In Bangladesh, where groundwater is readily available, there are reports of some successful experiences of such NGO-supported male (Wood et al. 1990) and female water selling groups (van Koppen and Mahmud 1996).

In these NGO programs in Bangladesh, representation of the household by one member, but now the woman, is increasing rapidly. Women mediate credits and other services to their husbands especially if the credits are used for the productive units of their male relatives such as dry-season irrigated rice cultivation. This role of mediator may slightly increase women's status. But if the NGO's aim is that women themselves become owners and managers of private irrigation equipment, this can only be realized if the whole package of credits, irrigation training, and organizational support is directed explicitly at women as individual producers or entrepreneurs, in other words, when allocation is individual- and producer-based rather than household-based. Women who are heads of households benefit under both conditions (van Koppen and Mahmud 1996).

CONCLUSIONS

The evidence reviewed in this paper suggests the overall working hypothesis that rural poverty is alleviated by:

- explicit targeting at the resource-poor as individuals, not as households
- protecting them against expropriation without compensation, and aiming at more equality in resource rights
- improving their access to inputs, markets, and other institutions
- linking water rights to the land user and strengthening the rights to irrigated land of the resource-poor
- linking water rights to investments, and, in the case of private irrigation, providing appropriate equipment and financing facilities
- including the resource-poor in planning procedures from the start

Further needs for research and action can be summarized as follows:

- The impact sought by agencies, poverty alleviation, needs to be explicit and operationalized, for example through performance indicators.
- The assumed positive effect of improved access to water and land on smallholders' incomes, food security, and other factors of well-being need to be verified empirically.
- Best practices, in which projects realize their potential contribution to poverty alleviation, need to be studied in-depth and compared.
- Insight into the consequences of project actions requires at least the systematic monitoring of:
  - gender, class, and ethnic characteristics of beneficiaries,
  - their access to irrigated land, and
  - the level of water service provided to them.
- Systematic research is needed on gender- and class-differentiated production relations in irrigated agriculture and irrigation management worldwide and on the conditions under which the resource-poor are either more or less productive than other social categories.
- Insights into processes that include or exclude the resource-poor as legitimate rights holders need to be complemented by insights into the different contents of the rights and their possibilities to realize the rights. The pluralistic legal-normative perspectives (Von Benda-Beckmann 1991) of the different actors need to be taken into account. Further, systematic study of intra-household negotiations on obligations and rights, and of transfer of rights, such as inheritance practices, is urgently required.

Irrigation agencies have an important contribution to make to poverty alleviation, but mainstream irrigation intervention agencies, policy, and research have not used their opportunities yet. The socio-political space to realize this potential will only decrease with growing water scarcity in the near future. Therefore, opportunities that continue to be missed, are likely to be missed forever.

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Gender, Land, and Water: From Reform to Counterreform in Latin America[1]

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ABSTRACT

Rural women did not fare very well in the land reforms carried out during the Latin American "reformist period" of the 1960s and 1970s, with women being underrepresented among the beneficiaries. It is argued that women have been excluded from access to and control over water for reasons similar to those adduced for excluding them from access to land during these reforms. The paper also investigates the extent to which women have gained or lost access to land during the "counterreforms" of the 1980s and 1990s. Under the neoliberal agenda, production cooperatives as well as communal access to land have largely been undermined in favor of privatization and the individual parcelization of collectives. Significant land titling efforts are also being carried out throughout the region to promote the development of a vigorous land market. This latter period has also been characterized by the growth of the feminist movement throughout Latin America and a growing commitment by states to gender equity. The paper reviews the extent to which rural women's access to land and, thus, water has potentially been enhanced by recent changes in agrarian and legal codes.

INTRODUCTION

The 1990s may well be called the decade of "counterreform" in the Latin American agriculture sector. The rise and predominance of the neoliberal model throughout the region—with its emphasis on free markets, comparative advantage, and a reduction in the role of the state in the economy—have resulted in a fundamental restructuring of land tenure, and potentially other property rights, such as over water, throughout the continent (Kay 1995).

Most Latin American countries undertook some form of agrarian reform—redistributing access to land to landless, land-poor, and tenant farmers—from the 1960s to the 1980s. In many countries the large latifundia or haciendas were expropriated, eroding the power of

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[1]This paper draws upon and expands Deere and Leon 1997.

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the traditional landlord class. The "reformed" sector which emerged from these expropriations was quite heterogenous, but usually consisted of various forms of collective ownership and production, in addition to family farms.

Agrarian reforms were accompanied in most countries by growing state control over water rights. Most Latin American states declared water resources to be either the ultimate domain of the state and/or assumed state regulation of access to and control over this resource. Thus, along with agrarian reform agencies, these decades saw the proliferation of water or hydraulic agencies throughout the continent. The latter were also charged with overseeing the large-scale investments in hydroelectric and irrigation development that characterized this period.

The explicit aim of most of the counterreforms has been to invigorate the land market to generate a more competitive agriculture sector that can compete in international markets. Most counterreforms have thus aimed to secure individual property rights in land so that, subsequently, following market signals, land may be transferred from less- to more-efficient producers. Similarly, in the context of reducing the role of the state in the economy and the search for efficiency, regulatory agencies are being dismantled and water rights are being privatized or such laws are under discussion.

This article assesses women's land and water rights during both periods—that of agrarian reform and counterreform. The subsequent discussion gives more attention to women's land rights than it does to women's water rights for two reasons. First, since women's access to and control over water often depend on whether they are property owners, we consider women's land rights to be, analytically, the prior issue. Second, there is much less information available on women's access to water in Latin America than that on access to land.

Another factor differentiating the two periods—of reform and counterreform—is that in the latter period, gender and development issues have become an international concern. Most Latin American governments are now formally committed to the goal of gender equality, at least as parties to the United Nations convention to end the discrimination against women (Krawczyk 1993). This raises the question of the extent to which state intervention in the agrarian sector in the latter period has been influenced by three decades of feminist research and activism, resulting in more favorable terms with respect to rural women's access to crucial resources.

It is important to reiterate here why women's access to land and water are important issues. We focus on two arguments: the 'productionist' and the empowerment arguments.[4] The stereotypical view of Latin American peasant agriculture for too many decades was that it was based on the family farm, with a division of labor whereby the male head of household was the principal agriculturalist, and the spouse, the "helper." This view was perpetuated by the Latin American agricultural censuses and by researchers who relied upon such for cross-cultural analysis (Boserup 1970).

Several generations of feminist researchers have amply deconstructed this vision, illustrating that the gender division of labor is most heterogenous, varying by region, principal

[4]See Agarwal's (1994a; 1994b) detailed analysis of why women's independent control over land is critical to women's well-being in the case of South Asia. She develops four arguments: for welfare, efficiency, equality, and empowerment. Our 'productionist' argument includes welfare and efficiency considerations while our empowerment argument also assumes considerations regarding equality and equity.

crop, the inherited structure of land tenure and the labor market, peasant social differentiation, and race and ethnicity, among other variables (Deere 1995; Deere and Leon 1982, 1987; Campana 1990). In many situations, women are the primary agriculturalists. In others, they have become so over the decades of the 1970s and 1980s, related to the growing number of female-headed households in rural areas, a phenomenon partly related to increased male seasonal migration, particularly among smallholders.

The research effort of the 1970s largely focused on making women's work in agriculture visible. Not until the 1980s was attention directed to women and land rights (Deere 1985) and not until the 1990s to women and water rights (Lynch 1991; Zwarteveen 1994, 1997; Roeder 1996; Arroyo and Boelens 1997). The result of this effort has been to demonstrate that for the growing number of female farmers throughout the continent, formal land and water rights are critical. Moreover, land and water rights are intimately linked, since in most of Latin America membership in an irrigation system largely depends on being a landowner in addition to having participated in the system's construction and maintenance. In addition, without property rights in land, women cannot join credit and service cooperatives or otherwise have access to credit or technical assistance. We term this the productionist argument since these constraints limit women's productivity or most effective use of the productive resources to which they have access.

Further, it has been demonstrated that women's formal rights over land influence their bargaining power position within the household and community (Deere 1990; Agarwal 1994a, 1994b). Women who own land not only find it easier to find a spouse, but also to terminate an unacceptable relationship, since they have their own independent means of support. Within marriage, women landowners tend to play a greater role in decision making, particularly over the intra-household distribution of labor and income. Also, women's ownership of land is important in assuring them security in old age, since the possibility of designating inheritance shares encourages grown children to assist them. Thus, even in cases where women are not the principal agriculturalists, ownership of land is very important to their status and well-being (Roquas 1995). This is the empowerment argument.

A similar argument is now being made in terms of water rights (Zwarteveen 1997; Arroyo and Boelens 1997). Water rights constitute a social relation and thus control over water is an important source of bargaining power within both the household and the community.

Drawing on the available data for nine countries (Chile, Colombia, Costa Rica, Ecuador, El Salvador, Honduras, Mexico, Nicaragua, and Peru), this paper examines the changes that have taken place in the region's agrarian laws in terms of women's potential access to land and water. It also examines whether rural women's organizations and the growing feminist movement in the region have had an impact on the generation of more gender-equitable agrarian and civil legislation.

In the next section, a brief summary is presented of the manner in which women were excluded from the Latin American agrarian reforms. The subsequent section focuses on the main neoliberal policies adopted in the nine countries. Then, the main changes that have taken place with respect to gender-equitable agrarian legislation are reviewed. While it is still too early to assess the full impact of many of these recent changes, some tentative conclusions are put forward on the likely impact on women's access to land and water.

THE LATIN AMERICAN AGRARIAN REFORMS

Previous research on the Latin American agrarian reforms demonstrated that most reforms directly benefited only men (Deere 1985, 1986, 1987; Leon, Prieto, and Salazar 1988). Table 1 provides the most recent data available on the extent to which women were beneficiaries in nine of these agrarian reforms. It shows that women fared quite poorly, ranging from only 4 percent to 15 percent of the direct beneficiaries.

Table 1. Share of female beneficiaries in nine Latin American agrarian reforms.

Country/Years	Female beneficiaries
Chile (1964–73)	None/Low
Colombia (1961–86)	11.2% (1986)
Costa Rica (1963–88)	11.8% (1988)
Ecuador (1964–93)	Low
El Salvador (1980–91)	Cooperatives: 11.7% Individuals: 10.5%* (1991)
Honduras (1962–91)	3.8% (1979)
Mexico (1920–92)	15% (1984)
Nicaragua (1981–90)	Collectives: 11.0% Individuals: 8.0% (1990)
Peru (1970–91)	Low

Note: *In the case of El Salvador, this value does not take into account that women represented 35.9 percent of those whole lands which were expropriated in favor of their tenants in Phase III of the 1980 agrarian reform. In other words, women incurred a net loss in the "land to the tiller" phase of the reform.

Sources: Chile: Garrett (1982)
Colombia: Leon, Prieto, and Salazar (1987: 49)
Costa Rica: Brenes Marin and Antezana (1996: 2)
Ecuador: Phillips (1987)
El Salvador: Fundacion Arias (1992: 34)
Honduras: Callejas (1983)
Mexico: Arizpe and Botey (1987: 71)
Nicaragua: INRA/INIM (1996: 10)
Peru: Deere (1985: 1040)

Legal, structural, and ideological mechanisms all contributed to women's exclusion from these agrarian reforms.[5] With the exception of the Mexican and Nicaraguan agrarian reform laws of 1971 and 1981, respectively, the majority of the reforms required beneficiaries to be household heads. Restricting beneficiaries to only household heads discriminated against women since throughout Latin America custom dictates that if both an adult man and woman reside in a household, the man is considered its head. Even in those cases where beneficiaries were defined as individuals, it was usually assumed, if not explicitly stated, that only one individual per household could be designated a beneficiary and that was the household head.

[5]This section is based on Deere 1985, 1987. Table 1 updates the tables presented in these earlier works.

As a result, the only women who could potentially be reform beneficiaries were either widows or single mothers.

The requirement that beneficiaries be household heads served not only to exclude women from the agrarian reforms, but also to exclude them as direct beneficiaries of irrigation projects and from participating on equal terms with men in irrigation associations. This has been amply demonstrated in the case of eight irrigation projects sponsored by the Dutch Technical Cooperative Service (SNV) in Peru and Ecuador (Roeder 1996; Vattune 1996; van der Pol n.d.; Arroyo and Boelens 1997). In these and other projects in the Andean region the only women who could participate as full members of irrigation associations were widows or single mothers who, in addition, were landowners (Lynch 1991; Krol n.d.).

A related structural problem is that many agrarian reforms benefited only the permanent agricultural wage workers employed on the estates at the moment of expropriation and excluded the large, seasonal labor force from cooperative membership. In Chile, El Salvador and Peru, for example, the permanent agricultural wage workers were generally men, although women were often an important component of the seasonal labor force. The inability of the agrarian reforms to accommodate the vast majority of seasonal agricultural workers was prejudicial to both men and women. However, whereas men are found in both categories of workers—permanent and seasonal—the structural characteristics of women's labor force participation resulted in women being excluded as a social group. The few women permanent workers, and thus potential beneficiaries, were then subject to an additional criterion: that they be household heads. This requirement, of course, reduced their participation still further.

In a number of the reforms carried out during the US-sponsored Alliance for Progress period of the 1960s, besides prioritizing landless workers and tenants, potential beneficiaries were selected on the basis of a point system. In Colombia, for example, the point system favored those with more education, larger family size, good reputations, and farming experience. Women were at a disadvantage compared to men in terms of educational attainment. Moreover, female heads of households suffered under the reputation criterion since nonconformity with the patriarchal nuclear family norm lowered their status in the eyes of the community. Women were also disadvantaged by the farming experience criterion since men in the Andes are considered to be the primary agriculturalists and women are generally regarded as their "helpers," irrespective of the amount of time they might dedicate to farm activities.

Ideological norms governing the proper gender division of labor—that a woman's place is in the home while a man's is in the fields—often appeared in the content of agrarian reform legislation, particularly in inheritance provisions that explicitly assumed that beneficiaries would be male and that women would acquire land only if they were widowed. Ideological norms also constituted a significant barrier in practice to the incorporation of women as beneficiaries in reforms that explicitly provided for the inclusion of female-headed households, such as in Honduras.

Ideological norms have played an equally important role in excluding women from access to and control over water. First, it should be noted that in the Andean region, the division of labor by gender with regard to irrigation tasks is most heterogenous, ranging from where it is considered a normal female task to where it is embarrassing for a woman to be seen irrigating a field (Vattune 1996; Valcarcel 1997). Women's greater participation in irrigation appears to be associated with the smallholding sector and male temporary migration (Lynch 1991; Krol n.d.). Uniformly, however, men are assumed to be the irrigators by project

administrators and community leaders in an ideological version of the "proper" gender division of labor (CICDA-CESA-SNV-CAMAREN 1996; Arroya and Boelens 1997). Thus irrigation systems are designed for men and primarily men receive training in the use and upkeep of these systems.

Ideological norms also govern women's participation in irrigation associations and meetings. Any dealing with the outside world must be mediated by men, for to attend meetings is not considered a woman's proper role, much less to speak up or defend her rights. Moreover, if a woman replaces a man it is seen as diminishing a man's self-esteem (Roeder 1996).

THE COUNTERREFORMS

The Chilean counterreform represents the prototype of neoliberal agrarian policies, these having commenced in the 1970s. Whereas the Peruvian counterreform was a product of the 1980s, the other cases studied here are more recent, commencing in Nicaragua, Honduras, El Salvador, Mexico, and Ecuador in the 1990s. The two exceptions to the counterreform trend in the countries examined here are Costa Rica and Colombia. While they share a commitment to neoliberal macroeconomic policies and have opened up their external sectors, for various reasons they have pursued different sectoral policies with regard to agriculture (see table 2).

Table 2. The Latin American counterreforms.

Country	Restitution	Parcelization of cooperatives/ collectives	End of state redistribution	Land titling	Privatization of water
Chile	X	X	X	X	X
Colombia				X	
Costa Rica				X	
Ecuador		X	X	X	*
El Salvador		X	X	X	
Honduras		X	X	X	
Mexico		X	X	X	X
Nicaragua	X	X	X	X	
Peru		X	X	X	*

* = Under discussion.

Agrarian reform is now officially over in Chile, Peru, Ecuador, Mexico, and Honduras, and has recently come to a close in El Salvador and Nicaragua. In Chile and Nicaragua, the counterreform included restitution of land to former owners as well as the privatization of collectives. In Peru, Ecuador, Honduras, and El Salvador the counterreform has centered on this latter process, the parcelization of former production cooperatives. In Mexico it has been based on the privatization of the ejidos, collectively held land; in Peru and Ecuador, as well, ancestral landholdings of peasant communities may now be divided up and sold. In all seven countries the top priority of the state now centers on land titling in order to organize land

tenure in a more orderly fashion in the hope that security of title will then invigorate the land market.

El Salvador and Nicaragua represent somewhat special cases since land redistribution continued into the 1990s as a condition of securing peace and of the pressing need to reinsert ex-combatants and resettle thousands of people displaced by a decade of civil war. At the same time, the agrarian reform production cooperatives have largely been dismantled and individual land titling is moving vigorously ahead.

Of the countries examined here, agrarian reform efforts continue only in Colombia and Costa Rica. While Costa Rica never implemented a thorough agrarian reform resulting in a major redistribution of landed property, the state continues to be involved in the purchase of properties voluntarily offered to it for sale, for the purpose of redistribution. In Colombia, political considerations have also outweighed economic or ideological precepts with respect to the implementation of the neoliberal model in agriculture. The continuing rural violence promoted by guerrillas, drug lords, and paramilitary groups have forced the state to continue to play a role in land redistribution, although the acquisition of land by peasant groups increasingly relies on market mechanisms.

In terms of water, the Chilean case again constitutes the prototype in the region with respect to its privatization (Baer 1997; Tala n.d.). Mexico has also initiated the transition from government-managed irrigation systems to farmer-controlled irrigation districts. In Peru, the 1991 Law to Promote the Modernization of Agriculture opened up the way to treating water as private property; a new Water Law which would allow full privatization has been under discussion since at least 1994 but has not yet been approved (del Castillo 1994). Ecuador is the other case where a law privatizing water rights has been considered, but rejected (in 1994) by the legislature (Navarro, Vallejo, and Villaverde 1996).

MOVES TOWARDS GENDER EQUITY

The main accomplishments in recent years with respect to gender equity are summarized in table 3. In seven of the nine countries included in this survey, important legal changes have taken place enhancing women's land rights. The most frequent accomplishment has been that in five countries—Colombia, Costa Rica, Honduras, Nicaragua, and Peru —land rights are no longer vested only in household heads. In all of these countries women and men now have explicit and equal rights before the law to own and inherit land in their own names. While land redistribution efforts continue only in Colombia and Costa Rica, explicit gender equality before the law could prove beneficial to women in land titling programs in Honduras, Nicaragua, and Peru. Recent changes in the Civil Codes of Chile and Ecuador, giving married women the right to administer their own property, could also prove beneficial to women in the land titling projects of these countries.

Ironically, Mexico—which in 1971 was the first country to establish equal gender rights to land—has now effectively disenfranchised rural women with the reform of Article 27 of the Mexican constitution under the Salinas government. Family usufruct plots in the ejidos can now become the individual private property of the ejidatario (Stephen 1996: 289; Esparza, Rocio and Bonfil 1996: 8; Botey 1997: 170). Moreover, women are no longer guaranteed that

Table 3. Gender progressive changes in land rights.

Country	Household head dropped	Joint titling	Priority to female heads	Priority to women	Civil code
Chile					1994
Colombia	1988	1988	1988	1991	1990
Costa Rica	1990	1990			
Ecuador					1989
El Salvador	1993*		1993*		1994
Honduras	1991	1992			
Mexico	1971–1992				
Nicaragua	1981	1995	1993		
Peru	1991				1984

*Refers to reinsertion program only.

they will inherit the family parcel upon the death of their husbands; ejidatarios who have received land certificates may designate any heir they please.

The Mexican case is also important in reminding us that legal changes do not necessarily translate into de facto changes in customary practices. While between 1971 and 1992 men or women over the age of 16 could become agrarian reform beneficiaries and ejidatarios, in fact, social custom, based on patriarchal ideology, continued unchallenged and resulted primarily in only male household heads usually becoming ejidatarios. Most women ejidatarias were widows who inherited ejidatario status upon the death of their husbands (Arizpe and Botey 1987).

A second accomplishment in four countries—Colombia, Costa Rica, Honduras, and Nicaragua—is the provision for joint titling of land, whether a couple is married or in a consensual union. Joint titling is mandatory in Colombia, Costa Rica, and Nicaragua, but applies only to land distributed through the agrarian reforms. In Honduras, where joint titling could be potentially important in the current land titling program, not only must a couple request it but, if they are in a consensual union, the relationship must be officially registered— a process that is both costly and goes against customary practice (Acosta and Moreno 1996:3).

Only three countries have prioritized female heads of household in recent land distribution efforts: Colombia, El Salvador, and Nicaragua. The Salvadoran case is limited to the reinsertion program for ex-combatants and their supporters (squatters in the zones of conflict), which resulted from the 1992 Peace Accords (Fundacion Arias 1992: 67-68; Luciak 1996). Whereas the government only intended to benefit household heads (i.e., families), the former female combatants of the FMLN argued that priority should be given to female household heads and that, in addition, in the case of couples, each individual should receive his or her own parcel of land and title. Moreover, they demanded that women should be the same proportion of beneficiaries as they represented in the guerilla forces. Women comprised 29.1 percent of the FMLN combatants at the time of demobilization and they represent 26.2 percent of the FMLN beneficiaries of the land transfer program. All told, women represent 33.4 percent of the total number of beneficiaries (Luciak 1996: 10).

In the Nicaraguan case, the priority given to female household heads and joint titling of land to couples was largely a response to the demands of the Women's Commission of the Sandinista-affiliated national peasant organization (UNAG, Union Nacional de Agricultores y Ganaderos) that since the late 1980s had been pressuring for a more gender-equitable agrarian reform. Their efforts combined with the lobbying of the National Women's Institute (INIM, Instituto Nicaraguense de la Mujer), resulted in (mid-way through her term) President Violeta Chamorro instructing the National Agrarian Reform Institute (INRA, Instituto Nicaraguense de Reforma Agraria) to begin giving preference to joint titling of land and to promote the titling of female heads of households (INIM 1996: 5). Joint titling of land to couples (whether married or in consensual unions) was made official by Law No. 209 of December 1995. During the Chamorro government, from 1992 to November 1996, women constituted 25 percent of the 35,545 persons benefited by this government's land redistribution and titling program (ibid.: 3).

Here we will examine in more detail two other cases of proactive moves to increase women's access to land: Colombia and Costa Rica.

Costa Rica

One of the most remarkable events of all in Latin America was the adoption in Costa Rica of the 1990 Law to Promote the Social Equality of Women, passed at the end of the Arias administration.[6] This law established that land and housing were to be considered family property, giving both spouses equal rights over them; similarly, men and women were to have equal access to agricultural credit; finally, the law gave legal recognition to consensual unions for the first time (Guzman 1991: 199, 208; Campillo 1995: 360-61).

Article 7 of this law merits special examination: "All property distributed through social development programs should be inscribed in the name of both spouses in the case of married couples; in the name of the women in the case of consensual unions, and in the name of the individual in any other case, be it male or female" (in Madden 1992: 55).

First, as in several other countries, the law establishes joint titling for land distributed by the state; however, for the first time in the history of agrarian legislation in Latin America, women were given priority over men in the titling of land when the family was characterized by a consensual union. This historic piece of proactive legislation was apparently taken quite seriously by agrarian reform functionaries because they began handing out land to women whether or not they had previously filed a land request (Madden 1992: 80). In 1990, women constituted 38.7 percent of those titled that year (Brenes Marin and Antezana 1996: 2).

The constitutionality of Article 7 was soon questioned by groups of peasant men who subsequently brought suit against the agrarian reform institute, IDA. The suit was settled in 1994 by the Supreme Court in the men's favor. Subsequent land distributions to consensual unions are to be titled in the names of both partners (ibid.: 9).

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[6]This law seems to have been the result of demands of urban women's organizations that the state implement its 1984 pledge to end the discrimination against women. It was also strongly supported by the President's wife, Margarita de Arias, who was quite involved internationally in promoting women's issues. Interview with Fabiola Campillo, former FAO and IICA expert on women's issues, by Magdalena Leon, January 22, 1997, Bogota, Colombia.

It is also worth noting that Costa Rica developed such progressive legislation with respect to rural women's land rights in the absence of a strong rural women's association. While local rural women's groups have proliferated, particularly in the context of income-generating projects, only in 1996 was a National Association of Peasant Women formed with the explicit objective of empowering rural women (Viquez Astorga 1996: 8).

Whether Article 7 will significantly increase women's access to land—through joint titling of couples—depends on a number of factors. First, it is unclear how much land is available for redistribution. Under the current neoliberal model, which favors economic efficiency over social justice—it is doubtful that a thorough redistribution of landed property will soon be on the agenda. Second, the law was apparently not made retroactive to cover previous agrarian reform beneficiaries, thereby reducing its potential impact.

A recent report by the Coordinator of the Women's Office of the Agrarian Development Institute was quite pessimistic in terms of large numbers of women gaining access to land (Viquez Astorga 1996). Besides the above factors, she notes that few rural women are aware of their rights and hardly ever apply for land, a factor she attributes to the fact that they do not see themselves as farmers. And despite a good number of "gender sensitizing" courses that have been held in that country, government functionaries in the agriculture sector do not perceive women to be agricultural producers. It is worth noting that no mention can be found in the literature on Costa Rica on women's rights with respect to water.

Colombia

As can be seen in table 3, Colombia stands out as the gender-progressive leader in terms of legal measures facilitating women's access to land. This is partly explained by the growing organizations of rural women during the 1980s, which led in 1985 to the creation of the first national association of rural women, ANMUCIC, the National Association of Peasant and Indigenous Women (Gomez-Restrepo 1991). ANMUCIC drew attention to the discriminatory aspects of the existing Agrarian Law 135, whose provisions largely led to the titling of land only in the name of men, although it was presumed that all household members benefited. Their demands were to play an important role in shaping Agrarian Law 30 of 1988, which for the first time explicitly recognized the right of women to land.

Among the main provisions of the law was that, henceforth, agrarian reform titles were to be issued in the name of couples, whether the woman was the legal spouse or the permanent companion. In addition, special provisions were made for female heads of household over 16 years of age, such as prioritizing their access to unutilized public lands. Peasant women's groups were also to be given equal participation with those of men in regional and national committees of the national agrarian reform agency, INCORA.

In terms of the advances introduced by Law 30, the total number of agrarian reform beneficiaries on a per annum basis increased dramatically between 1986 and 1991, as compared with the previous 25 years. Notwithstanding the provisions favoring the incorporation of women introduced by the law, the proportion of women beneficiaries nationally remained the same, 11 percent (Duran Ariza 1991, Appendix 3). Unfortunately, the available data for this period do not report the extent of joint titling.

A series of dispositions were subsequently enacted to strengthen the possibility of achieving gender equity. In 1991, a new resolution was issued giving priority to land distribution

efforts to women who were in a state of "lack of protection" due to the situation of violence characterizing Colombia, associated with increasing widowhood and abandonment (Medrano 1996:7).

The situation of escalating violence and political crisis characterizing Colombian society in these years accelerated initiatives for national conciliation, leading to the constitutional assembly which resulted in the exceptionally progressive Constitution of 1991. The new Colombian constitution emphasizes equality of rights and opportunities between men and women and the prohibition of discrimination against women. In concert with the new constitution came important changes in Colombia's Civil Code favoring women. The full rights of consensual unions were recognized, elevating these to equal those of formal marriages in terms of joint patrimony and inheritance.

The new constitution of 1991 provided the context for the new Agrarian Law 160 of 1994, passed under the Gaviria government, which is both redistributionary and neoliberal. On the one hand, it seeks to broaden access to landed property while fostering a private land and credit market. On the other hand, it maintains the role of the state as the key intermediary in economic and judicial relations between the market and peasantry to assure at least a modicum of redistributionary justice.[7]

The main provisions which favor women are as follows: the beneficiaries are explicitly delineated as peasant men or women who are in conditions of poverty and nonowners of property. Female heads of household, and other women, especially, those considered to suffer from a lack of social and economic protection due to violence, abandonment, widowhood, and who lack or have insufficient access to land are given priority in the determination of beneficiary status. The provision enacted in the 1988 Agrarian Law promoting the joint titling of lands ceded to households of adult men and women was reaffirmed. A major victory for the rural women's organization, ANMUCIC, was that it is to be included in the membership of the executive committee of INCORA and in the regional and local committees charged with selecting the beneficiaries and executing the law.

The accomplishments of Law 160 in its first year (1995) of operation were mixed. First, land distribution proceeded at a pace only slightly above that of the late 1980s, 4,172 beneficiaries per year as opposed to 3,673 in the previous period.[8] At this rate, it will be many years before the land hunger of the majority of Colombia's rural poor is satiated. Second, women are a higher proportion of the direct beneficiaries, at 19 percent, than they were in previous years, when they constituted only 11 percent of the total. Moreover, if the share of couples who have been titled land is taken into account, the percentage of households where a woman was a direct beneficiary increases to 37 percent of the total, a significant increase over past values. It is worrisome, however, that notwithstanding the provision of the law requiring joint titling, the majority of those receiving land under Law 160 are still male household heads.

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[7]INCORA, Ley 160 y sus normas reglamentarias, Sistema Nacional de Reforma Agraria y Desarollo Rural Campesino, Bogota, no date (law is of August 3, 1994). The main innovation in the law is that beneficiaries will receive a 70 percent subsidy of the value of the land to be purchased, with the remaining 30 percent to be negotiated in commercial terms. Also, beneficiaries are to negotiate the price of land directly with landowners, with INCORA intervening only as a mediator.

[8]These data are drawn from the Instituto Colombiano de la Reforma Agraria (INCORA), Gender Office, preliminary data as of June 1996.

The implications of Law 160 for the future of rural women's land rights largely depend on the extent to which women become aware of their rights in increasing numbers and begin to demand that these rights be fulfilled. That is, until effective demand for land is created by rural women themselves, it will be difficult to overcome the historical and cultural barriers that have restricted women's access to land. Here, the national rural women's association, ANMUCIC, has an historic role to play. And the state must assure that if women have access to land, they also have access to water, credit, technical assistance, etc., to assure that they have the means to be effective producers. To date, the discussion of women's access to water has largely been ignored, with the focus centered on women's access to land and credit.[9]

It must also be taken into account that Colombia's new agrarian reform, which holds such potential with respect to rural women's access to land, is taking place under most unfavorable circumstances. Over the last decade or so, Colombian drug traffickers have undertaken what is virtually a historically unique counter agrarian reform in the countryside. While they are accomplishing what the 1961 agrarian reform was never able to do—take land away from the landed oligarchy—the degree of land concentration which is being generated is alarming. Suffice it to note that an estimated three to four million hectares of land have been taken over by the drug traffickers,[10] at least twice if not three times as much land as was redistributed by the Colombian state over the past 35 years.

The implication of this situation is that it is not a sufficient condition that the state be gender-conscious in terms of rural women's access to land and that it use all of the resources at its disposal to enforce the law. In addition, in order to make land available for poor rural women and men, the state must garner the political will to break the power of the drug traffickers and paramilitary groups. This will not be an easy task.

CONCLUSION

Agrarian reforms were carried out throughout Latin America over the course of this century, but particularly in the decades of the 1960s–1980s, for both social equity and efficiency considerations. Under the neoliberal model, in the majority of countries, social equity considerations in the distribution of productive assets are a thing of the past. The welfare of the great majority of rural men and women is to be determined in land, water, labor, and capital markets, which can be expected to reward the most efficient.

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[9]As part of the new focus on land reform relying on market mechanisms there has been renewed attention of the need to provide land reform beneficiaries with an integrated package of services to assure that their production plans are profitable. In this context, in a pilot program in five municipalities, the National Institute of Land Preparation (INAT, Instituto Nacional de Adecuacion de Tierras), which is in charge of irrigation districts, will be participating in training programs and in cofinancing investment plans (Ministerio de Agricultura y Desarrollo Rural, INCORA, and DNP 1997).

[10]Interview with Alejandro Reyes, researcher at the Institute of Policy Studies and International Relations of the University of Colombia, by Magdalena Leon, May 30, 1996, Bogota, Colombia. Also see El Tiempo, "Narcos se aduenan del campo," November 30, 1996: 1. Here it is estimated that as much as half of Colombia's productive lands are in the hands of the drug traffickers.

The two central questions of this paper were: 1) how have rural women fared under the guiding hand of neoliberalism and in the process of the Latin American counterreforms; and 2) what has been the influence of international feminism and the growth of the Latin American women's movement in influencing changes in gender-discriminatory legislation regarding women's access to land? With respect to the first question, in the two countries where the agrarian collectives were dismantled in the 1970s and 1980s—Chile and Peru—women were such a minimal share of their membership that their dismantling and parcelization probably had little direct impact upon them. The impact of the counterreform on women would likely depend on whether the male head of household was titled land,[11] and whether the share of household income which was pooled was more or less when the male head was a member of the collective in comparison to being an individual farmer. A similar conclusion can be reached with respect to Honduras, although in this counterreform there is the possibility (although not mandatory) of joint titling of land.

In Nicaragua and El Salvador, where women had a much larger share of the cooperative membership compared to Honduras, the impact of the counterreform will depend on whether female cooperative members are as likely to be able to acquire a land parcel as male members, and if so, whether they receive land of comparable size and quality as the male membership. For Nicaragua, there is case study evidence that women were less likely to get access to a land parcel when the cooperatives were divided up and when they did, they tended to get the worst parcels (Brunt 1995). Whether the actions of the Chamorro government in the 1993-96 period have reversed this tendency, remains to be seen.

Unfortunately, we have found no references in the literature to what has happened with respect to water rights when cooperatives were dismantled. Moreover, research has yet to be carried out from a gender perspective on the privatization of water rights in the Chilean case, the only experience of sufficient longevity to evaluate seriously.

In examining the gender accomplishments summarized in table 3, it is clear that the majority of the positive changes in agrarian and civil codes have been in response to the international feminist movement and the UN convention to end the discrimination against women as well as the pressures which national women's movements have been able to exert upon the state. The latter was facilitated in those countries that have women's ministries or institutes (or women in development units in the ministries of agriculture), such as in Colombia, Costa Rica, and Nicaragua, and recently, in Chile.

With the exception of Colombia and to a certain extent, Nicaragua and Honduras, none of these nine countries has been characterized by strong, national-level rural women's organizations. Not surprisingly, the most has been accomplished in Colombia, where there is only one, autonomous, national peasant women's organization.[12] There is little question that the gender-favorable legislation in Colombia has been a product of women's increasingly prominent voice in national politics. It is also clear that if gender-progressive legislation is to be-

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[11]Land that has been distributed previously by agrarian reform efforts, by inheritance or other means, but that does not have legal title.

[12]The Honduran and Nicaraguan cases thus differ from the Colombian in that Honduras is characterized by multiple rural women's organizations at the regional and national level and these have found it difficult to adopt a unitary program in terms of women's land rights. In the case of Nicaragua, there is only one national peasant women's structure, but it is not autonomous from the main national peasant organization, UNAG, nor until the 1990s, from the Sandinista Front, the FSLN.

come a reality in practice, it will depend upon the unified action of local and national rural women's groups. Local-level organizations of women may be a necessary condition for the creation of the demand for water and land rights, but it is not a sufficient condition. To achieve change in national legislation and to assure its implementation, rural women must have a national voice.

In those countries that have passed through processes of both agrarian reform and counterreform, women's access to land and water will depend henceforth on the marketplace and on inheritance practices. One aspect of the neoliberal model that may favor rural women is that one of the preconditions for developing a vigorous land market is land titling. Lack of clear titles to land is endemic among Latin America's smallholding sector and has become the focus of attention of both the World Bank and the Inter-American Development Bank. Programs prioritizing the titling of female household heads have been instituted in Chile[13] and Nicaragua. It is possible that the land titling programs may result in benefiting more women than were benefited in the whole period of state land redistribution, particularly if these are proactive; that is, if they support titling women in family disputes over land.

A point of concern regarding land titling programs, however, is whether, once women have legal titles to their land, they will be able to hold on to their parcels and have access to the necessary complementary resources (i.e., water, credit, technical assistance) to earn a decent living as agriculturalists. Since one main rationale for land titling programs is to invigorate the land market, by allowing land to be transferred from the least to the most efficient producers, it will be particularly important to monitor the outcome of these programs.

As buyers in the land market, women will no doubt be at a disadvantage as compared to men, notwithstanding the fact that the neoliberal model has resulted in the expansion of many nontraditional agricultural exports that favor the employment of women. The Chilean case stands out in this regard (Lago 1987; Matear 1997). But most rural wage employment for women is temporary in nature, and with only a few exceptions, women tend to earn less than men. Low wages for agricultural workers, in general, irrespective of gender, result in a low capacity to save. In the absence of subsidized credit particularly designed to allow the landless and land-poor to participate in the land market, it is doubtful that the growing number of landless agricultural wage workers will be participants in this market.

In the coming years, the struggle over inheritance rights will undoubtedly take on an even more important focus as the primary means by which rural women might claim rights to land and water. The rights of spouses and partners in terms of inheritance vary widely and often differ in the civil and agrarian codes of a given country (FAO 1992). Given the prevalence of consensual unions throughout rural Latin America, high on the feminist agenda should be the demand that these be accorded equal status to legal marriages, without the need for prior registration (as in Honduras or Ecuador).

In some countries, farmers can bequeath their property to whomever they wish; in others, such as Colombia, Ecuador, El Salvador and Peru, a spouse or permanent companion is automatically guaranteed a certain portion of the property whether so bequeathed by a will or

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[13]In Chile, it was not until 1991 that a national office (SERNAM, Servicio de Mujeres) was created to bring a gender perspective to public policy. One of its first actions was to sign an accord with the Ministry of National Property (also called the Heritage Ministry) to ensure that female-headed households be given priority attention in the World Bank-financed national land titling program (Matear 1997: 99).

not. This latter provision seems most important if women are to be provided with a modicum degree of security in old age. When a landowner dies without a will, some countries stipulate that the spouse or partner is the first heir; others provide for property to be divided between the spouse/partner and the children. Certainly the former provision is much more favorable to women, assuring them greater security and that they will be attended to in old age by their heirs.

Most Latin American countries follow the Napoleonic code which provides for bilateral inheritance by all children, irrespective of gender, if the parents die without a will. However, whether in fact rural women are able to claim their inheritance is subject to social practices and is an arena of struggle and contention, one particularly growing in intensity as land shortage becomes more acute (Roquas 1995). In the coming years, it will be important for women's groups to struggle for the enforcement of bilateral inheritance and equal land and water rights for all children, irrespective of gender.

In sum, the main conclusion of this paper is that during periods of state intervention in agriculture, feminist strategy must focus on assuring that both men and women are beneficiaries of agrarian reforms or counterreforms, either through joint titling of land and water rights so that the family unit is the beneficiary in practice, or by demanding that both men and women be given land titles and control over water individually. In countries that have already passed through agrarian reform and counterreform, women's access to land subsequently depends on two factors: access to the land and water markets, and inheritance. Feminist strategy, through collective action, may well make a difference in the latter practice. The future of women's access to productive resources in Latin America greatly depends upon it.

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Rice Cultivation and Gambian Women

Judith A. Carney[1]

ABSTRACT

Issues of equity and efficiency dominate current discussions on the impact of neoliberal economic programs within developing countries. As state bureaucracies are downsized in favor of privatization, concern grows over equity issues such as women's access to resources. To date, most research examines gender inequality in women's property rights in land. Only recently is attention focusing on the privatization of water rights and women's access to irrigated land. Even less research has analyzed the erosion of women's water rights in common property resource systems (CPRs) not characterized by private titles. Yet CPRs are especially emerging a casualty of privatization. This paper provides a case study of a CPR wetland system traditionally dominated by female rice cultivation. The individualization of property rights in wetland Gambian rice systems is analyzed over the past 30 years in terms of women's responses to diminished resource control. Emphasis is placed on specific forms of women's negotiation in irrigation schemes to illuminate ways to improve gender equity objectives with privatization.

INTRODUCTION

In the West African country called The Gambia, rice is traditionally grown by women. As the nation's dietary staple, food security objectives have long centered on rice development projects. Over the past 30 years, this emphasis has increasingly focused on pump-irrigated schemes that permit year-round cultivation. But the performance record and utilization of these schemes have proven dismal. In examining the reasons for repeated failure of double-cropped irrigated rice, this paper illuminates the significance of gender issues, especially women's declining access to productive resources and the failure of irrigation planners to build upon women's wetland farming expertise.

Divided into three parts, the first section presents an overview of women's indigenous knowledge of wetland farming. Emphasis is placed on the soil and water management prin-

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ciples regulating rice cultivation in diverse microenvironments, how these principles spread out the labor burden in wetland cultivation, as well as their importance for reducing risk of total crop failure in years of low rainfall. The second section places women's role in rice farming within a historical context, emphasizing the gender division of labor in agriculture as well as the land use system and crop rights that developed within the Gambian farming system. The third section illuminates the significance of gender-based conflicts over labor and crop rights for the poor performance of pump-irrigated rice projects while revealing the significance of macro-economic policy shifts over the past decade for the use of irrigated land. The paper concludes by exploring potential directions for achieving gender equity objectives and appropriate technology development in Gambian rice projects.

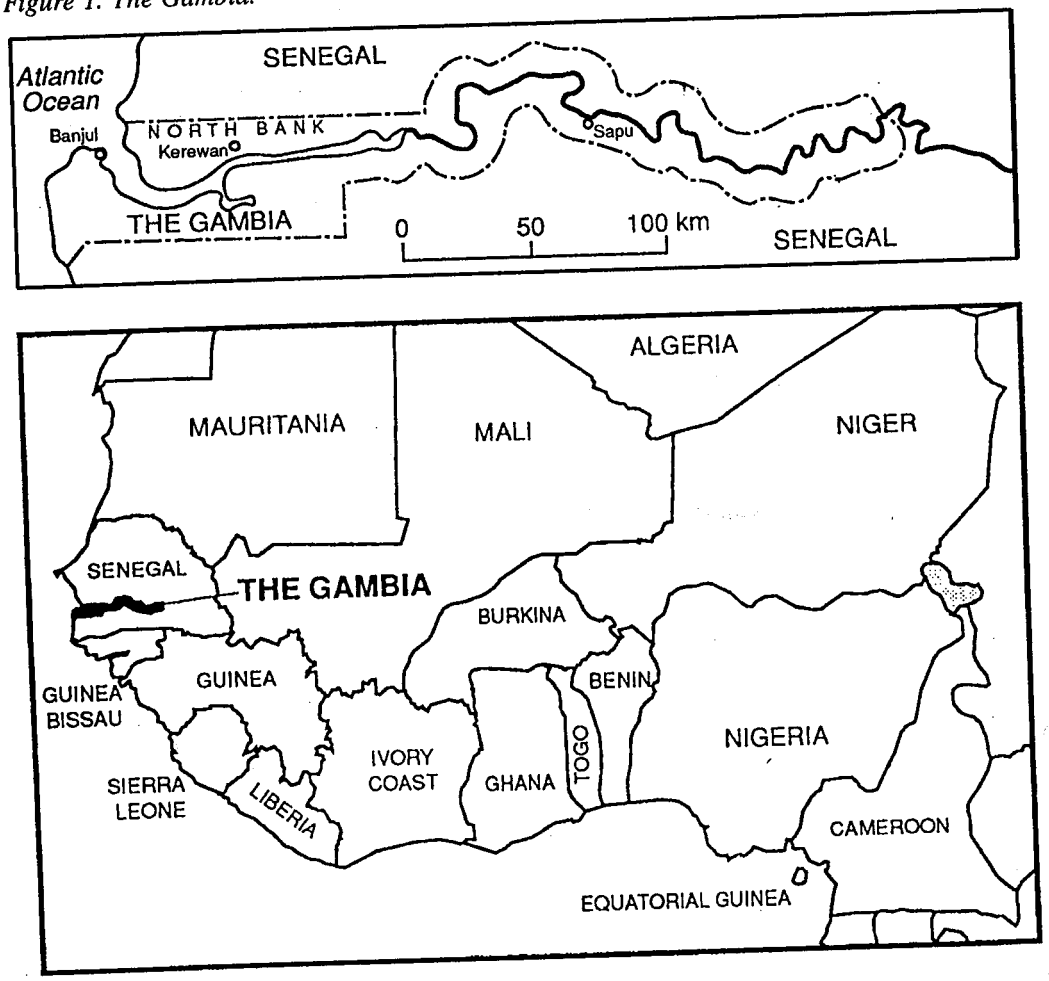
THE GAMBIAN WETLANDS AND WOMEN'S ENVIRONMENTAL KNOWLEDGE

The Gambia, a narrow land strip 24-50 kilometers wide and nearly 500 kilometers long, encloses a low-lying river basin that grades gradually into a plateau, where the altitude seldom exceeds 100 meters (figure 1). The plateau forms about one-third of the country's land base and depends upon rainfall for farming (Carney 1986). Precipitation from June to October averages 800-1,100 millimeters and favors the cultivation of millet, sorghum, maize, and the principal cash crop, peanut. As in neighboring Sahelian countries, the Gambian rainfall regime fluctuates considerably between years and within a season. From the 1940s through the mid-1980s, for example, annual rainfall declined by 15 to 20 percent and became increasingly distributed in a bimodal seasonal pattern (Hutchinson 1983). The recurrence of a 2-week, mid-season dry spell during August increases cropping vulnerability on the uplands and places greater dependence on lowland farming.

The lowlands are critical for understanding human livelihood and survival in the unstable rainfall setting of the West African Sudano-Sahelian zone. Lowland environments permit a multiple land use cropping strategy that utilizes other forms of water availability, thereby freeing agricultural production from strict dependence on rainfall. Constituting nearly 70 percent of the country's land mass, the Gambian lowlands make available two additional environments for agriculture: 1) the alluvial plain, flooded by the river and its tributaries; and 2) a variety of inland swamps that receive water from high water tables, artesian springs, or moisture-holding clay soils. The lowlands, which enable an extension of crop production into the dry season or even year-round, are planted to rice, although vegetables are sometimes grown with residual moisture following the rice harvest.

While The Gambia is covered by more than 100,000 hectares of lowland swamps, only about one-third of the area is suitable for farming (ALIC 1981; CRED 1985). This is due in part to hydrological conditions along the Gambia river and its tributaries. Riverine swamps coming under marine tidal influence are permanently saline within 70 kilometers of the coast, seasonally saline up to 250 kilometers, and fresh year-round in the last 230 kilometers of the river's course through The Gambia. Since the 1980s rice cultivation has wavered between 15,000 and 20,000 hectares while pump-irrigation involves only about 1,500 hectares of that amount in the permanently freshwater zone of the Gambia river (PPMU 1993; Carney 1993).

Figure 1. The Gambia.



Lowland cultivation is thus pivotal to the Gambian farming system, enabling crop diversification over a variety of microenvironments and a reduction in subsistence risk during dry climatic cycles. Wetland farming, however, requires considerable attention to forms of water availability as well as edaphic and topographic conditions. In The Gambia, this knowledge is the domain of women, who have specialized in wetland rice cultivation since at least the period of the Atlantic slave trade and have adapted hundreds of rice varieties to specific microenvironmental conditions (Jobson 1623; Moore 1738). This cumulative in situ knowledge of lowland farming underlies The Gambia's regional importance as a secondary center of domestication of the indigenous West African rice, Oryza glaberrima, domesticated in the region at least 3,000 years ago (Porteres 1970:47).[2]

[2]While the Portuguese began introducing Asian sativa rices from the seventeenth century, glaberrima varieties dominated until the twentieth century. In response to food shortages associated with the expansion of cash cropping peanut and cotton on the uplands during colonial rule, government officials emphasized increasing lowland food production. This led to the emergence of rice as the dietary staple and the introduction of numerous higher-yielding Asian varieties, which now dominate the rice cropping system (Gamble 1949; Van der Plas 1956).

Women's knowledge of wetland environmental resources is brought into relief in figure 2, a cross-sectional profile of the main rice production environments of The Gambia.[3]

Women recognize five principal microenvironments for rice cultivation. On the most general level, type of water availability distinguishes their own emic classification system: namely, whether a microenvironment receives water from rainfall, river tides, the groundwater table and/or artesian springs. But rice-growing environments are also nuanced by distinct edaphic properties associated with specific hydrological regimes. Thus, hydromorphic, acid-sulphate, and alluvial soils are identified by their location along colluvial slopes, in the seasonally or permanently freshwater zone of the river, or in areas experiencing occasional, monthly, or daily tidal flooding. The following paragraphs present the emic classification system used by Mandinka women, The Gambia's dominant ethnic group and preeminent rice growers.

Tendako: upland and rain-fed rice, planted by direct seeding of short-duration varieties (<100 days) in sandy clay soils after the onset of the June rainy season. In average rainfall years, yields are between 500 and 700 kilograms per hectare.

Bantafaro: Rice planted in hydromorphic soils, frequently along colluvial slopes. This rice often utilizes supplemental forms of water from the moisture-holding clay soils, a high groundwater table, or underground springs. The plots are frequently ridged to minimize water runoff. This is also the microenvironment where women establish seedbeds for longer duration varieties that will be transplanted to the tidal swamps. Average yields are between 800 and 1,000 kilograms per hectare.

Leofaro: This rice microenvironment occupies the outer edge of the tidal rice zone in the seasonally saline part of the river. Generally directly seeded, leofaros can only be planted in normal rainfall years. Yields seldom exceed rain-fed rice averages even though the fields occasionally receive supplemental water from high tides. Leofaros represent a marginal environment for rice cultivation in drought cycles because the increased period of river salinity can lead to acid-sulphate soil conditions. Potential acid-sulphate soils underlie nearly 13,000 hectares of alluvial plain in the seasonally saline zone located upstream between 70 and 150 kilometers (Thomas, Varley, and Robinson 1979). Normal precipitation cycles prevent their formation by keeping the leofaro wet from rainfall and occasional tidal flooding. Under such conditions, rice can be planted. However, successive years of prolonged drought cause the leofaro to dry out, thereby beginning the process of acidification. If the process is not reversed by a return to normal pluvial conditions, acidification can render an area permanently unsuitable for cultivation. During the drought period of the mid-1980s annual rainfall in The Gambia decreased by 25 percent. The result of several low rainfall years was the formation of large tracts of acid-sulphate soils on the leofaros of central Gambia. Soil measurements taken in the area recorded pH values as low as 3.0 (Carney 1985).

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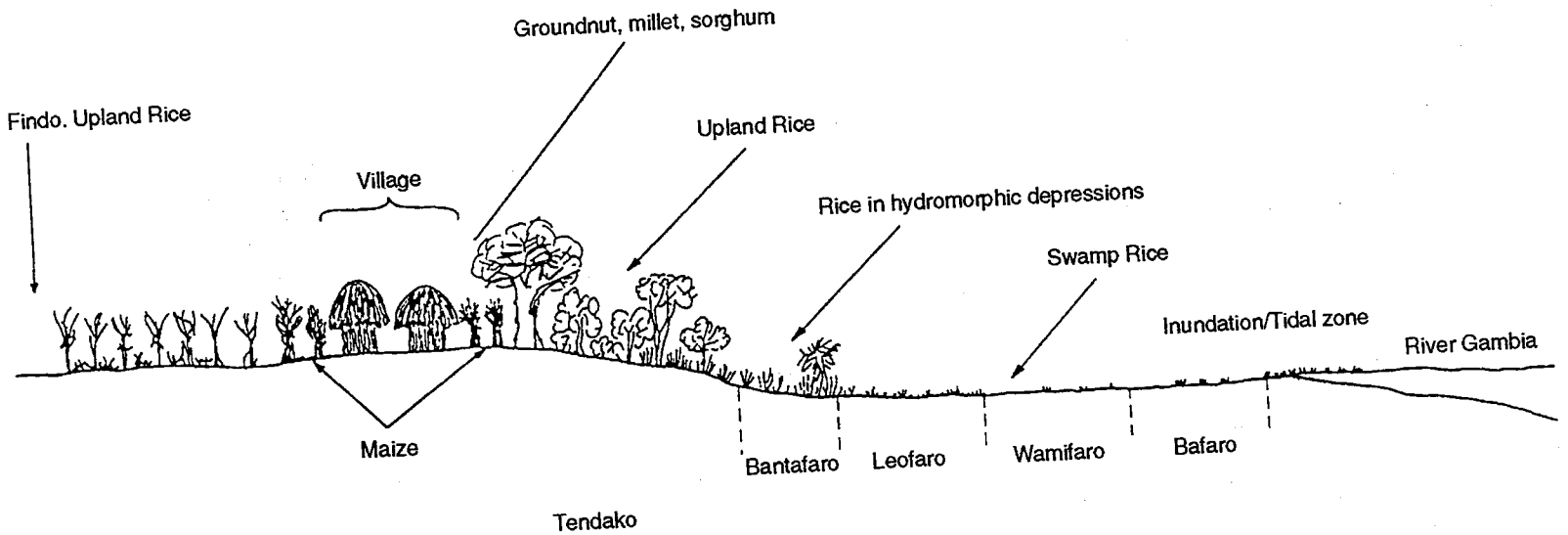
[3]The cross-section is for the seasonally saline zone of the Gambia river, located between 70 and 250 kilometers upstream. This section is represented because it contains all the country's rice production environments

Figure 2. Agro-ecological zonation: Central Gambia.



Wamifaro: This microenvironment occupies the middle range of the tidal zone, meaning that the swamp experiences flooding from higher river levels during the wet season and lunar flooding the remainder of the year. The wamifaro is the favored production zone of female rice farmers because water levels in the swamps are not so deep as to make access difficult (which is the case in the swamps nearest the river). While vertisols underlie permanently freshwater swamps, continual tidal flooding prevents the formation of acid-sulphate soils in the seasonally saline zone. In such areas, rice is planted with the return of freshwater conditions from mid-July. The accumulated rainfall causes a steady rise in the level of the Gambia river and its tributaries until October. Women adjust seed varieties and planting techniques to the different water levels and flooding periods of their wamifaro. They consequently either directly seed or transplant medium- and long-duration varieties, which are harvested in December and January. Above approximately 250 kilometers of the Gambia river, year-round freshwater conditions prevail, sometimes permitting the cultivation of two crops of medium-duration varieties. Yields average 1,500-2,000 kilograms per hectare. Most of The Gambia's pump-irrigation projects are concentrated on the wamifaros in the permanently freshwater zone of the Gambia river.

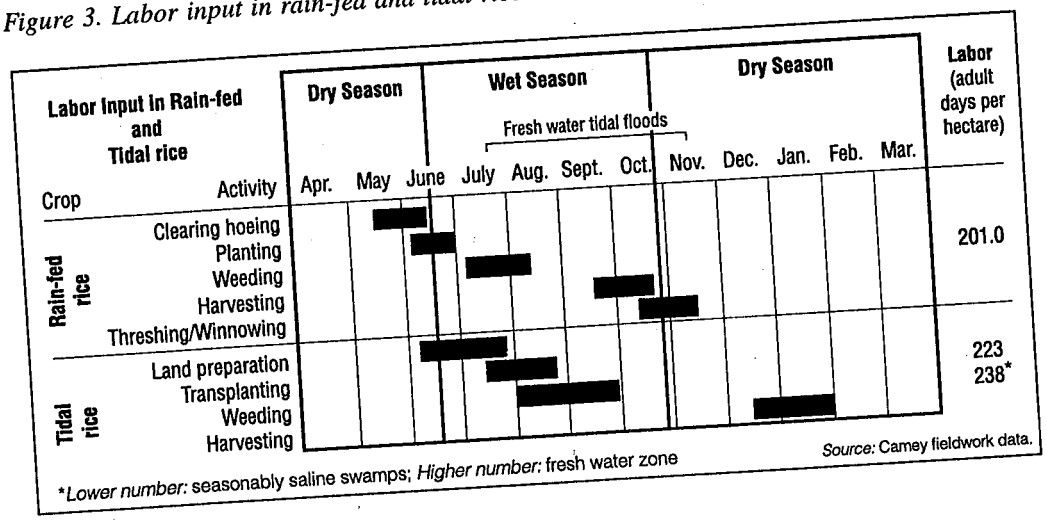
Bafaro: Located nearest the river, this rice microenvironment is subject to daily flooding by high tides of the Gambia river and its tributaries. In both the seasonally saline and freshwater river areas, women grow long-duration (130-145 days) and tall varieties that are transplanted from bantafaro nurseries and ripen from December to January. The bafaro and wamifaro microenvironments are the most productive traditional rice-growing areas. Annually enriched by alluvial deposition, yields generally average 1,500-2,000 kilograms per hectare. As daily flooding from the river requires a greater degree of water control than in the wamifaro, only one pump-irrigation project (Jahaly-Pacharr) with centralized pumping facilities has been implemented on the bafaro.

This description of women's cultivation along an upland to lowland continuum also reveals the logic underlying the West African rice production system (Richards 1996). Female rice farmers face labor shortages in rice cultivation. To even out their labor burden, they plant varieties adapted to different moisture regimes. The rice microenvironments consequently mature in sequence (figure 3). Rain-fed rice, planted first and harvested in October, brings to an end the pre-harvest period of food shortages known in The Gambia as the "hungry season." Proceeding downslope, the bantafaro are next planted, followed by the tidal fields. In the seasonally saline zone, the upland and bantafaro fields are already cleared, planted, and weeded by the time freshwater returns to the river in mid-July, when cultivation begins on the wamifaro and bafaro. By planting along an upland to lowland landscape gradient, females spread out their labor burden in rice production while minimizing the risk of complete crop loss. Thus, in years of low rainfall when the rain-fed crop may fail, a rice harvest is still possible in tidal areas. Through detailed knowledge of water regimes and soil properties as well as the selection of seed varieties adapted to different conditions, Gambian women reduce the risk of farming rice in the Sahel, where precipitation may vary 40 percent annually or be maldistributed within a year.

GENDER, ENVIRONMENT, AND ECONOMY: A HISTORICAL REVIEW

Policy interest in wetland environments actually began in the early decades of the twentieth century when colonial officials began documenting farming practices in diverse lowland settings (Carney 1986). The objective was to improve household subsistence security and generate rice surpluses that would feed an expanding pool of migrant laborers, whose seasonal influx accounted for the pace of peanut expansion on the uplands. Migrant laborers in peanut cultivation, known in The Gambia as "strange farmers," produced nearly half the peanut crop. They numbered about 20,000 in the interwar period and accounted for 1 out of every 20 rural residents (Carney 1986:121).

Figure 3. Labor input in rain-fed and tidal rice and rice microenvironments.



Initial efforts focused on improving swamp accessibility by tree clearing, causeway and footbridge construction, and increasing yields through improved Asian seed varieties. By the 1960s, colonial swamp development projects had culminated in an expansion of rice planting to some 26,000 hectares (Carney 1986:178). But limits had been reached on the degree to which women could carry the subsistence burden. Further gains in food availability rested on altering the gender division of labor by drawing men into rice growing. The colonial government's inability to do so brought swamp rice projects to an end (Carney and Watts 1991:660).

In 1949, the colonial government initiated another approach to surplus rice generation by implementing a large-scale irrigation scheme on the site of the present-day Jahaly-Pacharr project. The Colonial Development Corporation (CDC) scheme departed from the earlier swamp rice improvement project in one important way: land was removed from female rice growers through a 30-year lease program (Carney 1986). But the project failed as a result of

the poorly designed irrigation system as well as the lack of male and female interest in wage work. The colonial government rice projects are notable for adumbrating the post-independence emphasis on irrigated rice as well as the gender-based conflicts that would surface in subsequent wetland development projects.

These conflicts center on the invocation of customary tenure "laws" by male household heads and village elites to reduce women's land and labor rights in rice farming or, in Mandinka nomenclature, the conversion of land with individual use rights *(kamanyango)* to land whose product is controlled by the male household head or senior males *(maruo).*[1] When colonial swamp development schemes improved access and productivity, male household heads and village patriarchs called into question women's customary use rights. In one case that reached the colonial authorities, men argued that "if women mark the land and divide it, it would become 'women's property' so that when a husband dies or divorces his wife, the wife will still retain the land, which is wrong. Women must not own land" (Rahman 1949:1). Women's land access was clearly being contested by male claims that female use rights would alienate swamp land from the patrilocal and patrilineal kin-residence system. The significance of the maruo designation for resources struggles is that when applied to developed land, females experience an erosion of their customary labor rights without a reduction in their work burden.

A brief review of the meaning of the terms for property access and labor rights illuminates the issues that continue to be disputed in Gambian irrigation projects. The household landholding is termed maruo and cannot be alienated from the residence group. Maruo, however, also refers to a set of labor obligations and crop rights. All able family members are expected by custom to provide labor on household land for family subsistence needs. Men's maruo work responsibility is traditionally met on the uplands through cultivation of millet, sorghum, maize, and peanuts, which may be traded to purchase cereals in deficit years. Rice production frequently fulfills women's maruo obligations, especially among the Mandinka, who are noted rice farmers. A key aspect, then, of the maruo designation is that the crops are produced for household subsistence.

Men's maruo production is organized through the *dabada,* the basic work unit for male family members. A household may have more than one dabada if it is large (> the 17 member average) or friction exists between adult males within the kin-residence group. The product of male maruo labor is in turn distributed by either the male household or dabada head to smaller subunits, or women's cooking units, the *sinkiro.* The basic consumption subunit, the sinkiro refers to all who eat from the same pot, generally the co-wives and children of one adult male. The sinkiro forms the basis for women's maruo labor in the household. Women's maruo production consequently is controlled either by the senior woman in the group or by individual co-wives who contribute rice when it is their turn to cook.

A second, and important, type of tenure relationship also operates on a subset of the land that composes a household's landholding. In exchange for providing labor toward household subsistence, junior males and all adult females are given access to some of the family's landholding for farming. These individual land rights and plots are known as kamanyango. As long as the farmer remains a member of the household, she or he controls the decision

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[1]Following the convention established above, Mandinka terms are used to describe land and labor rights. The principles are similar within the farming systems of the three other major Gambian ethnic groups (Wolof, Fula, and Serrahuli), who have also been included in irrigation projects.

making over the plot's use and the benefits derived from its labor. Men's kamanyango plots are in upland, rain-fed areas; women's kamanyango, like their maruo fields, are planted to rice in the swamps. Kamanyango labor rights and plots thus provide subordinate family members the means to obtain cash from farming, as they control the rights to the crop produced as well as the money gained from its marketing. While kamanyango plots are less numerous than maruo ones, they are a critical issue in The Gambia, where rural society is largely polygynous, male and female budgets frequently separate, and each mother is traditionally responsible for purchases of clothing and supplemental foods crucial for the well-being of her children.

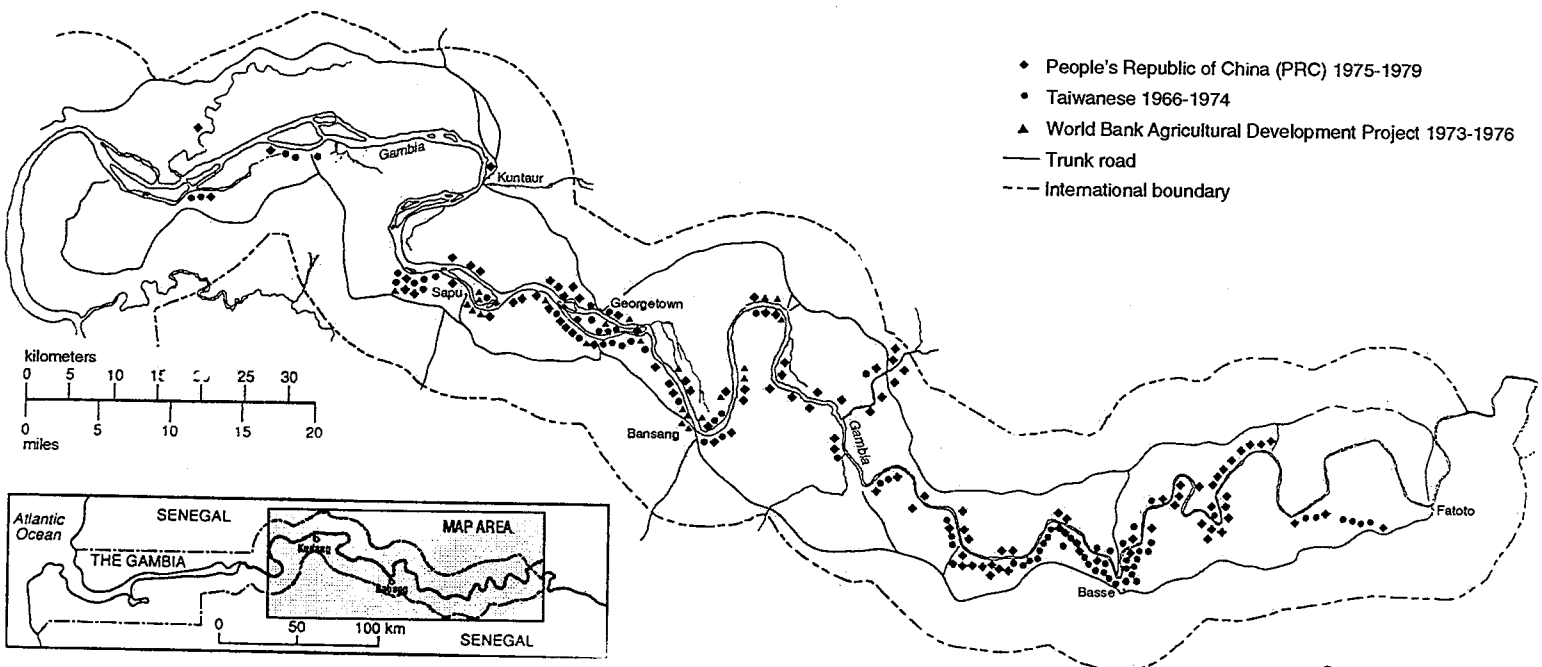
IRRIGATED RICE DEVELOPMENT AND GENDER CONFLICT

Subsistence security served as the rationale for donor funding and support of pump-irrigated rice projects in The Gambia. Implemented in 1966, just 1 year after independence from Britain, and 2 years before the 1968-73 Sahelian drought, the Gambian government obtained foreign aid to promote import-substitution by encouraging domestic rice production. Rice imports had reached 9,000 tons per annum, and foreign exchange reserves had seriously eroded with declining global commodity prices for peanut. From 1966 to 1984, the Taiwanese and mainland Chinese governments, the World Bank, and the International Fund for Agricultural Development (IFAD) were all involved in implementing double-cropped irrigated rice schemes in The Gambia. These resulted in developing the irrigation infrastructure on some 4,000 hectares of women's tidal swamps. But by the 1990s, only one-third of the land remained in irrigation, with just 10 percent double-cropped.

The Gambian irrigated rice development can be divided into two phases. The first one (1966-79) centered on small-scale community-controlled perimeters averaging 10–20 hectares (figure 4). The second phase (1984-), is represented by the large-scale Jahaly-Pacharr irrigated rice project (1,500 hectares, of which 560 are pump-irrigated) with centralized water delivery (figure 5). The small-scale projects, funded by Taiwan (1966-74), the World Bank (1973-79), and mainland China (1975-79) were developed at a cost of US$7,500 per hectare; the Jahaly-Pacharr project, capitalized at nearly $17 million, averaged $46,500 per hectare (CRED 1985:273). In contrast, improved swamp rice projects developed for Gambian women by a German nongovernmental organization The Freedom From Hunger Campaign financed by the Deutsche Welthungerhilfe during the same period averaged US$2,000 per hectare.

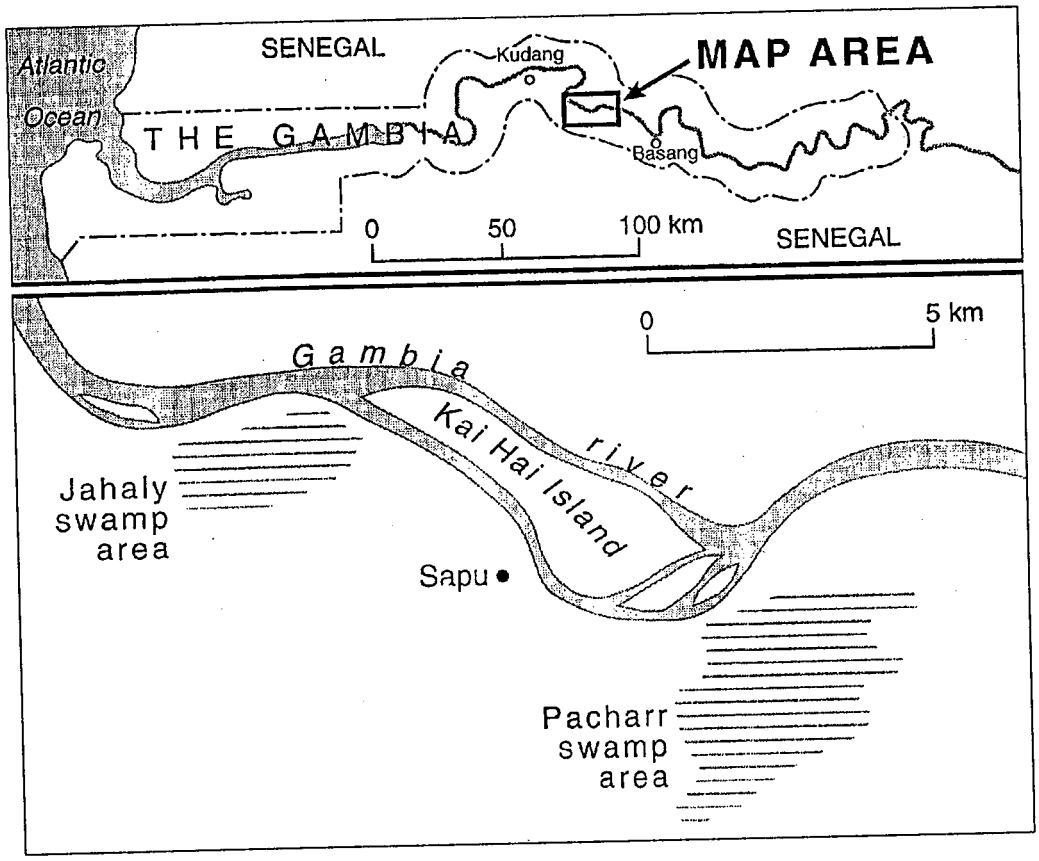
Each project adhered to a similar technological package: the introduction of high-yielding dwarf rice varieties, the construction of irrigation canals, and reliance on pumps for water delivery during the dry season or during water-deficient periods in the wet season. The principal differences in the two phases of irrigation were in the form of perimeter control and land allocation. The small-scale projects remained under customary tenure within the jurisdiction of a single community while the Jahaly-Pacharr scheme operated on a 30-year lease, which legally permitted the management to evict unproductive farmers. The large-scale scheme provided a centralized water delivery system in each of the two swamps, involving nearly 2,000 households in 65 villages. The canal infrastructure in the small-scale perimeters served 0.4 hectare; it was divided into 4 to 10 plots, which were allocated to different village families.

Figure 4. Small-scale irrigated rice schemes: The Gambia, 1966–1979.



Source: Carney 1986

Figure 5. The Jahaly-Pacharr irrigated rice project.



The water delivery system in Jahaly-Pacharr reached 10-hectare blocks, with plot size and land allocation averaging 0.5 hectare.

These differences in water delivery system and land control between the two types of irrigation systems serve as the backdrop for the gender issues that erupted in the projects. Each project credited farmers the seeds, fertilizers, pesticides, and fuel oil costs for water delivery. Credit repayment depended upon meeting anticipated productivity rates. Double-cropping, however, required mobilization of male as well as female family labor for year-round farming. To overcome male aversion to farming rice—the problem that had plagued colonial swamp development projects—development strategies adhered to a remarkably similar course by introducing the technical package for irrigated rice to male household members (Dey 1981; Carney 1993). Yet the sequence of cropping activities depended upon the availability of male and female family labor. By placing men in charge of technologically improved rice production, the donors hoped to encourage male participation; instead, they unwittingly legitimized male control over the surpluses gained from double cropping.

Control over the disposition of marketable surpluses proved pivotal to the gender-based conflicts that erupted within project households over which family members were to assume the increased workload. Male household heads claimed female labor under the customary category, maruo, but irrigated farming spelled a fundamental shift in the labor obligations

regulating the traditional cropping system. Maruo labor claims had developed in the context of a 5-month agricultural season; double-cropped irrigated rice required invoking the maruo obligation for year-round labor. There was thus no precedent for women to perform maruo subsistence labor during two cropping periods when production would yield men a marketable surplus.

The donors' uninformed view of the Gambian household-based production system resulted in gender conflict that frustrated double-cropping objectives. In the two phases of the Gambian irrigation development, female rice farmers responded in three principal ways to the loss of their rice fields and efforts to augment their rice burden through the maruo designation on irrigated land: 1) by providing maruo labor for one cropping season and relocating kamanyango production to unimproved swampland where they could generate small surpluses for sale; 2) when alternative swampland for rice farming was not available, by agreeing to perform maruo obligations on irrigated rice plots during the dry season cycle in exchange for using the same plot as kamanyango without irrigation during the rainy season; or 3) by laboring year-round on irrigated schemes but demanding remuneration in rice for their labor during one cropping season (Carney 1993). All but the first response involved an increase in women's labor. Conflict resolution, however, was to profoundly affect double-cropping objectives.

The first two responses characterized small-scale irrigated rice development, which usually confined pump-irrigation to the dry season. The third proved more common in the IFAD-funded Jahaly-Pacharr scheme, which had effectively absorbed all available rice fields into the project. Seeking to enforce compliance with the year-round cropping calendar and production targets, the Jahaly-Pacharr project lease permitted the government to tie plot use to repayment of the credited inputs and mechanization charges (2.4 tons unhusked rice per annum or half the anticipated average annual production) (IFAD 1988).

The project's mandate to double crop as a condition for participation, and the larger plot allocation in the Jahaly-Pacharr scheme, placed intense pressure on household labor. Previous irrigation schemes had accommodated women's kamanyango claims by not adhering to year-round pumped production. As Jahaly-Pacharr had absorbed most of the available rice swampland in the region, women depended on the project to reassert preexisting kamanyango land access (figure 5). But Jahaly-Pacharr was a more costly scheme than its predecessors and its credit package expensive. Both the government and IFAD were determined to prevent nonpayment of credit, a problem that repeatedly characterized earlier irrigation projects (CRED 1985). Only by a firm labor commitment from both male and female family members could the cropping calendar be followed, productivity kept high, and eviction from the project avoided. Because compliance with the cropping calendar depended on adult labor availability, the management did not champion women's kamanyango land claims in the project's pumped fields. Females now faced enormous pressure within the household to augment their labor burden.

Failing to gain management support for their kamanyango claims in the pumped plots, women pressed for their individual crop rights on the 700 hectares of the project being developed for improved tidal irrigation. If the tidal plot was the only land received in the Jahaly-Pacharr scheme, they were often unsuccessful; if the household received multiple plots, their effort to have one designated kamanyango frequently succeeded. But there were fewer fields than female claimants and tidal rice development only involved about a fourth of the project

villages—those with preexisting land claims in the area. Households not receiving tidal rice land in addition to the irrigated plot faced new demands by women: labor remuneration on the pumped plots in a share of unhusked rice. This demand was easily accommodated in the 25 percent of project households that had received more than one irrigated plot. In those households females were generally awarded the second irrigated plot as their kamanyango in exchange for providing maruo labor on the first.

Female demands for land access or labor compensation, however, could not be met in the households that were forced to share an irrigated plot. In such cases no marketable surplus was being produced; men and women worked the plot for subsistence requirements and struggled to repay the credit. The pattern of conflict resolution was more complicated in the remaining project households with just one irrigated plot. Women forced the issue of their crop rights when they failed to receive income benefits after the first irrigated rice harvest. During the second cropping season in 1984, they began to refuse to go to the irrigated fields. Because of their militancy the majority of households agreed to negotiate with women, generally agreeing to remunerate their labor at a rate of about 10 percent of rice production.

However, about one-fifth of the households that controlled one pumped plot failed to uphold women's kamanyango rights through remuneration of unhusked rice. A major reason why these households failed to offer women compensation of unhusked rice is related to intra-household friction within some kin-residence groups between dabada heads and the senior male household head. The Jahaly-Pacharr project registered the plot allocation in the name of the male household head under the assumption that all family members would be available for labor. However, many households were already divided into several dabada. Project development thus meant that control over the marketable surplus would be in the hands of the senior male household head and not necessarily divided with the male heads of the dabada. Women's ability to receive compensation of unhusked rice in such households consequently depended on the resolution of intra-household conflict over the disposition and control of surplus production.

As a result of the failure to uphold women's kamanyango rights, women withdrew their labor from the project's irrigated fields. They began forming work groups for hire to carry out the project's labor-demanding tasks like transplanting, weeding, and harvesting. By organizing into hired work groups, women managed to bid up the daily wage rate for a single laborer from US$0.70 per day to $1.12 per day. Thus, the exodus of female labor from some households and their efforts in others to maintain maruo and kamanyango production during the wet season, when the labor of males turned to peanut cultivation, resulted in many households experiencing problems in adhering to the irrigation calendar. By the 1991 dry season, the problem had magnified with crop development varying as much as one month between plots irrigated in the same 10-hectare block. As a result, water deliveries were not arriving in a timely fashion for crop needs, and yields fell. During the 1991 dry season, average rice yields declined to just 2 tons per hectare from the 4.5 tons average of the 1984 dry season.

By 1991, labor shortages within the household, exacerbated by male concentration on peanut cultivation during the wet season, had led to an increasing emphasis on the dry season cultivation cycle when men could help in rice cultivation. Facing considerable noncompliance with cropping schedules and credit repayment, the project management decided to evict unproductive and indebted households. However, this long-threatened disciplinary action could not be enforced. Too many households were affected, including powerful village and regional

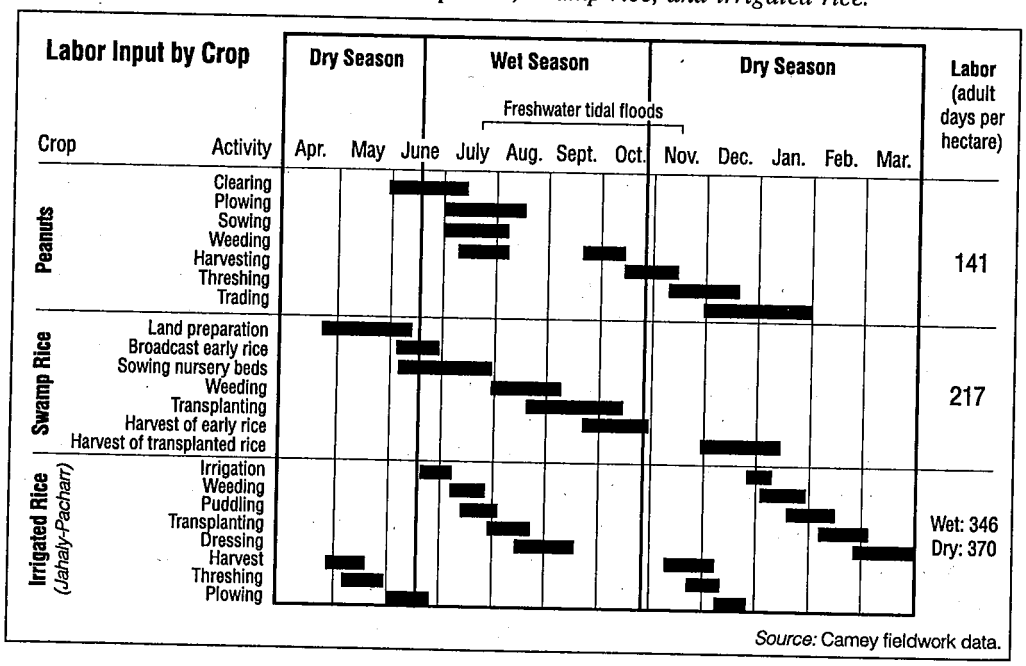
elites. The attempt to alienate project land from household control proved politically unworkable.

While gender conflict erupted in all Gambian irrigation projects, it was exacerbated in the Jahaly-Pacharr project by the large plot size and the focus of male labor on the cash crop, peanut, during the wet season. An examination of comparative labor requirements between peanut, swamp rice, and irrigated rice cultivation reveals the labor demands of each crop (figure 6). Imposing labor-intensive technologies on a rural society already overburdened with farm work and where the indigenous rice system had developed to spread out the labor burden, attest to the problem posed by irrigation schemes. Appropriate technology development would require a rethinking of the demands on labor as well as the form of technology transfer.

Government documents, IFAD reports, and those of the Dutch technical team involved in project design do not reveal the reason for increasing the average irrigated plot size in Jahaly-Pacharr over earlier schemes. Perhaps it facilitated a more efficient water delivery system. The decision to increase basic plot size proved even more puzzling given the widely published research by Jennie Dey (1981, 1982) on labor scarcity and gender issues in Gambian small-scale irrigated rice projects.

The profound changes underway in the Jahaly-Pacharr project by 1991, however, involved more than just gender issues. An understanding of the patterns outlined above improves by situating the scheme within the changing policy arena of the late 1980s and early 1990s. From 1986, The Gambia experienced several structural adjustment programs, which removed the government's artificial support price for domestic rice.[2] Trade liberalization resulted in the import of cheaper broken rice from Thailand and the removal of the fertilizer subsidy, which resulted in a price hike of 11 percent and higher charges for the imported diesel oil to

Figure 6. Labor requirements between peanut, swamp rice, and irrigated rice.



run the irrigation pumps, tractors, and land leveling equipment upon which Jahaly-Pacharr depended (Schroeder 1997; Johm 1990; Puetz and von Braun 1990). While the subsidy on rice was removed, the producer price of peanut was raised 16 percent to stimulate exports and increase foreign exchange earnings (McPherson and Posner 1991). These policy measures encouraged an emphasis on peanut cultivation over rice in the project area during the wet season while discouraging investments in the costly inputs needed to keep rice yields high. Nonetheless, the IMF support price for peanut was regarded as a temporary measure until The Gambia developed its comparative export advantage in fruit and vegetable marketing (Harvey 1990; McPherson and Posner 1991).

By the 1990s, Jahaly-Pacharr households had received the macroeconomic signal. Noting the vast expansion in banana cultivation underway in Senegal during the 1980s, some enterprising farmers began introducing the seedlings to the Jahaly-Pacharr area. Banana, cultivated without fertilizer, was widely grown on project fields by 1993; market demand originated from the coastal tourist sector and across the border in Senegal.[3] Rice production continued in the dry season on women's tidal fields, as well as with rainfall on unused pump-irrigated plots during the wet season by females.

CONCLUSION

The evolution of irrigated rice projects in The Gambia illustrates the types of intra-household conflicts that can develop with labor intensification in a gendered crop and a complex tenure system. The discussion also reveals the significance of macroeconomic policy shifts for agriculture, especially their implication for subsistence security objectives. A final theme addressed in this review of Gambian rice farming is the importance of women's role in food production and its linkage to specific knowledge systems of environmental resources. For centuries, rice cultivation in The Gambia has depended on women's detailed knowledge of rice farming environments and the transmission of that knowledge from mothers to daughters. However, this indigenous knowledge system requires access to the wetlands that permit its continuity. The Gambian wetlands are increasingly becoming the focus of vegetable and fruit projects designed to improve the country's foreign exchange earnings (Schroeder 1997; Carney 1993). During the 1990s, rice production dropped below 15,000 hectares and the index of food production per capita for the country fell in the decade after 1980 from 156 to 109, a decline of 30 percent (McPherson and Posner 1991:36). While the specter of another major drought

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[2]During the heyday of irrigated rice projects, the Gambian government dramatically increased the producer support price. At the onset of the 1968–74 Sahelian drought, the official price was 118 dalasis per ton; by the implementation of the Jahaly-Pacharr project the producer rice price had reached 580 dalasis per ton.

[3]Banana cultivation in the area, however, had been introduced by the Taiwanese on a few of the irrigated rice schemes they funded. The bananas formed a crucial component of an agro-forestry system and were planted on the embankments enclosing the plots. On the growth of the Gambian horticultural market and its encouragement with structural adjustment, see Carney 1992.

haunts, an important question emerges: what might be an appropriate irrigation strategy for one of the world's poorest nations with a rural per capita annual income of US$130?

This review of Gambian irrigated rice projects illustrates the significance of the social organization of production and consumption within a farming system for transferring irrigation technologies to women. One striking contrast between African and Asian farming systems is the frequent absence in Africa of the family farm as understood in the West and Asia, where family members pool labor, and each dependent receives benefits from the overall effort. In contrast, African farming systems are often developed in societies with high rates of polygyny where each mother is expected to provide directly for the specific needs of her children. African farming systems are marked by a strong gender division of labor, sometimes by crop, other times by task, as women perform specialized operations like sowing, weeding, and transplanting (Guyer 1980; Whitehead 1981; Richards 1983; Jones 1986; Moore 1988; Linares 1992). While Asian farming systems, once characterized by specialized gender-based activities, are becoming more flexible with broader economic change (Merrey personal communication), this pattern is not strongly evident in sub-Saharan Africa.

Appropriate irrigation development consequently depends on understanding that African farming systems are deeply gendered and frequently do not operate within a joint-utility framework. Other considerations are also vitally important. Of particular significance is the issue of access to and control over resources. In many African countries women may actually establish individual land rights by the act of clearing and cultivating unclaimed swamp land (Guyer 1980; Whitehead 1981; Linares 1992). In The Gambia, a woman also possesses the right to transfer individual plots to co-wives, daughters-in-law and sometimes, to daughters if their marriages keep them in the same village (Dey 1981; Carney 1986).[4] In countries where women's individual land rights exist in the farming system, appropriate irrigation development means a commitment to incorporating and safeguarding these rights in irrigation planning.

Any irrigation project that develops with a crop that is traditionally gendered, or reliant on skilled female labor, should link gender equity to productivity goals. This may involve pursuing innovative land allocation approaches, like distributing plots to sinkiro rather than to the dabada or household. As the fundamental unit of women's production in The Gambia, and perhaps elsewhere in the continent, cooking units could in fact become the basis for irrigated plot allocation. But this would require a return to the smaller landholdings that served as the basis of project design in earlier irrigation projects. By allocating plots to cooking units within an extended household, plot control would be placed directly in the hands of women. Direct female control over the use and distribution of the rice surplus would improve the likelihood that rice is first targeted for subsistence before it is marketed.[5]

The design of irrigation projects with gender equity objectives also involves a consideration of alternatives to pump-irrigation, like tidal irrigation. In resource-poor and debt-encum-

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[4]The transfer of individual land rights to daughters is less frequent because patrilocal residence patterns usually mean that a daughter is married outside the village and unable to farm land in her natal village.

[5]One of the oft-cited complaints by Jahaly-Pacharr project women in the scheme's first years was that the male plot owner would sell the rice produced by their labor, placing pressure upon them to use the kamanyango share they received in unhusked rice for subsistence rather than sale.

bered countries like The Gambia, appropriate technology development by nongovernmental organizations has focused on improving tidal rice production. While these projects cost considerably less than pump-irrigation schemes and may be capable of less spectacular yields, they have proven sustainable in The Gambia for two reasons: they build upon women's knowledge of wetland farming, and they target females as beneficiaries. The continued cultivation of the tidal irrigated plots in the Jahaly-Pacharr project underscores the potential of appropriate technology development. But the success of any appropriate technology approach depends on a policy framework that views food security as a crucial issue in drought-prone environments.

Given the poor performance record of African irrigation schemes and their contribution to debt, national and international pressures are mounting to make existing irrigation projects economically viable. The neoliberal policies enshrined in structural adjustment by the International Monetary Fund encourage the export of nontraditional crops like fruits, vegetables, and flowers (Mbilinyi 1988; Mackintosh 1989). In the Sahel most of these economic developments are unfolding on wetland environments, long-prized for food cropping (Mackintosh 1989; Adams 1992; Carney 1993; Schroeder 1997). Somewhat buffered from rainfall instability, wetlands are increasingly being converted to horticultural development. Appropriate wetland development will prove central to addressing the continental food crisis.

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SECTION 5

Introduction

Gender and Collective Action

The term 'collective action' is used to describe the process and consequences of individual decisions to coordinate behavior. It refers both to the (formal or informal) processes by which institutions are created and maintained, and to the (formal and informal) groups that decide to act together. All cases of collaborative decision making can be understood as collective action.

The process of collective action often initially entails a challenge to the status quo, through a publicly voiced, normative claim that the particular status quo situation is somehow unjust or socially inappropriate. In the context of irrigation management transfer (IMT), this challenge of the status quo is frequently (though not always) externally imposed. New collective action inevitably involves either creating or redistributing rights and duties. Such change involves power and authority and is thus also structured by prevailing gender relations. The further development of collective action is very much a process of 'choices' by individual agents between cooperating and not cooperating (see the paper by Cecile Jackson in Section 2). The ability and willingness of individuals to participate in collective action is partly structured by prevailing power relations and norms and values. It is also determined by expectations regarding the outcomes of collective action, and will be partly contingent on the expected behavior of the other participants.

Within the irrigation discourse, it is now widely accepted that collaboration to manage common resources is not only possible, but is widespread. The question is no longer whether decentralized collective action can be effective, but under what circumstances it is appropriate, and how positive synergy between the state, market, and civil organizations can most efficiently and fairly supply public goods. Concepts and theories on collective action provide good entry points for analyzing gender-based patterns in the management of organizations and in their outcomes. The explicit focus on the tensions and compatibilities between individual and collective behavior allows critical examination of the opportunities and constraints to female access to and control of public decision making and public goods. In spite of this, the salience of gender relations for institutional forms has until recently not been obvious to mainstream social scientists, or irrigation management specialists. This is because the production and reproduction of gender-based inequities are rarely made explicit in institutional ideologies and norms. While it is accepted that 'domestic' or 'private' institutions are gender-based, public relations of production, exchange, and administration are often assumed to be indifferent to gender difference.

A gender-based approach to collective action explores ways in which characteristic organizational structures and procedures may produce accountability failures where women are

concerned, the ways in which incentive systems may militate against the pursuit of women's interests, and the ways certain organizational cultures and cognitive orientations may undervalue women's perspectives and the expression of their interests. It also facilitates the exploration and assessment of strategies for change, and alternative organizational arrangements. The three papers in this section explore this theme using data from three very different parts of the world: South Asia, the Philippines, and Tanzania.

The paper by Ruth Meinzen-Dick and Margreet Zwarteveen reviews the (meager) evidence on female participation in collective action activities in South Asia (i.e., Bangladesh, India, Nepal, Pakistan, Sri Lanka). They document the minimal participation of women in formal water user associations in South Asia, raise a number of issues about the likely consequences and causes of this minimal participation, and identify a set of research needs. Substantive areas requiring more research include: gender differences in water uses and needs, women's changing roles in irrigated agriculture, how membership criteria and community norms affect women's participation in user organizations, the informal means women use to influence decisions and their effectiveness, and the impact of the low level of female participation on the effectiveness of user organizations.

A large percentage of the poor people of the world live in South Asia, mostly in rural areas, where the social structure is highly skewed in terms of gender as well as class, caste, and other variables. Access to natural resources, land, forests, water, as well as social resources such as education and capital is also highly inequitable and gender-biased. There are quite a number of governmental, and nongovernmental, programs aimed at promoting local community control of resources as a means of improving incomes and living conditions while conserving natural resources; some of these make deliberate attempts to overcome gender biases in property rights and access. To date, there are relatively few studies of the outcomes of these programs in terms of gender, particularly those with a water component. IWMI is initiating collaborative research in India, Nepal, and Sri Lanka (with Ford Foundation support)[1] and hopes to do so in Pakistan during 1998.

Rhoda Kweka, herself a key manager in a division of Tanzania's Ministry of Agriculture concerned with promoting gender equity in irrigation, provides an overview of a special program aimed at mobilizing women for irrigation development and other activities in the Mbeye region. Designed to correct the deficiencies in an earlier project which had failed to make provisions for women's participation, this project illustrates the great difficulties in such projects and the potential benefits. Jeanne Illo, well-known for her pioneering work to involve women in irrigation associations in the Philippines, provides us with an update on recent efforts at the political level to strengthen women's positions. Women's interests in water include those of men—irrigating crops—as well as other concerns, such as water for vegetable plots and having access to clean water for household use. The Philippines case, like some of the Latin American countries described in the paper by Deere and Leon, illustrates the importance of women's organizations in pressing for more equity in terms of rights, and of collective action to obtain them and make them a reality.

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[1]This support was a direct outcome of this Gender and Water Workshop.

Gendered Participation in Water Management: Issues and Illustrations from Water User Associations in South Asia

Ruth Meinzen-Dick and Margreet Zwarteveen[1]

ABSTRACT

The widespread trend to decentralize natural resources management responsibility from the state to "communities" or local user groups has by and large ignored the implications of intra-community power differences for the effectiveness and equity of natural resources management. Gender is a recurrent source of such differences. Despite the rhetoric on women's participation, a review of evidence from South Asia shows that female participation is minimal in water user organizations. One reason for this is that the formal and informal membership criteria exclude women. Moreover, the balance between costs and benefits of participation is often negative for women because complying with the rules and practices of the organization involves considerable time costs and social risks, whereas other ways to obtain irrigation services may be more effective for female water users. Although effective, these other and often informal ways of obtaining irrigation services are also typically less secure. More formal participation of women can strengthen women's bargaining position as resources users within households and communities. Greater involvement of women can also strengthen the effectiveness of the organization by improving women's compliance with rules and maintenance contributions. Further detailed and comparative research is required to identify the major factors that affect women's participation and control over resources, if devolution policies are to address the tension between objectives of transferring control over resources to community institutions, and ensuring the participation of all members of the community, especially women, in highly stratified and patriarchal societies.

INTRODUCTION

The devolution of natural resources management responsibility from the state to "communities" or local user groups has become a widespread trend that cuts across countries and re-

[1]International Food Policy Research Institute and IWMI, respectively. The authors wish to gratefully acknowledge the comments and help provided by Lynn Brown, Anna Knox McCulloch, Doug Merrey, and Agnes Quisumbing. Responsibility for any errors rests with the authors.

sources sectors. Programs such as Joint Forest Management, Irrigation Management Transfer, and Fisheries Co-Management can all be seen as variants of attempts to establish or strengthen "community-based natural resources management." What is happening in irrigation, as in other sectors, can be seen as the convergence of a number of policy trends: decentralization, which attempts to improve the management of natural and fiscal resources by moving both decision-making authority and payment responsibility to lower levels of government (e.g., India's *panchayati raj* programs); privatization, which transfers ownership of resources from the public sector to groups or individuals (including for-profit firms); and participation and democratization, which seek the involvement of citizens affected by programs, for social goals of empowering local people as well as for goals of improving program performance.

However, devolution of control over resources from the state to local organizations does not necessarily lead to greater participation and empowerment of all stakeholders. This is particularly true in highly differentiated and stratified societies. Romanticized views of "communities" as homogeneous groups that have a strong common commitment to maintaining their local resources base, while ignoring the effects of power differences within the community on who can participate in decisions regarding management and the share of benefits, risk reinforcing inequality (Agrawal and Gibson 1997).

While there may be many ways of identifying groups that are frequently marginalized, gender differences in power and influence are a recurring pattern. Women's participation has received considerable rhetoric, but there has been less carefully paid attention to the differences between women's and men's needs and priorities with regard to resources use, and the barriers women face in achieving control over resources, especially within local organizations.

This paper examines the implications of gender differences for local management of natural resources, with special reference to the management of irrigation systems in South Asia. In this context, a highly stratified social structure, as well as common patriarchal norms on the appropriate position of women, provide a clear challenge to notions of homogeneous "communities" for managing resources. At the same time, the vital nature of water resources for men and women, both for irrigation and other uses, highlights what is at stake in the process of devolution of resources control.

The intra-household literature provides an important source of insight and understanding of gender differences. The section following this introduction reviews the major issues related to intra-household models, and links them to the analysis of gender in community studies. The paper then examines the implications of gender for devolution of natural resources management, especially irrigation. Because the outcome of devolution programs hinges on the activity of local organizations, the third section of the paper examines the extent and forms of women's participation in these organizations, using examples of water user associations in South Asia, and presents evidence on the effect of gender differences in participation on the system management as a whole. Because of the lack of systematic research on gender dimensions of community organizations for irrigation and management of other resources, it is impossible to draw firm conclusions about the need for and impact of female involvement (or noninvolvement). This paper tries to draw out the main issues, and illustrate them wherever possible with empirical examples. The concluding section looks at ways to increase women's involvement in resources management organizations and highlights policy issues and critical areas in which further research is needed.

GENDER, COMMUNITIES, AND NATURAL RESOURCES MANAGEMENT

Households and Communities: Beyond the "Unitary" Model

The treatment of a community as a homogeneous group with common objectives parallels, in many ways, the "unitary models" of the household in economic literature. Both treat a social institution comprising multiple individuals as though it behaves as a single entity, by assuming that all members have common objectives, and that they pool their resources (see Alderman et al. 1995).

While a unitary conception of the household has value as a heuristic device and allows parsimonious formal modeling of behavior, it has come under significant criticism on empirical grounds, as findings from studies of income pooling or labor supply decisions are inconsistent with many of the model's underlying assumptions (Alderman et al. 1995). Applying unitary concepts of the household to policy issues therefore risks producing inappropriate recommendations. A number of studies have, for instance, found that women and men spend income under their control in systematically different ways, with women more likely to devote a high proportion of their income on food and health care for children. Increasing the income of one member of the household (often the male "head") does not automatically increase the welfare of all household members equally. For example, in the Mahaweli irrigation and resettlement scheme in Sri Lanka, Schrijvers (1984) argues that

> *the chronic undernutrition in the Mahaweli H area is a direct result of planning that cuts women off from their productive resources. It is of primary importance that women, who have to provide the daily food for children and other members of the family, have the means themselves to obtain sufficient food. . . . Research showed that only 35% of the net income of the male farmer (after debts were paid off) benefited the rest of the household.*

In contrast to unitary conceptions, there is a range of "collective" models of household behavior that deals with household actions as the outcome of negotiations among individuals (see Alderman et al. 1995). Using this approach directs attention to differences among members, especially with regard to bargaining power. The suggestion that women and female children "voluntarily" relinquish leisure, education, and food would be somewhat more persuasive if they were in a position to demand their fair share. It is the juxtaposition of women's lack of economic power with the unequal allocation of household resources that lends the bargaining power approach much of its persuasive appeal (Folbre 1986:251).

The gender analysis literature abounds with examples of how systematic, socially constructed patterns of differences between men and women affect the distribution and use of resources within households (see Haddad, Hoddinott, and Alderman, eds. 1997; Hart 1995). However, Agarwal (1997a) argues that leaving this analysis at the household level is incomplete, because it does not take into account the effects of the community on gender relations in the household, or vice versa.

Community Management of Natural Resources

As the literature on social stratification clearly demonstrates, there exist marked intra-community differences between subgroups (see Bendix and Lipset, eds. 1954; Dumont 1980). These differences apply not only to wealth, but also to norms and preferences and to power and interests. Thus, priorities for use of resources and style of management are also likely to differ, as are capacities and powers to defend those priorities.

The subgroups in communities are often defined along the lines of occupation, class, caste, or ethnicity. Gender cuts across these dimensions of intra-community differentiation and hierarchy. In terms of access to and control of resources, gender interacts with other aspects of socioeconomic differences, implying that women cannot be considered a homogeneous category in terms of their interests and needs. Because women are positioned within society according to a variety of different criteria, the interests they have in common as a group are similarly shaped in complex and sometimes conflicting ways (Razavi and Miller 1995). It is therefore difficult, if not impossible, to generalize about the interests of women. What is possible is the identification and analysis of how gender shapes and influences the possibilities, interests, and perceptions of men and women as regards natural resources management.

The ways in which women and men of different classes, castes, or ethnic groups use and manage resources can therefore not be a priori assumed or easily predicted. Men's and women's linkages to natural resources are rooted in their locally and historically specific material realities. This is why it is problematic to assume the existence of a "natural" (or essentialist) relation between women and nature, as some eco-feminists do (Shiva 1988) at other than symbolic levels. Furthering the understanding of the multi-stranded and complex linkages between gender equity, communities, and environment at levels other than ideology (Agarwal 1992) requires thinking across and beyond stereotype bipolar hierarchies which tend to oppose men to women and nature to culture, and should avoid essentialist notions of gender differences.

As in the case of intra-household analysis, the case for including attention to gender differences within communities depends on the extent to which patterns of resources control, decision making, or welfare outcomes are influenced by systematic differences between men and women. Even though there exists relatively little empirical information about these differences, theories about intra-household and intra-community differences do provide some indication as to where to start looking for them. Gender relations crucially influence both the structures of property and endowments with which people enter communities, and the structures of reproduction that govern domestic divisions of property and labor and thereby shape people's relationships to communities. Furthermore, community organizations affect women's access to and control over resources and decision making and welfare. Thus, whether the policy objective is to achieve more efficient and sustainable use of resources, or to promote equity and greater local participation and control, systematic power differences between men and women merit attention.

The links between gender and community have direct consequences for the efficiency and sustainability of natural resources as well as for the livelihoods of people who depend on those resources. The linkages become especially relevant for policies in the context of the current emphasis on devolution of resources management. As the state transfers responsibil-

ity and rights over natural resources—forests, pastures, fisheries, or irrigation systems—to local "communities," membership in local resources management organizations takes on an increasingly important role in determining rights over resources. Hence, it is critical to examine and be aware of who within the communities takes on the tasks, and who controls use, decision making, and the stream of benefits.

Although there is a growing body of literature on gender and property rights (see Agarwal 1994; Lastarria-Cornhiel 1997; Meinzen-Dick et al. 1997a; Rocheleau and Edmunds 1997; Zwarteveen 1997), much of the theoretical and empirical analysis has focused on gender dimensions of access to private resources. By contrast, the literature on common property resources has tended not to look at gender dimensions. For example, only 17 of the 529 papers presented at the International Association for the Study of Common Property meetings since 1990 mention gender or women in the title or abstract.

Devolution programs that vest rights or control over resources systems (including irrigation infrastructure) in local communities create (or recreate)[2] common property resources. Even though policy statements (e.g., ICWE 1992) generally use terms such as "participatory," "user-based," and "involving all stakeholders," little explicit and systematic thought and attention has so far been given on how to achieve these objectives, especially as regards women's participation. Even in the domestic water supply arena, where women's roles are well recognized, Narayan (1995) found that only 17 percent of the 121 projects reviewed achieved substantial levels of female participation. If control over resources is devolved to "traditional" institutions, these are likely to be male-dominated, and reinforce existing power relations.[3] Creating viable new "democratic" institutions is difficult and time-consuming, especially if they are to be strong enough to manage a valuable resource over a long period.

The literature on common pool resources management addresses the implications of heterogeneity of assets, as well as heterogeneity of preferences for collective management of resources. Although this does not deal specifically with gender issues, some of the issues raised may be applicable. Baland and Platteau (1996) argue that cultural differences in perceptions and norms and differences in interests in a resource are detrimental to local resources management, but differences in assets or power are not necessarily a disadvantage. The negative effects of asset differences are less if the stronger members have an interest in the resources and depend on the contribution of the less powerful for maintaining the infrastructure or enforcing rules, or if the links between the two sets of users are highly personalized and multidimensional. This would imply that strong differences between women and men in expectations and priorities are likely to be problematic. The multi-stranded linkages between women and men mean that intra-household negotiations affect the outcome of natural resources management at the community level, and that women will have more bargaining power for getting their needs met if men need women's direct or indirect contributions to resources management (Meinzen-Dick et al. 1997a). The extent to which women are able to meet their water needs through community or household institutions must, however, be examined empirically.

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[2]In many cases, the resources that are being vested in communities in devolution programs were originally local common property resources. The state had exerted a claim over those resources, and is now transferring them back to the communities (Agarwal 1997b).

[3]According to Wade (1987:230, cited in Baland and Platteau 1996) "corporate organizations, to be effective, should be based on existing structures of authority. In practice, this means that the council will be dominated by the local elite which is a disturbing conclusion for democrats and egalitarians."

Gender and Participation in Resources Management Organizations

There is a long history of women's involvement in local organizations. Moser (1989) identifies participation in community management work as part of the "triple role" of women (along with their reproductive and productive roles), and notes that this has formed the basis for many welfare approaches to women (e.g., mothers' clubs, provision of relief, or community services such as domestic water supply or health care), which treat women's organizations as an extension of their domestic roles. Other literature and efforts to organize women have focused on information and political empowerment (e.g., DAWN 1985).

The major types of women's organizations for production have been cooperatives and micro-credit programs, e.g., Self-Employed Women's Association (SEWA), India. Both of these deal with "enlarging the pie," or creating new assets. Women's participation in organizations with control over natural resources is more challenging (literally) because it deals with property rights over existing resources, especially natural resources. Instead of creating new assets, which is a positive-sum activity for members and does not threaten the rights of nonmembers, participating in the management of resources such as land or water can be divisive. For women, as for the poor, to formally claim a right to the resources and take an active role in their management will mean challenging the status quo.

At the level of policy formulation, there seems to be widespread consensus about the need to include women in community organizations for resources management and conservation. The Dublin Statement on Water and the Environment adopted:

> ***Principle No. 3—Women play a central part in the provision, management and safeguarding of water.*** *. . . Acceptance and implementation of this principle require positive policies to address women's specific needs and to equip and empower women to participate at all levels in water resources programs, including decision-making and implementation, in ways defined by them* (ICWE 1992:4).

Many projects and programs which involve the organization of community-based groups make explicit mention of their intention to guarantee some degree of participation of women. Contrary to the expectations raised by these policy statements, there exists very little evidence of explicit attempts to increase or improve the involvement of women. Most of the "mainstream" literature on natural resources management (especially irrigation) does not mention gender differences (other than in the form of the occasional obligatory statements that "more attention is needed") nor differentiate between male and female users. Much of what is available is in the form of project documents and "gray" literature. The "gender and environment" and "eco-feminist" literature does make frequent mention of women as resources managers, but this seems to be mainly based on the recognition of women as important users of natural resources. If management implies some kind of control over decision making and planning to achieve objectives, it is less likely that women will be, as frequently, considered "managers" (Jackson 1993).

Recognition of Women as Water Users

A first and crucial condition for enabling and questioning women's participation is the recognition—at all levels—of women as resources users and managers, and the acceptance of women's resources and management needs as legitimate. In the context of irrigation, and with the possible exception of female-headed farms, women often continue to be perceived as "helpers" of their husbands. Men are seen to best represent the water-related interests and needs of the household at the level of the community, and complete congruence of interests between men and women is assumed. These ideas are partly, and often implicitly, based on a representational division of the world into two clearly delineated spheres of activity, the public and the private. The paradigmatic subject of the public and economic arena is male, whereas that of the domestic arena is female (Goetz 1995).

In much of the South Asian irrigation context, these assumptions are not valid. Using water or irrigating is not confined to men; women do use water both for productive and for domestic purposes. In addition, women provide labor or other resources to the maintenance of irrigation systems, and they directly or indirectly benefit from the use of irrigation water. They do so mostly in their capacity as co-farmers, working in close collaboration with their husbands to cultivate irrigated crops on their husbands' (or "the family") plots. In such a situation, the nature of the needs of the husband and wife for water are usually quite similar: both want and need a supply of water that is adequate for successfully growing one or more crops a year. Differences of opinion and in preferences may nevertheless exist regarding the timing and timeliness of water deliveries, which are based on gender divisions of tasks and responsibilities or on different crop preferences.

Women often also use water for purposes other than irrigating the "main" crop, for instance for watering livestock or for irrigating the homestead or for domestic purposes (see Zwarteveen 1994 and 1997 for a more detailed description of gender differences in water needs). The number of women using water for irrigation in their capacity as heads of farms is reported to be steadily increasing in most South Asian countries (see Bhattacharya and Jhansi Rani 1995). Female heads of farms may have different water needs than male farmers, either as a consequence of a reduced availability of male family labor, or because irrigated agriculture assumes a different importance in the household's livelihood strategy.

Gender differences in water needs have not been widely documented. Nor is there much documentation about women's uses of water, or of women's involvement in irrigated agriculture. Increasing the recognition and legitimacy of women's water-related needs and interests, and of gender as a source of differences as regards those needs and interests, crucially depends on more information and on research to gather this information.

WATER USER ORGANIZATIONS IN SOUTH ASIA

Membership of Water User Organizations

Evidence from water user organizations in Sri Lanka, Nepal, Pakistan, and India shows that women's participation in these organizations is much lower than men's (see table 1). In all

Table 1. Female participation in water user organizations.

Country	Female members %	Membership criteria	Reference
Sri Lanka	15	Legal ownership or tenancy of irrigated land	Athukorala and Zwarteveen 1994; Kome 1997
Nepal	0	Cultural notions regarding gender roles	Pradhan 1989; Bruins and Heijmans 1993; Zwarteveen and Neupane 1996
Pakistan	0	Officially recognized "water users" on warabandi lists	Bandaragoda 1997
India	6	Legal ownership of land	PMU 1991; IRDAS 1993; Dalwai 1997

these countries there is low female participation in water user organizations despite high involvement of women in irrigated agriculture and agricultural decision making. In most cases, low female participation is also in conflict with official policy statements, which almost always claim that the involvement of all farmers or water users is the ultimate objective. The few documented cases of a higher female involvement in water user organizations either stem from women-only organizations managing groundwater pumps (van Koppen and Mahmud 1995; Jordans and Zwarteveen 1997) or are from areas where men were not interested or were absent (Jayasekhar, Karunakaran, and Lowdermilk 1992; Dalwai 1997).

The extent of participation—by men or women—in organizations for resources management is the outcome of two factors: rules for membership, which determine eligibility to participate, and the balance of costs and benefits to be derived from involvement, which influences individuals' decisions to participate. While membership criteria and incentives for participation have received attention in analyses of water user associations generally (see Ostrom 1992; Meinzen-Dick et al. 1997b), there has been much less attention to gender differences in either of these critical areas (Agarwal 1997a).

Formal and Informal Membership Criteria

The most easily recognized gender-based barriers to participation stem from membership rules which directly or indirectly exclude women. These either stipulate that only formal rights holders to irrigated land can become members (some Sri Lanka cases) or require head-of-household status to be eligible for membership, or sometimes a combination of both (Nepal). Since men tend to occupy these categories more often than women, most women are not considered eligible for membership. In the South Asian context, such formal criteria often appear to coincide with existing notions about the appropriateness of female participation in meetings. In dry zone irrigation systems in Sri Lanka, where legal cultivatorship is the membership criterion used, out of the limited number of women belonging to this group only very few actually do (actively) participate in the activities of the water user organization (Kome 1997:30).

Prevailing stereotypic ideas about the gender division of labor and about appropriate male and female behavior function as informal membership criteria. In Sri Lanka, Nepal,

Pakistan, and India, ideas that only men are farmers and interested in irrigation, along with the traditional male domination in public decision making are factors that underlie the absence of women in water user organizations (Bandaragoda 1997; Bruins and Heijmans 1993; Kome 1997; Zwarteveen and Neupane 1996). In addition, women are thought not to be capable of participating in meaningful ways (partly because they are illiterate) and they are assumed to be busy with other more appropriately female activities (Bruins and Heijmans 1993; Zwarteveen and Neupane 1996). Social norms prescribing women to confine their activities to a small geographical area (homestead, village or nearby fields) may also effectively exclude women from becoming members of water user organizations (IRDAS 1993).

In addition to these formal and informal membership criteria, the process through which new water user organizations are formed in management transfer programs is often gendered, partly as a result of preconceived notions of planners about who are to be considered users, and partly because of the organizing process itself. In Sri Lanka, the Irrigation Department initiated this process by contacting those farmers they already knew, whom they asked to inform and mobilize other farmers. Almost all the farmers known by the Irrigation Department were men, and very few of these men invited female farmers to participate. The fact that the first set of activities to be undertaken by the new organizations concerned rehabilitation construction work further decreased the chances for women to become involved, since construction works are considered typical male activities (Kome 1997).

Long (1989:240) observes that "the question of non-involvement should not be interpreted to imply that nonparticipants have no influence on the constitution and outcomes . . . . On the contrary, they can, as 'backstage' actors, have a decisive influence on strategies and scenarios." In spite of not being formal members or participating in meetings, women may play other roles in organizations, or in carrying out collective action. There exist a few documented examples of such nonformal ways of female participation. Pradhan (1989) describes how in the Bhanjayang Tar Ko Kulo in the hills in Nepal, women intervened in a conflict between head enders and tail enders about canal maintenance. In the Sreeramsagar irrigation project in India, women in one village organized themselves to remove obstructions in the canal and guard the water flow. This elicited the following comment from an old male farmer: "We have seen that nobody is bold enough to obstruct women and it has made things easy for us" (Rao, Hassan, and Shyamala 1991). A female farmer in another village in the same irrigation system played a leading role in settling water-related conflicts. In yet another village, women took the initiative to help their husbands to irrigate, by allowing them to guard the canals and procure the water while the women applied the water to the field. The *neerpaccis,* or common irrigators, in South Indian tanks are traditionally male employees of the water user association. In several cases, women have been seen carrying out the water distribution tasks, not as reerpaccis themselves, but carrying out the work for their husbands (field observations 1994). In Sri Lanka, wives of male office-bearers often assist their husbands with administrative tasks and secretarial duties (Athukorala and Zwarteveen 1994). Women may also be asked to clean meeting areas, and to provide drinks and snacks to participants (Weerakoon 1995).

Although highly anecdotal, these examples of management-related tasks and roles of women suggest that nonformal and less-recognized ways of participation in water user organizations may prove to be a promising area for further research. It may provide important entry points for identifying realistic ways to make water user organizations more gender eq-

uitable, while it may also shed new light on the determinants of the performance of organizations by uncovering management practices and decisions that have hitherto gone unnoticed.

Costs and Benefits of Participation

Just as membership criteria have formal and informal dimensions for men and women, so also the costs and benefits include a range of tangible as well as intangible factors that influence decisions to participate in the activities of local organizations. While the tangible factors may be easiest for outsiders to identify, other considerations can rank higher in local people's own decisions.

Because of their high domestic and productive workloads, the opportunity cost of time to attend meetings and do other work for the organizations is different, and often higher, for women than for men. Important in this respect is that it is not as easy for women to transfer some of their responsibilities to their husbands as it is for men to leave some of their tasks to their wives. Timing and location of meetings may also impose a higher cost on women than on men. In the Ambewela irrigation system in the hills in Sri Lanka, meetings are held at night to suit male preference. For women, it is highly unsuitable to go out after dark (Kome 1997). In another system in Sri Lanka (Parapegama), women do not like to go to the meetings of the water user organization because the meetings are held at the bar,[4] and usually end up with everybody drinking liquor. And, while most Sri Lankan men go to the meetings by bicycle, very few women own or ride bicycles, implying that it would take them much longer to go to meetings (Kome 1997). Similarly, formal training held away from the village or community and requiring an overnight stay imposes a higher cost (in terms of child care arrangements or family resistance) on women than on men.

Because of membership criteria and as a direct result of the process of organization, water user organizations in South Asia have often come to be historically and socially constructed and defined as predominantly male domains. For a woman to be able to actively participate in water user organizations implies challenging prevailing gender norms and practices, at both the household and the community level. It would involve a revalorization of female identity and work, rejecting norms and regulations which tie women to specific roles and it would imply struggling to occupy spaces previously reserved for men. As one Sri Lankan woman tried to explain the absence of women in the water user organization:

> *Women work hard in the field. They contribute more labor to the cultivation than men. However, we never try to challenge the men. We think they should retain their position as head of household. Traditionally, a man is seen as the decision maker in the household. This is not the case in reality, but still we allow them to go to the FO [Farmers' Organization] meetings in that capacity* (Kome 1997:14).

[4]It is not typical for Sri Lanka that bars are used as meeting places for farmers' organizations. Meetings are often held at temple grounds or community centers, which are socially accessible to women.

Also, the abilities and capacities needed for participating in organizations, and especially for office-bearer positions, may not be as easily identified with women as with men for a number of reasons. In Nepal, "Women ... referred to their illiteracy as a reason for not attending meetings; they were afraid that they would not be able to understand what was being said and thought they would have little to contribute" (Zwarteveen and Neupane 1996:9). Farmers (male and female) in Nepal also mentioned women's lack of negotiating skills and mobility as two factors inhibiting meaningful participation of women (Zwarteveen and Neupane 1996). On the benefits side, the prestige of participation in public fora, and especially of leadership positions in the organizations, may be valued more highly by men than by women (see Moser 1989; Agarwal 1997).

Whether women are willing to bear these costs and face these social risks will largely depend on their assessment of the effectiveness of the organizations and of formal participation in them as a means of achieving personal objectives, as compared to other means available to them. This calculation is illustrated by comments from a woman in the Parapegama irrigation system in Sri Lanka:

> *I never participate in the FO meetings. If I go there I have to spend about 2 or 3 hours, but if I stay at home, I can make 200–300 beedis.*[5] *Therefore I do not like to go. I will ask my husband what the officers said. It is better to be a member of the Death Donation Society*[6] *than be a member of the FO. The FO does not give quick benefits; we can cultivate without the FO. In addition to that, most people ignore the FO* (Kome 1997:24).

In the Nepal Chhattis Mauja system, which was built and is traditionally managed by farmers, women said that they never attend meetings of the water user organization because the meetings offer no opportunities for them to raise their concerns and needs. Many of these women perceive "stealing" water to be an easier solution than those offered by more formal channels (Zwarteveen and Neupane 1996).

In other cases, the fact that women benefit indirectly from the organizations even without participating directly may explain why they see no need to participate more fully and formally. In the Rajolibanda Diversion Scheme in Andhra Pradesh, India, "although women are not actively involved in the discussions and approval of the operational plan, all women are aware of it" (IRDAS 1993:27). The women also indicated that because of the meetings, they benefited from a reduction in conflicts over water and from information about when they would get water, which enabled them to plan their work in the house and the fields (IRDAS 1993:28-29).

That female nonmembers succeed in getting their needs met indicates that not all irrigation management decisions pass through the formal organization. Instead, the water user organization can be considered one of a number of coexisting and partly overlapping "do-

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[5]Beedis are local, inferior cigarettes. Making beedis is an attractive income-generating activity of young women with children, since they can do it at home.

[6]Death Donation Societies are savings societies. In principle, savings are meant to be spent for funerals. In practice, Death Donation Societies often also provide loans for consumptive or agricultural purposes.

mains of interaction" (Villareal 1994) in which decisions about resources management are taken. One such domain of interaction in which women influence water-related decisions and obtain services is the household. In almost all cases reviewed (women themselves indicated that) if they need anything specific to be said at water user meetings, they would either tell their husbands or try to send male relatives (often sons or sons-in-law). Likewise, many women indicated that they receive information about water delivery schedules and other decisions taken at water user organization meetings through their husbands or male relatives.

When access to irrigation services is negotiated within the domain of the household, it becomes subject to the quality of the intimate relations women have with their husbands, sons and sons-in law, or fathers. Women's success in obtaining services geared to their needs will partly depend on the extent to which their specific water needs are complementary to, shared with, or conflictual with those of their husbands and male relatives, and on their bargaining position in household interactions.

Another important domain of interaction regarding water decisions may be the "field." Many negotiations, struggles, and conflicts regarding water take place alongside the canals, and actual water distribution is often partly determined in this domain. Kome (1997) reports that in a Sri Lankan dry zone irrigation system, one's capacity to take water is in the first instance determined by the location of one's fields along the canals. In the second instance, water distribution follows the principle of "the survival of the fittest," reflecting existing power relations. Gender as one determinant of power also interferes in determining one's ability to obtain water. An example is provided by one woman located at the tail end, who after having unsuccessfully tried to obtain water a number of times (at night), decided to ask her brother to divert the water for her. She assumed that other irrigators would be reluctant to prevent him from taking water, since he is a man and can better defend himself (Kome 1997). Pradhan (1989) referring to hill irrigation systems in Nepal also mentions the ability to physically defend oneself as a factor which limits women's possibilities to take water in times of water scarcity.

Other domains of interaction which directly or indirectly (co-)determine women's access to and control of irrigation services may exist. Female networks (work groups as well as social groups) may be important, especially where male and female social networks are highly segregated. And in addition to domains, individual contacts with people (mostly men) in powerful political positions can be a significant source of power. Female farmers in both Sri Lanka and Nepal could very clearly identify the persons they would approach in case they had water-related questions or needs (Zwarteveen and Neupane 1996; Kome 1997). Maintaining good relationships with such people through regular courtesy visits and gifts may be an important mechanism for women to secure their access to resources.

The use of indirect means to obtain water resources is consistent with women's strategies for gaining access to other resources, such as land and trees (see Lastarria-Cornhiel 1997; Meinzen-Dick et al. 1997a; Rocheleau and Edmunds 1997). But as is often the case with gender differences in property rights, gaining access through such indirect means does not provide much control over the resources, or the ability to make decisions regarding their management. Relying on connections to access the resources, whether through male relatives, officials, or others, increases women's dependence on others; whereas independent rights to resources can raise women's standing and bargaining power. Nevertheless, these socially nuanced means of access are critical to actual patterns of resources use, and should not be neglected in research or policies.

To what extent women's needs are "defendable" in the different domains depends on their social and legal legitimacy. In the case of water needs, although the literature often refers to irrigation organizations as "water user associations," they tend to include only irrigators, and are concerned with water deliveries to field crops. Some of the uses of water by women, such as water used for irrigating homestead gardens or watering livestock, are likely not to be included in formal water distribution plans, and may thus not be considered legitimate in the domain of the water user association. In other domains (such as the household and field) the legitimacy of these needs may be greater, allowing women access to water for meeting these needs. In this respect, it is important to realize that women may have a vested interest in not being identified as users or farmers: claiming water as women (or mothers or domestic caretakers) may cause less resistance and be easier than claiming water as farmers.

In sum, looking at natural resources management organizations in some South Asian countries from a gender perspective reveals that the dynamics of resources management cannot be properly understood when limiting one's attention to the formal organization. The evidence also suggests that the lack of visible participation of women in the resources management organization cannot be construed as implying their lack of interest in the use and management of the resources, nor does it imply that women do not influence what happens within the organization. Water user organizations are only one of a possible number of domains in which decisions about the management of water are taken. Women's access to these other domains may be easier as compared to the formal organization, while their participation in these other domains may also be more effective.

However, the fact that women succeed in somehow getting their water needs accommodated does not imply that more formal participation in water user organizations is not desirable or necessary. Access obtained through informal means is not as secure, and control over water which is not sanctioned by democratically devised rules and principles is more prone to be influenced by unequal power relations. If devolution programs are to effectively transfer rights along with responsibility for water management to local communities, it becomes all the more critical to examine how those rights are distributed within the communities.

Implications of 'Nonparticipation' for the Effectiveness of Organizations

The lack of participation of a large number of the users in the management of irrigation would, at least according to the theories of participatory management, imply performance weaknesses in the organization, because of weaknesses in communication, representation, democracy, and accountability, which may lead to free riding, rent seeking, and corruption (Ostrom 1992). In one of the few studies to address this from a gender perspective, Zwarteveen and Neupane (1996) found that the all-male organization for the Chhattis Mauja system in Nepal faced difficulties in enforcing its rules on women. Female heads of farms in the head end of the system always took more water than their entitlements, while contributing less labor than they should. In other parts of the system, village irrigation leaders also mentioned water stealing by women as a problem which was difficult to solve because women were not members of the organization and thus could not be punished. Women did not steal water or "shirk" from contributing labor to maintenance only because of opportunism. Water stealing by women occurred partly because women had an interest in applying more water to the rice field than

would be needed for optimal crop growth. A slight increase in the ponding depth considerably decreased weed growth, and thus the time women needed to devote to weeding. As for contributing labor, formal rules and prevailing gender norms made it difficult for women to comply. Female labor contributions are valued less and there is even an official rule which stipulates that labor for emergency maintenance and maintenance of the head dam can only be supplied by men. Fear of being harassed by men and cultural restrictions on female mobility also impede women's ability to contribute labor (Zwarteveen and Neupane 1996).

For forest management, Sarin (1995) provides an additional example which illustrates that the exclusion of women from community management organizations may hamper the effectiveness of the organization. In this case, noninvolvement of women made it easy for them, especially those from outside the village, to continue to gather firewood in spite of strict regulatory rules set by the organization. In some communities 90 percent of the rule offenders are women. Male office-bearers find it difficult to stop these women, since they risk being accused of molesting them. As a result, the need for female participation in organizations is now accepted, not on grounds of equity, participation or democracy, but because women are needed to help the organization enforce its rules, or to stop other women from taking firewood. The irrigation association in Chhattis Mauja has not come to this point, but the problems of enforcing rules and contributions on head-end women may yet bring about such a change, especially if male migration increases the number of female-headed farms.

CONCLUSIONS: IMPLICATIONS FOR RESEARCH AND ACTION

The Case for Attention to Gender Differences in Community Water Management

As control over natural resources is passed from the state to local "communities," the stakes for involving women as well as men in the management of those resources are too high to ignore gender in analysis and implementation of devolution programs. As users of the resources, both women and men have interests, needs, and priorities in respect to their management. Natural resources management institutions need to take these into account to ensure the livelihoods, especially of the poor. As managers of the resources, women and men often have different knowledge, skills, and resources to offer. Natural resources management institutions will be better able to manage the resources sustainably if they tap these diverse resources. At a minimum, sustainable resources management requires that the institutions will need to ensure the compliance of all users. Given the difficulty of monitoring and enforcement in the management of resources, it is likely to be easier to ensure compliance by women if they have a say in the setting of rules. This increases the likelihood that the rules are consistent with meeting women's needs, that women will know what the rules are, and that they will abide by the rules and enforce them. This paper argues that explicitly addressing the challenge of female participation in community water management organizations is likely to lead to better and more equitable devolution policies.

Increasing Women's Participation in Water User Organizations

Although female users may participate in less-visible and less-formal ways, and although women may sometimes succeed in getting their needs met without being formal members of community organizations, this does not imply that it is not worth attempting to make more formal provisions for women's participation. Just as formal control over private land and resources can strengthen women's bargaining power within the household, a formal claim over communal resources (and the institutions for their management) can strengthen women's position in the household and the community. Although not all women have the same water-related interests, and although those interests are difficult to determine in advance for any category of women, it is in the interest of all women to build up a concrete "controlling presence" over the way in which water is distributed and canals are maintained.

In South Asia, more formal participation of women in organizations will not happen automatically and cannot be left to local communities. External pressure, guidance, and intervention will often be required, and explicit policy support is crucial. Attempts to improve female participation have to be backed by strong financial, technical, and legal support. A major problem with externally applied regulations is that this approach appears to be at odds with objectives of local control. Yet upon closer examination, most devolution programs impose many external conditions upon local management organizations: a variety of requirements for registration, auditing, bylaws, and activities if the organizations are to be recognized by the government or receive external assistance. If these can be imposed for the government's convenience, or to ensure fiscal viability for the maintenance of the resource base, interventions can also be made to ensure gender equity.

Existing knowledge points to some possible ways to enhance female participation. A first step involves the definition of membership rules: instead of allowing one member per household, both male and female members of households could be considered eligible for membership. Although simply ensuring women's membership or removing the "entrance barriers" for women is important, this in itself does not guarantee women's equal and meaningful participation. "Integrating" women into existing organizations may not work if it implies that women have to adapt their behavior to existing rules. They may learn to win, but this will often be at the cost of bringing their "different" perspectives into play, as when overachieving women managers become "sociological males" (Goetz 1995). The project of "gendering" community organizations goes beyond integration: it is an inherently transformative project in that it should be oriented to routinizing gender-equitable forms of social interaction and limiting the possibilities for choosing discriminatory forms of social organization. In this regard, it is important that very explicit and focused attempts to reach and mobilize female members are made early in the process of devolution. Once water user organizations have come to be established and defined as "male" organizations, it will be much more difficult to remove and overcome gender barriers, biases, and inequities.

What such a transformative project entails in practice will very much depend on local specificities. It will require efforts to determine whether and how needs and interests with respect to the use and management of water are gender-specific. If women have specific needs these should be publicly recognized and supported so as to increase their visibility and social legitimacy. Because needs, and the perception of needs, are likely to be gender-specific, the motivation of individual users to participate is likely to also be influenced by their gender.

Women may, for instance, be more interested if their participation is explained and interpreted as a logical extension of their socially accepted roles as mothers and wives, whereas men may become interested if participation contributes to their perceived male roles as public decision makers.

Attention needs to be paid to such details as the timing, location, and structure of formal meetings, which should reflect the importance of women's participation and allow for their opinions to be taken seriously. Care should, for instance, be taken that seating arrangements do not mirror power hierarchies, with chairs for important men and stools and mats for those who are less important (cf. Sarin 1996). Identifying a public site where it is socially acceptable for women to meet with men, and a time that does not conflict with their domestic or productive activities is critical.

It is not only the traditional way meetings are conducted or users are organized that restricts women from participating, speaking, or being listened to (Agarwal 1997a; Hobely 1991). Even many "participatory" approaches to eliciting community objectives (e.g., discussion groups, transect walks, mapping exercises) may place barriers on women articulating their interests and needs (Mosse 1995). Parajuli and Enslin (1990) found that functional literacy training can be instrumental in overcoming women's own feelings of incompetence and inhibitions to speak up at meetings in Nepal, and this is likely to apply to other areas in South Asia where there is a large gender gap in literacy, and where literacy has become an important indicator of an individual's abilities to "deal with the outside world." Increasing women's experience with meetings in other types of organizations may also increase their confidence and ability to participate. In India, Bangladesh, and Nepal, separate women's organizations have been identified as one successful strategy to empower women both within households and within communities. Being organized with other women breaks women's isolation, brings them into contact with outside agents and markets, and increases their visibility. Through their own organizations, women may become more visible at the community level as well (especially through group linkages with markets and other institutions outside the community), and community decision making processes may begin to alter their male-oriented practices and include women and their concerns (see Carr, Chen, and Jhabvala 1996 for examples).

Research on Gender and Water Management

There has been relatively little empirical research on how gender, along with other differences, affects collective action for natural resources management. To develop more sustainable and equitable policies for devolution of resources management, we need more consistent information about men's and women's formal and informal strategies for accessing and managing the resources, and the factors which influence those strategies.

Several types of research are required. Because many of the ways in which women participate in water resources management are not seen in formal meetings, in-depth, qualitative research is required to understand their roles and strategies. Information about uses of water and involvement in decisions needs to be complemented with an understanding of the norms and perceptions that surround these uses and decisions. Participant observation methods, which involve spending time with people, and in-depth individual interviews, can help identify how women and men access water, and what types of collective action they are involved in, especially "behind the scenes." Focus groups and individual interviews can elucidate the patterns

of who engages in different types of behavior, and the motivations of different actors. It would be useful to build on the growing body of intra-household studies to examine how relationships within the household influence women's participation in community institutions, and vice versa. Interviews on norms are also important sources of information on the implicit water rights of different groups, as well as on gender-based barriers to participation.

A second type of research is required to identify the conditions under which different patterns of participation apply. Individual case studies are valuable sources of insight, but comparative research allows us to look at what factors affect behavior, and address basic questions such as:

- Why are gender differences in participation greater in some places than in others?
- Under what conditions will intra-household negotiations be sufficient to meet women's water needs?
- How does male migration (or changes in cropping pattern, or any other type of change) affect women's participation?
- How do different forms and levels of female participation affect organizational performance?

The challenge of comparative research lies not only in specifying the factors that are likely to influence gender differences in participation, but also in finding ways of consistently capturing both the formal and informal involvement of men and women in water resources use and management.

Finally, to identify intervention strategies that can improve women's ability to meet their water needs through local institutions at the household and community level, there is a need for documentation and evaluation of a variety of programs in this field. Documentation of procedures and success stories is a first step, but it is also essential to include information on the socioeconomic conditions under which they took place. Evaluations of programs that were not successful, or those which achieved some objectives and not others, can be equally informative for developing programs and policies that are appropriate for different local situations.

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Women in Smallholder Irrigation in Tanzania

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ABSTRACT

The Government of Tanzania has opted to ensure food security within the country and at household level by improving smallholder irrigation. Ineffective and inefficient development of irrigated agriculture was found to be caused by insufficient consideration of gender relations in the initial planning and design of irrigation development. Marginalization of women and their lack of access to resources such as land, capital, credit, technology, and training, and the fact that women are not involved in decision making, have contributed to food shortages.

A project called "Women in Irrigated Agriculture and Related Activities" (WIA Project) enabled studies to be conducted in the Usangu Plains, Mbeya region for 8 years. The activities were carried out in two phases: phase I was research-oriented and phase II was action-oriented, aiming at improving household food security through involvement of women. The long-term objective of the WIA Project was "to improve the living conditions of the villagers, especially the economically marginal groups of society and in particular women." One immediate objective was the establishment of a participatory nutritional status monitoring system, and sensitization of the community and the government officials in issues connected with the interrelationships among intra-household gender relations, agricultural production, and household food security.

The project's objectives were achieved by providing technical inputs and ensuring that within households, program benefits were reaching women farmers and meeting their specific needs. Community mobilization was one of the successful activities during project implementation. Women have been mobilized and trained to have the necessary skills in food production, group leadership, and basic accounts. Group solidarity has given women access to production resources: land and water.

There is a need to establish a problem-solving mechanism whose main function will be to involve women in irrigation development. It was envisaged that WIA phase II activities would be fully incorporated into ongoing related programs in the project area.

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INTRODUCTION

General

Tanzania is located on the eastern coast of Africa and comprises the mainland and the islands of Zanzibar (figure 1). It has an area of 945,000 km² and a population of around 28 million people, expanding at a rate of 2.7 percent per annum. Women comprise about 52 percent of the total population and account for 75 percent of the labor force engaged in agricultural production. Approximately 98 percent of rural women classified as economically active are engaged in agriculture, and they produce about 60-70 percent of all the food consumed by rural households.

One of the major economic objectives of Tanzania is to increase self-sufficiency in food. As far as food production is concerned, Tanzania can be considered to be in a situation of "quasi-self-sufficiency." In a normal agricultural year, some parts of the country, particularly the southern highlands regions, are able to produce sufficient food crops, while others are constantly in short supply due to insufficient rainfall.

Most of Tanzania's irrigation potential relates to surface supply from rivers, streams and freshwater tributaries, and lakes. Low performance of the irrigated sector limits the country's production capacity. Out of 1.0 million hectares of irrigation potential, only 150,000 hectares are estimated to be under irrigation. This is due to low resources allocated to this sector by the government. Irrigation requires specific types of technology to abstract water from a defined source and convey it to the fields. Most farmers have inadequate resources without the assistance from the government.

Food shortages are estimated to have affected 40 percent of the Tanzanian population and 28.7 percent of the population is chronically insecure in food (FAO 1994). Women and children are affected more. Women carry the major responsibility for both subsistence agriculture, and domestic work. They spend more hours per day than men in both productive and reproductive activities. Household food security and nutritional levels are associated with women's access to incomes and their role in household decisions on expenditure. The gender division of labor assigns more off-farm, on-farm, and household tasks to women than to men.

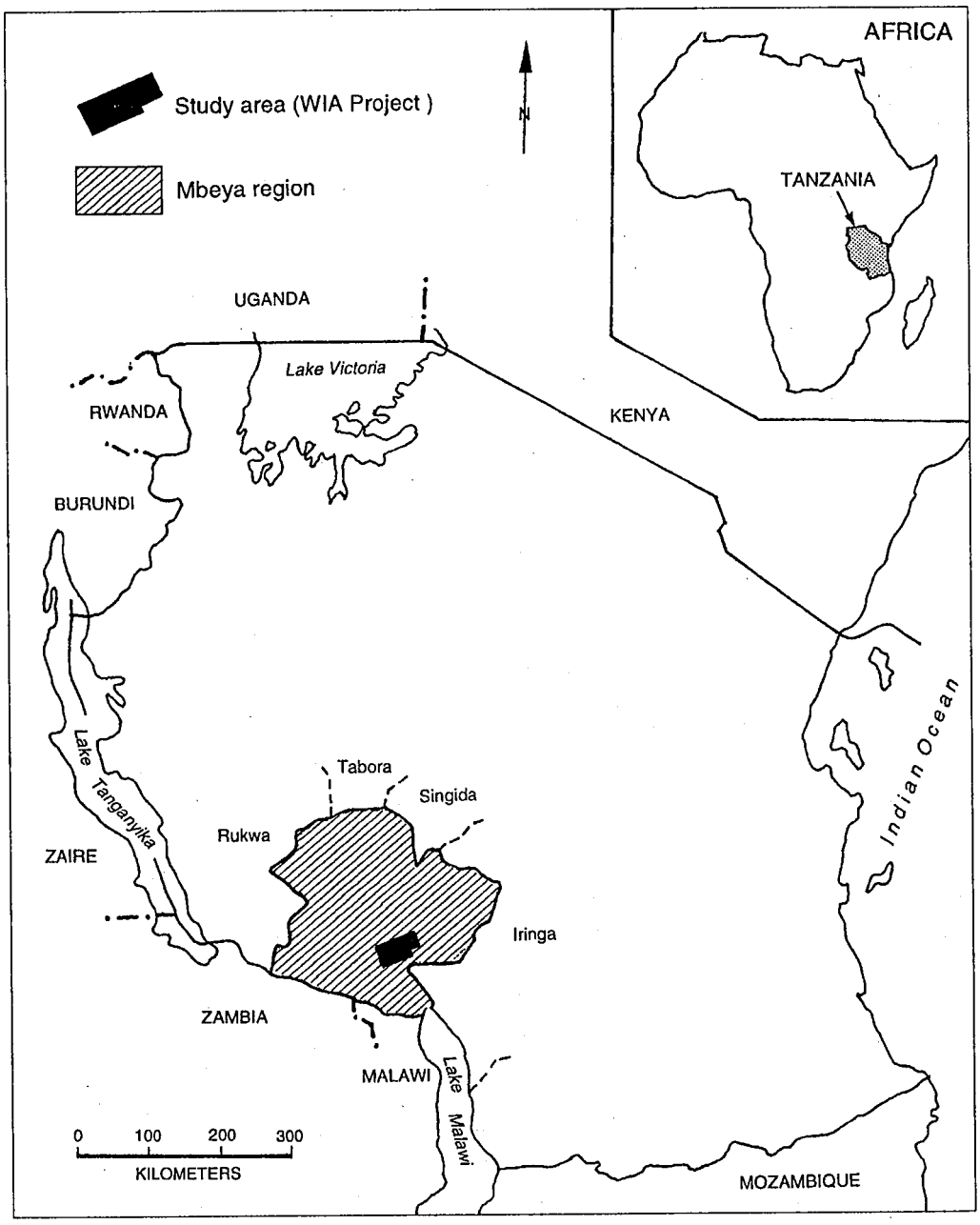
In Tanzania, decision making at the household level continues to be male-dominated in all farming-related activities, even in those where women contribute the majority of the labor. Even in ministries and government bodies like the Ministry of Agriculture and Cooperatives, women hold only a small percentage of decision-making positions.

Rural women's tasks are almost always labor-intensive and time-consuming and only a few modern tools are available for such tasks as transplanting and weeding. Despite their important roles as producers and household managers, women are often marginalized when it comes to allocation and accessibility of resources such as land, capital and credit, and modern technology, which reduce their productivity.

Smallholder Irrigation

Through irrigated agriculture, water development has become an important aspect of development and environmental management of the natural resources in rural areas. Land and water

Figure 1. Location of Women in Irrigated Agricultural Project, Tanzania.



are the most important resources, but in the context of rural societies in Tanzania, water is highly acknowledged as a strategic resource and is often placed at a higher level than land and livestock. For the smallholder irrigation farmers, improved water abstraction and conveyance systems are essential for their agricultural production, especially in drought-prone areas like the Usangu Plains in the Mbeya region.

A smallholder farmer-irrigator in Tanzania is seen as an individual who earns his or her living as an irrigator by owning small plots, usually not exceeding 5 hectares (although there are some who own more than 10 hectares); or one who seasonally rents such plots from other smallholder farmers. It is possible to find smallholder irrigators who are also engaged in other sources of income, for example from livestock or from conducting a small business. Smallholder irrigators in Tanzania produce their crops through traditional irrigation farming systems. There are no tenants on state-owned irrigated farms. The government usually improves small-scale irrigation for smallholder farmers located next to state-owned farms.

Normally, land for irrigation is divided into small plots located at specific areas or zones in a village and with various sizes. Such land is more important than any other land in a village and is often found in valleys or lowlands. Currently, the major crops under irrigation in Tanzania can be grouped into two categories depending on the amount of available water during the dry and wet seasons. For example, rice and maize are wet season crops but are also grown during the dry season under irrigation. Rice is grown thrice a year in some parts of the country, while maize is grown twice. Vegetables are usually grown throughout the year (Kagubila 1996).

WIA PROJECT

Project Background Objectives and Justification

A project called "Women in Irrigated Agriculture and Related Activities" (WIA Project) conducted studies in Usangu Plains, Mbeya region, in two phases for 8 years. Phase I was from 1988 to June 1991 and the activities focused on 6 villages, while phase II was from July 1991 to June 1996 and the activities were extended to cover 10 villages.

The WIA Project was designed to correct the deficiencies found in a previous project called Usangu Village Irrigation Project (UVIP), which had failed to accommodate and take into consideration some possible differences and inequalities in the social division of labor, rights, and decision making between men and women farmers. The UVIP goal was simply to increase agriculture production.

The long-term objective of the WIA Project was to improve the living conditions of the villagers, especially the economically marginal groups in society and in particular women.

Among others, the immediate objectives were the establishment of a participatory nutritional status monitoring system and sensitization of the community and government officials on issues connected with the interrelationships between intra-household gender relations, agricultural production, household food security, and family nutritional well-being.

Project Activities

Phase I activities were research-oriented, studying the social and nutrition impact of irrigation on farm families. Socioeconomic and gender baseline surveys were undertaken to identify family needs in the project villages, women-specific data collection, identification of their

obstacles in agricultural production, assessment of the impact of irrigation development on family nutrition status, agronomic practices, and identification of solutions to the identified problems.

In general, phase I was for data collection and development of strategies and mechanisms for the further involvement and participation of women in the management of the irrigation schemes both as actors and beneficiaries. Strategies were developed to ensure that project benefits accrued to both, men and women, equally.

Phase II activities were based on the survey findings of phase I and were mostly action-oriented. These included the following types of interventions:

Agricultural Production

- Sensitizing village governments on the need to allocate plots to women's groups

At village level the women beneficiaries, village government leaders, and the community in general were sensitized on gender issues through farmer seminars, village meetings, film shows, and dramas. The main messages were on women's social and economic rights, health-related matters, and mostly about project activities.

The project reached women farmers through about 27 women's groups known as Village Women Irrigation Committees (VWIC). These groups enabled women to obtain the means of production: land, agricultural inputs, machinery, credit, training, and extension services. For example, the Women Group in Mahango village was given a plot of land of 1.2 hectares by the village government, which was later improved by the project.

- Training of farmers on new technologies

Animal-drawn technology was introduced to reduce the time spent on land preparation and transportation. Five women's groups were loaned a pair of oxen each and were trained in the management and use of the plow.

Six women's groups merged into one group of ninety members. The project loaned them a milling machine worth Tanzanian shillings 2.5 million (US$4,000). Women's groups had access to banking systems and improved agricultural practices, and improved farming technology for maize, rice, and horticulture.

- Training field extension officers

The extension services reached 40 male-headed households against 10 female-headed households (see table 1). This is 80 percent and 20 percent, respectively. The random sampling for the 1996/97 cropping season indicated the extension service coverage to be 100 percent.

- Identification and organization of contact farmers

Due to low productivity, the contact farmer approach based on the training and visit methodology was adopted by the project. Through the contact farmer program, 478 households were assisted with agricultural inputs. An increased yield has been recorded of about

Table 1. Extension contact with irrigated maize farmers 1995/1996 cropping season.

Name of village	No. of farmers	Category of household		Estimated contact farmers	Non-contact farmers	Land size (ha) contact	Actual extension
		MHH	FHH				
Igurusi	17	14	3	14	3	0.25-2	14 MHH 3FHH
Majenje	17	10	7	12	5	0.25-2	7 MHH 7 FHH
Mahango	27	25	2	6	21	0.24-3	7 MHH
Azimo	22	18	4	19	3	0.25-2.5	12 MHH
Total	83	67	16	51	32	-	40 MHH 10 FHH

MHH-Male-Headed Household. FHH-Female-Headed Household.

15–20 bags (each 100 kg) per acre[2] for irrigated maize and 12–18 bags each for rain-fed over the traditionally established yield of 8–10 bags per acre. The total numbers of households assisted for rice production were 168 male-headed and 24 female-headed. The samples survey in October 1995 in the four villages showed that out of 83 farmers practicing irrigated farming, 51 were contact farmers and 32 acquired the acknowledge from different sources.

Food Security and Nutrition

This activity touches many programs including those discussed above.

Farmers were categorized into male-headed households, female-headed households, and "malnourished" households. Given the limited resources, 10 farmers were identified per season per crop for rice and maize respectively: 5 male-headed, 3 female-headed, and 2 malnourished households for 3 cropping seasons consecutively: 1992/93, 1993/94, and 1994/95.

The improved agricultural practices gained by women have been transferred to other members of the family and the community. For example, out of 41 farmers who visited in March 1996, 46 percent had learned the improved maize practice from women's groups. About 54 percent acquired the skill from demonstration plots. Male-headed households were observed to rank higher in loan repayment than female-headed households and women's groups. The reason was that most male-headed households were among the high and average resources households; they hired laborers and oxen for farm work. The project staff raised awareness among the beneficiaries, policy makers, planners, and others on the role of women for the success of irrigation development.

Forestry

This includes promotion of reforestation and environmental conservation through tree planting, planting fruit trees, and introduction of fuel-saving stoves.

[2]One acre is 0.4 hectare.

Irrigation

The WIA Project activities were centered on the areas of implementation of the FAO-executed UNDP-financed project, the Usangu Village Irrigation Project (UVIP). This project became operational in 1984 with the aim of upgrading the traditional irrigation schemes, Majengo (530 ha), Meta-Lunwa (1,000 ha), Mswiswi (670 ha), Ipatagwa (500 ha), and Motombaya (600 ha). These schemes cover 3,500 hectares of irrigable lands, which are used by farmers in 23 villages with approximately 19,000 households. For example, the upgrading of the Majengo scheme was completed in 1988 and 530 hectares of irrigable lands were reallocated to 452 farmers in 6 villages (3,000 households) adjoining the scheme. The Mswiswi scheme had about 15 percent of the households in the area headed by women.

The irrigation schemes were traditional. They were rehabilitated by improving the canals to repair breaches and construction of small intake/weir and division boxes to raise the water velocity so irrigation water could reach farmers' plots. Drainage was also improved to prevent waterlogging. For example, part of a 838 m canal was excavated by farmers through self-help and 190 m by machine. Six culverts were installed on the main canal and two check structures were constructed.

Reduction of Women's Workload

This was done through the establishment of plots for woodlots by women's groups including three nurseries for firewood and fruit trees, and the introduction of fuel-saving stoves; training women in the use of the ox-plow; introduction of suitable and affordable technologies; and provision of loans to women's groups to buy grain milling machines and oxen for plowing.

Phase 1 Findings

The household survey showed that male farmers owned nearly all the irrigable land in the upgraded Majengo scheme. For example, out of 452 farmers who were allocated land, only 100 (22 percent) were women of whom 23 were single.

About 59 percent of the women owned one acre (0.4 ha) only as compared to 41 percent of the men who owned 2-4 hectares, with no women members owning such large areas. Male farmers had access to and control over the household labor force and improved technology. For example, about 12 percent of the male-headed households owned sprayers, while 23 percent owned ox carts. Men enjoyed extension services, which are mostly directed towards heads of households. However, food production is solely women's responsibility with a pronounced labor input in both rice and maize production but without control on the produce (rice).

A 1-year longitudinal growth study of under-fives and primary school children below ten was undertaken to monitor monthly and seasonal variations in growth and nutritional status linked with food stocks, men's and women's labor demand, and childbearing frequency. The longitudinal growth study revealed that malnutrition is widespread with 10 percent of the under-fives being severely malnourished and 53 percent moderately.

IDENTIFIED GENDER RELATIONS AND INDICATIONS

The conclusion based on the research findings in phase I, is that improved irrigation production leads to the marginalization of women farmers. It increases their workload in food production and household chores, and ignores food crop production, which is women's responsibility. This is because the effort for weeding and other farm work increases while rice is not considered to be a food crop but a cash crop for men. Their male counterparts own and control production resources (land, technology, and extension services). In phase I, strategies were developed to ensure that project benefits accrued to both, men and women, equally.

The project staff raised awareness among the beneficiaries, policy makers, planners, and others on the role of women for the success of irrigation development. What are called gender issues in irrigation agriculture in Tanzania as a whole were reflected in the gender issues identified at the micro-level in the WIA Project villages. Although valid for all farming systems in the country, these gender issues have been identified within the context of gender and irrigation.

Resource Base of Communities

The important questions to ask are: What is the resources base of the community being investigated? Who controls and owns the various resources? The gender issue here is that the majority of women do not own the available resources but have use rights only. Land is under the control of men. Women have no control even over the farm produce, though they are the ones who contribute labor. The gender conclusion from this is that the existing resources base of the communities (not only land) is unfairly distributed between men and women.

Intra- and Inter-Household Relations

Intra-household and inter-household relations explain much about gender relations within the village farming systems. A household in the Tanzanian society comprises a man (husband), wife (mother), children, and all other dependents in that household. Agricultural production is carried out by both female and male farmers, but traditionally, women play a major role. Women, according to tradition and customs, have no mandate over the use of land (though the government is now working on this). In other cases, the decision on the use of the produce is made by men, often without involving the woman (the producer). In the village government, women are neither in the decision-making bodies nor are they committee members in the farmer organizations.

The gender issue here is one of cultural heritage and the conflicts with the new trends in human relations. Going against one's customs and traditions is a big challenge—but change is a must since societies are dynamic. However, in this process, women appear to suffer more than men within their households and communities.

Farm-Household Management and Livelihood Systems

Men dominate in decision making while women dominate in the management of their households. Therefore, decisions which are not jointly taken result in conflicts between husband and wife. Men, traditionally being the heads of the household, are the decision makers on the use and distribution of household resources though women are rarely involved. In this case we are talking of rural life, where the majority are bound to customary laws. Women are household managers in the sense that they are supposed to know about family food and child care, though men can assist.

Struggles for poverty alleviation therefore imply a male bias because it is not conceived as a struggle for the alleviation of poverty among women at household levels for all members. Traditionally, women were not expected to have any income of their own, so the issue of providing credit facilities to women was received negatively by some men without knowing that it is for the benefit of the family as a whole. Men sometimes sabotaged women's projects. From village discussions in the WIA Project area, it seems that it is not surprising nor bad if women are poor, rather it is bad if men are poor.

Sexual Division of Labor

In the context of irrigated agriculture, the sexual division of labor is more pronounced because the operations involve water management and various operations from plot preparation to transportation of crops from fields, to storage facilities at home. Women perform nearly all these tasks. Women are overworked because in some areas, especially in irrigated areas, women have to take responsibility for most of the agriculture (both plots under irrigation and rainfed family fields) and for all household and childbearing activities. This is based on research findings (observed behavior) in most irrigated agricultural areas. Women lack adequate skills, resources, and knowledge to support many of their activities. They produce using traditional tools and techniques. Table 2 provides a summary of gender relations in irrigated agriculture. The data are based on cultural norms and apply to nearly all traditional irrigation projects, though there are differences from region to region.

Leadership and Decision-Making Roles

Women do not participate fully in household and community leadership roles. Traditionally, women are not supposed to talk in meetings where men are present; hence, issues related to women cannot be aired publicly to get the community's attention. Women are therefore denied the opportunity to contribute ideas through the existing channels of decision making. More often, women are noted for their silence in meetings and general "invisibility" in discussions. Men dominate in leadership roles.

The project tried to sensitize women and men on the need of having women representatives in the committees. The women's groups were used to empower women and to discuss their issues.

Table 2. Sexual division of labor in rice operations in Usangu Plains.

	Type of operation	Women	Men	Both men and women
1.	Field preparation			X
2.	Nursery preparation		X	
3.	Nursery maintenance		X	
4.	Cultivation			X
5.	Field wetting			X
6.	Transplanting			X
7.	Irrigating		X	
8.	Weeding	X		
9.	Bird-scaring	X		
10.	Harvesting/threshing			X
11.	Harvesting/winnowing	X		
12.	Bagging			X
13.	Transportation	X		
14.	Storage			X
15.	Marketing			X

Food Security and Nutrition

Most households in the Usangu Plains do not have stable food security and good nutritional intake. They do not grow enough maize to last them for a whole season, but must import from neighboring districts. Rice is regarded as a cash crop.

The malnutrition cases among children under five are considered to be high. Of 84 malnourished children, 26 (31 percent) were severely malnourished. This was linked to the women overworking in the fields and at home, constraining the time available to take care of their children (table 3).

Provision of Household Energy Needs

The main source of household energy is fuelwood from forests, shrubs, and farm residues. Kerosene is also commonly used for cooking and lighting. The collection of fuelwood is entirely women's activity, which is a burden for them as it is collected far from residential areas (estimated to be 5-8 km away).

Legal Aspects and Property Rights

The proper behavior of both men and women has been defined differently according to customary, statutory, and religious laws. Strong patriarchal attitudes, which are mainly from customary attitudes against women, exist in most ethnic groups. Customary laws and traditions hinder women from participating fully in agricultural development, since land is still under

Table 3. Nutrition status of under-fives, December 1993.

Village	Total under-fives registered	Identified with malnutrition		
		Total	Moderate	Severe
Azimio	208	14	11	3
Chamoto	77	8	5	3
Igurusi	430	17	11	6
K/Mswiswi	118	4	3	1
Mahango	247	9	6	3
Majenje	238	13	9	4
Nsonyanga	182	11	7	4
Uhambule	200	8	6	2
Total	1,700	84	58	26
Percentage			3.41	1.53

Source: In collaboration with the District Medical Office and the maternal-child Health District coordinator, the project identified malnourished children through the inventory of clinic cards.

the control of male farmers and the latter determine what to grow on the farm. During the study for example, the women's group in Mahango was given a plot of marginal land of 1.2 hectares by the village government. The women requested the project to improve the irrigation system to enable water to reach their plot. After one season, the owner of the plot in collaboration with the village chairman maneuvered to take back the plot. The intervention by the project saved the women from losing the improved plot.

Land hiring is a common phenomenon among women's groups. For example, in the 1995-1996 cropping season, the land rent ranged from US$30 to $45 per hectare. Only one group could afford this. Men were not ready to offer their land to women's groups, and some male heads even terminated their wives' group membership.

As regards African customs and traditions, it appears as if a married woman does not belong either to the parents or to the husband in terms of heritage. She is not expected or allowed to inherit a farm, a house or anything of value, though this is not stated clearly in the statutory laws. The government is working on this after concern has been expressed by several women groups and NGOs.

Some examples of these attitudes related to total disrespect for women are polygynous marriages, denial of property and inheritance rights, putting more value on a boy than a girl-child, and male neglect of child care and insistence on it being a female role.

Legal literacy is low in the rural areas and it appears women suffer more from this ignorance of laws. The gender issue here is how to use gender-sensitive legal provisions to achieve a common goal, equal justice in society. In Tanzania, land belongs to the state and anybody has the right to use or ask for it and can be allocated land by following laid down procedures. Since traditionally the land was in the hands of men it keeps being transferred to boy-children unless it is a new area. A law could be passed to allow women to inherit land. There are several examples in Tanzania where women, widowed and divorced, have lost land and belongings to their husbands' relatives.

Access to Support Services

Table 4 indicates some gender imbalances in selected services, in percentages of men and women in irrigation schemes in Tanzania as of 1994. These data were obtained from a study conducted in 1994 in different irrigation schemes in Tanzania (Kagubila 1996).

Access to Credit

The experiences of the WIA soft loans system showed that most women's groups and even some farmers had no access to a 1-acre plot required to qualify for a loan. The project, as earlier stated, was targeting economically marginal groups in the society, particularly women. Women's groups were given loans but some could not repay due to poor yields. Later it was found that loan repayment was poor, possibly in part due to men (husbands) sabotaging women's projects as they were not involved in the loan. The women's groups' yields were generally low, a consequence of late planting, poor land preparation, and lack of irrigable fields. In most cases, women were allocated marginal land by their village governments (see table 5). The gender issue here is that when targeting women for loans, the male partners (husbands) are often forgotten, so they should be involved for better results.

Access to Extension Services and Farm Inputs

Although both men and women experience inadequate access to extension services and farm inputs, it has been noted that such services are normally addressed to men as heads of households. Women are not supposed to meet the extension workers, who are mostly men. The project educated the community on the need for women to have access to extension services. Finally, most women's groups met extension workers in the project area. A remarkable progress was noted.

Table 4. Gender imbalances in selected dimensions in irrigation schemes in Tanzania as of 1994.

Aspects	Men (%)	Women (%)
Access to irrigation plots	90	10
Access to irrigation water (water rights)	80	20
Irrigation extension services	80	20
Access to training in irrigated agriculture	90	10
Access to hired labor	95	5
Access to credit	50	50
Distribution of incomes from sale of irrigated crops	90	10
Participation in design and planning stages	5*	0*

Source: Kagubila 1996.

*The low values indicate there is hardly any participation in design and planning of irrigation systems, even by men (editors' note).

Table 5. Loans for agricultural inputs and plowing to women's groups.

Year	Total no. of groups	Loan for agric. inputs (TSHS)	Loan for plowing (TSHS)	Total loan disbursed (TSHS)	Amount paid back (TSHS)*	Balance
1992/93	9	176,500	93,000	269,500	-	269,500
1993/94	14	141,000	564,000	705,000	-	705,000
1994/95	18	216,320	283,000	499,320	136,200	363,120
1995/96	4	127,900	-	127,900	-	127,900
Total	45	661,720	940,000	1,601,720	136,200	1,465,520
Percentage					8.5	91.5

* TSHS = Tanzania shillings.

Access to Improved Technologies

Access to improved technologies is a right of both men and women. A gender-sensitive process of introduction of improved technologies would indeed benefit women most. This is because the use of low and traditional technologies by women has been noted, which increases women's workloads. The project introduced plows and ox carts to all the farmers, and also distributed improved seeds.

Access to Markets

One of the main problems affecting small-scale farmers in sub-Saharan Africa is the lack of well-defined markets for their crops. Lack of well-established markets and marketing services affects both men and women. For any gender-sensitive planning for a crop marketing strategy, a good cooperative system should be in place. Presently, for the government to assist farmers in irrigation projects, the latter have to form a strong water user association that also functions to find markets for farmers' crops.

CONCLUSIONS

The improvement in the condition of rural women will entail their liberation from time-consuming tasks through appropriate and reasonably priced technology. This will result from making available information on the multiple roles of women and the bottlenecks involved in performing these tasks. During the improvement of the irrigated land, the project managed to allocate land to women's groups but not to individual women. It was noted that extension services managed to provide skills to women which enabled them to fully participate and benefit from the project services and resources, while at the same time promoting women in the project activities and services.

For women to participate in and benefit from development efforts, development specialists and policy makers must be sensitized to gender issues. There has been advocacy of allocation of land to women, to enable them to benefit from the rehabilitated schemes. Women's participation has improved household food security at the household level. At least 20 farmers out of 41 (49 percent) reported rain-fed maize to have improved their food situation while 39 (95 percent) of the visited farmers recorded year-round food availability from irrigated maize. At the same time, 54 percent of the farmers cultivating rain-fed maize and 44 percent cultivating irrigated maize revealed increased family income from the sale of surplus crops.

Similar data have been obtained in other irrigation projects in the country, i.e., those financed by the International Fund for Agriculture Development (IFAD). In these projects men and women—both married and single—were allocated plots for irrigation. Women were found to be highly motivated and committed to agricultural production. Experience obtained from the WIA Project is that integration of gender considerations into irrigation management improves irrigation performance. For irrigation extension to be effective, a participatory approach should be adopted and the practices adapted to the existing farming systems, which are structured by gender relations.

An improved productivity and nutritional status has been realized at the household level through the contact farmer program. For the three cropping seasons 1992/1993, 1993/1994, and 1994/1995, about 478 households were supported with agricultural inputs for maize production. The project recorded an increased yield of between 3.7 and 4.8 tons per ha. The rice yield increased to 2–3.5 tons per ha. About 202 households were assisted with inputs and this assistance was also extended to women's groups and the malnourished households.

The WIA Project has managed to encourage women who are in the project villages to realize their potentialities and has shown them that they should be able to influence changes in the cultural, political, legal, and economic environment. Some achievements made during the study are not quantifiable. The planners, policy makers at all levels, technical personnel, and the community have been sensitized and therefore, they have recognized the contributions of women to economic development in their roles as mother, wife, and housewife. Policy formulation and program planning are required on the basis of gender to encourage farmers (men and women) to use low cost technologies and locally available resources. People need to be assisted through training and the introduction of new skills, to manage their own affairs—especially their own irrigation schemes and farmer organizations.

Women's workload is influenced by culturally determined patterns of behavior such as rights, duties, obligations, and status assigned to women and men in society. The problem of women's workload can be minimized by the introduction of appropriate technology, which will reduce working hours on the farm as well as simplify the work. Women's multiple roles which include reproductive, productive, and community roles have led to increased workloads. During the study in Usangu Plains, it was revealed that women work longer hours to produce enough food and income to support their families than men, that women collect fuelwood and water for domestic use, and do other domestic work.

From the participatory rural appraisal findings, it was noted that women work 16 hours a day during the rainy season (planting), while their spouses spend only 10 hours at work. It was also learnt that the increase of food production under irrigation does not necessarily lead to improved nutritional well-being among household members due to time constraints faced by women. Women do not have time to prepare proper food for their children even if the food is available.

Active participation is required between women and men in rural development with a focus on making the rural conditions favorable for women to perform their tasks by creating a conducive environment. Community mobilization has been one of the successful activities during project implementation. Women have been mobilized to have better skills in food production, group leadership, and basic accounts. The group solidarity has given them access to production resources, land and water. The presence of women in the decision-making bodies has increased their negotiating powers at the village and household level.

Editors' note: Further information on gender and water can be obtained from the following sources: Koopman 1992; Kweka 1997; Mbilinyi and Shayo 1996; Mnzava and Makonta 1994; Rwegasira 1996; and Schaap 1994.

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Women and Irrigator Associations in the Philippines: Contexts and Outcomes of Collective Action

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ABSTRACT

The focus of this paper is the diverse ways in which rural women in the Philippines, either through women's or mixed-gender collective action organizations, struggle to gain control over key resources, especially water and land. The paper provides an overview of the diversity of ethnic groups, which before colonialism exhibited a high degree of autonomy and equity for women. The colonial period, under the Spanish followed by the United States, introduced new complications: although women got the vote in 1937 and have equal access to schools, politics, and social movements, they have always been dominated by men. The persistence of pro-male biases mocks the numerous legal and constitutional guarantees of equality for women. Although women do participate in local organizations like irrigation associations and cooperatives, they are rarely leaders.

During the past decade, however, a number of grass roots, regional, and national movements and associations have emerged to advocate women's rights, particularly to land. Women have also become increasingly active in irrigation associations, which continue to be largely dominated by men. The one-household one-member rule combined with the relegation of women to being considered 'unpaid family labor' rather than 'farmers' fails to recognize the increasingly important role women play in irrigated agriculture and local water management. There is evidence that when women are allowed to participate actively in irrigation management, they are very effective leaders.

INTRODUCTION

The Philippines is a string of 7,107 islands and islets that comprise three major island clusters: Luzon in the north, Visayas at the center, and Mindanao in the south. Its climate is marked by a relatively high temperature, high humidity, and abundant rainfall. Rainfall distribution varies from one region to another, but the climate can be classified into three seasons: rainy

[1]Institute of Philippine Culture, Ateneo de Manila University.

season, which extends from June to November; cool, dry season, from December to February; and hot, dry season, from March to May.

The country is vulnerable to typhoons, earthquakes, and volcanic eruptions. Typhoons devastate different parts of the country every year, while earthquakes and volcanic eruptions occur less frequently. In the early 1990s, earthquakes and volcanic eruptions disrupted lives in various parts of Luzon, which destroyed, among others, countless farms and irrigation systems.

The total land area of the Philippines is about 30 million hectares. Of these, 44 percent (13 million hectares) is devoted to agriculture, including the production of rice, corn, and several commercial crops (NSO 1992:341). Potential irrigable area is estimated at 3.1 million hectares, of which 42 percent or 1.3 million hectares are actually irrigated (National Irrigation Administration [NIA], personal communication). The Philippines' NIA defines potential irrigable area based on the 3% slope criteria). In 1996, about 68 percent (0.9 million hectares) of the service area was irrigated during the wet season; the irrigated area contracts to 53 percent (0.7 million hectares) during the dry season. Except for 3,000 to 4,000 hectares under bananas, all the irrigated fields are planted to rice (NIA, personal communication).

Filipinos numbered 68.6 million in 1995. The population consists of some 111 linguistic, cultural, and racial groups, who speak a total of about 70 languages, all of which belong to the Malayo-Polynesian family. Pilipino, which is derived largely from Tagalog, a language spoken in Manila and nearby provinces, is the national language. Roman Catholics account for 80 percent of the population. Protestants and Muslims make up 5 percent each.

CLAIMS TO POWER AND RESOURCES

Wresting a living in the lowlands, uplands, or coastal areas of the Philippines, as probably elsewhere, requires both individual and community initiatives. In the lowlands, the success of crop farming relies on a variety of factors, including soil fertility, rainfall, availability of water and other inputs, access to technology, and having the workforce to undertake certain operations at the time when they have to be done. While crop farming in most places is basically a household enterprise involving women and men, adults and children, some of the activities that support farms require collective action. One such endeavor concerns the construction, operation, and maintenance of irrigation facilities, particularly those owned and operated by the government or by a community of water users.

The question of participation in collective action for irrigation is often predicated on a person's or a community's access to land. In the Philippines, a person may be an owner, a tenant or lessee, or a tiller who has acquired cultivation rights for a cropping season. The interest and the nature of engagement, however, varies in each case. The cultivator, regardless of tenurial status, would be keen on ensuring that irrigation water is available whenever needed since this can help forestall crop failures and indebtedness. In exchange, the farmer contributes labor for the construction and maintenance of the irrigation system.[2] In contrast, the land-

[2]The author wishes to thank Cynthia C. Veneracion, research associate of the Institute of Philippine Culture, for pointing this out to her during a discussion of the role tenurial status plays in irrigation development.

owners, be they actual cultivators or not, have a longer-term interest in irrigating the rice fields. Primarily because of this, they may be willing to cede rights of way to the group or organization that will own or manage the irrigation system. Negotiations for rights of way usually proceed smoothly, although a few landowners have been known to stonewall irrigators' groups thereby delaying system construction or rehabilitation work.[3]

The fact that access—and rights—to irrigation depends on an individual's access to land dictates that any discussion about women's involvement in irrigation be related to the question of women's access to land. This, in turn, is shaped by the dominant gender ideology and the institutions that perpetuate gender inequalities in the country or region. The space for negotiation and collective action is partly defined by norms or prescriptions dictated by culture and law, and partly by the pressures exerted by competing parties or groups.

However dominant the ideology and however entrenched the practices surrounding land acquisition and control are, individuals and groups have ways of resisting them (Scott 1985). This paper seeks to explore the ways in which women, either as a separate group or as members of a mixed-sex organization (specifically, irrigator or water user groups), struggle to gain control, or at least a semblance of control, over such key resources as water and land.

Cultural Expectations

The country's ethnic diversity suggests the coexistence of divergent gender systems, which resonate with the gender themes of the pre-Hispanic, Spanish, and American periods. They also projected the tensions between the relatively egalitarian precolonial norms and the male-oriented Spanish and American heritage. It is widely believed that at the time of the Spanish colonization, Filipino women, like those elsewhere in precolonial Southeast Asia, enjoyed a high degree of autonomy and economic importance based on their socioeconomic roles in society and quasi-magical status conferred by their reproductive function (Reid 1988; Guerrero 1992). Women performed crucial roles in trade, diplomacy, politics, and religion. Gender relations were marked by parity. For instance, divorce did not destroy a woman's livelihood, status, or kin support system; property was held jointly by both spouses; and women retained control of their dowry (Mananzan 1989).

The Spanish missionaries imposed Roman Catholicism onto the native culture, and brought a notion of womanhood very different from that prevailing in pre-Hispanic society. Women's position became one of subservience. Any status a woman enjoyed derived from her role as mother and wife, or from her relationship to men. The Spaniards also introduced the ideology of the housebound wife, although it bypassed peasant women, who remained active in subsistence farming, and the working-class women in Manila (Dionisio 1994). Camagay (1995) reports that Filipino women, particularly those of the nineteenth century, had a mind of their own, and were assertive and enterprising. Moreover, the women working in tobacco factories (or the cigarreras) staged strikes to demand better wages and improved working conditions. But while the women continued to be producers and have the possibility of resorting to political action when needed, they left political leadership almost entirely to men.

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[3]A well-documented case of a problem landowner is described in Illo 1988 and in Veneracion, Illo, and Volante 1985.

The United States introduced a more liberal ideology to the Philippines. Filipino women won the right to vote in 1937. They joined the labor force en masse as factory workers, clerks, sales staff, and teachers. The public school system gave males and females equal chances to be educated, and the mass media projected the image of the free white woman who held her own with men. These gains, however, masked the fact that politics, including trade unions and the peasant movements, continued to be dominated by men, and the working woman was still expected to be the dutiful and loving wife at home, putting her domestic duties above all.

Spanish and American influences barely touched the Muslims and other cultural groups, and distinctions between them and the colonized lowlands still remain. However, as a result of interaction and state efforts at integration, the cultural minorities have begun to show gender divisions similar to those of the majority Christian population. Even within the same ethnolinguistic groups (such as the Tagalogs or the Bicolanos), egalitarian impulses compete with male-centered biases. The net effects of these competing influences can be traced in many facets of Filipino life, including people's claims to resources such as land and water. Nonetheless, the notions of a woman's place and of separate male and female spheres tend to be more binding on Muslim women as a group than on Christian women. As a result, Muslim women have had less access to education and lower school attendance than Christian women or Muslim men. Muslim parents objected to sending their daughters to public school until the system accommodated the Islamic notion of spaces separated by sex. Attitudes have changed a good deal with respect to coeducation, but some prevail. Similar restrictions constrain women's choices for productive work. However, the laboring classes and the upper or educated classes have been less bound by religion. The former have to work in order to survive, while the latter, having been exposed to liberalizing ideas, are no longer willing to be confined to their traditional roles and now question the male practice of polygyny.

Within the family-household, power and authority rest with men, who reportedly head about 88 percent of all Philippine households (NSO 1997). The national figure for male-headed households is much higher than for many parts of Asia (UNDP 1996), but it is still lower than what might actually be the case. Although more and more women have been drawn into economic activities in an effort to raise family income, bias towards a male household head continues to be projected in government censuses and surveys. That is, whenever a senior male is present, he is usually reported to census takers as the household head although the de facto head may be a woman or the household maybe jointly managed and supported by the couple (Illo 1992). Moreover, in household enterprises such as crop farming, a senior male is generally considered to be the farmer or cultivator, easily dispensing with the crucial roles women play in farming and their claims to agricultural resources. In Central Luzon, for instance, only 10 percent of cultivators or farm operators were women, primarily widows. A quarter of them till less than half a hectare (see table 1).

Legal Equality and Unequal Realities

The persistence of pro-male biases mock the numerous laws that Philippines has enacted granting Filipino women constitutional and legal equality with men. The 1987 Constitution recognizes the fundamental equality of women and men before the law. After intensive lobbying by women's groups, other codes and legislation have affirmed the principle of gender equality. The New Family Code (enacted in 1987) stipulates women's right to own property and to

Table 1. Rural land operation, by gender and size of holding in Central Luzon, 1991.

Farm area	Gender of the operator			Percent of female to total
(ha)	All operators	Male	Female	number of operators
All farms	350,818	315,985	34,939	10.0
Under 0.50	57,338	48,854	8,590	15.0
0.50 to 0.99	64,148	58,402	5,746	9.0
1.00 to 1.99	112,531	102,644	9,887	8.8
2.00 to 6.99	109,348	99,352	9,986	9.1
7.00 and over	7,453	6,723	730	9.8

Source: 1991 Census of Agriculture, National Statistics Office, Manila.

contract employment and credit without their husbands' consent. The Comprehensive Agrarian Reform Law (1988) guarantees equal rights to ownership of land and its fruits, and equal representation in advisory or decision-making bodies of the Comprehensive Agrarian Reform Program (CARP). In 1992, Philippines adopted the Women in Development and Nation Building Act (Republic Act 7192), which sets forth as a national policy: "The State recognizes the role of women in nation-building and shall ensure the fundamental equality before the law of women and men." It provides equal access to resources, including credit and training, and requires the allocation of 10 to 30 percent of the Official Development Assistance (ODA) fund for gender-responsive projects and for programs and activities for women.

These laws are often thwarted in practice or have yet to be fully enforced. For instance, the right of children to inherit land from parents is circumvented by parents' granting land to sons and non-land resources to daughters (Quisumbing 1990). In the case of the agrarian reform law, as of 1992, only 10 to 14 percent of redistributed land had been awarded to women, and the average area awarded to women was significantly smaller than the area given to men (table 2). In addition, women's representation in decision-making bodies had been kept to 6

Table 2. Distribution of land reform beneficiaries, 1992.

Land reform instrument	Gender of the beneficiary			Percent of female to total number
	All	Male	Female	of beneficiaries
Emancipation patents				
Physical coverage (in ha)	363,277	326,496	35,815	10.0
Number of patents distributed	270,096	239,035	31,061	11.5
Average area per beneficiary	1.34	1.37	1.15	
Certificates of Landownership Award (CLOA)				
Physical coverage (in ha)	89,141	76,299	12,842	14
Number of CLOAs distributed	28,455	23,333	5,122	18
Average area per beneficiary	3.13	3.27	2.51	

Source: Department of Agrarian Reform.

to 9 percent at the provincial and national levels and to 18 percent at the barangay level (NCRFW 1995). Finally, field implementors continued to assume that only men could be farmers and they had been known to be unresponsive to demands for land by women farmers (Illo and Pineda-Ofreneo 1995).

Politics and Lobbies

As is the case with women in many places, Filipino women lack the political muscle to establish or protect their claims to land, water, credit, safety from physical and sexual assault, and the like. While women represent almost half the total registered voters, they have yet to turn this number into a political factor.[4] Like men, they consider politics as a male endeavor and political power as masculine. Not surprisingly, therefore, men continue to dominate the elective positions. In 1995, they accounted for 83 percent of the elected senators, 89 percent of the members of congress, and almost 90 percent of provincial governors. The same pattern prevailed at the local level. Some gains, however, were noted between 1987 and 1995, when more women ran for and were voted into office. These women generally came from families with an established political base. Recruited by political parties that have traditionally included women in their slates, they are assumed to handle "women's issues."

The promotion of women's welfare and protection of women's interests have invariably rested in women's groups, both women nongovernment organizations (NGOs) and grass-roots organizations, and their allies in the government. They spearhead campaigns in support of or against a particular public or political issue, conduct legal education programs, and launch public information campaigns (Illo 1997). Umbrella organizations such as SIBOL or Samasamang Inisyatiba sa Pagbabago ng Batas at Lipunan do lobbying work in the legislature and propose bills addressing women's issues.

Organizational Routes

Access to development resources, including irrigation water, is often made contingent on membership in particular organizations. Entry to organizations, however, is gendered. All farmer organizations, including irrigator associations, are made up of men, with women accounting for no more than 20 percent. To qualify, a person has to be the actual cultivator. Because farming is erroneously conceived as an individual (male) undertaking, a senior male member of the farming household is assumed by everyone, men and women, as the farmer. Except in rare cases, men lead these farmer organizations. Men also tend to dominate the leadership of labor unions and other rural organizations, even when women constitute the majority of the membership (Illo 1997). For instance, women account for 57 percent of members of cooperatives but only 17 percent of the officials (Illo and Uy 1992). In most cases, men are chosen to be leaders because leadership is viewed as a male prerogative or preoccupation,

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[4]Prior to the 1995 elections, a women's organization, PILIPINA, spearheaded an initiative to encourage and help women enter politics. Out of this and parallel activities in other Asian and Pacific countries a regional organization (the Center for Asia and Pacific Women in Politics) was born that was devoted to women in politics, with its base in the Philippines.

a commitment that would require considerable amount of time and energy, which women feel they can better spend on their family or household.

For their part, women are recruited to organizations that are formed to see to the "improvement" of communities, often involving the beautification of the neighborhood, improvement of the nutritional status of children, diversification of "home industries," and the like. In fact, the most ubiquitous women's organizations in villages are called Rural Improvement Clubs (RICs). Organized by the government's Department of Agriculture, RICs generally serve as funnels for government assistance (micro-credit, hog-raising, food-preservation, and similar types of technical aid) to rural women. In sharp contrast to these development-focused women's associations are the highly politicized peasant women's organizations.

CONTEXTS AND OUTCOMES OF COLLECTIVE ACTION: PEASANT WOMEN'S INITIATIVES[5]

The advocacy and struggle for women's land rights have been led by the Katipunan ng Bagong Pilipina (Association of the New Filipina) or KaBaPa, and Amihan (literally, harvest wind). A small group of women's rights advocates, with the help of allies in the government, also lobbied the government for the protection of women's land rights in the uplands. Both organizations were active in the Congress for a People's Agrarian Reform (CPAR), a broad coalition of peasant and rural workers' organizations that existed from 1987 to 1993. During its existence, CPAR was responsible for launching The People's Agrarian Reform Program, which stipulated that: "All women members of the agricultural labor force must be guaranteed and assured equal rights to ownership of land, equal shares of the farm's produce, and representation in the people's councils and other decision-making bodies" (Chapter VII, Special Concerns, Section 1, Rural Women).

Although CPAR's influence on the agrarian reform legislation was severely limited, the gender equality clause has found its way into the law. The legislative struggle, however, was but the beginning. The peasant women's organizations soon found themselves pitted against the Department of Agrarian Reform (DAR), the government agency tasked to implement the agrarian reform program.

KaBaPa

This organization emerged from the peasant movement based mainly in Central Luzon. It was founded by 2,000 grassroots women in 1975. Currently, it has 28,000 members and remains mainly rural-based. It has reorganized its membership into specific sectors depending on their tenurial status and livelihood source. One sector is the Katipunan ng Kababaihang Magbubukid (Association of Peasant Women) where the issue of land rights is a strong point of advocacy.

KaBaPa has had one test case for claiming women's land rights. This involves some 350 hectares of former sugarcane land in Lubao, Pampanga, which was abandoned by absen-

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[5]This section draws heavily from Illo and Pineda-Ofreneo 1995.

tee landowners who had gone abroad. The former sugar workers cultivated the land, planted vegetables, corn, and finally, rice. They were harassed by the military, and some peasant leaders were killed or tortured. The men began to lie low. It was the women who pursued the struggle to claim the land which reached a high point in 1988. The women leaders held dialogues with DAR officials and were even referred to the Department of National Defense, then headed by the current Philippines President, Fidel Ramos. Both the DAR central office and the Supreme Court decided in the women's favor, saying that they should be recognized as leaseholders who have first claim to the land. However, the landowners refused to give the women this recognition. They were thus forced to deposit their share in the bank, but the women are confident that they will finally get the land and when they do, they will make sure that women's names will appear as owners, either jointly with or separate from those of their spouses.

Amihan

Established late in 1986, Amihan called for genuine land reform and national industrialization while focusing on specific peasant women's demands, namely: recognition of their right to own land, priority to widows and single mothers in land distribution programs, just wages for women agricultural workers, protection from sexual harassment, and extension of maternity and daycare benefits. Unlike KaBaPa, Amihan has not actively sought affiliation and working relationships with the government, preferring to keep its independence and to encourage peasant women to harness their own resources for development.

Despite claims to gender equality, laws have been unable to protect or promote women's rights to land. Amihan's experiences underscore this point. One incident took place in Mindoro, where Amihan members attempted to occupy 110 hectares of abandoned land, hoping to make it productive. But right away, government officials gave the women the runaround when they tried to get data about the land they occupied. The women were even asked to present video documentation that they really were farmers.

A second case was reported in the Bondoc Peninsula, where tenant farmers belonging to an Amihan chapter are still trying to have a 166-hectare hacienda titled in their names under the CARP compulsory acquisition scheme. Here again, government officials have not been fully cooperative. When the hacienda was declared eligible for compulsory acquisition and redistribution to farmers, members of the Amihan trooped to the Municipal Agrarian Reform Office to be registered as beneficiaries. An amazed officer queried: "Where are your husbands?" The women angrily replied: "What's the matter, aren't we entitled to benefit from land reform? We work on the land ourselves, and shoulder a major part of the burden when expenses have to be paid." So far, only two Amihan members, both widows, have been allowed to register under the program (Illo and Pineda-Ofreneo 1995).

On the question of women's land rights, peasant women deal not only with the state but also with their spouses and male-dominated peasant organizations. Some of their problems are, in fact, rooted in gender relations within the family, to husbands' resistance to women's involvement in organizations, monopoly over decision making, and violent assertion of male power through beating their wives. Organized men also reportedly felt threatened and prevented women organizers from doing their work. Moreover, Amihan leaders have had differences with male-dominated peasant organizations over how land will be distributed because some male leaders still insist on family-based distribution through the male head of the household (Illo and Pineda-Ofreneo 1995).

WOMEN'S INTERESTS AND IRRIGATOR ASSOCIATIONS[6]

Within organizations like irrigator associations, women's interests are often swallowed by a narrower (male-defined) agenda. Being a woman and a member of the association, the struggle takes the form of harmonizing possibly conflicting interests regarding the use of resources such as water and time, and of fighting biases and prejudices about "place."

Water Uses and System Design

Interest in irrigation stems from a desire to increase crop yield and farm income. To this end, rivers are dammed and diverted to farms; rights of way have to be secured for the canal system; and labor and other resources are mobilized not only to build, but also to maintain the structures and facilities. The management and operation of the irrigation system generally require some kind of organization. Under the Philippine government's communal irrigation program, water users are organized to undertake various irrigation functions.[7] Farmers' participation ranges from securing water permits and rights of way, procuring the construction materials, negotiating the system design, monitoring project costs, and contributing labor and materials as "equity" to the project (Korten and Siy, eds. 1989).The irrigator association formulates and implements the water delivery or rotation schedule, repairs and maintains the canals and other structures, manages conflicts, collects irrigation fees, and pays the government for the cost of constructing the system. While women have as much stake in all these as do the men, their interest is more complex.

Women's interests in irrigation and irrigator associations reflect the tension between tapping water for irrigation and keeping the water supply safe for nonirrigation purposes. Like their male colleagues and spouses, women farmers are keen on getting the right amount of irrigation water at the right time. During their turn to receive irrigation, they check their farms once in a while to ensure that water flows unimpeded to their plots. They are generally more conscientious in meeting their irrigation fee obligations.

More than the men, however, women have other concerns related to water. They are involved not only in rice farming, but also in raising hogs and growing beans, pechay, tomatoes, sweet potatoes, cassava, and other crops. Their vegetable plots need water, as do their hogs. Because women and their children are responsible for all these, they need continuing access to water sources that might have been used for irrigation.

The women and their households also require water for bathing and personal hygiene, laundry, and cooking. For these they need not just any water, but water that has not been polluted by pesticides or inorganic fertilizers. In view of the gender division of labor in Philippine households, women have a greater stake in safe water supply. They use the water in their housework, and they are responsible for ministering to members who might fall ill because of contaminated water.

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[6]This section draws heavily from Illo 1985 and Illo et al. 1988.

[7]The Philippine government has two major types of irrigation development programs: the communal program, which assists farmer-owned systems; and the national program, which focuses on government-owned systems.

Because a water source does have different uses and users, an irrigation system has to be designed carefully and after consultations with other water users. Nonirrigation interests in water have been known to be raised by men during system-design negotiations. The urgency, however, is not as clear as when women articulate their water-related concerns. When shut out of the negotiations, women protest, sometimes through their spouses who are members of the irrigator association, at other times directly (barging into association meetings or putting up barricades). To gain a voice in the negotiation for the design of the system, women can join the irrigator association.

Benefits from Collective Action

Membership in an irrigator association bestows on the members the right not only to participate in discussions about the irrigation system, but also to share in the irrigation water. In exchange for irrigation water, however, members pay irrigation fees and membership dues, and provide labor and materials during construction and system maintenance. To most people, these are masculine concerns. Hence, like other farmer organization, irrigator associations are popularly conceived of as associations for men who have farms within the system's service area. Women, however, are more invisible in some areas than in others. In a system in the Bicol region, women account for about 11.3 percent of the members (Illo 1985); in Rizal Province (Southern Tagalog), 3.6 percent; and in Bulacan Province (Central Luzon), 2.4 percent (table 3).[8]

The low participation of women in irrigator (or any farmer) associations rests on the notion of one member per household, which belies the fact that, at least in the Philippines,

Table 3. Membership and leadership of communal irrigator associations in two provinces of the Philippines, 1997.

Item	Gender			Percent
	Male	Female	Total	female
Province of Bulacan (Central Luzon)				
Membership in irrigator associations	2,305	58	2,363	2.4
Association presidency	30	0	30	0.0
Association leadership (other than presidency)	120	2	122	1.6
Leadership at sectoral level	1,861	48	1,909	2.5
Province of Rizal (Southern Tagalog)				
Membership in irrigator associations	1,528	58	1,586	3.6
Association presidency	26	2	28	7.0
Association leadership (other than presidency)	245	7	252	2.8

Source: National Irrigation Administration, Bulacan and Rizal Provincial Irrigation Offices.

[8]The Central Luzon figure is surprisingly low, particularly when viewed against the fact that women in the region operate 10 percent of the farms (table 1). This is probably because Bulacan Province lies in the outskirts of Metro Manila and is home to industries and other nonagricultural establishments. Its proximity to the metropolis, source of jobs and market for various produce, might have encouraged women to seek employment outside the farm or to engage in agricultural ventures other than rice farming, including hog or poultry raising and commercial-scale vegetable growing.

farming involves more than one "farmer." Relegating the women as "unpaid family worker" not only undervalues their contribution, but also rejects women's claims to technology, resources, and benefits associated with farming. Likewise, it perpetuates an increasingly obsolete notion of a "woman's place," and fails to recognize the reality of new and rediscovered spaces that women can occupy.

Leadership and Privileges

Women lose more visibility among the leaders. They constitute 8.9 percent of all leaders in a Bicol irrigator association; 3.2 percent in Rizal; and 2.3 percent in Bulacan. The low level of participation of women in irrigation leadership is partly caused by the (mistaken) belief that men make better (or are the natural) leaders. This prejudice is reinforced by the dominant gender division of work in many rural Philippine communities. Because women are saddled with childcare, housework, food generation, and income-earning activities, they are understandably reluctant to take on more responsibilities. All these leave them very little time to do anything else. They feel that since men have more discretionary time, they should be the ones to take on leadership functions.

The male bias of irrigation projects and irrigator associations produces specific gendered outcomes, such as the development of male leadership, rejection of women who attend meetings on behalf of a spouse or father, and construction of systems that do not lend themselves to other uses of water. It also underscores the fact that participatory projects are heavily gendered, privileging men and admitting women only in the absence of a qualified male in the latter's households (table 4).

Premises and Promises

Irrigator associations that include women (including those whose spouses are also farmers) provide important lessons, particularly in connection with community organizing work with irrigator associations. Women in these areas belie the notion that an irrigation project interests only men. Data from Bicol show how women displayed considerable interest in the irrigation development efforts, attended meetings, and joined field inspections of proposed locations of irrigation facilities. Together with the men, they actively engaged in the discussions which would determine the canal layout in their area. Even among households that would not benefit from the projects, women tended to register concerns as to how the construction of project facilities would affect their property. Where the organization allowed more than one member from each qualified household, the proportion of female to total membership doubled (Illo 1985:43). It must be noted, however, that while a number of women became active participants in the irrigation project, the majority of women shied away from direct involvement, principally because of household or family responsibilities.

When allowed or encouraged to participate, women have had considerable impact on the association. They served as leaders, improved attendance during meetings and other activities,[9] helped finalize the location of irrigation facilities, and lent firmer support to the con-

[9]In the early 1980s, in Aslong women constituted 10 percent of total IA members, but accounted for as much as 22 percent of the people who attended meetings (Illo 1985).

tributions that their households had to make to the association. Female leaders successfully negotiated rights of way, kept systematic records of transactions, and managed the association's finances. The employment of female community organizers provided the farmers immediate role models of active female participants in the project.

Table 4. Project activities undertaken in participatory communal irrigation projects in the Philippines.

Project stage	Type of activity	
	Technical	Institutional
Preconstruction	Conducting surveys (M,f)[1] Obtaining rights of way (M,F) Collecting water-level reading (M) Preparing/negotiating design (M,f) Constructing warehouse for materials (M)	Securing water rights (M) Recruiting irrigator association (IA) members (M,f) Amending IA bylaws (M,f) Conducting organizational meetings (M,f) Registering the association (M,f) Creating task-specific committees (M,f) Attending seminars and training sessions (M,f) Formulating loan repayment plan (M,f) Mobilizing farmers for technical activities (M,f)
Construction	Procuring materials (M,f) Delivery and/or issuing materials (M,f) Actual construction of dams, canals, and other irrigation structures (M,f)	Strategizing farmer participation (M,f) Procuring materials (M,f) Supervising delivery and use of materials (M,f) Contracting construction work (M,f) Generating IA counterpart or "equity" (M,f) Monitoring project costs (M,f) Reconciling IA and NIA project cost records (M,f)
Operation and maintenance (O&M)	Distributing water (M) Clearing and repairing facilities (M,f) Collecting irrigation fees (M,f)	Mobilizing farmers for O&M activities (M,f) Negotiating water-use conflicts (M,f) Managing the IA finances (M,f)

[1]The data in parentheses pertain to the gender of the participants in the activity. The case of the letter (F or f) signifies the relative proportion of the male and female participants.

Source: Illo et al. 1988:26.

In a workshop held a decade ago, the participants, who included workers from the National Irrigation Administration (NIA), the government agency responsible for irrigation development, suggested several courses of action for improving the environment for women's relationship with irrigator associations (Illo, Veneracion, and Borlagdan 1988:71-73). One suggestion involved the distribution by the NIA of different sets of bylaws, with the following alternative formulations of the membership provision: one person per household (the traditional provision), joint membership, or separate membership for spouses. The NIA would provide the government agency in charge of registering associations (the Securities and Exchange Commission or SEC) copies of the alternative pro forma bylaws. Another recommendation called for the training or retraining of irrigation community organizers (ICOs) to help them deal with gender issues and anti-women sentiments in their assigned areas. This stemmed from the observation that, in some cases, ICOs had been the major obstacle to women's involvement in the irrigation project or in the association.

There was considerable promise to aid women in their struggle to gain access and control of a key resource like irrigation. Shortly after the workshop, training manuals were reviewed for gender bias, new training cases highlighted women's concerns and gender issues, and plans were drawn up for retraining the ICOs. That was 10 years ago. A few years after the unflinching assessment of NIA's performance and brave promises, the ICO supervisors who felt some commitment to promoting gender equity left, and interest in women's or gender issues waned. Some say that the good intentions were swept away by the political changes brought about by the overthrow of the Marcos regime, an event popularly referred to as the "EDSA Revolution." But it is probably more correct to say that the political upheaval gave the agency a "real" excuse to forget about the nascent pro-women efforts. In a manner of speaking, the women became the victims of the power struggle that ensued within the agency.

As the experiences in irrigation and agrarian reform programs have shown, collective action is crucial in getting women's right to land written into law or in getting women's concerns about irrigation recognized in action plans or policies. All these good intentions, however, have to be translated into deeds. This requires more collective action and continuing vigilance.

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SECTION 6

Introduction

Gender and Project Implementation Strategies

Irrigation research has little value unless it has the potential of being translated into practice. The papers in this section are written by people who are experienced in both research and project implementation, which give them an important and clear practical orientation. Eva Jordans notes that there is little documentation of gender strategies in irrigation development, and almost no effort has been made to examine *how* the policies and practices of implementation agencies must change to become more gender-sensitive, and *what strategies* are most effective to incorporate gender. Her paper examines these issues at the policy, institutional, and implementation levels, and illustrates key observations and recommendations with case study examples.

Felicity Chancellor's focus is on smallholder irrigation development in Africa, where women are known to be key stakeholders facing a large variety of constraints to participating effectively in irrigation development and management. Current policy goals, for example to enhance farmer investment, the added costs of gender training for irrigation department staff, biases in implementation strategies and in the perceptions of the implementors themselves, all combine with social, economic, and cultural norms that constrain women's participation in irrigation. Based on her long experience in Africa, and the literature on gender issues in that continent, Chancellor makes a number of useful suggestions for addressing these issues.

The striking thing about these two papers is their emphasis on the importance of further research. They agree that to provide a scientific basis for prescribing implementation strategies, more needs to be known about the constraints, the policies, and the outcomes of different implementation strategies. All the papers in this volume are concerned with improving implementation to achieve more social, including gender, equity. This concern, and the concern expressed for more research, were raised throughout the discussions at the workshop. This is a common theme running through all the papers in this volume.

Strategies to Incorporate Gender in Irrigation Planning

Eva H. Jordans[1]

ABSTRACT

Documented experiences on gender issues in irrigation have led to an understanding of *why* incorporating gender in irrigation planning is important. That increased recognition, however, has not yet been systematically translated into *how* the planning practices of irrigation agencies and professionals have to change to become gender-sensitive, and *what* strategies are most effective. The paper argues that to incorporate gender in irrigation planning effectively, strategies are needed that address the policy, institutional, and implementation levels of irrigation planning.

Gender strategies in irrigation development are rarely documented and evaluated, and this information is often not accessible to a larger audience. Additional research and documentation are thus required, especially on cost-benefit analysis of gender-sensitive irrigation planning, and the evaluation of the impact of existing strategies to incorporate gender in irrigation planning. On the basis of constraints identified, recommendations for improvements need to be formulated.

At the same time, action is required to pilot test the recommendations, to improve tools for gender-sensitive irrigation planning and water resources management policy formulation, as well as to further develop guidelines and training material. A dialogue and link between research and action need to be established to strengthen efforts to develop successful strategies to incorporate gender in irrigation planning.

INTRODUCTION

This paper provides an analysis of strategies for including gender in irrigation projects and programs, based on a review of available literature and personal observations in various field projects of the Food and Agriculture Organization of the United Nations (FAO) and other organizations in Africa and Asia. The real challenge is the translation of socioeconomic and gender considerations into actual changes in the planning and design of irrigation schemes.

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[1]Sustainable Development Department, Food and Agriculture Organization of the United Nations (FAO). The views expressed in this paper are those of the author and do not necessarily represent those of the FAO.

Another challenge is to close the gap between gender experts and irrigation professionals on the one hand, and between irrigation researchers and practitioners on the other. The objective of this paper is to identify appropriate strategies to meet these challenges, in the context of both irrigation agencies and donor-assisted irrigation development.

GENDER AND IRRIGATION

Gender refers to the relations between women and men, which are revealed in a range of practices and ideas, including the division of labor, roles, and resources between women and men. Gender relations differ within and between cultures, as they are influenced by class, age, caste, ethnicity, and religion. Gender roles are dynamic; they change over time. Changes can be attributed to factors such as economic hardship, environmental crises, family instability, increasing education levels, and development activities. Because of the diversity in gender roles and their dynamic character, gender stereotypes apply to very few, if any, places in the world. The most common gender stereotype that has guided and shaped many irrigation policies and the planning and design of irrigation systems is that women are primarily housewives and mothers, while men are farmers and irrigators.

Irrigation has become an increasingly private rather than a public investment. Operation and maintenance responsibilities have been transferred from state agencies to users and private organizations. This has direct consequences for the participation of different social groups, favoring those who have access to the means to acquire irrigated land and irrigation equipment and to pay water fees. In addition, the emphasis in recent years has shifted from new irrigation development to the upgrading and improvement of under-performing irrigation schemes, combined with irrigation management transfer.

Studies have documented that where irrigation design fails not only to accommodate actual gender-based patterns of intra-household and community organization but to recognize that women are often water users and farmers in their own right, risks are high that women lose existing access to land or the products of their own labor. The failure to recognize the reality of gender relations also negatively affects agricultural productivity of irrigated crops (Zwarteveen 1994). Studies documenting these effects include those of Jones (1983, 1986), who analyzes an irrigated rice project in North-Cameroon, Blumberg (1989), who describes the impact of the Turkana Irrigation Project in Kenya, and Bernal (1988), who describes the Sudan's irrigated schemes. An impact assessment of the Mekong Irrigation Program (MIP 1991) in Laos resulted in similar findings, as those of Bruins and Heijmans (1993), who studied The Bauraha Irrigation System in Nepal. Another well-documented example is that of the Jahally Pacharr Project in The Gambia (Dey 1990; Carney 1988).

The ultimate goal of incorporating gender into irrigation planning is more equitable, effective, and efficient management of irrigation systems through:

- better tailoring services to water needs of women as well as men, and
- improving women's access to and control over water services through improved legislation and more active participation in decision making, managing, and operating water resources and irrigation systems (IIMI 1997).

Multilevel Strategies

Irrigation planning takes place at the policy, institutional, and implementation levels. To be effective, strategies to incorporate gender into irrigation development thus need to focus on these different levels simultaneously. The three levels, the areas of responsibility and the main actors at each level, as defined in this paper, are presented in table 1.

Table 1. Policy, institutional, and implementation level.

Level	Responsibility	Main actors
Policy	Formulate policies, plan, consult stakeholders, establish necessary conditions, e.g., legal framework	International, national, and regional planning and governing institutions
Institutional	Link policy level to the implementation level, execute policies, provide feedback to policy level, resources mobilization	Institutions and service entities, such as district irrigation and extension services, water user associations
Implementation	Ensure livelihood, efficient and sustainable use of natural resources	Households, farmers, local groups, communities, field staff, and engineers

At the policy level, gender issues must be recognized as a legitimate political concern, and objectives and goals for their inclusion in irrigation policies and planning need to be formulated. The scope for integrating gender issues into irrigation and water policies depends to a great extent on the national policy objectives with respect to water and agriculture. For example, gender issues might be more easily incorporated in an agricultural policy environment that advocates national and household food security, than one focusing predominantly on water conservation. Policy support creates the pressure to actually make changes and determines the direction of those changes.

At the implementation level, practical strategies need to be developed that involve both women and men farmers in the planning and implementation of irrigation activities, to satisfy their gender-specific needs. In between, to link the policy level to the implementation level, specific institutional strategies are needed that strive toward the building of capacities to implement gender-sensitive programs, enhance management capacities and facilitate communication and interaction between farmers and policy makers.

Gender-sensitive strategies toward irrigation planning at the policy and institutional level have only recently started to develop. There is more experience with practical strategies at the implementation level. Unfortunately, these are only occasionally documented, hardly ever evaluated and are often not accessible to a large audience.

The following sections discuss required gender strategies at the three levels, analyze existing strategies, and identify gaps that need to be filled by additional information or action. This leads to recommendations for a research agenda and a plan of action, as well as interaction between research and action. The discussion is based on the assumption that strategies need to be simple and integrated into existing planning procedures.

POLICY LEVEL

At the policy level four specific strategies are called for:

- define a gender strategy for irrigation planning
- incorporate gender issues into water resources management policies
- analyze costs and benefits of gender-sensitive policies
- promote stakeholder participation in planning

Gender Strategy Definition

Many countries have policy directives about women in development, but few have linked these to the process of irrigation planning. Thus, there is a need for irrigation agencies and donor-assisted irrigation projects to formulate a gender strategy for the planning and implementation of irrigation programs and projects.

An analysis of strategies toward gender and irrigation reveals that the first attempts by irrigation planners have often isolated women and have focused only on specific women's spheres, domains, or activities. These attempts can be categorized as a *Women in Development* (WID) approach. The women's components initiated in the WID approach are separate from the mainstream activities. Often, the focus is on women's role as domestic caretakers and not on their role as farmers. For example, vegetable gardens for women on small plots outside the irrigated areas, crop processing activities, and new income-generating activities have been added to irrigation development activities.

The advantage of the WID approach has been that it made women visible, and funds were allocated to activities to involve them. However, the weakness of this approach is that women's components are often marginal and small-scale compared to the mainstream project, and very often not sustainable. The main irrigation activities tend to ignore women when these women's components exist.

More recently, in a number of irrigation development activities, a *gender mainstreaming* approach has been implemented, which means that women are recognized as farmers and are involved in core irrigation activities side by side with men. The approach makes use of the analysis of the different roles and resources of women and men, and the relations between them. Gender-specific barriers women face are identified and strategies to address these barriers implemented.

Involvement of women in on-farm irrigation development, increased access of women farmers to irrigation technology, and activities that increase women's participation in water user associations are examples of mainstreaming activities. The following case illustrates how a mainstreaming strategy can be implemented.

The Cidurian Upgrading and Water Management Project in Tangerang, West Java, Indonesia, conducted a pilot program for the inclusion of women farmers in planning the project after it became apparent that they were not participating. Separate meetings and four special training sessions for women farmers were organized with the following objectives:

- to provide women with basic information on the program
- to overcome women's initial reluctance or shyness
- to make an inventory of women's interest in participation that would result in concrete plans
- to identify potential leaders and representatives for water user associations

Field staff, other officials, and men farmers were involved in special training and discussion sessions on the need for women's involvement (Dok, Putri, and Zulaicha 1992).

A gender strategy is not static, but may evolve over time, as the following case illustrates.

The Grameen Krishi (Agricultural) Foundation (GKF) was established in 1991 by the Grameen Bank in Bangladesh. GKF supports agricultural development through irrigation, credit, and services. The Foundation's gender strategy has evolved over time. At first only men were included in GKF's crop production activities, while women were supported in their traditional homestead-based activities, such as rice processing and small husbandry. Gradually, GKF recognized women's actual important roles in crop production. This recognition, combined with a serious commitment to women, led GKF to shift its gender strategy to one that involves women farmers in its irrigation and agricultural activities. Agricultural production became more accessible and productive for women, who gained access to land, irrigation water, credit, seeds, fertilizers, and marketing facilities. Women were also able to earn more from the agricultural activities than in the traditional activities. The recognition and acceptance of women as farmers and as irrigators are a crucial first step in addressing gender issues in irrigation programs (Jordans and Zwarteveen 1997).

More recently, there has been growing support for the inclusion of other socioeconomic patterns, in addition to gender differences. In some cases, class differences exclude some groups from irrigation development, just as gender differences do. This strategy is called *socioeconomic and gender analysis (SEAGA)*. As a strategy, the analysis of gender differences together

with other socioeconomic differences, such as class, age, ethnicity, and religion, corresponds more to reality and may prove more effective and sustainable.

Gender and Water Resources Management Policy

Water resources management policies usually accommodate the needs of different sectors, such as urban water uses, industry, environment, and agriculture at the national level or for a river basin. The challenge is to incorporate identified needs of individuals, women and men, who are spread among the different sectors.

This could start with an assessment of women's and men's concerns related to water in each sector.

> *In Bangladesh it is important to recognize that women, who are responsible for the provision of water for drinking, horticulture, and other domestic purposes, do have different perceptions and concerns about water than men, who use water predominantly for irrigation of rice. However, women's views on water issues are profoundly affected by their socioeconomic status. Women from wealthier segments of society generally have access to private hand tube wells, while poor women may depend on public surface water bodies* (Duyne 1997). *Field observations indicate that in some areas of Bangladesh, conflict arises among groups of users of water during the dry season. Irrigation may consume all available surface water and cause a lowering of the groundwater table, resulting in limited availability of water for drinking, as well as for gardening and other domestic purposes.*

Much more information is needed on linkages between gender and water resources management policies, to be able to develop strategies that incorporate gender issues. The underlying premises and assumptions regarding socioeconomic and gender differences on which existing water resources management policies are based need to be unearthed. Water resources management policies need to be redefined to depict realistic gender relations and all women's and men's water needs. Efforts to formulate new water resources management policies should incorporate socioeconomic and gender issues from the start.

Cost-Benefit Analysis

To establish the legitimacy of women's claims to water and irrigation services, cost-benefit information needs to be collected that justifies the inclusion of gender in irrigation planning with any additional costs involved. Social and economic benefits of women's participation may be quantified, e.g., effect on water management and water use efficiency, on yields, on labor productivity, or on family health. Studies that document the impact of gender-sensitive planning, such as the following example, are needed.

The Dakiri irrigation system is one of the few systems in Burkina Faso where women have obtained irrigated plots on an individual basis: 60 women (or 9 percent of the total number of plot-holders) have an individual plot. Most of their husbands also have plots. A recent case study found that the productivity of both irrigated land and labor is higher in households where both men and women have plots, in comparison with households in which only men have plots. The study further shows that women are equal to or better than men in irrigated farming, and their motivation to invest labor in irrigated production significantly increases when they have individual plots (Zwarteveen 1997).

Furthermore, cost-benefit analysis should disaggregate costs and benefits in terms of gender and class. This will yield information that helps to choose between different investment options; for example, a smaller, targeted investment may produce proportionally larger and more equitable benefits.

Stakeholder Participation

The planning of new irrigation development or upgrading of existing systems is increasingly based on the process of stakeholder participation. A stakeholder is anyone who has a direct or indirect interest in, or is affected by, or can affect the outcome of, irrigation development. A stakeholder approach to irrigation development requires an understanding of priority problems and recognition of the stake of all participants in achieving success.

A key stakeholder in many irrigation programs is the government, as a primary decision maker and implementor of policies. Many individuals or institutions may be indirectly involved or affected, or may be involved through linkages to those who are directly affected. Such stakeholders may include NGOs, various intermediary or representative organizations and private sector businesses. Those directly affected by a proposed irrigation intervention, farmers and tenants, are clearly among the key stakeholders. They are the ones that stand to benefit or lose from irrigation programs (World Bank 1994). In most irrigation systems, few women have official rights to land and water, which is why they are seldom identified as key stakeholders.

Different groups of stakeholders have similar, but also conflicting, interests. Power relations, both between local, regional, and national level, between rich and poor people, and between women and men, strongly influence final decisions made. In cases of a very hierarchical social structure and inequitable distribution of assets, women and poor people will generally lose out in the planning process, unless special efforts are made.

In the rehabilitation of Bauraha Irrigation System in the district of Dang in Nepal, women farmers were not identified as stakeholders and consequently not involved in the planning and the design of the rehabilitation activities. The result was a male-dominated problem identification, i.e., the high labor requirement for maintenance and repair. The constraint faced by women, i.e., water-shortage that resulted in

> *competition for water with male farmers, was not considered. Consequently the project replaced the brushwood intake structure by a solid trashrack-intake, that would require less maintenance in future. Although the intake could easily have been expanded to increase the water flow, it was built with exactly the same dimensions* (Bruins and Heijmans 1993).

In addition, specific restrictions often prevent women farmers and marginal groups from voicing their opinion in stakeholder consultations. These need to be recognized and strategies developed to tackle them in order to facilitate their active participation from the early stages of planning through implementation (Wilde 1997).

Stakeholder groups at policy, institutional, and local-level need to participate actively in the planning process. However, linkages between participatory appraisal and planning at the community level and irrigation planning at system, district, and national level, need to be strengthened, which include the development of appropriate tools. Stakeholder participation and participatory irrigation planning efforts need to be evaluated and documented with special emphasis on the participation of women farmers and marginal groups. Their participation in the planning process, as well as the actual reflection of their needs in the final design and implementation, need to be documented.

INSTITUTIONAL LEVEL

To link the policy level to the practical level of implementation calls for specific institutional strategies, including:

- changes in the institutional framework of irrigation institutions
- preparation of guidelines on gender and irrigation
- increasing the capacity of the various actors to integrate these concepts into their work
- involvement of women in water user associations

Institutional Framework

In order to formulate and implement a gender strategy in irrigation development, existing institutional frameworks may need to be changed. Issues to be addressed include alternative organizational arrangements and gender expertise.

The various organizations involved in irrigation development include national governments, national irrigation organizations, multilateral organizations, international research institutions, donor agencies, and lending institutions. Often, separate institutions are responsible for gender issues and rural women, e.g., a Ministry of Women's Affairs. A strategy to bridge the gap between irrigation and gender institutions can be the installation of gender focal points or gender units within irrigation institutions or sections.

In Tanzania in 1995, a Women and Irrigation Unit was formed within the Irrigation Department of the Ministry of Agriculture and Cooperatives, with the mandate to advise the department on policy issues relating to gender and irrigation. It oversees the integration of gender issues into all aspects of irrigation project preparation, implementation, and monitoring, and provides training, supervision, and monitoring for all projects and irrigation-related personnel. The unit serves as a center of knowledge and experience on gender issues in irrigation in Tanzania, participates actively in ongoing programs, and collaborates daily with staff of the Irrigation Department. Although understaffed and faced with a serious lack of funds, the unit manages to sensitize the Irrigation Department staff on gender issues, and to initiate a gender strategy, especially in the field of water user associations.

The change in the institutional framework can only be complete if the gender policy and strategy are included in the budget of the institution. There needs to be a separate budget for a gender program, or funds should be earmarked for clearly defined gender activities. There is some indication that gender units tend to get marginalized and do not lead to real changes in the institutions' policies and programs. Greater access to funds, and more control over these funds, especially in times of budget cuts, would increase the effectiveness of these units.

Ultimately, all staff members of irrigation institutions need to become gender-sensitive in their work, making special gender units superfluous. This aim needs to be supported by strong management commitment to gender issues. Changing an institutional framework is a difficult task, especially in the current environment in which most irrigation agencies have to economize, decrease staff, and drastically cut irrigation investments and expenditure for operation and maintenance. On the other hand, the shifting roles of public irrigation agencies from implementation to coordination, advice, and supervision may also provide the opportunity to incorporate gender.

Guidelines on Gender and Irrigation

Guidelines on Gender and irrigation assist irrigation professionals and agencies in integrating gender issues into their work. Guidelines come in different formats—from one-half page "do's and don'ts" to extensive documents that spell out every step in detail.

An example of a set of general guidelines is the "Sector Guide: Irrigation," developed under the Socioeconomic and Gender Analysis program of FAO/ILO. The document gives specific suggestions for the inclusion of socioeconomic and gender issues in various stages of the project cycle, lists key questions for analysis, illustrates the issues with case studies and recommends appropriate tools (Jordans 1997).

Guidelines cannot spell out every activity and design choice beforehand. Specific activities will largely depend on the interest and needs among the stakeholders, women and men

farmers, based on their constraints and opportunities. On the other hand, it will also depend upon the willingness, motivation, and creativity of the irrigation planner and designer.

In addition, strategies will differ because of diverse and dynamic gender roles and differences in field situations, regions, and countries. Different irrigation systems require different strategies. For example, the issues that have important gender implications in a large canal irrigation system are very different from the issues in a small-scale pump irrigation program. Guidelines can be developed to integrate gender issues into specific situations or programs.

> *The "Guidelines on addressing gender issues in the Traditional Irrigation Improvement Program (TIIP)" in Tanzania describe the gender strategy of the TIIP program, and step by step tools for the integration of gender. The document further offers suggestions to address gender issues in daily fieldwork activities, as well as in office work. The document provides practical ideas on how such things as the cultural taboo for women to see the irrigation intake or open the water gate, which obstructs women's access to irrigation water, can be overcome* (Grift, van der 1995).

The impact of existing gender guidelines, such as the ones mentioned above, needs to be evaluated. They also should be adapted to today's irrigation context, that is influenced by growing water scarcity and irrigation management transfer to the private sector.

The lack of wide dissemination of gender guidelines and the additional time and effort that irrigation professionals take to apply these separate guidelines indicate that in the long run this strategy may not be effective. What is needed is to incorporate socioeconomic and gender issues into the general irrigation guidelines and manuals. Until now, these technical publications have been almost always gender-oblivious. In fact, most irrigation manuals and guidelines are predominantly technical and hardly focus on people, let alone recognize differences between groups of people and between women and men.

Capacity Building

Strategies and efforts to integrate gender into irrigation planning will only be effective if proper capacity building activities accompany them. Capacity building aims at the development and enhancement of the skills of people to incorporate gender issues into their irrigation activities. Training activities can also raise awareness, initiate discussion and feedback, and be instrumental in the participatory planning of activities and monitoring of progress. Participants in the training activities could be staff of irrigation agencies, irrigation engineers and designers, water user associations, or farmers. While general participatory gender training programs have been developed and conducted by various agencies and groups, only a few examples exist of these training programs or materials that specifically focus on the irrigation reality and practitioners.

Under the Special Program for Food Security (SPFS) in Zambia, implemented with technical assistance from FAO, a number of low-cost irrigation pumps were introduced. Both women and men are involved in the irrigated production. They pump and distribute the water on the field alternately. Participatory training sessions are organized for technical staff, extension workers, and farmers throughout the growing season in order to support and closely monitor the program. Special training sessions are organized on the socioeconomic and gender issues related to the introduction of the various technologies. The different roles and resource-bases of women and men farmers and the implications for the irrigation program are discussed, in order to raise awareness among the staff. In action plans prepared during the training, the extension staff defines specific activities that ensure both women's and men's involvement in the program and an adequate response to their needs and constraints.

Very few capacity building activities, such as the training program mentioned above, have been evaluated for their usefulness and impact on the irrigation development. Findings of these evaluations could lead to further improvements of the training programs.

Water User Associations

In the context of privatization processes and decentralization, irrigation management transfer entails the turning over of operation and management responsibilities from government agencies to the private sector; in practice, transfer is very often to water user associations (WUAs) or water companies. Mechanisms are needed to ensure that women are included in the membership, decision-making committees, and among irrigation professionals of the WUAs.

Specifically, WUAs can:

- Abolish the one member per household rule, and allow dual or multiple membership within a single household.
- Reserve positions for women farmers in WUAs to ensure proper representation of the needs of all farmers.
- Allow men to designate their wives as members and vice versa and establish liberal membership recruitment procedures.
- Set targets for the percentage of women members in WUAs that correspond to the actual participation of women in irrigated agriculture.
- Ensure that the women members also play a decision-making role in the associations. This may require specific training and support to overcome cultural constraints, e.g., women who are not used to speaking in public or in mixed groups. It may also require separate preparatory meetings in which women prepare their point of view and reach consensus on certain issues, which they can then present in the mixed meetings.

Give both women and men responsibility for water management, such as the operation of gates, guarding the water flow, or the distribution of water.

The above options for action may be more feasible in some socio-cultural contexts than in others. The question should be asked: What is feasible and practical in the current context? Decisions should be based on discussions with the women and men water users.

The documentation and evaluation of the impact of strategies to increase the number of women members and their management roles in WUAs could result in insights that could help overcome resistance against, and skepticism about, the above measures. For example, in Tanzania the involvement of women in decision-making positions in WUAs has resulted in fewer operational problems and better financial recovery of operating and maintenance expenses, compared to WUAs where only men are involved (Masija 1996). The impact on water management efficiency, equitable water distribution, and financial recovery of operating and maintenance expenses should be studied and if possible quantified.

IMPLEMENTATION LEVEL

Practical strategies at the implementation level are needed to guarantee the active participation of women and men in irrigation planning, design, operation and maintenance, and monitoring and evaluation. The main practical strategies are:

- gender-disaggregated data collection
- gender-sensitive design
- gender-sensitive technology development
- equitable land and water rights
- irrigation in the context of the overall water resources and farming system
- equitable access to extension and training
- budgeting funds for gender-sensitive planning and implementation
- gender-disaggregated monitoring and evaluation

Data Collection

Appropriate strategies to include gender issues in irrigation planning can only be identified when gender-disaggregated data are available. Gender-disaggregated data should be collected on land titles and use, division of labor, and barriers related to irrigated agriculture and water use. In reality, use is often made of existing quantitative data, which tend to be unreliable,

outdated, or lack sufficient detail about gender and other important socioeconomic variables. Qualitative methods such as rapid rural appraisal and participatory rural appraisal supplement existing data.

Apart from one-time data collection efforts, recurrent data collection programs in the irrigation context, such as registration of water users and recording the payment of water and maintenance fees by farmers, should be gender-disaggregated.

Irrigation Design

Modern irrigation design criteria are intended to:

- match design to users' wishes because irrigation is a service to farmers, which should be as convenient and efficient as possible
- complement the organization of labor
- allow for freedom of crop choice
- optimize local decision making of technical issues such as site, plot size, methods of field irrigation and number of participants, using participatory approaches in the context of local farming systems and conditions (Wolter and Burt 1997; FAO 1996)

Provided that the planning and design process is truly participatory, and all socioeconomic groups and women and men have an equal say, it is more likely that gender aspects will be better integrated in irrigation programs from the early stages of the design process (Facon 1995). Whether this assumption is actually true has however not yet been documented.

A point of concern is also that not all the implications of certain technical design choices may be clear to the engineers or to the farmers. Engineers may not be aware that their technical decisions have different effects on women and men. On the other hand, farmers may not know the range of design choices that are technically feasible and the impact of each choice. For example, an irrigation design that delivers water for 24 hours per day has the technical advantages that: i) there are lower operational losses from frequent filling and emptying of canals; ii) there is no need to construct a night reservoir; and iii) the carrying capacity of canals and structures downstream of the reservoir can be half the size of those of a system that delivers water for 12 hours a day. However, due to social constraints women farmers are often severely restricted in their movement outside the village at night. They may thus not be able to take their share of water during the night.

It is therefore important that irrigation designs are prepared, presented, and discussed with the farmers, to arrive at a design that is acceptable to both women and men farmers. In addition, more structured information is needed on the linkages between design decisions and differential effects on women and men farmers.

Irrigation Technology Development

Both women and men farmers should have access to information and training and, if interested, access to irrigation technology. Technology must take into account the following criteria to be appropriate for both women and men:

- investment costs in line with farmers' financial means, including availability and access to credit (for women/men)
- investment costs that consider farmers' returns (women/men)
- the available cultivable area (women/men)
- type of crops to be grown (women/men)
- amount of labor required and amount of labor available (women/men)
- physical strength needed for operation (women/men)

During development and extension of a certain irrigation technology, all handling and maintenance requirements need to be assessed, to ensure that the technology is matched to the operational capacity and strength of both the women and men users. This can best be done in close consultation with the users, to avoid decision making and design based on preconceived and possibly mistaken ideas.

> *In Zimbabwe women adopted sprinkler irrigation and were among the first to acquire an adept knowledge of it. However, sprinkler irrigation was inconvenient for them because it required frequent moving of heavy sprinkler laterals and thus permanent presence for the women who lived far from the schemes* (Chimendza 1989). *After recognition of these problems, the sprinkler laterals were successfully replaced by drag-hose sprinkler systems. Drag hoses do not require frequent movement and are much lighter to handle* (Bosma 1997).

A greater acceptance of a certain technology will benefit more farmers and help realize a project's full potential. Mistakes made in the selection of an appropriate technology must therefore be mitigated as soon as possible, ideally during a pilot-testing phase.

Land and Water Rights

Irrigation design (technology) and management (institutions) have the potential to create, transform, or reproduce entitlement structures. The very legitimacy of women's needs for rights to land and water is often questioned, even in situations where women held such property rights in the pre-project situation (IIMI 1997). A number of researchers hold the hypothesis that access to water is determined by existing land rights: water rights are often derivative from land rights

(Merrey 1997). Women almost everywhere have restricted access to land, and probably even more so to high-value irrigable plots. With the direct linkage between land rights and water rights, the possibilities for women to obtain formal access to irrigation water are limited. Independent ownership of resources, especially land, is of crucial importance in promoting the well-being and empowerment of women. The issue is not just one of property ownership; it is also one of property control (Agarwal 1994).

A second way of obtaining land and water rights is through active participation in irrigation infrastructure construction. In these cases, there is some correlation between rights (property) and responsibilities (investment in property creation) (Ambler 1990). Women who head their households often have little time for these kinds of additional activities, which may reduce their access to land and water rights. In addition, women who participate in construction activities do not always get equally compensated as men.

Strategies identified to promote more equitable access to water and irrigated land for women and men could, depending on the local situation and in coordination with the community, include measures to:

- conduct more in-depth research into the local legal position of women and men concerning their access to and control over natural resources
- support national, regional, and local advocacy groups that aim to enhance and enforce the legal position of women
- provide legal education to women and men, as well as government and other organizations' staff
- allocate irrigated plots to women identified as heads of farm households
- put the title to irrigated plots in joint names of the couple or divide family land between husband and wife (or wives) with individual titles
- promote collective land and water rights for women, especially those from marginal groups
- stimulate organization of women's groups to claim and protect their rights
- pay attention to measures that secure the land and water rights of women in male-headed households, so they are able to continue to farm the land upon the death of the husband or after divorce (Fong and Bhushan 1996; Benda-Beckmann et al. 1996)

With irrigation increasingly a private investment, access to capital becomes a determining factor for access to land and water. Water markets are being established where water is for sale. A strategy to increase women's access to land and water should include efforts to increase their access to capital and credit.

Water Resources and Farming System

Irrigated agriculture should not be dealt with in isolation, but should be seen and understood in the context of the overall water resources system and farming system. In many areas, rain-fed agriculture and livestock are equally important for livelihoods of rural households, or more so, than irrigated agriculture.

Other uses of water in the watershed area need to be included in an overall water use plan, possibly with the effect of reduced water availability for irrigation.

> *In the Mahango scheme in Tanzania, FAO has assisted in the construction of an intake in a small river for the irrigation of women farmers' fields. In 1995 and again in 1996, a serious water management problem arose, not within the village, but with the village downstream whose inhabitants are predominantly cattle herders. In the dry season there is not enough water for all the different user groups. Conflicts center around the gates that control the water flow; gate handles have been stolen, and gates have been demolished. The downstream villagers are in the process of digging upstream from the intake a deep trench that will divert the water to their village. As a result, no crops were cultivated during the 1996 irrigation season.*

In discussions with local groups, all water uses need to be discussed and a preferential ranking needs to result in a comprehensive water use plan. In addition, a range of both men's and women's agricultural and nonagricultural activities within the farming system could be supported. Activities in this field should only be promoted once women's involvement in mainstream irrigation activities has been secured. This avoids the danger of limiting women's involvement to women's components which are outside mainstream irrigation activities. Specifically, planning could include:

- provision of the rural infrastructure needed to alleviate increasing demands on women's time, including household water supplies, woodlots, and fencing for livestock
- inclusion of value-adding activities for produce from irrigated farming
- inclusion of technologies for rain-fed areas and household vegetable plots
- construction of extra inlets or pipe connections to provide improved irrigation to subsistence vegetable and fruit production (Fong and Bhushan 1996)

Extension and Training

Strategies to involve both women and men farmers in the planned extension and training programs are not specific for irrigation programs, but apply to most agricultural development programs. Preconceived ideas about training needs for different groups of farmers should be

avoided. Instead, there should be a training needs assessment, so that women farmers can express their interest in such training activities as operation and maintenance of pumps and water management.

Project and Program Costs

It is important to include in budgets all additional costs for activities to integrate socioeconomic and gender issues in an irrigation project or program. Even if precise costs are unknown at the time of formulation, proper inclusion of estimated budget items is very important. Availability of a budget is often a determining factor in the extent to which an irrigation program or agency can respond to specific constraints for women.

Cost estimates for inclusion of activities in the field of socioeconomic and gender issues could include:

- institutional support to increase the capacity of institutions to plan and implement the project, e.g., experts on gender issues in irrigated agriculture and on participatory planning
- crop development aimed at both irrigated and rain-fed crops grown by women and men farmers
- training to improve staff and farmers' capabilities, e.g., gender and irrigation training
- research support aimed at proper inclusion of socioeconomic and gender issues in all research and data collection efforts, or additional research on gender issues
- water supply, sanitation, and other infrastructure construction that facilitate use of water for nonirrigation purposes
- project coordination, specifically for the implementation, management, and monitoring of the irrigation program, including a gender-disaggregated monitoring system

An assessment needs to be made of the estimated benefits of these additional costs, especially in the situation of an investment project, although benefits may very often be very difficult to quantify.

Monitoring and Evaluation

The planning of irrigation development should include arrangements for the collection and analysis of gender-disaggregated data for monitoring and evaluation. This includes the definition of gender-disaggregated indicators for measuring changes. Regular data collection and analysis could be done by field staff who are directly involved in the implementation of activities. Monitoring can also be carried out in a participatory way, e.g., through regular meet-

ings or workshops with farmers, field staff, government representatives, and community organizers. It may also encompass self-evaluation methods for women's and men's groups and WUAs.

It is important to monitor participation of women and men and the impact of the activities on their relative positions to better adapt plans and to introduce additional activities or modify ongoing activities. Collection and analysis of gender-disaggregated data and participation in monitoring and evaluation meetings can increase the gender awareness among the staff. They may become more attentive to differences between women and men in their daily work.

Irrigation development should include an evaluation of the gender strategy and its impact on the program. Useful lessons can be drawn from strategy evaluations for future irrigation programs.

> *The positive impact of paying attention to gender issues is detailed in the project completion report of the Philippines Communal Irrigation Development Project. This project exceeded physical development targets and appraisal estimates of irrigation intensity and paddy yields. The project's success has been attributed to the full participation of the farmer-beneficiaries. The project partly draws on a tradition of farmer-built irrigation systems and responds to a cultural context in which women exercise independent land rights in the community by:*
>
> - recruiting community organizers, two-thirds of whom are women
> - ensuring membership of both spouses in water user associations
> - actively encouraging women to assume leadership roles
>
> *It was also noted that women's membership facilitated the payment of fees, because women control family finances* (Quinsumbing 1994).

OPPORTUNITIES FOR IMPROVEMENT

To identify the opportunities for improvement, two questions can be asked:

- What additional data and information are needed to develop more efficient and successful strategies to incorporate gender in irrigation planning?
- What actions are needed to translate the above-mentioned research-based information into the actual development and implementation of gender-sensitive irrigation planning?

Table 2 presents the opportunities for improvement that have so far been identified at the policy, institutional, and implementation levels.

Table 2. Information and action needs.

	Information needs	Action needs
Policy level	• Linkages between gender and water resources management policies • Cost-benefit analysis of women's involvement • Women's and marginal groups' involvement in participatory irrigation planning and stakeholder consultations	• Add gender expertise to the formulation of water resources management policies • Improve tools for linking participatory community planning and irrigation planning at national level
Institutional level	• Impact of institutional changes to incorporate gender issues • The usefulness and effectiveness of gender and irrigation guidelines • The impact of existing training activities in gender and irrigation • The impact of strategies involving women in water user associations	• Change existing institutions, including the budget • Improve and pilot-test gender and irrigation guidelines • Incorporate gender issues in general irrigation guidelines • Develop training material and organize training sessions that focus on gender and irrigation specifically, including the production of audiovisual materials
Implementation level	• Linkages between design decisions and differential effects on men and women • Impact of strategies involving women farmers in irrigation planning	• Pilot-test recommendations resulting from research studies • Disseminate successful practical strategies

The research and action needs have been identified at the three levels of irrigation planning. Different groups or actors will be involved in the research activities or implementation of actions, depending at which level these are situated.

Information Needs

Research activities can provide the data and information needed to develop more effective strategies to incorporate gender in irrigation planning. Research activities, as identified in this paper, should focus on the impact analysis of current gender strategies, including cost-benefit analysis, and on the exploration of linkages between gender issues and water resources management.

Information Needs at Policy Level

- linkages between gender and water resources management policies in the different sectors, such as industry, environment, agriculture
- cost-benefit analysis of women's involvement in irrigation programs and quantification of social and economic benefits
- women's and marginal groups' involvement in participatory irrigation planning and stakeholder consultations, including methods and tools used

One hypothesis could be that the involvement of women farmers has a positive economic effect on scheme performance, which would then justify additional costs for gender-sensitive irrigation planning. Another hypothesis could be that the current support for participatory irrigation planning does not automatically lead to gender-sensitive planning, if no special measures are taken.

At the policy level, the aim should be the active involvement of governments and institutions that provide policy advice, such as lending institutions, international research institutions and United Nations agencies.

Information Needs at Institutional Level

- impact of changes in the institutional framework that integrate gender issues in irrigation institutions
- usefulness and effectiveness of existing gender and irrigation guidelines
- impact of existing training activities on gender and irrigation
- impact of strategies involving women in water user associations

A possible hypothesis for research at the institutional level is that so far, these institutional efforts have not been adequate as they have mostly led to ad hoc activities and programs, which show varying degrees of effectiveness. Irrigation institutions should play a major role in research efforts at the institutional level. Ministries of irrigation, irrigation programs, and projects as well as WUAs need to be involved.

Information Needs at Implementation Level

- linkages between design decisions and differential effects on men and women, especially in the context of rehabilitation and upgrading of irrigation schemes
- documentation and analysis of the impact of various practical strategies that involve women farmers in irrigation planning

At this level active involvement of water users, women and men farmers, and WUAs in the identification of research issues should be sought. Their needs and priorities should be included in the research efforts. Furthermore, NGOs, field staff, engineers, and community organizers could be directly involved in the research activities.

Information can be obtained partly through specific socioeconomic and gender studies as described above. In addition, an effort could be made to ensure that regular studies and surveys on irrigation management and farmers' participation collect their data disaggregated by gender. This would increase the amount of available gender-disaggregated research data tremendously.

Action Needs

Some of the activities listed below can start simultaneously with the research activities identified, or in some cases they can be combined. For example, the research into linkages between gender and water resources management policies could be combined with gender experts who participate in teams that assist governments with the formulation of new water management resources policies. Other activities require prior research before they can be implemented, such as the dissemination of successful strategies.

From the discussion in this paper the following needs for action at the three levels have been identified:

Action Needs at Policy Level

- Include gender expertise in the formulation of new water resources management policies.
- Improve tools, linking participatory community planning to irrigation planning at scheme, district, and national level.

Action Needs at Institutional Level

- Change existing institutions to integrate gender concerns in irrigation planning, including separate funds for gender activities.
- Improve and pilot-test gender and irrigation guidelines.
- Incorporate gender issues in general guidelines on irrigation planning.
- Develop training material and organize training sessions that focus on gender and irrigation, including the production of audiovisual materials that illustrate women's roles in irrigation management.

Action Needs at Implementation Level

- Pilot-test recommendations resulting from research studies, especially in the context of water saving and irrigation management transfer programs.
- Disseminate successful practical strategies to a large audience.

JOINT EFFORT

In sum, there is still a lot that needs to be done before the planning of irrigation will incorporate gender issues successfully. Research organizations and researchers have only a limited capacity to ensure that their research results and outputs actually lead to the desired changes in the irrigation planning practice. A mechanism to ensure application of research results in irrigation practice is close cooperation between research and implementing organizations, such as national irrigation organizations, NGOs, and advisory bodies such as lending and United Nations agencies. A second mechanism is close cooperation, in the form of participatory research, with farmer groups and WUAs. For example, joint participatory workshops involving researchers, local organizations, and farmers could be organized to identify and prioritize research issues and discuss preliminary research data. Furthermore, using a similar method, the data could be validated and preliminary lessons learnt could be formulated to improve current strategies and practices.

Other mechanisms that stimulate or enforce implementation of gender strategies at the different levels of irrigation planning are necessary. Requirements and criteria for implementation of gender strategies formulated by donor and lending agencies as a prerequisite for funding can be effective. Another mechanism is the documentation of the cost-effectiveness of gender strategies and their positive impact on irrigation scheme performance, which provides an economic justification for their implementation.

Therefore, dialogue and cooperation between research and implementation are needed to develop and implement successful strategies to incorporate gender in irrigation planning. The goal should be to strengthen the link from theory to policy to practice, and back, through a joint effort of research and action.

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Women and Smallholder Irrigation Development in Africa: Constraints and Opportunities

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ABSTRACT

The general aim of this paper is to identify constraints to improving women's effective participation in smallholder irrigation development, operation, and management. Smallholder irrigation performance must improve if future food production targets are to be met. Women, as key stakeholders, must therefore be empowered to contribute and benefit. Although many of the constraints that women face arise from social, economic, and cultural norms in irrigating communities, some arise from within irrigation development policies themselves.

Despite the general adoption of the principle of gender equality, current smallholder irrigation policies have the potential to further disadvantage women. Promotion of farmer investment, responsibility for management, and payment for services are not always consistent with commitment to gender equality. In addition, lack of gender-awareness in the irrigation profession, coupled with the cost to irrigation departments to provide gender training, contributes to weak commitment to gender goals.

The objective is to highlight some points of conflict between current policies for smallholder irrigation development in the region and gender goals. The paper argues for the adoption of strategies to reduce these constraints and identifies issues on which research could contribute to effective improvement in women's contribution and rewards.

INTRODUCTION

Concern for Women

Many international organizations are concerned about the disadvantaged situation of women, especially in poor countries. The UN conference in Beijing brought together these concerns and highlighted the need to focus on gender. In the poorest communities, women's heavy workload causes decline in their health and in the well-being of the family. In Africa, the sig-

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nificance of women's workload is particularly great in rural communities where women are often solely responsible for a family. Donors are concerned not to add to women's work, as has sometimes happened in the past (Barrett 1995) and aim to implement gender-sensitive approaches to provide women with opportunities to improve their situation.

The water sector is of particular importance as water is a vital resource for poor women. Securing water is part of everyday life; it is scarce, heavy to carry, and costly but essential for the survival of families and for production of food. Despite the enormous importance of water in rural Africa and African women's experience in managing water-shortages both in farms and in families, they are often ignored in the planning that relates to water. In the past, this has led to poor access to water for women and, in irrigation projects, to disappointing levels of production, which have in the worst cases jeopardized the viability of the project (Dey 1981, 1990).

Evaluation of the impacts of irrigation reveals that women have suffered from development processes that exclude them from decision making (Dey 1990; Carney 1988; van Hooff 1990). At the same time, poor performance of schemes is common. Farmers' investment in a marginally successful project risks squandering resources that poor people can ill afford. Women are particularly vulnerable to loss of resources, partly because they are often poor to start with and partly because, as they already support enormous workloads and lack control of benefits, they have less opportunity to recoup losses (Adepoju and Oppong 1994; Zwarteveen 1996; Chancellor 1996).

The extent of women's poverty is estimated to be such that 70 percent of the world's poor are women. Forecasts suggest that in sub-Saharan Africa the number of poor people will rise to 304 million by the year 2000 (IFPRI 1995). Further "feminization" of agriculture is expected as men continue to migrate to urban employment, when already 70 to 80 percent of household food is produced by women. This is not to say that femaleness necessarily leads to poor agricultural performance; women are recorded as highly productive in some circumstances (Chancellor 1990). But women often fall onto the disadvantaged side of other demographic axes such as landownership, resources control, and formal skill development.

SMALL-SCALE IRRIGATION DEVELOPMENT

Small-scale irrigation development is considered appropriate to sub-Saharan Africa for a number of reasons:

- It is estimated that sub-Saharan Africa produces less food per person than it did 30 years ago (FAO 1996). Irrigation is expected to contribute to reduction of the shortfall in food production.

- Large-scale government investments are unsustainable without financial support and become a heavy burden on expenditure.

- The top-down implementation of large schemes is no longer politically acceptable. Participation and capacity building in rural communities greatly distinguish small-scale irrigation development from large-scale irrigation development.

> Participation enables farmers to have input to design, contribute skills and local knowledge, and develops a sense of ownership through involvement and contribution.

Underhill (1990) has raised sound points about the necessary role of farmer participation in ensuring the effective and sustainable use of water in small-scale schemes. He argues that implementation must not be the application of a ready-made plan but that it should be sensitive to environment, complexity, rural time scales, and support for local people to participate in a real way. However, it is questionable if irrigation departments are able to address these crucial issues. The World Bank review of successes in small-scale irrigation in the Sahel also emphasizes participation and motivation as crucial elements in success. The influence of the market and socioeconomic conditions on the motivation of the key participants should be carefully investigated (Brown and Nooter 1992). Many commentators identify design of new schemes as a problem area where engineering, agronomy, and sociology must come together in a meaningful way to determine effective ways to encourage farmer participation. Ubels and Horst (eds., 1993) recommend new roles for professionals incorporating communication, facilitation, and synthesis. A major problem in putting this in practice has been establishing good methods for determining who the key participants are and determining practical steps to ensure they participate effectively.

Although large schemes have notably failed in Africa, small-scale irrigation systems have not performed well either. Small schemes consistently perform poorly, achieving lower than expected yields, poor economic returns, and inadequate maintenance (Barghouti and Le Moigne 1990; Underhill 1990). Small-scale schemes are often only viable with government subsidy because farmers do not generate sufficient surplus to finance maintenance or improvement (Madyiwa and Dube 1996). The cost to governments of supporting spatially dispersed irrigation systems cripples their ability to maintain schemes in good working order, which results in poor service to irrigators and threatens the effectiveness of government investments in irrigation (Madondo 1992).

However, as rural populations increase, more food must be produced locally (FAO 1996). Attention will focus on the effectiveness of water used for irrigation, and how to improve performance. Performance depends to a great extent on the performer and, despite women's key role in smallholder irrigation, links between women and irrigation performance are poorly documented.

There must, therefore, be dual objectives for future new approaches. First, women's situations have to be improved and second, improvements must be made in the economic performance of small-scale irrigation. There is an implied assumption that the second will be linked to the first. Irrigation developers, however, are unlikely to be motivated to empower women until outcomes of women's participation are monitored and positive impacts of women's empowerment on performance are demonstrated. The goal for developers is to achieve targets such as areas developed and yield or economic return maximized.

WOMEN'S ROLE IN SMALLHOLDER IRRIGATION

The World Bank (1996) emphasizes the need for farmer participation and participation of what it terms "sub-groups" such as women, poor people, and the landless. Recent research in African irrigation schemes has found women to be major contributors of agricultural work and of irrigation work in particular (Williams, J. L. H. 1994). Present estimates for women's contribution are in the range between 60 percent and 95 percent of the total work (Chancellor 1996). A number of factors contribute to this state of affairs.

First, irrigation seldom provides enough food or cash to meet family needs. Thus income has to be derived from other farm enterprises or be supplemented through paid employment. In a study of thirteen schemes in The Gambia, Kenya, and South Africa, irrigation was the sole source of income for less than 4 percent of smallholders (Chancellor and Hide 1996a). Men commonly take on extensive agricultural and livestock farming and are often better qualified to take paid employment. Women mainly stay at home because of their multiple roles in childcare, homecare and farming, while men migrate out. Women are left to take over men's former contribution to cultivation, operation, and maintenance of the irrigation system. These women-headed households often lack not only "man" power but also may lack skills and capacities to participate effectively in operating, managing, and developing schemes to meet their needs. This aspect of rural communities will not change significantly in the near future as it results from long-term disadvantages of women in access to education and technical training. Male out-migration, on the other hand, will increase as rural production continues to lag behind population growth, further swelling the number of women-headed households in rural areas. Mainstream small-scale irrigation development, then, is a major "woman" issue and women's lack of capacity has to be addressed to promote sustainable development.

Women's gardens are an important development in which women already demonstrate their ability to use water efficiently, market high-value crops, and maintain and repair equipment. The gardens are essentially commercial and are important to rural, peri-urban and urban women to generate income over which they retain control (de Lange 1994; Waughray et al. 1997).

Second, the intensification of agriculture, which accompanies irrigation development requires more labor input per unit of land. Increasingly women provide that additional labor, even in male-headed households (Madondo 1992). There are a number of contributing factors; one is that tasks such as weeding and transplanting are traditionally allocated to women. These tasks are increased by irrigation whereas plowing and land preparation, traditionally male tasks, increase less or not at all. In highly intensive activities such as horticulture, if returns are high men often participate in tasks traditionally regarded as women's tasks. However, it is common to meet additional demand by employing relatively cheap female labor.

Third, women often fulfilled the role of food growers, complementing the male role in providing meat. Later, in agricultural development, when cash crops were introduced, women were often regarded only as assistants to male farmers. Their own food-growing activities came to be regarded as unimportant because they did not necessarily generate cash. This led to the expectation that women will labor in irrigated agriculture for little or no reward. Although women do contribute for the general good and may not accept payment, it is clear that this expectation is wrong in many places and women have to be compensated for their time and

labor. The mistaken assumption that family labor is freely available has contributed to poor performance because designers have wrongly assumed that labor will be readily available when this is not the case. This mistake occurs regarding both men and women and results from a lack of differentiation regarding who does which tasks and when. In Kenyan schemes, irrigated agriculture tasks were delayed due to other productive commitments in dryland areas of the farm and maintenance was not done at the appropriate time (Hulsebosch 1990, 1992; Hulsebosch and Ombara 1995; Gillott 1993).

Women's role in irrigation schemes above field level is minimal. Although there are examples of women functioning effectively in water user groups and farmer committees, these are the exception rather than the rule (Chancellor 1990). Newly developed systems may have evolved in a slightly more gender-aware way and include women in the management committees but, as irrigation investment in the region has been low in the past decade, most schemes are male-dominated at committee level.

Unlike agriculture, irrigation has not attracted women professionals and few have chosen irrigation and engineering careers. Lack of young women entering scientific training is a major factor. Motivation to acquire relevant technical qualifications is reduced further for women by the lack of role models.

At policy level too there are few women in the region. Qualified women are scarce and are recruited into work areas, which are regarded as appropriate to women, such as health, community development, and education. Women's interests are not necessarily neglected but there is a substantial risk that a paternalistic approach suffices and women's strategic needs are not met.

CURRENT POLICIES

Where irrigation performs poorly, failure is often attributed to poor commitment on the part of farmers, although clearly this is not always the case. Cost recovery is adopted as a policy in most African countries in the belief that farmers will respond by increasing participation and exercizing keener economic judgement on construction and maintenance of irrigation infrastructure.

Participation and commitment are closely linked and it is argued that participation has no meaning unless commitment is an integral part of the outcome. The World Development Report (World Bank 1996) recognizes the importance of participation in the effective delivery of public goods such as irrigation and in determining effective future maintenance. It identifies three keys to using participation effectively:

- involve beneficiaries directly
- seek the early consensus of *all* beneficiaries
- mobilize cash or "in-kind" contributions from beneficiaries

The World Bank's role in controlling disbursement of funds is a powerful position from which to influence behavior. If these strategies are adopted, they are expected to improve the

performance of irrigation investment and, it is assumed, to improve women's situation. But in practice, participation of farmers is not necessarily a gender-sensitive activity (Silva-Barbeau 1996; Williams, Suzanne 1994).

PARTICIPANTS OR STAKEHOLDERS

Perceptions about the best people to participate in irrigation planning have changed dramatically over the last decades. In the early "post-colonial period," the term "beneficiary" was given a narrow interpretation and linked to the concept of ownership or membership, and tended to exclude women. This was especially true where land tenure was a male prerogative or where this was presumed to be the case by male-dominated development initiatives (Zwarteveen 1996). Gradually, the concept of irrigators broadened to include tenants and sharecroppers and last of all expanded to include women. However, moves to include women do not occur spontaneously and participatory processes can ignore women if socially determined roles are already significantly gender-biased.

Although stakeholder-analysis determines the issues for each group affected by proposed developments and allows greater differentiation between groups of people and institutions involved in irrigation management and development, it does not in itself correct existing biases. However, users are encouraged to question the homogeneity of groups such as farmers and women and in doing so become aware of the relative importance of particular groups. Stakeholder groups are prioritized to identify primary and secondary stakeholders and their status as active participants is defined. The analysis differentiates between stakeholders. Primary stakeholders roughly correspond to direct beneficiaries and people who lose out such as downstream users or other users of the catchment, and secondary stakeholders may be institutions and groups affected indirectly such as service providers and entrepreneurs. Key stakeholders have impacts on the success of the project such as smallholders and engineers (ODA 1995a, 1995b; Grimble and Chan 1995). Individuals may belong to more than one classification of stakeholder. For example, women are typically key stakeholders as well as primary stakeholders in African schemes. Stakeholders in irrigation are identified at all levels from the irrigated field through to international organizations. The scope and focus of interest at each level reflect the sort of decisions that are relevant to the stakeholder. Table 1 gives a typical list.

This view of stakeholders does not imply that participation must involve all levels at once but it does highlight the pivotal role of women at local or field level in irrigation, and the absence of women in policy and planning of irrigation at higher levels mentioned earlier.

There are strong links between the potential for including or neglecting certain categories of stakeholder and the type of participation approach used. Different levels of involvement have different outcomes for project success, for women, and for sustainability. Passive involvement is now recognized to be ineffective in all aspects, typified by announcements by departments giving information and requiring only that the recipient listens. Although passive involvement is a thing of the past, women are still recipients of this type of involvement because announcements are not directed to them or are inaccessible to the poorly educated.

Table 1. Stakeholders in smallholder irrigation.

Level	Stakeholder	Interest
Global and international	International agencies	Maintenance of the resources base
	Foreign governments	Reduction of conflict over water
	Environmental and human rights lobbies	Egalitarian resources management
	Future generations	All of the above
National/regional	National governments	Economic policies
	Planners	Political popularity
	National pressure groups	Human rights issues
	Nongovernment organizations	Food self-sufficiency
Sectoral	Water resources management	Conservation
	Agriculture	Water and land availability
	Industry	Water and land availability
	Water supply and sanitation	Water availability and quality
	Wildlife conservation	Biodiversity, migration
	Fisheries	Flow maintenance
	Downstream communities	Water availability
	Irrigation departments	Continued role, sector growth
Regional/provincial	Irrigation departments	Continued role
	Provincial administrations	Conflict avoidance
Local off-site	Local traders	Business opportunities
	Community leaders	Conflict avoidance
	Riparian users	Development
	Non-benefiting farmers	Maintenance of rights to water
	Non-benefiting water users	Incidence of disease
	Health workers	Demand for education
	Educators	Wear, tear, and demand
	Infrastructure providers and users	Wear, tear, and demand
Local on-site	Landowners	Value of land
	Male farmers	Costs and benefits
	Female farmers	Job opportunities
	Male and female hired workers	Job opportunities
	Agency staff	Job satisfaction
	Support service staff	Job satisfaction

Information offered is inadequate for people to make an informed decision. Unrealistic expectations and subsequent disappointment are common.

Provision of information for planners was regarded as adequate participation for some time, but the approach has two major drawbacks:

- the impression of participation is created while leaving farmers out of decision making
- assumptions about who can provide relevant information may be wrong (in the past male landowners were approached)

Information gathered in this way is likely to be irrelevant to the needs of small-scale women irrigators. Consultation processes became popular but suffered the same essential problems so women still lack influence in irrigation development or management.

On the other hand, offering short-term incentives often achieves high rates of female involvement. Food for work programs are often directed to women to ensure that benefits are dispersed through the family. However, issues relating to irrigation development are clouded and long-term suitability is not fully debated. Women are not likely to debate appropriate irrigation design while they are preoccupied by immediate food needs. They gain in the short-run despite a substantial increase in their workload. Women's physical contribution to irrigation development through such programs is seldom matched by their participation in planning or operation. The overall effect is therefore exploitative; neither women nor irrigation development benefit in the long term.

Water user groups illustrate functional participation; action is limited to tasks already determined by the physical and institutional setup such as scheduling and fee collection. Women participate increasingly in such groups, proving themselves efficient in the roles assigned them. Although they gain experience and contribute to operation and maintenance, while their numbers remain small their influence on major decisions is minimal (Zwarteveen 1995). Women will continue to form a minority whilst group members are elected from predominantly male electorates and also where women lack confidence in their roles in irrigation management (Chancellor 1995). Customary land tenure ensures that plots are registered in men's names thereby endowing them with membership rights. In newly developed Kenyan schemes, women are treated as members despite lack of land tenure and their attendance at meetings is an essential element in securing group loans (SISDO 1993).

The question arises that, if it is accepted that female participation is required,

- How can it be achieved?
- How much is the likely cost?
- Who pays?
- What is the scale of expected benefit?

There is a range of strategies that has been tried, tested, and evaluated in rural development activities. Evaluation of gender-sensitive strategies in the water sector is generally unavailable and, for the time being, selecting and adapting experiences from other sectors may be the best option. Whilst, in principle, gender-sensitive approaches are adopted, impact in the field remains low unless additional funds are allocated. Women may lack experience in participation and are therefore unlikely to participate without encouragement. Staff time has to be allocated to address this need, and additional people who have skills for promoting par-

ticipation may have to be included. If funds are unavailable, women may not be supported and will have difficulty in participating effectively. In the past, ineffective participation has been interpreted as lack of interest on the part of women. We are now aware that this may not be true. In cases where participation contributes to policy formation, women's exclusion may result in loss of future capacity to plan and manage water locally. As irrigation departments are characterized by shortage of funds, it is important to justify prioritizing women's participation, if funds are to be allocated for this. Gender-disaggregated performance data are required but on the whole they are unavailable. A first and relatively inexpensive step is to gender-tag routine data collection on planting dates, input use, and yield collected by extension services.

Stakeholder analysis is strengthened by combining it with analysis of strengths, weaknesses, opportunities, and threats perceived by the stakeholder groups (SWOT analysis). Points of conflict between groups or between a group and a proposed innovation can be identified. There is no single recipe for successful gender-analysis and techniques can blend to provide the right combination for a given time and place.

However, there are features of gender-analysis in the irrigation sector that distinguish it from other activities:

- The attitude of farming participants and irrigation professionals is challenged. Gender training and sensitization force self-examination and change on all sides. It is therefore difficult to predict the outcomes.

- A wide range of skills is needed and respect for other professional skills is crucial to success.

- Although irrigation development is seen as unfriendly to women users, gender sensitization must address the needs of men and women and enable men and women to support each other while determining their own roles.

Implementation to ensure that in practice women's voices are heard can still be difficult. Marginalizing women is often justified in terms of culture and tradition, both of which can be very difficult to refute. An additional stumbling block is irrigation developers' claim to be ill-equipped to tackle such a wide field. So at what stage should irrigation departments and agencies get involved?

It becomes very difficult to establish where responsibility for funding participation lies. Other professionals such as political and social activists may be more appropriate players in the initial stages of irrigation development than irrigation professionals. On the other hand, the importance of technical and physical parameters requires professional input. Departments in the region favor multidisciplinary, holistic approaches as highlighted at the 1996 Nairobi Workshop (Ministry of Agriculture, Livestock and Marketing 1996).

Evaluation of the benefit that results from addressing women's needs is largely not done. Future evaluation could focus on measurable indicators such as yield and profitability, maintenance and sustainability, income for men and women and relative shifts, workloads of men and women, and participation of men and women in irrigation management. Used alongside the qualitative measures such as women's perception of their job satisfaction, a fuller picture can be achieved. The quality of indicators requires constant review. Recording attendance at

meetings may not be so useful as recording the vote on decisions according to gender. Farmers could be encouraged to monitor their own schemes using basic gender-based information, seeing which might enable them to see women's achievements in a way they have not previously seen.

MOBILIZATION OF CONTRIBUTIONS

Contributions to irrigation development are made in cash or in kind, or in various combinations. Women-headed households are likely to have difficulty in mobilizing either type of contribution. Although women's access to credit was poor, this is a less serious constraint nowadays. Women are highly motivated to save and work together and have earned a good reputation in credit organizations (Madondo 1992). Group lending principles are spreading rapidly in Africa and village saving initiatives are taken forward by NGOs among women and through women's organizations in many African countries. The impacts of this change are widely felt in irrigating communities. Credit and investment funds in women's control are seen to benefit families and generally improve living standards. The World Bank now recognizes the benefits to be gained from targeting women in projects and programs. It is wrong to assume that women cannot mobilize cash. At the same time, it has to be widely recognized that women experience difficulty in retaining control over interventions, which they work hard to finance. There is a danger of increasing women's vulnerability by encouraging them to use credit for production if marketing and thus benefits are controlled by others.

In general, in smallholder farming and in irrigation, men make expenditure decisions. Surveys of expenditure patterns show little variation in this gender dominance; although in some schemes where women participate in expenditure decisions, the final veto is often in male hands (Chancellor 1997). In woman-headed households this is clearly not true but even in these circumstances male relatives will decide, particularly if the expenditure relates to inputs and equipment. Despite the growth in female-headed households, there are still more male-headed households in smallholder irrigation in Africa. The exception is in development of irrigated gardens. Women in The Gambia and South Africa are able to both sustain irrigation and maintain control of the productive assets in garden developments (Chancellor 1996). In some places, women have already taken matters in hand. In South Africa, women demand and obtain training in operation and maintenance to avoid dependence on men and the risk of delay or financial penalty. Women's groups deny men access to the irrigated area, to preserve their control when necessary (de Lange 1994).

Mobilization of cash contributions can therefore work against women. Either their male partner decides without their participation, which could potentially increase their workload or reduce expenditure in another vital area, or they are potentially short of resources to meet the contribution. If women do succeed in mobilizing cash, they still have the problem of retaining control. A wide variety of circumstances, customs, and institutional features can affect their ability to do this. Issues such as the basis of rights to land, women's access to markets, and control of equipment and expenditure become important as well as women's overall workload and lack of technical and literacy skills. It is important to consider how projects and programs can develop institutions and strategies to protect women's investment. If this

issue is ignored, then there is a risk of key stakeholders losing motivation, a situation which is already recognized on a number of schemes, particularly where commercial crops are grown.

In Kenya, women have taken opportunities to develop enterprises to complement their irrigation work. This allows women to exploit a proportion of their irrigation labor to create private funds without reducing their contribution to existing irrigation tasks on men's fields, thus enabling men to support their efforts (Chancellor 1996). The scale of women's investment tends to be small.

Mobilizing farmer contribution in kind is a favored policy. Contributions are intense in the initial stages of development and typically include activities such as land clearance and leveling and construction work. Later, in both large and small schemes labor provided by the farmers is mobilized for maintenance and minor repairs to the system (Madyiwa and Dube 1996). In farmer-managed systems the whole distribution system and headwork is in farmer care. Both professionals and farmers often assume that operation and maintenance are done mainly by men. However, women in smallholder irrigation systems frequently claim to be involved in operation and maintenance and work alongside men in much of the unskilled and heavy work. Technical training has generally targeted men, leaving the unskilled and less visible jobs to women. Gender-blindness in design has resulted in operational and maintenance tasks inappropriate for women users. Sadly, it does not follow that these tasks are always done by men especially when male out-migration is prevalent.

Additionally, women's physical contribution may go unnoticed because it takes the form of support to male farmers. In Eritrea, small dams were built using local labor, mainly men. Women assisted men by transporting stone to the site in barrows, arguably the greater part of the task. Reference to local "farmer" or "community" contributions failed to highlight women's work because it depicted men constructing dam walls (personal observation).

Although women are presently contributors, if their contribution is consistently ignored or not rewarded, they will become unwilling to contribute in future.

CONSTRAINTS AND OPPORTUNITIES

Concern to benefit women and at the same time improve irrigation performance set the scene for a number of conflicts and possibilities. Unless participation is adequately funded, even where the principle of gender equality is accepted, cheap and quick participatory methods will be used. Cheap methods are likely to allow continued exclusion of women or, at best, make it hard for them to participate fully. Women's "needs" will not then be addressed by project design, although women will probably continue to contribute substantial amounts of labor to the production process. The outcomes for women and for irrigation efficiency will not be as good as they otherwise might be. General gender-sensitive principles need to be adopted and clearly linked to practical strategies to ensure compatibility with existing policies.

A first step towards adopting gender-sensitive principles is to help all stakeholders to be gender-aware through training for irrigation department staff as well as for irrigation communities. The cost of providing training has already been mentioned but an added difficulty arises in professional staff failing to recognize their own need for training. It is essential to recognize that gender-training is not simply a field-level activity.

In smallholder irrigation development, within the major policies of participation and cost recovery:

- Women's objectives must be clearly prioritized.
- Strategies to reduce women's constraints must be adopted.
- New emphasis on training and capacity building is needed to improve performance.

1. WOMEN'S OBJECTIVES MUST BE CLEARLY PRIORITIZED

If women are to be assisted to identify and prioritize their constraints in relation to irrigation operation, management, and planning, there are a number of preconditions to address:

- Recognition of women's already heavy workload is crucial. Plans to involve women in participation and training should take account of their workload constraints.
- Awareness-raising must be explicitly directed to women.
- Time must be given for women to assimilate information and discuss issues.
- Communication links with irrigation developers must be woman-friendly.

2. STRATEGIES TO REDUCE WOMEN'S CONSTRAINTS MUST BE ADOPTED

Irrigation development will gain by forming links and working with other agencies such as community developers, women in development groups, credit institutions, or livestock departments in seeking ways of reducing constraints. An example of apparently successful cooperation between irrigation, credit, and livestock agencies in Kenya resulted in an integrated program. The target group was women on an existing horticultural irrigation scheme in Kenya. Women's groups of no more than thirty members were used to facilitate the program. A credit program directed at women to finance inputs for irrigated horticulture increased agricultural productivity and at the same time improved women's incomes and command of resources. A "zero-grazing unit" provided credit in the form of a cow from whose milk women derived benefit for family consumption and for sale and one calf per year. The cow was stall-fed on fodder grown on the boundaries of the irrigated plot and on crop residues. Women did provide additional labor but it was considered minimal in relation to program benefits (personal observation). Although women's participation in irrigation scheme management was not a major factor, strong female participation in resources allocation, in this case input credit and female labor, created opportunities for women to improve their situation in an irrigation setting (Chancellor 1996). In sum:

- It is crucial to promote labor-saving as well as increased production.
- Holistic approaches can increase the number of constraint-reducing strategies available.

Where policies of participation and cost recovery lead to turnover of existing government-run or -assisted smallholder schemes, there is no guarantee that women's interests will be safeguarded. Women should be alerted to opportunities and pitfalls that can arise and encouraged to use the opportunities provided for them to participate in a turnover process.

- In turnover of existing smallholder schemes labor-intensive strategies must, at least, be identified. Farmers are expected to increase their input to operation and maintenance and it is crucial to success that the gender implications of additional work are fully understood by both men and women.
- Successful turnover will depend on the accurate delivery of training to men and women in appropriate skills for future roles in management, operation techniques,. and administrative aspects.
- Women farmers are less likely to be able to find additional time than men. The effect will be to reduce the number of women who take up training opportunities or maintain functional roles in turned over systems. Thus turnover may distance women further from decisions and policy.

3. NEW EMPHASIS ON TRAINING AND CAPACITY BUILDING IS NEEDED TO IMPROVE PERFORMANCE

The emphasis on provision of irrigation infrastructure has relegated training to a low priority. Agricultural extension is not always able to provide appropriate material to the relevant individual. The training services available to men and women should be gender-sensitive in composition and delivery.

At the outset of new projects or at turnover or rehabilitation, people need to be prepared for changed systems and new roles. The program must address training and capacity building for both men and women and must take steps to participate with communities to define needs and ensure support. Women will need community support to undertake training, unless labor constraints are removed first. It is more likely that training will lead to labor-saving strategies being adopted. Irrigation professionals must address the issue of motivating women to undertake training. Production goals can only provide motivation for women if the produce is controlled by them. However, women are motivated by reduction of their personal workload and their work is a key factor in the sustainability of smallholder irrigation. Therefore,

- Training programs may be more effective in responding to the needs of the trainees.
- Training should, where possible, be linked to income opportunities.

In designing new irrigation systems community involvement is required at the earliest stage. However, demand-led irrigation is not necessarily gender-sensitive. Even when development is demand-led, stakeholder analysis has been carried out, strengths and weaknesses have been investigated, and participation has been achieved, women's needs can remain neglected. The possibility of this happening is greatly reduced if gender training has taken place and if the strategic needs of women are supported at planning and policy level:

- Stakeholder analysis should form the basis of planned participation and should be augmented by investigation of strengths, weaknesses, opportunities and threats, and gender analysis.
- Participation should be planned to ensure women are included and empowered.

RESEARCH ISSUES

Rural women are less powerful than rural men in established farming systems. In many countries the established system favors men through land tenure and resources control. Male dominance is further maintained by the behavior of staff in agencies who have had no opportunity to experience gender training and by the general assumption of policy makers that benefits and effort are shared equally between members of families.

Because of these characteristics, recently established policies such as participation, cost recovery, and turnover to farmer management create potential for continued gender inequity in small-scale irrigation development. Policy implications are poorly understood, partly due to the range of interpretations contained in words such as "beneficiary," "participation," and "contribution," and partly due to lack of meaningful and measurable indicators for women's empowerment or smallholder irrigation success.

Policy impacts on women's lives as they relate to their needs and objectives must be investigated. This process has already begun and many qualitative studies are reported. The recent CGIAR gender network debate has drawn attention to field studies where participation did not lead to gender-sensitive development. Research is needed to identify successful ways of turning gender-sensitive sentiments into practical steps to include women's views on policy, financing, technology transfer, and sustainability issues and to be consistent with empowering women irrigators.

Future research themes might usefully include investigations to:

- Identify points of conflict between gender-training, gender-sensitive participatory development, and existing policy
- Establish effective practical strategies for field use to identify and prioritize irrigation needs on a gender-basis.
- Determine strategies for reducing constraints to women's participation.
- Determine what rural women consider to be essential elements of empowerment in the irrigation sector.

- Understand the relationship between women's empowerment and smallholder irrigation performance.
- Identify ways to publicize understanding of the above relationship to rural communities.
- Investigate, pilot-test and evaluate user-friendly interactive information flows between women irrigators and irrigation developers and planners.
- Devise appropriate methods to evaluate performance of smallholder irrigation using quantitative and qualitative targets.
- Identify criteria for selection of appropriate participatory strategies.

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