

# Identifying Gender Aspects of New Irrigation Management Policies

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## 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-

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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.<sup>2</sup>

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.<sup>3</sup> 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.

<sup>2</sup>For an elaboration of these arguments, see Small and Carruthers 1991; Sampath 1992; Merrey 1996.

<sup>3</sup>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.<sup>4</sup> 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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<sup>4</sup>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,<sup>5</sup> 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

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<sup>5</sup>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<sup>6</sup> (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.<sup>7</sup> 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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<sup>6</sup>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).

<sup>7</sup>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<sup>8</sup> 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

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<sup>8</sup>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 (Turrall 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 (Turrall 1995; Vermillion 1997). In all fairness, it is not easy to make a meaningful comparative assessment of IMT programs.<sup>9</sup> 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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<sup>9</sup>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.<sup>10</sup> 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,<sup>11</sup> 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;

<sup>10</sup>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.

<sup>11</sup>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<sup>3</sup> to 5,120 m<sup>3</sup>. 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.<sup>12</sup>

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.<sup>13</sup>

### ***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).<sup>14</sup> 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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<sup>12</sup>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.

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

<sup>14</sup>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 assess 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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