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# A gender perspective to irrigation management

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## 1. Introduction

When working in the Department of Irrigation at the Wageningen Agricultural University, a professor who had just given a seminar was asked by someone in the audience why he had not made any reference to women in his presentation. The professor was silent for a few seconds, and then said: "I only pay attention to women in my spare time".

Of-course this professor meant to make a joke, even though it was a sick one. Still, his answer reveals the attitude of many irrigation engineers, who feel that their job is merely a technical one. They deal with water, with hydraulics and hydrology, with canals, structures and crop-water requirements. They do not deal with people, and certainly not with women. Women? Women are their mothers, wives, their girlfriends and daughters. Women belong to the personal domain and not to the professional domain.

Although gender is thus a relatively new and often somewhat strange topic for irrigation professionals, irrigation is well known to many WID and gender professionals. Why is this? Irrigation projects, and particularly irrigation settlement projects, provide some of the most striking examples of project failures caused by the failure to recognize and accommodate gender issues.

Several studies in Africa (e.g Dey, 1990; Carney, 1988; Jones, 1986) show how women, as a result of new irrigation interventions, have lost access to land and to the proceeds of harvests in favor of their husbands and male relatives. While women were expected to contribute their labor to the newly irrigated crops controlled by their husbands, they often did not equally and fully share in the benefits. In some cases this led women to withdraw their labor and to search for income generating avenues of which the benefits would accrue to them.

In Sri Lanka, in the Mahaweli Ganga Irrigation System, it was found that after the system had been in operation for a number of years, the rate of undernutrition in the system was one of the highest in the whole of the country. One contributory cause was the lack of opportunities for women to gain some individually controlled income, or to grow individually controlled crops. The income from the sale of paddy was given to the male farmers, who sometimes spent this income on their individual needs, rather than on the needs of their families (Schrijvers, 1985).

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## 2. Gender and gender analysis

Attention to gender in the context of irrigation arises from two basic concerns. The first is a concern with the ineffectiveness and inadequacy of technologies and institutional choices as a result of the neglect of gender considerations. This concern stems from the recognition of the important roles of women in both productive and reproductive activities. Women often perform many more tasks and are much more involved in agricultural activities than is generally assumed and reflected in official statistics. The success of policies and interventions aimed at raising the levels of agricultural production, or at alleviating poverty, depends for a large extent on identifying and addressing the appropriate target group. Just as there is a need to differentiate between large and small farmers for purposes of policy and project implementation, similarly there is a need to distinguish between the roles of women and men in agriculture.

The second concern is with the differential impact of development strategies and interventions on women and men. It has become clear that in many cases women have not benefitted equally from development efforts. In some cases women have even become worse off. Studies arguing that economic development and technological change are not indifferent to the already existing class and gender inequalities and often tend to reinforce those, have shown how women have gradually and systematically lost access to and control over resources in favor of their husbands or male relatives.

There is one additional reason to justify attention to gender in any agricultural development effort. This is the almost worldwide trend towards a feminization of agriculture. The declining profitability of agriculture leads men to migrate, either permanently or temporarily, to towns or abroad to earn a cash income. As a result, all agricultural tasks and decisions become the responsibility of women.

What do we mean when talking about gender? Gender refers to the socially determined roles of men and women. Gender roles are learned, are variable across and within cultures, and change over time. Unlike earlier approaches, a gender approach does not focus solely on men or on women, but on both men and women and on the relations between men and women within households and within society as a whole.

Gender analysis in agriculture is the systematic effort to document and understand the roles of women and men within agriculture. The key issues in any gender analysis effort are the division of labor; the access to and control over resources and benefits; and the social, economic and environmental factors that influence the first two. Two basic assumptions underly every gender analysis effort:

1. Every policy or intervention ultimately stands or falls with the willingness and ability of the direct users to spend their time and resources;
2. Farming, almost everywhere in the world, is primarily a family affair.

Gender analysis in agriculture basically consists in asking three related sets of questions:

- (1) **Activities analysis; or who does what, when and where?** These questions are concerned with what tasks are performed by men, women and children which contribute to farm production, to household production, to child-bearing and rearing, and to other productive activities including off-farm activities. The activities analysis reveals periods of labor shortage and identifies all competing tasks by gender, not just those in farm production.
- (2) **Resources analysis; or who has access to or control over resources for production?** By control is meant the power to decide whether and how a resource is used, how it is to be allocated access refers to the freedom or permission to use the resource. For example, "where men have control of livestock or traction, their wives and female relatives may obtain traction services from them. Women have access to traction, but men have control of it. Where women keep the cash and make decisions about expenditures, women have control of cash, men have access to it. The question of access to and control of land can be confusing, but is also illustrative. For instance, in the case where land is allocated by a senior male, but decisions about what to plant are left to the person to whom it is allocated, one would argue that both adult males and adult females have access to land (with some indication that female access is through males); and that both have control of land, but that male control is greater (allocation and decision making on use) than female control (decision making on use only)" (Feldstein and Poats, 1990:16).

Resources include land (and the terms on which it is available); capital, including cash, tools, and livestock for production or traction; labor (one's own, family/children's, others'); other inputs, including seed, fertilizers, and pesticides; services such as credit and education; and knowledge.

- (3) **Benefits and incentives analysis; or who benefits from each enterprise?** Benefits analysis refers to who has access to and control of the outputs of production. This include all the end uses of a product, for example of a crop: home consumption, sale, income from sale, fodder, compost, crafts, building materials, etc. Benefits can also refer to changes in the farm labor process, such as reduced labor demands or reduced risks. It also includes the output of alternative or competing enterprises. The extent to which individual household members benefit, or expect to benefit, from activities will partly determine their willingness to invest their time and resources in these activities. Women may, for example, be willing to increase their labor contributions to irrigated crop production when they benefit from increased yields or incomes. However, whether or not they will actually do so will also depend on their roles and responsibilities, as well as their control over resources. Is the extra work compatible with their other tasks; does their husband allow them to work longer hours in the field; do they have the know-how and skills to perform the specific tasks concerned? Incentive analysis deals with these

questions. It is the analysis of preferences which underlie farm household members' incentives to continue or change what they do.

### 3. Towards a gender perspective to irrigation management

Trying to develop a users' perspective to irrigation management means trying to find out where and how male and female water users' needs are compatible with the objectives of the irrigation system. Again, the basic premise here is that unless the direct users are willing and able to use the water delivered by the irrigation system efficiently and effectively the objectives of the irrigation system will not be realized. Hence, the project of developing a gender perspective to irrigation management basically consists of answering the following questions:

1. What are the objectives of the irrigation system?
2. What are the needs of female and male water users?
3. To what extent are (1) and (2) compatible, or: In what ways can we, as irrigation professionals contribute to accommodating the irrigation system to the needs of female and male water users?

#### 3.1 Defining the objectives of an irrigation system

Defining the objectives of an irrigation system in itself is a controversial and difficult matter. Different parties involved will have different priorities and different interests. Among the many objectives irrigation is expected to realize, are for example: increasing agricultural productivity; increasing political stability; decreasing poverty; achieving national food security; etc.

WID or gender advocates may add an additional objective to this list, which is that irrigation needs to contribute to the well-being of women, or even that irrigation has to lead to the empowerment of women.

Unfortunately all these objectives can seldomly be achieved at the same time. A high productivity at the irrigation system's level does not automatically mean that all households who are involved in irrigation benefit from it, or benefit to the same extent. Nor does a high productivity or income at the household level always imply that all the household members have equally contributed and equally shared in this income.

There is no way in which all the different objectives and interests of the different parties involved in irrigation can be easily matched, or that potential conflicts of interests can be easily solved. However, to realistically plan and implement irrigation interventions it is crucial to realize that differences and potential conflicts exist. This recognition begins with bringing some consistency in the various levels of goals and objectives.

Mark Svendsen and Leslie Small (1990) have developed a framework which helps to see how the different goals and objectives of irrigation systems are interrelated. They define an irrigation system as a set of physical and social elements employed to acquire, convey and distribute water to fields and disperse it to the root zones of crops. The output of this system (water delivered) becomes a major input into the next level, the irrigated agricultural system, the outputs of which (crops) are the input into the agricultural economic system.

Parallel to these "levels" of performance one can distinguish organizational levels in an irrigated agricultural system. Bos et al. (1993) distinguish three functional levels: the irrigation sector, i.e. policy makers and planners usually located in ministries; the agency level, i.e. larger institutions responsible for allocation and management of goods and services in support of the farmer community; and the irrigation system level, i.e. the organization responsible for management of a physical system for allocating and distributing water. Broad objectives are set at the system level which (in principle) are turned into specific targets at regional or district levels by the macro-level agency; these in turn are the basis for specific targets at system level that presumably reflect objectives at the agency level (Bos et al., 1993). The organizations operating at these various levels supply services to a range of "customers" or stakeholders. These include the direct water users, but irrigation agency employees may also be considered stakeholders. People more indirectly affected by the irrigation system, like agricultural wage laborers or consumers of the crops produced, or traders can likewise be viewed as stakeholders (Ibid., 1993).

The focus here will be on the most direct and obvious stakeholders; farm households. However, households are not just receivers of irrigation system's services. Farm household members 'transform' the irrigation water into agricultural products by skillfully coordinating their labor, knowledge and other resources. In many instances, farm household members are also directly (either formally or informally) involved in allocating and distributing the water, as well as in the organization of and collective decisionmaking regarding these tasks. The nature of women's and men's needs with respect to irrigation and their assessment of the possibility to satisfy these needs will determine their willingness to invest labor and resources to irrigation and irrigated agriculture. Therefore, the level of satisfaction of female and male members of households using irrigation water is not only one important measurement of the effectiveness of irrigation systems (cf. Bos et al., 1993), it also is one important factor determining its effectiveness. Unless water users employ their own labor and capital in a way which makes good use of available and anticipated land and water resources, the ultimate benefits of irrigation will be restricted.

Although many differences may exist between the users of an irrigation system (based on land size; ethnicity; age; etc.), the focus here is on potential differences between male and female water users. Usually, if users' needs are taken into account at all, these are most often the male water users' needs. Women are often not considered, but there is

enough evidence to substantiate the belief that they have specific needs with respect to irrigation. Women's needs are not necessarily conflictual to those of men; they may be complementary or shared.

Following the Small and Svendsen framework, gender specific needs with respect to irrigation can be identified for the system's impacts, its outputs and for the process of irrigation management.

### 3.2. Gender specific needs with respect to the impacts of irrigation

Gender needs with respect to the direct impacts of irrigation will evolve around:

1. The allocation of labor, land, water and other resources to the cultivation of crops; to construction and maintenance activities and to participation in users' organizations and meetings.
2. The use of the outputs of irrigated agricultural production, e.g. consumption, storage for use, later exchange or later sale.

The identification of gender differentiated impacts not only is an indication of how women and men differentially benefit from irrigation, it also explains why women and men are differentially motivated to invest time and resources to irrigation and irrigated agriculture. In the African examples given earlier, women completely lost interest in cultivating irrigated crops since they felt that their extra labor contributions were not compensated by additional benefits or gains. Examples from India and Sri Lanka show that men not always share the income from irrigated agriculture with their wives and families.

The less visible and indirect impacts of new irrigation opportunities may also be gender specific. Women in the hills of Nepal were highly positive about new irrigation facilities, since these considerably reduced the time they need for fetching water for domestic use. In India, the unforeseen positive impact of canal irrigation on the growth of fodder was particularly beneficial for women, since it enabled them to increase their milk and ghee production. The opposite effect may occur with groundwater irrigation, which may lower ground water tables and thus reduce the growth of weeds used for fodder, or the growth of trees used for fuel wood and fodder. This occurred in Bangladesh, where the shortage of fodder and fuel increased the time especially poor women spend gathering fuel and fodder. It gradually pushed them towards more and more marginal sources, such as leaves and bark of trees, which hastens further deterioration of natural resources.

### 3.3 Gender specific needs with respect to the outputs of irrigation

Some of the differential interests and needs women and men may have with respect to the impacts of irrigation are reflected in the way women and men evaluate the direct outputs of the system. How do users evaluate the outputs of irrigation system? First of all they can be expected to be concerned with the amount of water delivered, or the adequacy of water deliveries.

Are women and men likely to differentially evaluate the adequacy of water deliveries? In many situations, the main irrigated crop will be controlled by the male farmer. Women often contribute labor to the cultivation of this crop, but very often they will also grow crops of their own. These crops may be used for own consumption, or they may be sold providing women with a source of individual income. When there is an opportunity of doing so, women will make use of irrigation water in growing these crops. They may take water directly from the channels, or sometimes they use drainage water. In Burkina Faso and Niger, specific plots were allocated for use by women. Since crops grown by women are not considered being the 'main' crops, or because it is not even realized that they are grown, their water requirements are seldom taken into account when devising water delivery schedules. In some cases, the use of irrigation water for growing crops other than the planned one, or for using water on plots outside the designed command area, will even be considered illegal. The fact that most interactions between managers and farm household members take place with men obviously contributes to women's water needs going unnoticed.

Gender differences in irrigation needs with respect to adequacy may also occur as a result of a gender division in tasks. Water can substitute labor, like for example in the case of pre-season applications to soften soil for land preparation (Svendsen and Small, 1990:393). Land preparation is often done by men, which means that pre-season applications reduce the amount of male labor needed. Women may be expected to do the bulk of weeding in paddy cultivation. Unless they work as paid laborers, women are thus likely to be in favor of increasing the ponding depth which reduces weed growth. In Nepal, women reported that the increased availability of irrigation water had considerably reduced the time needed for weeding. For the same reason of reducing the amount of their labor needed, women may prefer that rice be broadcasted instead of transplanted. In Sri Lanka, like in many other Asian countries, transplanting is done by women and it is a physically very demanding task. Broadcasting is most often done by men. Water requirements in terms of amount of water needed, as well as in terms of the timing of water deliveries are different when rice is broadcasted instead of transplanted.

A second measure users may use to evaluate the outputs of an irrigation system is equity. Equity refers to the spatial distribution of water across the irrigation system. When water is short, both farm households and managers will have to address the question of how to distribute the available water among plots and farm households. Equity then becomes a measure of fairness of the allocation of the shortage. It is obvious

that notions of fairness will depend very much on existing social and economic differences and power hierarchies. It may be considered fair that an influential farm leader receives a relatively larger share of water, for example. Also, farm household members may take local differences in soil-moisture holding capacity or seepage and percolation rates as valid reasons for differences in water deliveries (Vermillion, 1990:138).

A first and very direct gender difference with respect to equity may be that, justified by existing gender ideologies, female irrigators receive less water than male irrigators. This gender discrimination in water allocation will often not be very direct and open. It may for example be that crops grown by women may be considered less important and therefore receive less priority when water is allocated. Female heads of households in Nepal felt that they received less water than men. Because they were not supposed to participate in agricultural planning meetings, water allocation plans were made in their absence (Bruins and Heijmans, 1993).

Considerations regarding equity may also be valued differently by women and men because of differences in the nature and importance of social relations to men and women. In Nepal,

in Bhanjyang Tar Ko Kulo (canal) the head reach people initially took much interest in the improvement of the head reach section of the canal, but they were not concerned with the improvement of the tail reach because of local politics. There was a critical section in the canal from which most of the water leaked, requiring improvement if the tail end people were to receive reliable water. Some women from the head reach said to the head reach male farmers

that "if you do not further improve the canal, we females will do the job." This embarrassed the male farmers, resulting in further improvement of the canal in the tail end (Pradhan 1989:52).

Investments in extra-household social relations and networks may carry a specific significance for especially poorer women on at least two grounds. They tend to be more disadvantaged in relation to other more tangible forms of resources (see for example White, 1992). Furthermore, it may offer women a measure of autonomy from male authority within the household and can help furnish them with powers of persuasion in their dealings with men (Kabeer, 1992:12). It may therefore be that women place a higher value on fairness of water distribution than men do.

Different appreciations of timeliness, which relates to the distribution of water across the season relative to some utility-based standard (Svendsen and Small, 1990:395), may again arise because of a division along gender lines between crops. Potential gender differences may also occur because of male or female labor peaks; the availability of labor being the standard of utility used. In traditional swamp areas in Gambia, for example, women



used to cultivate rice in stages in accordance with the tidal movement of the water, thus staggering their labor inputs. The new pump irrigation system which was introduced required all tasks to be done at one go, which was difficult to realize for the female farmers. While minimizing peak water use was the rationale of planners for timing water deliveries, the female farmers preferred to time water distribution so as to avoid labor peaks (van Hooff, 1990:7/8).

A second set of output measures discussed by Svendsen and Small are the farm management-related measures. Particularly important with respect to gender is convenience, which refers to preference patterns for timing of water deliveries (Small and Svendsen, 1990:396). Women may have some specific wishes with respect to the daily time at which to irrigate, because they have to plan their domestic and productive activities alongside each other. Some of those activities have to be done at a more or less fixed time of the day, like preparing the meals. As a result, women may have a different preference for the time to irrigate or to work on the irrigated field than men. In a small scale irrigated vegetable project in Senegal, for instance, even though a canal system for surface irrigation would have physically facilitated the task of irrigating and would have required the presence of the female farmers in the field only once in a few days, the women preferred a reservoir system which made it necessary for them to go to the fields every day in order to water the crops with watering-cans. An important reason for women to prefer the reservoir system was that it left them free to decide when to irrigate, without having to consult other women (Helsloot, 1990:10). In Nicaragua, there was a marked difference in the time women and men were willing and able to spend irrigating their fields: women preferred to start later in the morning than men, because of their domestic duties they had to perform early in the morning (Blaauw, 1992:60/61).

Night irrigation may be particularly difficult for women, because of social norms which prevent women to go out at night. In Pakistan, the few women that were directly involved in irrigation would send a male relative or neighbor when their irrigation turn was at night. If there was no other possibility, they would try to be accompanied by a family member or friend (Basnet, 1992). Also, in Alto Piura in Peru, women complained of the specific dangers they had to face when irrigating at night (van de Pol, 1992).

Of the third set of output measures, water quality related measures, women are more likely than men to place a high value on having access to irrigation water which is clean enough to use for domestic purposes. It has been observed in Sri Lanka that, even though women used the water from the irrigation channels for daily purposes, this water was not considered pure enough to use for ritual bathing and religious purposes (Perera, 1989:90). Also, the health hazard presented by mosquitoes and snails which transmit diseases such as malaria, encephalitis and schistosomiasis (Svendsen and Small, 1990:399) may be felt more by women, since they are often responsible for caring for the sick.

### 3.4 Gender specific needs with respect to the process of irrigation management

Because addressing and accommodating gender concerns in irrigation can be expected to be more successful when user concerns are addressed and accommodated, and because of the many efforts all over the world to better and more involve users in irrigation management, the focus in this section will be on the potential gender differences with respect to participation in users' organizations. Looking at attempts to increase users' participation in irrigation management from a users' perspective means looking at whether and where men's and women's participation is desirable and possible. This will ultimately depend on how women and men evaluate the possibility of meeting their needs with respect to irrigation through formal participation, and it will depend on how irrigation professionals think that male and female users' involvement contributes to the overall performance of the irrigation system.

Evidence shows that if users' priorities are taken into account at all in irrigation management, the users' group will usually be thought of as consisting of men only. This is a reflection of the assumption that each farm household is benevolently headed by an adult male, who is able and willing to take all decisions on behalf of his dependent family members. The few irrigation management studies that focus explicitly on women reveal that in most cases women are virtually absent as official members of irrigator's associations. The most important reason is that membership is confined to either official landholders or heads of households. Both criteria far more often apply to men than women. Only in cases where men are not or hardly involved in irrigated agriculture, women will be officially involved in water users' associations.

Is it necessary to involve women in water users' organizations? The answer to this question will be different for every specific situation. It will depend on the nature and degree of women's involvement in irrigated agriculture and operation and maintenance tasks. It will also depend on the nature of the specific needs women may have with respect to the irrigation systems' outputs and impacts. In some cases improving women's involvement will directly lead to a higher performance of the irrigation system. This was for example observed in Indonesia, where men were engaged in off-farm activities for large periods of the year. Women were almost entirely responsible for the agricultural activities, including irrigation. However, the water users' organization consisted of men only. This led to inefficiencies in water distribution (Schrevel, 1989). In Nepal, in the Baurahua irrigation system in the Terai, the absence of women in the pre-seasonal planning meeting also led to inefficiencies in water distribution: female farmers were sometimes not aware of their water turns. Acknowledging this, male farmers took the initiative to invite women as well to the meeting (Bruins and Heijmans, 1993).

Women themselves, even though they have an obvious interest to do so, will not always be very eager to participate in male dominated organizations and gatherings. They may feel insecure or they may lack confidence in meetings with men. Organizations and meetings are often associated with political matters, or with the public domain, which

is not where women normally would go to solve their problems. In Sri Lanka, female heads of households prefer to send a male relative to water users' meetings, instead of going themselves. Or they may ask a male neighbor to represent their interests.

Women may have alternative ways to influence decisions with respect to the management of the system. In the Chhattis Mauja in Nepal, female heads of household were successful in reducing the fine that had to be paid when not doing maintenance work. In another area of the Chhattis Mauja, women convinced the irrigation organization to alter the rule which only allows men to participate in maintenance tasks. They convinced the male members of the organization that they could do maintenance works as well.

These, and other examples show that the effectiveness of users' organizations may not always be very high for women. Women will often differentially evaluate the costs and benefits involved in participating in users' groups. The attractiveness of participation may be less for women, because the costs and time spent for travelling to or attending meetings may be relatively higher for them, but also because norms and values are not always supportive of women engaging in public matters. Qualities for being an active and vocal member of irrigators' groups may be valued in men, but considered inauspicious when found in women.

#### 4. How to make irrigation and its management more gender sensitive?

There is no magic formula as to how to devise more gender sensitive irrigation policies and interventions. A first step, however, towards a gender perspective to irrigation management is to erase the stereotype picture of the farm household all of us have in our minds. When we think of farmers, water users or irrigators, we automatically think of men. The reality is that the irrigation world, at least at the users' level, consists of at least as many women as men. And the reality is that female water users do not always and automatically have the same perspectives; priorities, ideas and needs as male water users.

To recognize that gender based differences, which influence the way an irrigation system is used, exist implies that women, as well as men, need to be consulted when decisions are to be made regarding new irrigation institutions or facilities. Consulting with women will often require an extra effort: women may not be used to be asked about their opinions, they may be too busy to talk at length with outsiders to discuss alternatives. Women may not feel as confident in discussing matters that have always been discussed among men. Social norms and values may inhibit women to talk freely to male outsiders; which implies that female irrigation professionals need to be available to consult with women.

An extra effort will thus often be needed to elicit the opinions and views of women. This does not mean that it is very difficult to approach women. Participatory research approaches have been developed which provide strong and easy to use tools for getting female and male users to express their needs, priorities and interests. And while women may be a little shy, or feel inconfident at first, evidence shows that once women understand that they are offered with an opportunity to decide on matters that will influence their lives, they come up with a lot of suggestions and ideas. Women often have very detailed and specific knowledge about their natural and social environment; and their knowledge is often different from that of men.

To enhance female participation in users' groups may likewise involve a special effort. Men often have much more experience in conducting and attending public meetings, they know how to express their opinions and how to voice their concerns in a big gathering of people. Experiences in Indonesia and Nepal show that women can be trained to participate on an equal basis with men in organizations and meetings. In Indonesia, female water users were at first organized separately from male water users. In a latter stage, the women who were trained felt confident enough to become members, and even office bearers, of the official water user organization. In Nepal, female water users said that they needed literacy training in order to be able to participate in water users' organizations.

Past experiences with Women in Development projects show that it is often difficult for irrigation professionals to conceive women as producers, water users or irrigators. Many WID projects in the context of irrigation have focussed on small-scale side activities for women outside of the irrigation domain. Women are most easily perceived as mothers and domestic care takers; people who are not yet gainfully employed and therefore need some hobby-like activity to keep them busy and happy. The challenge for irrigation professionals is to realize that most women already are gainfully employed, and that their activities in fact form a crucial and integral part of the irrigated agricultural production system.

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