

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 exercising 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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