



Gender-Sensitive Irrigation Design

Consultation on gender issues in
smallholder irrigation

N Matshaigaga

Report OD 143 (Part 6)
December 1999



HR Wallingford



DFID Department for
International
Development

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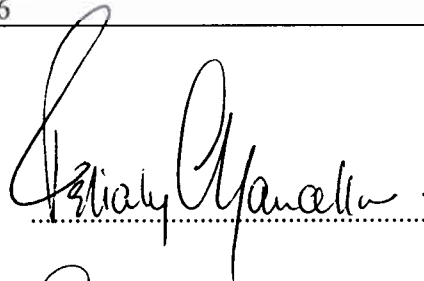
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GENDER SENSITIVE DESIGN IN SMALLHOLDER IRRIGATION SCHEMES AND EQUIPMENT

(PHASE 2)

A SECOND REPORT

for

**HR WALLINGFORD
OVERSEAS DEVELOPMENT UNIT
U.K.**

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EXECUTIVE SUMMARY

Brief Background of the Study

The study on Gender Issues in Irrigation Design of smallholder Schemes is in phases of which the current one is Phase 2. The main objective of the study is to further investigate critical areas in smallholder schemes, which were identified at the first phase. The areas are farmer participation in irrigation design, land preparation, pumps and marketing. HR Wallingford, U.K. in collaboration with Agritex, Zimbabwe and the Institute of Development Studies (University of Zimbabwe) initiated the study which is being sponsored by the British Government's Department for International Development (DFID). The study was implemented in Masvingo Province Zimbabwe.

METHODOLOGY

The research team mainly employed the Focus Group Discussions (FGDs) method of collecting data. Groups were formed on a gender basis. To support FGDs, in-depth interviews with key informants were also done.

KEY FINDINGS

Farmer Participation in Irrigation Design

- There is minimal or no farmer participation in designing of government-run schemes, while farmer participation at all levels is practiced in schemes that are initiated by NGOs or private companies.
- Farmer participation is not gender-neutral

Land Preparation

- Levelling is the most difficult task in land preparation and is mainly done by women using hand-hoes
- More and more women are now involved in the use of ox-drawn ploughs than in the past.
- The majority of farmers has no animal drought power and depend on hired services.
- Lack of appropriate technology in land preparation has effects on the physical being of farmers
- Demonstrations of best use of farm equipment were highly appreciated by the farmers and those who have tried the techniques have managed to improve their yields. The farmers want the demonstration to be spread to other farmers.

Pumps

- Pumps in government-run schemes are poorly managed compared to those that are farmer managed
- Electric pumps are perceived to be more reliable when compared to diesel pumps that break down more frequently, especially if they do not get regular service.

- Imported (donated) pumps have no back-up spare parts and thus are difficult to repair

Marketing

- There is generally poor crop timing causing irrigation schemes to produce the same crop at the same time resulting in them facing difficulties when selling.
- Farmers are not in a position to freely choose what crops they want to grow and are sometimes forced to grow crops that do not sell very well.
- There is generally division of crops by gender whereby men are attached to the most paying crops while women are attached to the crops that are financially less valued but highly valued in terms of food security in the household.
- Men usually do bulk marketing while women are involved in the day to day marketing of small quantities around the home.
- Over all, the schemes have marketing committees in place but most of the committees are not effective and are dominated by men
- Unequal and unfair distribution of income whereby men benefit more is common practice in the schemes especially those who have not received any training.

Macro Policies

- Government cost recovery programmes are affecting production in government-run smallholder irrigation schemes to the extent of threatening their sustainability and popularity.

RECOMMENDATIONS

Farmer Participation in Irrigation Design

- Involve men and women farmers in irrigation design in order to make them make informed choices that ensure continuity of the schemes.
- Encourage development agencies to budget the cost of men and women's participation in design

Land Preparation

- There is need to develop appropriate technology that is affordable and accessible to men and women farmers.
- Spread demonstrations on use of farming equipment and produce manuals with hints and instructions on the equipment. The manual should be in simple vernacular languages

Pumps

- Management of pumps should be done at scheme level to avoid delays that affect the farming process.
- Farmers who use imported pumps should be given all the possible details about the supplier of the pump and where spare parts can be bought.
- Offer training to men and women farmers on how to attend to minor pump breakdowns

Marketing

- Take an engendered approach to training farmers on marketing strategies to ensure effective disposal of their crops.
- Incorporate farmers concerns in compilation of crop calendars so as to include crops that are easy to sell.
- Provide gender-awareness training in order to reduce existing biases in labour and income distribution.

Macro Policies

- Government policies must not blanket everyone without being sensitive to the specific needs of people in particular sectors.

1.0 INTRODUCTION

1.1 BACKGROUND

Seventy per cent of Zimbabwe's population live in rural areas with the majority of them depending on agriculture for their livelihoods. According to Muir (1994:40), "Agriculture is not only important for the rural folk, it also dominates the economy". There are strong forward and backward linkages, thus, a poor agriculture season has serious implications for the entire economy.

The agriculture sector in Zimbabwe is further characterised by severe inequalities that are a consequence of the country's colonial history. Only a small number of white commercial farmers occupy the best half of arable land while millions of black households are crowded in drought-prone and infertile areas. (Poverty Forum Newsletter: May 1998). The areas formally known as the tribal trust lands (now communal areas) were carved out by successive colonial regimes to promote segregationist policies. The policies, according to Auret (1990); ZCTU (1996), turned the indigenous people from food sellers to white settlers, at the beginning of the century, to subsistence producers as of today.

The dominance of land as the defining issue in Zimbabwe agrarian politics has however eclipsed another equally important element, that of water. An understanding of Zimbabwean history and contemporary agrarian issues is impossible without taking the resource, water, into account since its availability is the determinant in land utilisation given the semi arid climate of the country. Small holder irrigation, therefore, provides a useful entry point into the dynamics of rural development and forms a perfect 'laboratory' for examining intervention issues.

Irrigation provides a key means of raising productivity which is synonymous with raising levels of living for the rural people. In independent Zimbabwe, smallholder irrigation farming became apparent as it was considered paramount for the development of rural areas. As a result, smallholder irrigation schemes emerged and are still emerging throughout the country. Some of the schemes are initiated and run by government, through the Agritex Department while some are initiated and run by International and Local Non-governmental Organisations (NGOs) as well as private companies.

The emergence of the irrigation schemes came along with a shift in the labour patterns in agriculture. The demand for agriculture labour in irrigation schemes is continuous throughout the year. Farmers harvest about three times a year unlike in dryland where they harvest only once a year. This scenario impacted negatively on irrigation farmers, especially women whose, already over stretched, workloads were automatically increased.

It is against this background that HR Wallingford, a UK Institute in collaboration with the Department of Agritex, Zimbabwe and the Institute of Development Studies, initiated the study on gender issues in irrigation design of smallholder schemes. The British Government's Department for International Development (DFID) has sponsored the research.

The first phase of the study aimed at identifying the problems that contribute to under-performance of irrigation systems, stressful working conditions and low returns to investment and labour. To gather this data the study utilised a survey questionnaire and focus group discussions which were administered and conducted on smallholder irrigation farmers in Masvingo District (Matshalaga, 1997). After completion of the first phase, a workshop was held in February 1998. The workshop was for irrigation practitioners from Southern African countries whose task was to consider the issues that were raised in the first phase and prioritise those to be investigated further in Phase 2. Following are the identified areas of the study that are to be pursued in Phase 2 of the study of gender issues in irrigation design of smallholder irrigation schemes:

- Farmer participation in irrigation design
- Land preparation
- Pumps
- Marketing

1.2 RESEARCH METHODOLOGY

1.2.1 Study Area

The study was done in Masvingo Province in Zimbabwe. Masvingo Province is situated in the southern part of Zimbabwe. The province is in agro-ecological regions 11, 111 and IV and it provided classical examples of smallholder irrigation schemes in Zimbabwe. There are various smallholder irrigation schemes in the area and they offer a variety of information because of the nature of their designs and operations. There are government run schemes, NGO, private company and farmer managed schemes in the area, also there are different types of water delivery systems and irrigation methods. These differences were ideal for the study, as they are most important for comparison.

1.2.2 Data Collection

Focus Group Method

The research design was Focus Group Discussions (FGDs). Focus group discussions are often used in conjunction with other methods, but in the study presented here they served as the principal means of data collection. This method was chosen because of its usefulness in investigating phenomenon that defines direct observations. Attitudes, opinions and orientations are examples of the phenomenon. A focus group is a carefully planned discussion designed to obtain perceptions of a defined area of interest in a permissive non-threatening environment. It is conducted with approximately seven to ten people by a skilled interviewer. The discussion is relaxed, comfortable and often enjoyable for participants as they share their ideas and perceptions. Group members influence each other by responding to ideas and comments in the discussion.

In this study, participants for focus group discussions were drawn from male heads of households, married women who farm together with their husbands and those with absentee husbands as well as from female and child heads of households. All in all twenty-one (21) focus groups were conducted. Another special groups was also drawn from men and women who had attended a

demonstration on land preparation equipment that was carried out after the first phase of the study. This particular group was meant to provide information to evaluate whether the demonstrations that were done were useful to the farmers.

Key Informant Interviews

Key informant interviews were undertaken with extension workers, organisational field officers and pump/dam attendants. These interviews highlighted some of the problems that are experienced by both the workers and farmers in smallholder irrigation schemes.

1.2.3 Sampling Procedure

A rapid irrigation schemes appraisal was undertaken at the beginning of the study. This helped the research team in deciding on the sampling technique to be used for this phase of the study.

Purposive sampling was employed. It purposively includes in the sample those elements of interest to the researcher and those which are directly relevant to the problem being studied. The sources of information in the study rapid appraisal were Agritex Officers, Extension Workers, Irrigation Committees and Project officers. These provided information about the irrigation design, water delivery system, household composition of the farmers and the plot sizes. Eight smallholder irrigation schemes were finally selected for this Phase of the study. The schemes that were selected are listed in the table below:

Table: 1 Sampled Irrigation Schemes

Name of Scheme	District	Male Headed House-holds	Female Headed House-holds	Plot Size	Irrigation Design	Management
Mushandike Village 16	Masvingo	30	5	0,5ha	Gravity-fed /flood	Agency
Mushandike Village 21	Masvingo			0,5ha	Gravity-fed /flood	Agency
Longdale	Masvingo	13	2	0,5ha	Electric Pump /sprinkler	Agency/ Farmer
Chinya-matumwa	Bikita	58	70	0,1 - 1ha	Diesel Pump /flood	Agency/ Farmer
Nyimai	Chivi					Farmer
Mubvute	Zaka	80	70	0,2	Diesel Pump /flood	Agency/ Farmer
Benzi	Zaka			10 beds	Bucket system	Farmer
Rupike	Masvingo	143	57	0.5ha	Electric Pump /sprinkler	Farmer
Lowlands	Gutu	15	2	0,5ha	Diesel Pump /sprinkler	Farmer

2.0 RESEARCH FINDINGS

2.1 FARMER PARTICIPATION IN IRRIGATION DESIGN

Farmer participation in irrigation design is thought to be an important phenomenon to the sustainability and viability of smallholder irrigation schemes. Irrigation farming is a relatively new phenomenon to the rural people in Zimbabwe. The farmers are in the schemes due to various backgrounds. Some of the farmers are in the schemes not by choice but because they did not have better options when their dryland was taken by government for development of irrigation schemes, dams or growth points. Other farmers were resettled in the irrigation schemes when they were looking for land. Because of these backgrounds, a majority of the farmers do not have any experience or knowledge of irrigation farming. In view of the above, involvement of farmers in irrigation design is generally lacking.

However, farmers need to understand why and how certain designs are preferred that the others, and also if there are any other options. Although the farmers might be ignorant about irrigation design, and thus, unable to make choices that are appropriate to their situations, it is important to inform them on the pros and cons of each design so that they can make informed choices.

Focus groups showed that the level of farmer involvement in irrigation design differs depending on who has initiated the project. The three major players in irrigation design and implementation are, as mentioned earlier, the government, non-governmental organisations (NGOs), and private companies. Focus groups indicated that smallholder irrigation schemes that are run by NGOs and private companies offer very high levels of farmer participation in irrigation design. In such schemes farmers make informed choices of the type of the irrigation design and equipment they would prefer (pumped, gravity fed, sprinkler etc.) They are given a chance to consider things like affordability, feasibility and sustainability before they can decide on what design to choose. The study revealed that in Masvingo, Care International- (an NGO) run projects had a lot of farmer participation in the design and implementation of irrigation schemes. Farmers were clear on the choices of design and running costs involved as well as their contribution to the irrigation projects.

Nyimai irrigation scheme, which is being sponsored by CARE, is one such a scheme where farmers are highly active in making decisions about their needs in the schemes. The scheme is still at designing stage but the farmers are highly involved, they are carrying out activities such as building the dam wall, work on the catchment area (to make it environment friendly), and the digging of canals. Below are some quotes from focus group discussions with farmers at Nyimai:

<p>Q How did the scheme start? <i>-CARE came and held meetings with us, telling us that our dam could be rehabilitated so that an irrigation scheme could be built.</i></p> <p><i>-After we weighed the benefits and were convinced that it was a good idea to have irrigation we agreed. We were then encouraged to work hard and rehabilitate the dam ourselves with CARE assisting with building materials.</i></p>
--

Q What water delivery system are you going to use?
-At first we wanted to have a pump that would draw water from the dam, but after learning about the advantages and disadvantages of the system, we felt that we might encounter problems in future. We then opted for a system that draws water by gravity because it is a more cost effective and sustainable option.

-The gravity system of drawing water, however, has implications on labour. Because we opted for that system, we have to dig long and very deep canals (about 3m) so that the water will be able to flow.

-It is better for us to work hard now (digging the canals) than to have a system that we will not be able to maintain after CARE have left us.

The quotes indicate that farmers, if given a choice, are willing to provide more labour in order to have a design that they feel is sustainable.

The situation in government run schemes is different. The fact that there are two ministries that are involved in irrigation design is in itself a hindering factor because already there is poor coordination between the ministries. Ministry of Water is basically concerned with the building of dams and the installation of pumps/engines while Agritex is concerned with the actual designing and implementation of the irrigation schemes. Although Agritex works directly with the farmers, it does not play any part in deciding what type of pump is best for that particular community, it also has no control over some of the structures that were put in place by the Department of Water. The process of building dams is usually done without consulting the stakeholders except only those people who are displaced by the dam.

Focus group discussions revealed that involvement of farmers by the Department of Agritex is also very minimal. The department does most of the decisions on behalf of the farmers. Irrigation experts in the department are the ones who decide which design is suitable for a particular scheme. The experts base their decisions more on technical grounds than on social realities. They are most concerned with identifying the most suitable design given the position of the dam versus the plots and the soil type. The irrigation experts do not consider other social issues such as, the community capacity to manage the scheme, costs that are involved and the extent to which government support will continue. As a result, in most of the government-run schemes, the irrigation designs are imposed on the farmers with very little explanation as to why they were chosen. Below are some extracts from focus groups with farmers, which show that farmer participation in design of government-run schemes is minimal:

Q Where you involved in deciding the design of the scheme?
-Only the farmers whose fields were incorporated in the scheme were informed about the government's decision to take their dryland for irrigation purposes. (Female-Mubvute)

-Some of us just used to watch them do their work on the construction of canals but all we could do was just wonder and guess. (Female Household Head-Mubvute)

-Later when the construction of the irrigation was complete and after we were allocated the plots, we were given an explanation why canals were better than the sprinkler method. (Male-Mubvute)

-They decided for us because they are the ones who know what is best for us, we do not know anything about irrigation. (Male Lowlands)

Incapacity to decide coupled with lack of knowledge of available options impacts negatively on the farmers who suffer the consequences of other people's decisions. Mubvute Irrigation Scheme is an example of a scheme where farmers' activities are at a stand still because there is no diesel to run the pump. If the farmers had been informed about potential diesel problems, there is a possibility that they might have chosen another design, or could have come up with alternatives to meet the diesel costs. Some of the farmers at Mubvute are now desperate because they have lost their dryland to the scheme and are not been able to plant anything in their plots. Focus groups showed that farmers who did not participate in the design and implementation of their schemes are demoralised and do not appreciate irrigation agriculture while those who have participated, on other schemes, are more determined and ready to deal with the problems that they encounter.

Farmer Participation in irrigation design improves the farmers' knowledge about the scheme activities, instills a sense of belonging and togetherness in the farmers and generally makes them understand the problems they encounter, and these factors make such schemes sustainable.

2.2 LAND PREPARATION

Land preparation is a crucial aspect of irrigation farming. The adverse effects of poor land preparation are manifested in many ways. According to Extension Workers in the schemes, shallow ploughing can cause the evaporation rate to be higher and thus the crop grows slower and yields are low. The amount of weeds also increases.

In flood irrigation where siphons are used for watering, poor land preparation can affect the watering process, as water will not flow easily causing inadequate water distribution.

There are three major tasks that constitute land preparation in irrigation schemes and these are ploughing, ridging and levelling. A majority of farmers in focus groups use ox-drawn ploughs to do the first two tasks, that is, ploughing and ridging. Levelling is mostly done using hand-hoes and in rare cases ox-drawn dam scoops are used to carry soil but the soil is still spread using hand-hoes.

Ploughing is traditionally a male-dominated task but FGDs revealed that more and more women are now involved in the use of an ox-drawn plough. Asked why women involvement in such tasks was on the increase, participants in focus groups gave various reasons. Below are some extracts from focus group discussions with men and women who were responding to the question:

-Usually only husband and wife are the only ones who work in the plot because the children all go to school. The two therefore have to help each other by alternating to do the heavy tasks.

-In some female headed households there is no male figure therefore, they just have to do work themselves.

-More and more men and women are realising that it is better for everyone, especially women to learn how to use the ox-drawn plough. Circumstances can change at any time, a husband can find work away from home or can die. In such cases, the wife has to continue working in the plot.

-Some cattle do not obey instructions from women, therefore, a man has to direct the cattle while a woman holds the plough

2.2.1 Draught Power

In all the schemes that were visited, with the exception of Rupike Irrigation scheme, focus groups revealed that most households that owned ox-drawn ploughs did not own draught animals. The farmers relied on hiring or borrowing. However, whatever the case, almost all ploughing was done with the use of ox-drawn ploughs. The average amounts paid for land preparation by farmers who hire draught power are, \$100.00 for ploughing and \$80.00 for ridging. The focus group discussions revealed that negotiating to hire draught power was not an easy task for all households. Draught power is considered to be easily accessible in situations where a ‘man to man’ talk takes place. According to women participants in focus groups, in cases where negotiations take place between two parties of the opposite sex, there are bound to be problems. Participants in a group of Female Heads of Household (FHH) at Mushandike Village 16 pointed out that they usually rely on relatives or family friends to do the ploughing for them regardless of whether they have money or not. They expressed that if they approached married men and women, there was usually resentment as married women consider them a threat to the stability of their marriages. To verify this allegation, married women in a focus group at Mushandike village 21 were asked to respond to the question of Female Heads of Households versus married men in land preparation and below are some of their responses:

Q Is it difficult for female heads of households to approach your husbands when they want to hire draught power?

-It depends on the behavior of the widow, if she is a loose widow we make life difficult for her by not allowing our husbands to entertain her.

-The lady who has just left this place is one good example of a loose widow, who can allow her husband to plough for such a person, by allowing him, you will be giving him away for free.

Female Heads of Households are, therefore, expected to behave in a particular manner that is acceptable to that particular community. The situation is however different where the female head of household is an elderly woman. Focus groups with both men and women showed that the plight of young female head of households was different from their elderly counterparts. Both men and women in the schemes tended to be more sympathetic to elderly women heads of households hence they did not have many problems in securing drought power to prepare their fields. The situation of young female heads of households is, however, different at Rupike irrigation where the farmers are more financially stable. A majority of the farmers at Rupike are self sufficient in all respects thus they rarely ask for any favours from each other. If the women need male labour, they simply use their financial resources to hire labour that is in abundance in the surrounding dryland. The same applied to female heads of household at Longdale, where the scheme offers a good example of a situation where women economic empowerment has resulted in women social empowerment.

2.2.2 Levelling

Levelling is the most labour intensive and time-consuming activity of land preparation in irrigation schemes, more so in schemes which use the floods system to water their plots. Flood irrigation farmers whose plots are not well-levelled experience problems when watering since water will not be able to reach some parts of the plots where there are depressions or humps.

Focus group discussions revealed that, although levelling is in some cases done using ox-drawn harrows, and/or dam scoops most of the work is done using hand-hoes. Levelling was voted the most difficult task in land preparation mainly because of the nature in which it is done, that is, use of hand-hoes. An ordinary family of four people takes about three days to level a 0.5 ha plot while a single person can take up to three weeks. The discussions showed that levelling was basically a woman's and children's task. Male involvement was only experienced in cases where ox-drawn dam scoops were utilised or in cases where labour was hired.

The fact that levelling was voted the most difficult task and yet was done mainly by women was also discussed in the groups and below are some extracts from the discussions:

Q **Why is it that women are the majority who do levelling and yet it is the most difficult task in land preparation?**

-Men always find good excuses not to help, they leave us with no choice but to do the work on our own. (female-Mushandike Village 21)

-We have to do other work such as looking for piece jobs to raise money for water bills, after all it is not that difficult, women and children can manage. (Male-Mushandike Village 21)

-Levelling is most important to women because they are the ones who will suffer the consequences when watering, if one decides to give the job of levelling to a man

and he does not do it properly, she must know that he will not be there to help when water is not moving smoothly. (Female-Chinyamatumwa)

2.2.3 Roles that Clash With Irrigation Work

As has been mentioned earlier on, there is a general agreement that irrigation increases the workload of the household, and that in general the female members of the household have to shoulder most of the increase. Focus groups showed that women find it more difficult than men to combine their many tasks, some of which are fixed and frequent, with work in their plots. Women are responsible for most of the food processing and preparation, the care of children and general household maintenance and yet they are the ones who provide more than 60% of the labour required in the plots. Men on the other hand also have roles that clash with irrigation, these include housing construction and repair, working outside the home to raise extra income, working in other farmers plots when hired to do land preparation and repairing/fixing farm equipment.

During dry seasons, livestock is usually left to graze freely because there is no threat of crop destruction. Irrigation agriculture entails winter cropping and this means that even during the dry season there is need to tend to livestock to keep them away from irrigation plots. The situation is particularly difficult during term time when school children are not able to help because they spent most of their day at school. Both men and women were involved in this task although it tended to fall mainly on women. Free-range livestock was also problematic when harvested crops were still being processed at home (e.g. beans, maize and wheat). Airing her sentiments with regards to the issue of unattended livestock, an 18-year-old female child head of household at Chinyamatumwa was quoted saying:

“When I harvest, it is very difficult to leave the home and go to work in the plot because goats will destroy all the harvested crop. I just have to sit there guarding the crop and wait until one of my siblings comes back from school to take over the task then I will go and attend to other tasks in the plot”

Plot holders are obliged to work on common scheme duties as and when they are required. Such duties include tasks like repairing the fence, cleaning the canals and so forth. Some households such as female or child headed households, where there is usually only one adult or one person who is available to do the work, face problems of clashing roles and are left with no choice but to neglect or ignore all the other roles and fulfill the scheme duties.

Despite the clash between irrigation and other household roles, the discussions indicated that irrigation agriculture appears to be given preference in terms of labour time allocation. This can be attributed partly to the fact that this type of agriculture is market oriented and to the pressure from extension workers who encourage the farmers to meet deadlines and who have an interest in the success of the schemes.

2.2.4 Land Preparation Technology

Technology used in land preparation is a cause for concern in irrigation schemes. The fact that land preparation is a continuous process throughout the year makes technological issues even more important. Lack of technology or having inappropriate technology adversely impacts on the land user's physical being and on productivity. Focus group discussions revealed that farmers in smallholder irrigation schemes generally lack the technology required for land preparation. According to the participants in the focus groups, the only farming equipment that can generally be found in the households is the ox-drawn plough. Most of the ploughs were said to lack some of the parts either because the parts were regarded unimportant or needed to be replaced. When asked to identify and cost some of the plough parts that needed to be replaced regularly (about once year), the farmers gave the list in the table below:

Table: 2 Plough Parts that Need to be Replaced Every Year

Name of Plough Part	Approximate Cost
Arms	\$55. 00
Wheel	\$55.00
Axel	\$80.00
Plough Share	\$70.00
Land Slide	\$60.00
Total Cost	\$320.00

Because of lack of farming technology, land preparation tasks like ridging, levelling and planting are done manually and the use of hand hoes is most common. This has implications for women who are usually the ones responsible for tasks that involve hand-hoe use.

2.2.5 Demonstration of land Preparation Equipment

After Phase 1 of the study was carried out, some demonstrations were carried in specific schemes. Both men and women attended the demonstrations. The main aim of the demonstrations was to show farmers how best to use the equipment that they already have and at the same time introduce them to new technology that can be used to reduce the labour in land preparation. The equipment that was used at the demonstration included the following:

- Ox-drawn plough
- Cultivator/ridger/Planter
- Leveller
- Imported Planter

According to participants in a focus group comprised of men and women who were drawn from villagers who had attended the demonstrations, the demonstrations were very useful and informative. Most farmers showed that they had benefited a great deal from the demonstrations. Below are extracts from the focus group with farmers at Mushandike:

-I learnt how to use a cultivator for ridging and planting. These tasks can be done at once when using the demonstrated method, I tried it and it worked perfectly for me. I have stopped using the old method that was time consuming and labourious. Using the cultivator to ridge and plant gives women enough time to go and cook for the family because you finish early. (Village 21 -Male)

-Farmers who attended the demonstrations are now very careful when buying ploughs. One has to take a tape measure to the shop in order to buy a plough with correct measurements. A proper plough must measure 20 cm (width). If it does not measure that then it is a reject. (Village16 - Male)

-I was happy to learn about a small plough which is very light and very effective, I wish I knew where I can find it because I want to buy it. It is very light that even women can use it easily also a single donkey can pull it. (Village 21- Male)

-Before the demonstration, most farmers here used to remove plough parts thinking that they were not useful and would make the plough heavy for nothing. Now we know that each plough part serves a particular purpose and a plough with all parts is even lighter and performs better. (Village 21- Male)

Participants in the focus group expressed the wish that such demonstrations be spread to all farmers throughout the country since they improve farmers' knowledge on simple technology. However, participants were not happy with the fact that some of the equipment that was used for demonstrations could not be found locally. They also expressed fears that some of the equipment can be far beyond their reach in terms of their cost. The participants, however revealed that they were encouraged by the demonstrators to take measurements and try to reproduce some of the equipment that was simple and needed cheap metal. A blacksmith and plot holder at Mushandike Village 21 took the advice and reproduced a leveller, which he tried on his plot. The leveller worked well but needed some adjustments, which he is yet to make. Below are some stories told by some of the farmers who benefited from the demonstrations:

Amos's Case

Amos is 43 years old, married with 9 children. He is a plot holder at Mushandike Village 21. When he attended the demonstrations that were held in his village in 1997, he became interested in trying out the new method of ridging and planting using a cultivator. he was not sure of the result but was prepared to take the risk on a smaller piece of land, that is a 0,1 ha. he planted an onion crop called Texas Grano and this was not the first time that he had planted the same crop on the same acreage. He previously used to have a crop population ranging from 800 to 900 but when he applied the new method of using a cultivator for ridging/planting, he was surprised by the increase in the plant population that now was ranging from 4000 to 5000. He was happy to experience this kind of improvement of five times the crop population that he normally gets from the same acreage. After this discovery, he has never stopped using the new method and is very satisfied with the results.

Onias's Case

Onias is 40 years of age, married with five children. He lives in the same village as Amos and also attended the same demonstration group. In the table below Onias had this story to tell:

In 1992 when I stopped working in Bulawayo, I decided to buy a plough as I was now venturing into irrigation farming. I could not get the usual type of plough that I have always known so I ended up buying the only type that I could find in Bulawayo, the Silver Medal. When I got here, I was very disappointed because people told me that I had wasted my money. I used it for a while until I raised enough money to buy the one I originally wanted. I then abandoned the Silver Medal because I did not want to continue being the laughing stock of the community.

When the demonstrations came here, I was surprised to see that the same type of plough that I had abandoned was being spoken highly of. I discovered a lot of advantages of using that type of a plough. I discovered that when properly set, it can perform more evenly and is a lot faster than the other ploughs. When ploughing, it covers a bigger width because its hitch assembly has more holes, it can take almost the width of a tractor. It is faster in throwing the soil off it, thus, making it much lighter for the draught animals. It also has strong handles that are supported by crossing bars.

Little did I or anyone in the community know that I had hit the jackpot when I bought this plough. Every one is now looking for a "Silver Medal". I am very happy with my plough and I am now very proud, thanks to the demonstrators."

Both Amos and Onias's stories showed that proper use of farming technology can reap good results and that lack of knowledge on the technology can affect production.

2.3 PUMPS

Pumps are a common feature in smallholder irrigation schemes where they are a major form of water delivery system. There are two major types of pumps, that is electric and diesel powered pumps. Both pumps perform the same task and can provide the same amount of water at a given period. The difference in the two pumps is only experienced in their day to day performance.

Out of the eight schemes that were visited, only two were not using pumps because they are gravity fed. Although gravity system is favourable in terms of cost, maintenance and management, it is not always possible as has already been mentioned that there are various factors that determine the design of an irrigation scheme. As a result, pumped schemes are common thus, prompting the need to focus on the situation of pumps in smallholder irrigation schemes.

2.3.1 Operation of Pumps

Focus group discussions revealed that the responsibility of operating pumps varies from scheme to scheme depending on whether there are government employees who are employed to attend to the pumps or not. In some schemes, the farmers do not have any knowledge on how the pump is

operated because they all look up to pump attendants to start and close the pumps. Some farmers, both men and women, have never set their eyes on a pump and they totally divorce themselves from any activities that are to do with the pump. Commenting on the farmers' attitudes towards pump operations, a Pump attendant at Chinyamatumwa was quoted saying,

“The farmers do not seem to be interested in knowing about the pumps. Last year when they were complaining and blaming me for the pump breakdowns, I suggested that they should come to the pump house so that I demonstrate and explain to them why the pump was not working. Nobody turned up on the arranged date”

In other schemes where there are no government employees to attend to the pumps, the farmers have a roster and they take turns to operate the pumps. Male farmers in the schemes generally perform the task while females do supporting tasks such as carrying diesel and helping to pump when starting the engine. The situation is however different at Longdale where women are also involved in pump operation. However, the women are not rostered during the irrigation peak season when the pump runs up to late at night. It is considered unsafe for women to go to the pump house at that time of the night and therefore the responsibility then shifts to be that of men. Unlike other farmer-managed schemes, Rupike irrigation scheme employs two of its plot holders to operate the pumps. The two farmers perform the same tasks as the government employees but are paid from the scheme fund. This arrangement has an advantage over the one where government employees are the ones responsible for pump operations because when farmers operate the pumps, it is expected that they are more sensitive to the needs of their fellow farmers and can communicate effectively with each other. Focus groups revealed that there is a communication gap between the government employees (pump attendants) and the farmers, some farmers are not free to approach government employees if they have any queries and feel that they are intruding. Below is an extract from a focus group with farmers:

“We are even afraid to go near the pump house without the permission of the Pump attendant.” (Male-Chinyamatumwa)

The communication breakdown between farmers and pump attendants usually exists because the two seem to have different goals or a different focus. Pump attendants are mostly interested in maintaining and protecting the pumps in order to keep their jobs hence they will not do anything do jeopardise that while on the other hand, farmers are more interested in having water in their plots no matter what it takes.

2.3.2 Pump Breakdowns

Pump breakdowns are very common in the smallholder schemes. In general there is a lack of access to manufacturers' manuals, simple trouble shooting or even recommended routine maintenance. In these circumstances almost all breakdowns become major issue. The breakdowns vary from major breakdowns that are technical to those that are energy (diesel, electricity) related. All breakdowns affect the performance of the schemes as they impact negatively on the production levels as well as on the crop quality.

Focus group discussions revealed that pumps in the smallholder schemes have a history of breaking down regularly causing losses, increased poverty and stress on the farmers. The discussions also showed that of the two major types of pumps, electric powered have lesser problems compared to diesel powered pumps. Diesel powered pumps need more regular service/checks compared to electric pumps. For example, the farmers at Lowlands have to change their oil and air filters more frequently than those at Longdale who only service theirs after a period of five years. Diesel pumps are also more vulnerable to temperatures, they breakdown more often during the irrigation peak season as they heat up quicker because of the long hours that they run. Breakdowns that occur during the irrigation peak season are the most damaging because that is when the crops need the water most, and if they miss water for a short period, the effects can be costly. Tables 2 shows a break down of expenses and loss of anticipated incomes that were encountered by farmers in at Longdale.

Table 2: Pump Breakdown Related Expenditure and Loss of Anticipated Income Per Farmer: Chinyamatumwa Irrigation Scheme

Name of Crop	Expenditure Breakdown		Anticipated Income per 0,5 ha
Green Mealies	30kg Compound D fertiliser	\$245.00	\$5 000.00
	15kg Amonium Nitrate	265.00	
	4kg Maize seed	52.00	
	1kg Insecticide	38.00	
	Ploughing	100.00	
	Ridging	80.00	
	Total	\$780.00	£5 000.00

Despite the technical problems, diesel powered pumps are also affected by diesel deliveries which are not very reliable since the suppliers only come when they have a certain amount of diesel to deliver in the area. The smallholder irrigation schemes normally do not order enough diesel to warrant a delivery, so they, therefore, have to wait until there are other orders in the area for them to get a delivery.

2.3.3 Attendance to Breakdown

The extent to which pump breakdowns impact on farmers depends on factors such as who will attend to the breakdown and when. If minor breakdowns are attended to at scheme level, the impact can be minimal compared to schemes that depend on outsiders to attend to breakdowns. Focus groups indicated that minor breakdowns are more common than major ones, thus, prompting a need to understand how they are handled. Attendance to pumps vary depending on whether the scheme is farmer or government managed. In government-managed pumps, there are certain bureaucratic procedures that have to be followed when a breakdown occurs. The government procedures apply to both minor and major breakdowns. According to an interview

with a pump attendant, the government employs a specialist who attends to pump breakdowns. The pump specialist is stationed at the provincial office, which is in Masvingo. The normal procedure is that, when a breakdown occurs, the pump attendant contacts the specialist at the office, either by phone or physically. The specialist then visits the site to assess the problem, if it is something that can be dealt with immediately, he/she then attends to it but if there is need to buy a part he goes back to Masvingo to make requisitions for the purchase of the spare part. The whole process has a lot of hitches which include things like, that the specialist might not be in the office attending to other breakdowns elsewhere or might have no transport to visit the site of the breakdown. The speed in the purchase of parts also depends on the availability of funds in the government votes. In some case the pump attendant at the scheme fails to raise money to go to Masvingo and has to ask for contributions from the farmers. All these factors, coupled with the normal red tape in government, result in loss of precious time with the farmers being the ones who have to bare the brunt of the effects of the breakdown.

Unlike the government managed pumps, those managed by farmers offer a better service to the irrigators as the responsible committees can quickly attend to minor problems and hire private companies to attend to the breakdowns. Most of the farmer managed pumps never break down to the extent where the farmers lose a complete crop except only for Longdale which had problems with a part that needed to imported.

2.3.4 Imported Pumps

The smallholder Irrigation schemes that were initiated by donors have a special problem, which is unique, them. The donors, through the department of Agritex, donated irrigation equipment pumps and engines. The equipment and machinery were imported from the donor countries with no or very few back-up parts. When such pumps break down, they are difficult to repair since the parts cannot be found locally. Examples of such schemes are Longdale and Lowlands whose pumps were donated by DANIDA and Chinyamatumwa by the Japanese.

Longdale scheme could not plant anything from December 1997 to May 1998 due to a pump breakdown. The farmers failed to find a gasket rubber seal for their pump from the local irrigation equipment suppliers. They also took the rubber seal to rubber specialist companies with the intention to ask them to reproduce the seal but they were unable to help because they were not able to make the metal that is inside the rubber. All what the rubber specialists could do was mend the old rubber. Below are extracts from a focus group at Longdale:

-We have no idea of where we can find the gasket rubber seal neither do we have an idea of the name of the Danish company which made the pump (Male)

-Does any one of you know where DANIDA offices are located, (question directed to research team), may be they are in position to advise us. (Female)

During the period of the pump break down, farmers at Longdale lost four crops that they were supposed to grow. The table below shows the types of crops that the farmers could not grow and the incomes that they expected to get from the sales.

Table 3: Intended Crops and Anticipated Income Lost : Longdale Irrigation Scheme - December 1997-May 1998.

Name of Crop	Anticipated Income Range
Beans	\$3 000.00 - \$4 000.00
Green Mealies	\$5 000.00 - \$6 000.00
Tomatoes	\$2 000.00 - \$3 000.00
Cabbage and Rape	\$1 000.00 - \$1 500.00
TOTAL crop gross income loss	\$11 000.00 - \$14 500.00

All the three schemes that have imported pumps have experienced similar problems, only that the others (Chinyamatumba and Lowlands) are in a better situation because they have stand by pumps. Nonetheless pump breakdown costs are very high.

2.3.5 Repair/Service/Maintenance Costs

Farmers who manage their own pumps are solely responsible for meeting the all the costs that they incur in repair/service and maintenance of pumps. In a bid to respond to the problem of pump breakdowns, such schemes have come up with strategies that ensure sustainability of the pumps. Schemes such as Rupike, Longdale and Lowlands have set up funds that cater for this need. The farmers initiated income-generating projects which help raise money for repair, service and maintenance of the pumps. The projects include a welding project at Rupike, a tractor for hire at Rupike and a common dryland plot at Longdale. The irrigation committees in the schemes have arranged for each plot holder to contribute towards a common fund. The money that is contributed by the farmers ranges from \$60.00 to \$500 per harvest depending on the general performance of the scheme.

For the government managed pumps, the costs are recovered through the payment of water bills which are meant to cover all other costs that are related to water supply. Thus, farmers in such schemes do not directly incur repair/service/maintenance and thus see no need in putting such common funds as those in the schemes that are managed by farmers.

Although farmer managed schemes perform better in pump management/repair and service, pump related problems are common in all the schemes.

2.4 *MARKETING*

Irrigation farming is basically market oriented as it is aimed at uplifting the standards of living for the rural population through income generation, even though there are other underlying reasons such as food security, import substitution and resettlement of displaced farmers. The acreage of smallholder irrigation schemes is generally very small hence the bulk of the crops that are grown in such schemes are cash crops. Demand for cash is also very high as there is need to constantly pay for water, electricity bills where applicable, to buy inputs and to repair and replace irrigation

equipment. Sustainability and continuity of such schemes thus heavily depends on the ability to sell the produce.

2.4.1 Crop Choice

Focus group discussions revealed that the choice of crops is generally beyond the control of the farmers in smallholder irrigation schemes. It is the Agritex Extension workers who normally decide on what and when to plant the crop. The norm in most schemes is that crop production has to be uniform throughout the scheme. The reason for this is not known to the farmers in the schemes.

According to the participants in focus groups, there is a tendency of poor crop timing whereby some crops are harvested at such a time when they are in abundance even in the dryland. This makes it very difficult for the farmers to dispose of such crops through selling as there is bound to be stiff competition and lowering of prices. Expressing her views, a participant was quoted saying:

“If we sell tomatoes at the beginning of the year we get more money, we can sell them at \$120.00 per bucket but now we are only selling them for \$60.00 per bucket because they are all over the show. We are actually competing with dryland farmers who have small garden along the rivers and yet they are supposed to be our customers if we make good timing of when to sell” (Lowlands-female)

There are some crops that are well known for their being difficult to sell. Focus groups showed that wheat was one such crop which is highly labour intensive and water demanding but very difficult to sell. Below are some extracts that show the problems related to selling wheat:

<p>Q How long does it take you to sell all your wheat produce after a harvest?</p> <p><i>-Wheat is very difficult to sell it can take up to almost a year before I finish selling a harvest. (Mushandike Village 16-Female)</i></p> <p><i>-I have never been able to sell wheat, I always end up taking it to the millers to grind it into mealie-meal and cook sadza with it. (Chinyamatumwa-Male Child Head of Household)</i></p> <p><i>-I wish we could stop growing wheat that often, it is better to grow maize instead of wheat because if we can not sell maize then we store it or sadza (Logdale-Female)</i></p> <p><i>-The other time we had a beautiful wheat crop and even the Vice President of Zimbabwe came for a field day at our scheme. We were very proud when it was still green but could not sell any of it after harvesting. (Male-Lowlands)</i></p>

Despite the difficulties that farmers face in selling wheat and the fact that wheat is not regarded as a staple food in Zimbabwe, Agritex Extension Workers continue to put it on the crop calendars year by year. This scenario reveals a clash of interests between farmers and Agritex who seem to have different objectives when choosing the crop.

The research also revealed that crop choice is a phenomenon that also extends to the household. There are certain crops that are attached to a particular gender especially in households where there is husband and wife. The major crops such as cotton, wheat and maize are men's crops while leaf vegetables, tomatoes, beans and groundnuts are allocated to women. The crop allocation is believed to be influenced by some gender ideologies that assign men the role of a provider or bread winner and women the role of the one responsible for processing and preparing household food. The crops that are attached to women, are the ones that ensure food security in the home, also, when such crops are sold the proceeds are also expected to go towards the upkeep of the household. On the other hand, the crops attached to men are those that earn bulk money which is expected to cover the major household needs including purchasing of family assets and farming equipment/machinery.

2.4.2 Marketing Patterns

Bulk marketing of any crops (men's or women's) is generally a responsibility for men. Men usually sell the produce that is sold to central marketing boards such as CTTCO and CTTPRO for cotton and Grain Marketing Board for maize and wheat, where they are members. Men also sell to contracted companies such as Cairns Mutare who buy tomatoes. Besides the usual male crops, mentioned above, the other crops that are sold by men on contracts are tomatoes and beans. Day to day marketing activities are a domain of women who are mostly responsible for selling small quantities such as cups of beans, packets of tomatoes and bundles of vegetables. The activities could either be undertaken around or away from home. The marketing away from home normally takes place at rural service centres, bus stops and at the major city of Masvingo. However, the farmers revealed that the bigger city market in Mavingo was not a desirable place to take their produce and this was due to various reasons. An extract below shows some of the reasons why farmers are not keen to venture into the big markets:

- Q Why don't you sell your produce at big market places like Masvingo where there are more buyers?**
-The problem with the market in Masvingo is that farmers are only allowed to sell their produce in a producers' market which opens in the early hours of the morning and closes at 10.00 am. After 10.00 am we are required to vacate the market place whether the goods have been bought or not. We therefore end up selling our perishable goods at give away prices because we will be racing against time and can not take them back home. (Female –Mushandike Village 21)
- Buyers in the big markets are too clever for us. They cheat and steal from us, they actually use all the tricks 'in the book' to bring down our prices. (Male-Chinymatumwa)*
- Q Can't you have a one voice and stand against buyers who want to exploit you?**
-We are afraid that if we voice against the customers they might leave and find other producers who are more polite. We cannot afford to offend them because we need money for water bills, schools fees etc. Poverty and desperation denies us any bargaining power (Male-Mushandike Village 16).

Although the day to day marketing has been said to be dominated by women, men's involvement is experienced in the marketing of fast selling crops such a green mealies which are sold away from home or involve the use of public transport to ferry the large quantities. Some men in focus groups argued that the task needed strong men who are alert because there are too many thieves and con man who wait to steal from farmers. Female participants were skeptical about the issue of allowing men to sell the day to day produce because of the unfavorable experiences that most of them have had with that practice. A female participant in a focus group at Chinyamatumwa was quoted saying:

“If men go to the service center to sell the produce, they will come back empty handed, with neither the produce nor the money. They spend the money on beer”

A male participant at the same scheme was also quoted saying:

“As much as we would like to help with the selling, women do not let us, they don't trust us, they think we are irresponsible. They want to do the selling themselves so that they can buy groceries and at the same time buy themselves some goodies. Some women like sugar too much, they can spent all the income on goodies”.

Despite the 'tug-of-war' that appears to take place between men and women concerning the sale of certain crops, the discussions over all showed that men's participation is more at the marketing stage than in any other activities in irrigation farming

2.4.3 Marketing Committees

Putting marketing committees in place is generally a practice that is being done in smallholder irrigation schemes as has been shown by the eight schemes that were visited, were all of them had elected marketing committees. The sizes of the committees vary from two to seven people per committee.

Focus group discussions showed that the majority of farmers are not clear what the roles of these committees are. They also showed that most of the marketing committees are not very active in carrying out their tasks and the committee members themselves are not even sure of how to go about carrying out their tasks. Majority of them have not had any formal training in marketing hence their effectiveness is very limited. Because of all the above reasons, the marketing committees are not recognised by the farmers neither are they appreciated, they are just put in place as a formality. However the marketing situation at Rupike is different. The farmers at Rupike are a highly satisfied bunch because they manage to sell all their produce every season. Both the male and female farmers speak highly of their marketing committee that is composed of two very active and knowledgeable women. The committee members travel to companies like National Foods and Midlands Milling, in Masvingo Urban, to market their produce. Once they secure a contract they make sure that the buyer will provide transport to come and buy the crop from the scheme shed. The situation at Rupike can be attributed to the training that the farmers got from their mother company (Rio Tinto) which trained them about the importance of producing good quality produce and how to market.

The gender composition of most of the marketing committees in the small holder schemes indicates a gender imbalance. Men dominate most of the committees and yet their participation in irrigation farming is lower than that of women. The male dominance in the committees can be attributed to the fact that, as mentioned earlier, most women benefit from small sales thus are not interested in bulk marketing activities and therefore see no reason for joining the committees. Also women find it difficult to leave their homes to go and source markets.

2.4.4 Distribution of Irrigation Income

Since irrigation involves a lot of labour and effort, it is important to consider how the incomes are distributed amongst the members of the households who participate in the process of irrigation. It is also an important area because sustainability of the schemes also depends on how much the farmers are motivated and satisfied with their incomes. Dissatisfaction on the part of the farmers at household level may affect production at scheme level.

The research showed that income distribution differs by type of household. In married households, men tend to benefit from the irrigation spoils more than women do because they have more control over the bulk money from bulk sales. Most married women never experience situations where they handle large sums of money. Most married women also do not have bank accounts in their names as they are considered to be beneficiaries to the husbands account.

Discussions with married women revealed that they have devised survival strategies that help them cope with their situation. Since the women largely depend on income from small sales for their personal needs as well as day to day financial demands, they keep money in secret places that are only known to them. Below is an extract from a focus group discussion with women at Mushandike:

- Q Do you have bank accounts?**
-Some married women have bank accounts but most of us do not have because they cause noise in the household as men will not part with their money until they are sure that your account is empty.
- We therefore save money privately and keep it safe for a rainy day. We usually keep our money in the bra or under the armpit.*
- Q Where do you normally get the money for the “bra Banks”**
-We get the money from small sales such as, cups of beans, plates of tomatoes and cobs of green mealies. We also keep all the small change from our bulk shopping

According to the women, the income from small sales plays a very important role in providing for the day to day household needs including the school needs for the children. Men get bulk amounts but the money does not last for long as they are also responsible for the bulk buys of the family and therefore remain with no money for other small needs.

Female heads of households are in a special situation, they have complete control over the production, consumption and marketing of their crops and they do not experience the same problems as married women. They make their own decisions, which, according to married women in focus group, are better than married households. Child heads of households are also in a similar situation since they are the decision-makers. However, the situation is more complicated for the child head of households who are forced by circumstances to perform tasks that are meant for adults. Below a female child head of household was quoted saying:

" All my siblings come to me for all their needs. Sometimes my little sister cries for a ball point when I have no money" (Chinyamatumba)

Income distribution related problems are common in most smallholder schemes but are less in schemes that have received some training on budgeting. Rupike irrigation is one such scheme, which was fortunate to receive training on money management. According to the focus groups, the farmers at Rupike were trained in almost every aspect of irrigation farming including the distribution of income. Generally, both men and women in this scheme have respect for each other and appreciate the idea of saving money. Participants in focus groups revealed they had large sums of money in their banks (as much as \$30 000.00) and have spent a lot of money uplifting their homes.

The situation at Rupike offers an example of the benefits of training. The approach that was used by Rio Tinto to initiate Rupike irrigation scheme, that of engaging the farmers in intensive training programmes, has proved to be fruitful, especially to women who are usually the victims of gender imbalances and mere male greed.

2.4.5 Contracts

Contracts are a useful marketing strategy in smallholder irrigation schemes. They give farmers an opportunity to sell all they need to sell and get their financial returns in bulk. Farmers who manage to secure contracts have less fear and worries about who will buy their produce. Contracts also encourage competition and are an incentive to farmers who will thrive to produce high quality products. The competitive environment created by contract expose the farmers to alternatives and encourages them to know more about how best they can win contracts.

Roughly assessing the levels of success of the schemes, the research revealed that the schemes that are doing well in all aspects of their irrigation and management are those who sell their crops on contract basis. Rupike irrigation has highly satisfied farmers who mainly concentrate on producing high quality crops while their marketing committee finds contracts.

Focus groups revealed that farmers in smallholder schemes rarely enter into contracts to sell their produce. This is attributed to reasons such as that farmers are ignorant of such marketing strategies or because they fear the unknown. A participant in a focus group was quoted saying:

"If you breach a contract, you can be sent to jail, it is not advisable to enter into contracts if you are not sure of yourself" (Male- Benzi)

Some of the Schemes prefer to enter into what they call "Gentlemen's Contracts". When asked to explain what they meant by gentlemen's contracts, farmers in a focus group at Mushandike Village 16 were quoted saying:

-It is a kind of contract where two parties enter into an agreement which has no strings attached to it but both parties are clear of the risks involved (Male).

-Companies who offer gentlemen's contracts are very open, they actually tell us that we are entering into a contract that does not tie anyone down, neither the farmer nor the company. If the farmer does not produce the required amount of crop or if the company is unable to buy the crop that it requested, no one sues the other. (Male).

Although some of the farmers might not be happy with the implication of a gentlemen's contract, they still enter into such contracts because, either they do not have better alternatives or they feel safe in such contracts.

2.5 EFFECTS OF MACRO POLICIES ON SMALLHOLDER IRRIGATION SCHEMES.

The Economic Structural Adjustment Programme (ESAP) is a macro policy that is meant to strengthen all sectors of the economy, including agriculture, so as to reform the economy. Instead of strengthening the irrigation schemes, macro policies seem to have contradictory effects. ESAP has negatively affected all aspects of irrigation farming which include purchasing of inputs, marketing and water provision.

In a bid to cut government expenditure, ESAP removed the subsidies and other forms of aid to the poor. Trade was liberalised, thus, allowing traders to charge exorbitant prices on their merchandise. The magnitude of the prices was worsened by the fact that the farmers sometimes have so limited buying options that they buy from second party retailers. The smallholder irrigation farmers, who as the study noted, live principally on income generated from agriculture, end up minimally or not applying fertiliser at all. All this obviously results in low yields and increased poverty.

The water situation in smallholder irrigation schemes has changed because of ESAP. Previously, the situation was similar in the irrigation schemes, regardless of whether the scheme was run by the government or not. Farmers were provided irrigation water for free, they only had to pay a yearly flat fee which was meant for maintenance purposes. Now, because of the government cost recovery programmes, the situation in government-run schemes is different. The government is now charging for water use and the minimum charge is \$185.00 per 1000 cubic metres. This figure has proved to be very high for the smallholder irrigation farmers who end up paying very high amounts of money.

The fact that each village or each scheme has a common water meter makes the situation in the smallholder schemes even more complicated, because if a few farmers default payment, the

whole scheme is liable for payment. Faced with such a difficulty, farmers in most schemes have taken the responsibility of making sure that every one pays on time. In some schemes, farmers contribute certain amounts of money to a common fund for water and in others there are committee members who collect the money. After having problems failing to collect money from irrigators, the farmers at Mushandike came up with a means of collecting the money which is effective. At the scheme, every farmer who wants to water his/her plot has to pay an advance fee to the committee. No water is to be released into one's plot unless a receipt is produced. The advance payment is at \$50.00 per every watering session.

The 'no money no water' exercises has proved to be very effective in achieving the goal of collecting money but has raised a number of socio-economic problems which are even threatening the viability of the scheme. Farmers indicated that the minimum number of times a crop should be watered is once a week, thus, farmers at the scheme have save at least \$50.00 to be able to water every week. Considering that the farmers do not always have things to sell, and do not have other sources of income other than farming, the situation at Mushandike can be classified at critical. Below are some quotes from farmers at Mushandike who were unhappy with the water situation:

"The government must consider that we also have other expenses, we are remaining with nothing after paying for water" (female).

"The dam was built by our grand parents in 1945 through forced labour, why now do we have to pay for our parents' labour, they sweated for nothing" (Male)

"I sometimes water my plot once or twice a month because I cannot afford four times a month" (FHH)

"Crops are being affected, especially those that require large amounts of water, because farmers cannot afford to provide the required water, some have cut on the acreage" (Male)

Similar to Mushandike, all other government-run schemes are paying highly for the water and generally the farmers do not understand why.

The fact that water management is now a responsibility of the Ministry of Water also impacts on the farmers. The study revealed that in most cases the activities of the Department of Water are divorced from the farming activities and hence may not to be sensitive to the needs of the farmers. The Department of Agritex may put up an irrigation scheme, work together with the farmers but have no control over the delivery of water. A typical example that the research found was at Mubvute Irrigation Scheme. At the scheme, a flood irrigation scheme was build and all the necessary infrastructure is in place but there is no water because the Department of Water has no money to purchase the diesel. The farmers at the scheme have lost two irrigation seasons and have also lost a dryland season because their fields are now part of the irrigation scheme. The food security levels in the area are seriously low. It is believed that if the water delivery was a responsibility of a department which works directly works with the farmers, maybe the situation would have been responded to in a more sensitive manner. Although farmers in government-run

schemes may be willing to contribute and buy diesel, they are not permitted to do so as they have to follow particular procedures first.

Over all, the study showed that decisions that are made at macro level are done without the involvement of the stakeholders, and thus, tends to be insensitive to their particular needs and concerns.

3.0 CONCLUSIONS AND RECOMMENDATIONS

3.1 CONCLUSIONS

Farmer Participation in Irrigation Design

- Levels of participation at an irrigation site are affected by a number of parameters including:
 - the institution involved and the arrangements it has constructed to facilitate participation
 - the attitudes of individuals within the institution
 - the attitude of the community and of men and women
- Most of the farmers in schemes are not there by their own choice but because they did not have any better choices when their dry-land was repossessed by government for developmental programmes or for the development of the schemes.
- Generally, farmers in government-run schemes are not given an opportunity to choose the irrigation design that is most appropriate to their agriculture, social, economic and cultural needs. Designs are imposed to them together with the schemes.
- To a large extent, farmer participation is practiced in schemes that are initiated by NGOs or private companies. A communication gap exists between government departments and farmers.
- Participation has not generally succeeded in involving men and women equally.

Land preparation

- The introduction of irrigation has created more work, especially for women and this is exacerbated by women's poor access to technology.
- A majority of the farmers in smallholder schemes use ox-drawn ploughs for ploughing and ridging but use hand-hoes for levelling. Levelling is the most difficult task in land preparation and also takes more time than all the other tasks and is usually done by women. Land-levelling is crucial to efficient in-field water distribution and poor levelling results in poor water distribution and patchy growth which adversely affects the yield obtained from the field
- The number of women involved in ploughing by ox-drawn ploughs is increasing in smallholder irrigation schemes. Many women are female heads of households are plot holders and many women have absentee husbands who are employed somewhere.

- Most farmers removed some parts from their ploughs, which they thought would make the ploughs heavy, because of lack of knowledge. Also lack of appropriate land preparation technology has negative impact on the physical being of men and women as well as the draught animals.
- The demonstration (Phase1 at Mushandike) on the proper use of farming equipment was very useful to the farmers with some of them making significant improvements on their crop production. Farmers need more of the demonstrations and wish they could spread to other schemes.

Pumps

- In government-run schemes, pump attendants are employed by the government to manage the pumps and the farmers are completely not involved in anything to do with the pumps. Also attendance to pump breakdowns is inefficient and unreliable in such schemes. This is often due to communication difficulties between the farmers and the pump operators or the ministries involved. These communication difficulties stem from the institutional set up which is not farmer friendly and is particularly inaccessible to women who may find leaving home for long periods difficult.
- Farmer managed schemes have funds set aside for pump breakdowns and are, generally, quicker in responding to the breakdowns.
- Electric powered pumps are perceived to perform better and need lesser service than diesel ones, which need regular service and breakdown often because of high temperatures.
- Farmers are facing problems with imported pumps because when they breakdown, even minor breakdown, there are no spare parts to replace the worn out ones. Also the farmers do not know whom to contact in the foreign countries to buy the spare parts.

Marketing

- Generally there is poor timing of when to harvest a crop resulting in most schemes selling the same crop at the same time causing stiff competition. Also, farmers on government schemes are not free to plant whatever they want, they have to follow a strict crop calendar which is compiled by Agritex Officers. Because of this, crops that are difficult to sell are still being grown in the smallholder schemes even though the farmers do not appreciate the crop.
- Bulk marketing is generally a responsibility for men while women are mainly involved in the day to day marketing of small quantities of the crops, which are mainly sold at home.
- Bigger markets in the city are not favoured by small-scale irrigation farmers because of the many problems with transport and difficulties that they meet at the market.

- Marketing committees are there in most of the schemes and are dominated by men. However, the existence of the committees does not mean that they are active. Many committees are just a formality and are not doing anything towards meeting the marketing goals of the schemes.
- Contracts are generally not practiced in the schemes either because farmers are ignorant about them or they have fears of the unknown. However, the farmers have better knowledge of 'Gentlemen's Contracts' which are not reliable and do not protect farmers from unfair practices by companies.

Social/ Gender constraints

- Although most households own ox-drawn ploughs, the majority do not own animal draught power and depend on hired services. Young female heads of households face problems of resentment when they hire draught power because married women consider them a threat to their marriages.
- There is general unfair distribution of income in married households with men being the major benefactors while women in female headed households have the advantage of making independent decisions on how to distribute their incomes. Married women have responded to this problem by secretly saving the small amounts of money that they get from small sales. The situation in schemes that have received training is better.
- There is a general perception that men are more suited to technical tasks than women. This results in men being in charge of pumps even when women are the everyday users of the water.
- Social constraints relating to contacts with men and the time constraints imposed by family care make marketing particularly difficult for women.
- Women's activities are often seen as separate from the mainstream business of the schemes and have to be financed by the women alone, although the whole family usually benefits. (Women at Lowlands have to finance diesel for the pump to grow vegetables)

Macro Policies

- Removal of subsidies has resulted in high costs of inputs. Because of unaffordability, farmers are having to reduce or do without fertiliser, thus, reducing their production and income. Women are likely to be strongly affected by these circumstances as they are chronically short of cash.
- Farmers in government-run schemes are the most affected by the cost recovery programmes as they are paying heavily for water. This has resulted in some farmers having to cut down on the times they water their crops or cut down on the acreage in order to reduce costs. Women are the majority among poor farmers and will suffer disproportionately.

3.2 RECOMMENDATIONS

Participation

- Awareness raising is a necessary precondition for successful participation. It may be necessary to target particular groups that are known to lack skills, awareness and confidence do that they will be able to participate.
- Involve men and women farmers in irrigation design in order for them to make informed choices that ensure continuity of the schemes. It is believed that more knowledgeable farmers are more understanding and willing to assist when things go wrong in the structure of the irrigation unlike ignorant farmers who will always find someone to blame. Participation must include both men and women and, to ensure that women are considered, separate preliminary meetings may be required, or women's groups representatives consulted.
- Lessons from participation achieved in private and NGO schemes may provide useful material for government participation initiatives.
- It has to be recognised in budget allocation that effective farmer involvement needs resources allocated specifically to effective dissemination of the required information to men and women farmers and to farmer meetings.
- Phase 1 and 11 investigations confirm that irrigation is labour-demanding, that women provide much of the required labour and that tools are often inadequate from both ergonomic and productive view points. There is therefore a need to involve men and women in developing appropriate technology that is affordable and accessible to farmers and their workforces.
- Demonstrations included in Phase 1 of the project were welcomed by farmers and have led to changed behaviour and increased profits. There is need to intensify demonstrations and spread them throughout all smallholder irrigation schemes.
- Small and simple manuals that are written in vernacular languages and clearly illustrated are in demand for a wide variety of skills that are in daily use in irrigated production.

Land preparation

- Since women are heavily involved in land preparation it is necessary to target women in training. It is also necessary to offer equipment choices that take into account women's access to draught power and personal strengths and limitations.
- The social difficulties faced by young women need to be investigated, as the impact on family poverty may be severe.

- Special attention should be given to the problems of achieving effective land-levelling in scheme implementation and maintaining the design levels because of the impacts on :
 - Women workers
 - Water distribution
 - Yields
 - Income
- Consideration should be given to building on existing capacity to deliver effective on-site demonstrations. How to fund provision of demonstrations and participatory farmer experiments in a cost-effective way should be investigated.
- Provision of demonstrations and interactive training should be done in a way that ensures that both men and women can attend. The usefulness of land preparation demonstrations as a way to deliver gender-awareness training should be explored.

Pumps

- Management of pumps is better done at scheme level to avoid delays that affect the farming process. There is need, thus, to have trained farmers, local farmers who can attend to minor problems and these should include both men and women.
- Simple illustrated instructions should be prominently and permanently displayed adjacent to pumps.
- Training of local farmers to look after pumps should be carefully thought out so that the person who is trained has community support, is available when required and has sufficient incentive to remain available to do the job.
- Information about running costs, reliability and service requirements of engines and pumps of different sorts (electric and diesel) has to be made available to men and women in clear and understandable terms before they are expected to participate in design decisions.
- Farmers should be encouraged to discuss their preferences for pumps. Men and women may have different requirements that should be taken into account.
- Engines and pumps that can be serviced locally by professional service providers who have access to a wide range of spare parts and accessories should be recommended.
- If farmers receive imported donations of pumps, they must get as much information and detail as possible about the company that supplies the pumps and availability and cost of spare parts.
- Attention should be given to reducing potential conflicts between farmers and pump attendants

Marketing

- The crop calendar should be made with full participation of men and women farmers in order to incorporate their concerns about crops that are difficult to sell.
- Marketing committees need to be helped to develop a useful role. The concept of marketing as opposed to selling should be promoted through training. It is important to encourage women to participate in marketing committees so that their specific needs are addressed.
- Farmers should be aware that non-contractual marketing requires skilled handling and that improved results are possible.
- Train men and women farmers on marketing strategies to ensure quick disposal of their crops. The strategies will be different for bulk contracts and for small quantities.

Social /Gender constraints

- Irrigation design cannot, in itself, change social gender relations but it can make it possible for men and women to make the best use of the irrigation infrastructure they use. Gender-awareness raising can help reduce inefficiency in labour-use and income distribution. Inefficiency often arises from former gender ideologies on roles of men and women that are no longer appropriate.
- The increased responsibility that rural women have for land-preparation must be recognised and considered in provision of extension and services.
- Market institutions need to be gender-aware in developing new facilities
- Targeting technical training to women can increase efficiency of the system and provide opportunities for women to enhance their standing in the community

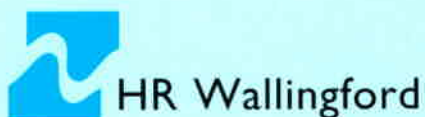
Macro-policy

- Government policies must be sensitive to the specific needs of people in particular sectors. In addition governments should be aware of the gender implications of past policy, before implementing new programmes. In order to do this, monitoring has to be in place and should be gender-based.
- Conventional poverty indicators may not be sufficiently sensitive to reflect the workload changes that are implicit in the introduction of irrigation and the impacts that these changes make on the livelihoods of men and women.

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