Gender-Sensitive Irrigation Design

Group based irrigation schemes in Zimbabwe

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Report OD 143 (Part 2)
December 1999

HR Wallingford

DFID Department For International Development

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Contract

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Executive Summary

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Group based irrigation is very common in Zimbabwe, with irrigators frequently sharing a water source, infrastructure and equipment. This DFID funded study investigated the gender disparities resulting from lack of gender awareness in the design and operation of these communal schemes.

Scheme design has been found to have a significant impact on the success of group based schemes and subsequently on livelihoods. Designs that have recognised the real needs of the users and have encouraged participation are generally the ones that have led to improved livelihoods. A number of gender issues are apparent. Women's lack of land, technical knowledge and training constrains their access to credit and water. The problems associated with land preparation, managing technology, communication with government ministries, transport, and marketing pose problems for all irrigators, but particularly women. Women were significantly constrained by social and cultural expectations, their disadvantaged status relative to control of and access to resources, their lack of participation in communal decisions and their heavy domestic and agricultural workloads.

Measures to increase both men and women in participation are needed if smallholder irrigation is to be successful in improving livelihoods and food security. Where high cost technological equipment is installed, adequate services should be in place for maintenance, operation and repair. New technologies must be accompanied by support services and training for users. Women comprise the majority of users and special efforts should be made to ensure that they have equal access to training, technology and resources as their male counterparts. A gender-sensitive approach to participation during design and rehabilitation of schemes can promote more user-friendly technology and operating regimes.

Acronyms

AGRITEX	Department of Agricultural and Technical Services
CARE	CARE - a Non Government Organisation
COTCO	Cotton Company of Zimbabwe
DWD	Department for Water Development

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Currency

In the course of this study, fluctuations in the exchange rate between pound sterling and Zimbabwe dollar have ranged from Z$18/£ to Z$65/£.

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1. INTRODUCTION

1.1 Background

The 'Women in Irrigation' study highlighted women's labour as a key factor in the performance of smallholder irrigation. It is important therefore to ensure that women's efforts are used in the best way possible to improve production and sustainability, whilst also guarding against exploitation of women. At present women are among the poorest people in rural areas, largely as a result of their lack of control over productive assets and their heavy workload.

Design of smallholder irrigation does not usually take into account the preferences of the end-user. The physical tasks connected with structures, machinery and tools are often laborious and time-consuming. These tasks impact differently on men and women, and different tasks conflict with other gender-specific obligations. The suitability of a system as a whole, or individual pieces of equipment, depends on durability, dimensions, energy requirements, technical skill for operation and maintenance, availability of spares and servicing, access to training and the overall workload of the user. In these respects men and women have different requirements and different starting points. Many of the heavier tasks associated with irrigated farming were found in Phase I of this project to be extremely difficult for women, to the point of causing extreme fatigue and bodily harm (Part 1, Appendix II & III). Even in systems built specifically for women irrigators, standard equipment can cause major problems for the users (Chancellor, 1997).

In smallholder irrigation, jobs are traditionally allocated on a gender basis but the interdependence of one job on another means that there are seldom entirely male or female tasks. *Gender-sensitive irrigation design* (GSID) refers to designs that recognise the different starting points, constraints and aspirations of men and women regarding the use of irrigation facilities. A good gender-sensitive design would be one that maximises the sustainability and production of the scheme while empowering both men and women to fulfil their objectives for an acceptable level of effort.

1.2 GSID Issues

The Gender-sensitive irrigation design project is a study concerned to identify gender-related problems and to assess the quality of participation achieved by men and women in the design of irrigation schemes. The study in Zimbabwe aims to:

- Identify aspects of irrigation design that constrain men and women from using their irrigation scheme to the best advantage in terms of profitability and sustainability
- Take into account the personal workloads of men and women with particular reference to the temporal and social constraints that apply to them
- Identify practical strategies for ensuring effective participation of men and women in the design or rehabilitation process
- Provide general guidelines for taking gender considerations into account in design or rehabilitation of small-scale, smallholder irrigation
- Provide publicity material to encourage gender awareness and appreciation of irrigation design issues among farmers.

Phase I of the project, which was carried out in Zimbabwe, concentrated on investigating gender roles through surveys and focus groups to:

I. Identify potential research issues,
II. Investigate pilot interventions

Phase I concluded with a workshop in Masvingo to enable regional irrigation professionals to prioritise the research issues. Although the workshop discussion was based on Phase I field work, the issues were not limited to those identified in this preliminary work. Priority areas for investigation in Phase II were identified (Appendix I). The workshop prioritised identified three major issues for concern in relation to gender disparity on irrigation schemes:

- Marketing
- Access to resources
- Equipment & land preparation (including indigenous technical knowledge)

Other points raised at the Workshop that were potentially relevant in Zimbabwe include:

- Inappropriate design of equipment
- Crop preferences. e.g men often prefer cash crops and women food crops
- Access to training and women's availability to attend training
- Access to information and the importance of language and illustration
- Effects of improved irrigation on women

Phase II is devoted to addressing the prioritised research issues. Levels of farmer participation and female involvement in decision-making and the implications of pump unreliability for farmers' incomes and livelihoods are also included.

2. CASE STUDIES

2.1 Methodology

Focus group discussions were held to further investigate the issues of (i) farmer participation in irrigation design, (ii) land preparation, (iii) pumps and (iv) marketing. The focus groups were formed on a gender basis. Information from in-depth interviews with key informants complemented the findings from these focus group discussions.

The focus group method of data collection was chosen because of its usefulness in investigating phenomena that cannot be obtained through direct observation – such as individual opinions and attitudes. Separate focus groups were formed for: (i) male household heads, (ii) married women who farm with their husbands, and (iii) married women with absentee husbands (*de facto*) together with female household heads *(de jure*). Where applicable, child household heads were also interviewed. Extension workers, organisational field officers and pump/dam attendants provided the complementary key information.

From these sources of information it became clear that further investigation was needed to:

i) Link the level of participation at design stage and the general support found in schemes to the subsequent level of female involvement, particularly in decision-making, use of water, land, labour and productivity.

ii) Quantify the implications of pump unreliability and its effect on farmers' incomes and livelihoods.

In order to try and link the levels of support and participation to incomes and production, a mini-survey was undertaken at two irrigation schemes. Men and women farmers at various levels of achievement were interviewed about:

- work priorities and duties,
- crop resource decisions,
- scheme management,
- profitability of irrigation,
- marketing, and
- their views on irrigation.

In order to determine the costs of pump unreliability three contrasting schemes were compared:

Scheme 1: Electric powered pumps, drag-lines with sprinklers (Rupike).
Scheme 2: Large diesel pumps and flood irrigation with water applied by siphons from concrete in-field canals (Chinyamatumwa).
Scheme 3: Small diesel pump and flood irrigation with water applied by buckets from troughs within the garden (Chemombe).

Discussions were held at each scheme with scheme users, AGRITEX and NGO extension staff and pump attendants. Department for Water Development (DWD) officials in Masvingo were also consulted to establish reasons for:

- the frequency and direct costs of breakdown, and
- the productivity consequences of breakdown

The discussions and conclusions in this report are taken from the Phase II investigations, which are documented in:

1. *Emeld Berejena, Jim Ellis-Jones & Nicola Hasnip. (1999) An assessment of the implications of pump breakdown and community participation in irrigation schemes, Masvingo Province, Zimbabwe. OD143, Part 5*
   Presents and analyses the results from the mini survey and discussions about pump related costs

2. *Neddy Matshalaga,(1998) Gender-sensitive Design. Consultation on gender issues in smallholder irrigation schemes. OD 143, Part 6*
   Presents and analyses the findings from the focus group discussions

The reports can be obtained from:
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2.2 General overview of smallholder irrigation in Zimbabwe and the schemes visited

Smallholder irrigators in Zimbabwe face many difficulties whilst trying to get the best from their schemes. Some schemes have suffered due to low levels of production, conflicts and low motivation amongst farmers. Other schemes, however, have seen improvements in livelihoods of irrigators as a direct result of irrigation. These differences have much to do with the way the schemes were initially designed. The schemes that have recognised the real needs of the users, and have encouraged participation, are generally the ones that have led to improved livelihoods.

The question of appropriate pumps was found to be of particular interest in Zimbabwe where many existing schemes rely on pumps that farmers have a limited capacity to maintain and repair. Selection of pumps has in the past been heavily influenced by donor policy and has resulted in long term difficulties.

A second major concern is land preparation, which has a number of gender issues. The long-furrow system, common in many existing smallholder schemes, may not be compatible with women's needs.

Marketing was also found to pose a problem for many irrigators due to the long distances to the nearest markets along dirt roads, where public transport is often lacking and disorganised.

In total, during Phases I and II eleven schemes were visited, representing a range of differing management styles and water delivery systems. This has enabled comparisons to be made to recommend strategies for improving on future design, choice and participation.

Below is a summary of the schemes by management style (Tables 1 - 4). For details see Appendix II)

Table 1 Management style

AGRITEX-managed	Farmer-managed	NGO-assisted
Chinyamatumwa (P)	Lowlands (P)	Benzi
Longdale (P)	Rufaro (P)	Chemombe (P)
Mubvute (P)	Rupike (P)	Chikava
Mushandike	-	Nyamai

(P) = pumped

2.2.1 AGRITEX-managed

In schemes managed by AGRITEX in conjunction with other Government Departments, institutional problems may arise which tend to complicate matters for the farmers involved.

Conflicts between farmers and government departments and their employees are often rife. At Chinyamatumwa conflicts have arisen between the AGRITEX extension worker and the pump attendants who are employed by DWD regarding the method of calculating the water bills. Similarly, at Mushandike, there have been conflicts between DWD, AGRITEX and the farmers, who feel that they pay for leaked water. They feel that it is the responsibility of AGRITEX to prevent leaks by repairing the dams and canals.

Most AGRITEX-managed irrigation schemes have an allocated extension worker who is responsible for implementing the cropping calendar and for giving advice on the correct procedures for ploughing, input application and planting. The extension workers have the authority to implement deadlines and to penalise farmers for failure to comply.

The four schemes have experienced problems of a varying nature. Chinyamatumwa and Mubvute have lost crops due to DWD failure to deliver fuel. The difficulty in locating spare parts for imported pumps has led to loss of crops at Longdale and Chinyamatumwa. Mushandike, which is a gravity-fed scheme, has had problems for many years with poorly levelled land and leaking dams and channels.

Table 2 provides some basic information on the AGRITEX-managed schemes

Table 2 AGRITEX-managed schemes

Irrigation Scheme	Built	Area under irrigation	No. Participants	Irrigation type	Power source
Chinyamatumwa	1992	34ha	128	Siphoned from in-field concrete canals	Two 60 kW diesel pumps
Longdale	1993	8ha	15	Sprinklers	One 15HP electric pump
Mubvute	1996	65ha	150	Siphoned from in-field concrete canals	Two large diesel pumps
Mushandike	1980's	408ha	250	Siphoned from in-field concrete canals	Gravity, no pump

2.2.2 Farmer-managed

Generally farmer-managed schemes receive advisory support from government departments such as AGRITEX and the Department for Water.

All the farmer-managed schemes visited by the project team received extension support from AGRITEX. Rupike, however, was the only scheme with an extension Officer based at the scheme. Both Rupike and Lowlands appear to be well managed and successful irrigation schemes, whereas Rufaro appeared to be struggling.

Farmers at Rupike were coping well and saving enough money to cover the electricity bills and maintenance of the pumps. DWD pay for their water. Livelihoods and standard of living are improving. Training was very successful at this scheme and consisted largely of demand-led courses. The relationship between farmers and AGRITEX was good as there are extension officers based at the scheme to advise on suitable crops and input application. The farmers at this scheme also have the added advantage of receiving help from Rio Tinto, in locating spare parts for pumps and other pieces of equipment.

In the near future, farmers may be required to pay for water, in addition to fuel and maintenance, which may cause financial problems. Equipment such as hoses and sprinklers are likely to need replacing in the not so distant future, which will be another expense.

Although the farmers at Lowlands appeared to be doing well, the arrangement with the extension worker was unsatisfactory. They were supposed to meet with him every two weeks, but because he is not based at the scheme this was not always the case. The farmers could improve their performance by paying attention to the existing system, improving the performance of the sprinkler heads and possibly by altering their crop pattern to take greater advantage of available markets. There is potential for expansion by using an additional pump to expand the irrigation area or to improve the performance of the existing area. A major source of inefficiency arose from women's livestock work, which is disruptive as it reduces the time they have for intensive irrigation work, resulting in inefficiency.

Rufaro Irrigation Scheme has experienced substantial problems. There is minimal AGRITEX support: and, farmers make little headway with their management problems and fail to plan and budget for recurrent costs. All six electric pumps, donated by Danida, have broken down, and the tractor is often not operational. The farmers invested in two more pumps and have continued to irrigate a small area using these. Because the co-operative idea failed the farmers reverted to individual plots but shared infrastructure and equipment on a co-operative basis. Table 3 provides some basic information on the farmer-managed schemes

Table 3 Farmer-managed schemes

Irrigation Scheme	Built	Area under irrigation	No. Participants	Irrigation type	Power source
Lowlands	1994	7.5ha	18	Sprinklers	3 Lister diesel engine – only one used at a time
Rufaro	1985	25ha	24	Siphoned from in-field canals	Electric pumps
Rupike	1993	100ha	200	Drag line sprinklers from buried mainlines	4 Electric 60 kW motors

2.2.3 NGO-supported

At most NGO-supported schemes, the NGOs act mainly as scheme facilitators, offering practical assistance and agricultural advice. Farmers are encouraged to participate and to think things through for themselves with guidance from the NGOs.

The gardens, all designed with the participation of the workers (mainly women), appeared to be successful. Although using buckets to carry and distribute water is hard work the women tend to make a go of it. Chemombe was the only garden scheme that had experienced a technical problem leading to crop loss. When a part of the 5HP Kingfisher pump relied on by the women, and operated by the chairmen, broke in two, their lack of knowledge meant that instead of arranging for it to be welded, the women used buckets and wheelbarrows to water half the garden.

Nyamai was still at initiation stage and participation numbers and garden size had not yet been decided on. The participation by both men and women in building the dam wall was enthusiastic and therefore encouraging.

Table 4 provides some basic information on the NGO-supported schemes

Table 4 NGO-supported schemes

Irrigation Scheme	Built	Area under irrigation	No. Participants	Irrigation type	Power source
Benzi	1991 / 1996	3 Gardens	c.165	Buckets from dam	-
Chemombe	1996	1.5 ha	63	Buckets from open troughs	5 HP Kingfisher diesel pump
Chikava	1997	3ha	92	Buckets from open troughs	-
Nyamai	1998	Garden	NA	NA	NA

3. RESULTS AND DISCUSSION

3.1 Interventions

The project suggested and facilitated the implementation of two interventions to promote awareness of alternative equipment design and to promote participation of women. One was at Mushandike Irrigation Scheme and one at Chikava Garden Scheme.

3.1.1 Demonstration at Mushandike Irrigation Scheme

Discussions at Mushandike during Phase I, resulted in a useful interchange of information about land preparation problems. There were two main constraints that concerned the smallholders; firstly, poorly levelled land and secondly, the need to achieve an acceptable ploughing depth with an acceptable level of effort. Poor land levelling has been a problem at Mushandike since the scheme began and has led to a retrenched position in which the farmers and AGRITEX are unwilling to act or to accept responsibility. The costs involved in a major land levelling exercise are high.

The project suggested that improved land preparation could be achieved using the farmers' existing equipment and gradually replacing it when needed with more appropriate models. In order to raise people's awareness of the possibilities, a demonstration of plough equipment and correct plough setting was arranged for a group of men and women farmers at one village. The farmers who attended the demonstration now obtain much higher yields than before, and now recommend that demonstrations be given elsewhere. The women found that the smaller ploughs and cultivators and correctly set ploughs are much more manageable and less strenuous to use.

Demonstrations should build on the capacity and resources already available at the schemes.

Quote: focus group meeting – July 1998
I was happy to learn about a small plough that is light and very effective. It is so light that even women can use it easily and also a single donkey can pull it. (M)

The cultivator makes very light work. It gives women time to cook for the family (F)

3.1.2 Use of buckets and watering cans at Chikava Garden Scheme

Most of the women at Chikava used large tins to water their plots, which involved bending down to fill them from the troughs. The project team discussed these problems with the women and used their suggestions as a basis for encouraging women to experiment with cheap plastic buckets and ropes to ease the task of lowering and lifting buckets in and out of the troughs. The women also experienced problems watering seedlings from tins as they found it difficult to control the water flow. The women saw watering cans as the solution to all watering problems.

It was suggested that they record their assessment of how well or badly the alternatives (buckets and watering cans) worked. This was done successfully and most women took part. After recording how long watering took with a watering can, the women reviewed their original solution. In the end they compromised, making a trade off between time and efficiency. Buckets were more time efficient, but watering cans were more efficient for light watering of seedlings. The women learned from the experiment and set off to look into buying more plastic buckets of their own and resolved to share the watering can.

3.2 Farmer feedback sheets

It has been possible to identify key issues that affect the performance of smallholder irrigation schemes in Zimbabwe and that warrant future research. Because so many issues came to light, a series of scheme-specific 'Farmer Feedback Sheets' were produced that listed the issues affecting scheme performance followed by comments and recommendations. (The 'Farmer Feedback Sheets' can be found in Appendix III).

Table 5 gives a general overview of the issues raised, differentiating between major and minor issues and those affected by these issues. The different coloured columns divide the table by the different management styles discussed above (See Section 3.2).

Using the priorities agreed in the 1998 Workshop, these issues can be grouped under the headings: marketing, access to resources and equipment and land preparation. Chapter 5 discusses these issues in relation to gender disparities.

Table 5 Overview of issues

Smallholder Irrigation Design

	AGRITEX				FARMER MANAGED			NGO		
	Longdale	Chinyamatumwa	Mushandike	Mubvute	Rufaro	Lowlands	Rupike	Chivaka	Benzi (Hand pump)	Chemombe
SCHEME LAYOUT										
Plot size	⊙	●								
Fencing		●			⊙	●	⊙		●	
Land preparation		●	●		●					
Water scheduling	●								●	
Water delivery		●	●		●	●	⊙		●	
PUMPS										
Access to spares	●	●		●	●	⊙			⊙	●
Reliability	●	●		❍	●	⊙			●	●
Cost	⊙	❍		❍	●				⊙	
Roster – on & off times										
Farmer participation @ design stage	●	●		●	●		⊙		●	
Fuel delivery		●		●						
Farmer awareness (knowledge)	●				●	⊙	⊙		●	●
Repairs/trouble shooting	●	❍			●				●	●
Loss of crops	●	●		●	●					●
EQUIPMENT										
Problems with land prep. Equipment		●	●	⊙	●		⊙			
Sprinklers						●	⊙			
Syphons		⊙		❍	●					
Buckets								●	●	
INSTITUTIONAL										
Conflict		●	●	●	●					
Lack of training	●	●	●		●	⊙		●	⊙	●
Communication	⊙	●	⊙							
Participation in scheme design	●	●	●	●	●	●	⊙		●	
MARKETING										
Cropping calendar	●	●		●	●					
Selling	⊙	●	●	❍	●	●	⊙	●		
Contracts	●	●	●	❍	●	●			●	
Meeting deadlines		●			●		⊙			
Transport		●		●	●	●	●	●	●	
COSTS/MONEY/CREDIT										
Access to credit		●		●	●					
Cost of water			●			●				
Incomes (lost)	●	●		●	●					●
HEALTH & LIVELIHOODS										
Poverty reduced	●		●			●	●	●		
Poverty neutral									●	●
Poverty increased		●		●	●	●				
Health increased		●						●		
Health decreased										

● Major issue – men and women

● Major issue – affects mainly women

⊙ Minor issue

❍ Potential issue

4. DISCUSSION

4.1 Marketing

4.1.1 Oversupply

Saturated markets cause problems for most smallholder irrigators. To some extent this will always be a problem due to seasonality, and leads to reduced prices and unsold produce. Farmers on government schemes have to follow a strict crop calendar which is imposed by AGRITEX. Crops that are difficult to sell, such as wheat, are still being grown. All farmers find it difficult to sell and women complain that it is difficult and time consuming to harvest. There is clearly a need for rationalisation and diversification. The cropping calendar should be compiled with full participation of men and women farmers, in order to incorporate their concerns about crops that are difficult to sell and crops that are in abundance in the area.

4.1.2 Access to markets

Where bulk marketing is undertaken it is generally the responsibility of men. Women tend to be more involved in the day to day selling of small quantities of crops. However, at many schemes bulk marketing is not considered and farmers struggle to sell their crops individually at the scheme or at local growth points and nearby towns. Transport is difficult from many schemes as the local buses are infrequent and often the drivers refuse to carry produce. Smallholders are therefore restricted to carrying small quantities on any one journey.

Large markets, such as in Masvingo are not favoured by women because of the many problems in addition to their transport problems they meet difficulties at the market. They are only allowed to sell their produce up until 10.00am, so they end up selling at low prices to get rid of their produce before they have to leave. To get around this problem, irrigators need alternative options for marketing. Assigning one market day per week to areas around the centre of demand, thus focusing buyers into a different growing area each day, is one such option. This would even out the opportunities for growers and at least partially transfer the cost of transport to the buyer. This would obviously need to be tested with the full participation of all stakeholders.

4.1.3 Marketing committees

Although marketing committees have been established in many smallholder schemes, a large proportion of them are not active. This is probably due to a lack of training in marketing skills and, therefore, a lack of confidence of the committee members. Many committees are just a formality and are not doing anything towards meeting the marketing goals. Many are formed mostly of men, as it is perceived that women have a wide range of other chores and would not be able to give up the time. In view of the marketing problems, committees need help to develop a useful role. The concept of marketing as opposed to selling should be promoted through training. Women are heavily involved in selling and marketing and their needs are central to the success of the scheme so they must actively participate in marketing committees. Marketing committees need to be encouraged to investigate the opportunities for group marketing and attracting the buyers to collect from the scheme. This will save time and money and help prevent the deterioration of produce during slow journeys to market.

4.1.4 Contracts

Contracts are generally not practised in the schemes, either because farmers are ignorant about them, have fears of the unknown, or realise that they could be sued for breach of contract. It is impossible for irrigators on schemes without a reliable supply of water to enter in to contracts. Farmers, however, tend to accept ‘Gentlemen’s Contracts’ which are not reliable and do not protect farmers from unfair practices by companies. Farmers should be made aware that better deals are possible through non-contractual marketing but this would require skilled handling. To develop these skills and ensure quick sale of their crops men and women farmers need training on marketing strategies.

4.2 Access to Resources

The resources important to irrigators are: land, water, equipment, draught power, credit, access to training, advisory services and markets. The study revealed gender disparities in access to these resources.

Inefficiency has been fostered from traditional gender ideologies on roles of men and women that are no longer appropriate. Gender-awareness can help reduce inefficiency through improved access to resources.

4.2.1 Access to land and water

In general, rights to own and use land commonly fall to male members of society and control of water is closely linked to control of land.

On many smallholder irrigation schemes men tend to have more control over land and water than women. Even though women work on the irrigated land they have little control of access to resources. This often relates back to the implementation of the scheme. At resettlement schemes such as Mushandike, one of the criteria for joining was that men had to be unemployed. Men were therefore encouraged to register as plot holders and as such control access to resources. However, at Rupike, the women have been encouraged to take an active role in scheme management since the scheme was initially implemented. They were already on the land when the scheme was designed and were the ones who registered as plot holders, mainly because the men wished to carry on dryland farming and did not like the idea of irrigation. These women now feel that they have more control over access and use of resources than the men do.

4.2.2 Access to equipment

Many households in Zimbabwean smallholder irrigation schemes own ox-drawn ploughs, but do not own the animal draught power required to use them, as many animals perished through drought. Most households therefore depend on hired services to help with the task of ploughing. Young female household-heads however face problems of resentment when they request help from local men as the wives consider this a threat to their marriages.

Due to preconceptions about women's roles as mothers and family providers and men's technical abilities, women are often restricted in access and use of equipment such as pumps. The introduction of irrigation has created more work, especially for women and this is exacerbated by women's poor access to technology, especially equipment for land preparation tasks. This maintains or even exacerbates the disparities.

4.2.3 Access to credit and household money

Most women do not have land rights and therefore have no opportunity of obtaining credit. However, women in female-headed households have the advantage of making independent decisions on how to distribute their incomes and also have more chance of obtaining credit to buy inputs than women with husbands.

Household incomes are often unfairly distributed between husband and wife, with men being the major beneficiaries. Married women have responded to this problem by secretly saving the small amounts of money that they get from small sales.

4.2.4 Access to training, advisory services and markets

There is a general perception amongst government departments and farmers themselves that men are more suited to technical tasks than women. This often results in men being in charge of pumps even when women are the everyday users of the water. Men also benefit from more regular contact with extension services. Targeting technical training to women could increase the efficiency of the scheme and provide opportunities for women to enhance their standing in the community. Advisory services must be sensitive to the changing responsibilities of rural women for land preparation.

Social constraints, costs and time demands of family care make access to markets, and meetings particularly difficult for women.

4.3 Equipment and Land preparation

Existing land preparation and watering equipment has not been designed with the users in mind. Men and women therefore face problems in using equipment. Women have reported more difficulties in this respect than men.

4.3.1 Land preparation equipment

A majority of the farmers in smallholder schemes use ox-drawn ploughs for ploughing and ridging but use hand-hoes for land levelling. Levelling, which is crucial to efficient in-field water distribution is the most difficult and time consuming land preparation task and is usually done by women. Sustained levelling using hand-hoes affects health, causing symptoms such as backache. Poor land levelling results in poor water distribution and patchy growth, thus adversely affecting crop yields and income levels. Therefore more attention needs to be given in scheme design and implementation to the problems faced by farmers in achieving effective land-levelling.

As more women in smallholder irrigation schemes become responsible for their households either through death of their husbands or absentee husbands, the number of women needing to plough is increasing. Due to lack of knowledge about the correct use of ploughs, many farmers (both men and women) remove parts from their ploughs in an attempt to make them lighter. This tends to make jobs harder and physically tiring and results in shallow ploughing. Although most farmers acknowledged that deep ploughing has a positive effect on water penetration, yield and weed growth, they were unable to achieve the correct depth with the available equipment. Shallow ploughing results in more work, especially for women who are responsible for weeding. The demonstration carried out at Mushandike Irrigation Scheme on the proper use of farming equipment proved to be very useful and many farmers have since made significant improvements to their crop production. Simple demonstrations of how to correctly use equipment to plough to the desired depth can both increase production and reduce energy required for land preparation, thus improving the health and livelihoods of farmers, especially the women who do a large majority of work.

Equipment is available which is more suitable for women, for example, lightweight ploughs, donkey drawn equipment and small weeding tools. Training courses and demonstrations should make sure that women are made aware of these options, and where such equipment may be obtained, and should assist women in making appropriate choices that take into account women’s access to draught power and their personal strengths and limitations.

4.3.2 Watering equipment

Irrigation schemes should be planned with the work involved in water application in mind. The application procedure and how it interacts with characteristics and obligations of the users is important as it affects health as well as crop production.

Sprinklers, siphons and buckets tend to be the most common types of watering equipment used for smallholder irrigation in Zimbabwe. The bucket method is hard work. It is usually women who use this method in the garden schemes, sometimes carrying over 50 buckets of water a day. Applying water from buckets is also not ideal for seedlings, as the force of the water can crush them. Similarly, water application from buckets tends to wash away fertilisers and manure. The women who work in garden schemes should be encouraged to experiment.

Sprinklers in smallholder irrigation schemes often fail or become less efficient with use. At present the users, who are mainly women, tend to improvise with stones and tape. When sprinklers fail both men and women lack knowledge and training. To sustain good sprinkler performance, women in particular need to be targeted with training to follow the correct procedures in maintenance and repair to sustain a good sprinkler performance on a daily basis.

4.3.3 Pumps

Many types of pump are utilised in smallholder irrigation schemes in Zimbabwe, from small transportable pumps to large in situ pumps.

Often in government-run schemes, DWD manages the pumps, employing pump attendants. They are not aware of the effect on crop production and therefore do not treat breakdowns as an emergency. There are often conflicts and communication difficulties between the farmers and DWD over spare parts and fuel delivery. Most communication difficulties stem from the institutional set up which is very top heavy and inaccessible to farmers, particularly women.

Generally, farmer-managed schemes have less bureaucracy and more motivation to set money aside for servicing and repairing pumps and therefore tend to be quicker in responding to breakdowns. However, as many schemes are getting older, irrigators may need to set aside more money than previously to cover increasing repair costs and possible replacement.

In emergency situations, where the Government is unable to deliver fuel, the farmers should be allowed to purchase their own and then reduce their payments to DWD accordingly. This should be an emergency procedure only.

It is widely held that electric powered pumps need fewer services than diesel ones (OD 143, Part 6), yet farmers on smallholder irrigation schemes are not often told the implications of the different pump types. If diesel pumps are not serviced regularly they are more likely to breakdown than electric pumps. Both diesel and electric pumps are often imported because of donor influence an finding spare parts for imported pumps is also a problem which farmers are not often told about. This has caused many problems including crop loss in many smallholder pumped irrigation schemes.

There is a need for both men and women farmers to receive training in attending to minor problems. The farmers to receive training should be carefully chosen. The community, taking into account availability, incentives and rewards, should select them. Women are less likely than men to leave the scheme and may therefore be preferred for training. Women also spend more time watering than men and tend to be more motivated to keep pumps running. The belief that pump minding is a man's job needs to be overcome.

Simple illustrated instructions in local languages should be prominently and permanently displayed adjacent to pumps. 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 concise and easily understandable terms before they can be expected to participate in design decisions.

The project has highlighted the risk of breakdown where pumps are used and suggests that pumps should be avoided through the use of well designed gravity-fed schemes. The initial costs involved with implementing a gravity scheme should not be directly compared with those of a pumped scheme. At the beginning, it may cost more to build a gravity scheme due to the longer distances of buried line or open canal, but in the long term when operating costs are taken into consideration the cost will probably be greater for pumped schemes. Where there is no other alternative to diesel pumping, the smallholders need to be aware of the full implications of the costs, both direct and indirect, so they are able to make informed choices. In relation to livelihood sustainability, irrigators on gravity fed schemes may in the long term be better off than those on pumped schemes as the former will only have to pay for water whereas the latter may have to pay for fuel and water. In the case of Chinyamatumwa, the farmers did not participate in design and so were unaware were unaware of the long-term implications and the possible effects on their livelihoods.

In newly proposed schemes, farmers should be encouraged to discuss the positive and negative affects of different pump choices and whether or not pumps are needed and can be sustained. Men and women may have different requirements that should be taken into account. The advantages of engines and pumps that

can be serviced locally with access to a wide range of spare parts and accessories should be emphasised. If farmers receive imported pumps, they must request as much information and detail as possible about the supplier and the availability and cost of spare parts.

5. CONCLUSIONS & RECOMMENDATIONS

5.1 Participation

Many farmers in smallholder irrigation schemes are not there by choice but as a consequence of various development programmes. It is partly for this reason that farmers in government-run schemes were not given opportunities to choose the irrigation design most appropriate to their agricultural, social, economic and cultural needs. The situation is different in schemes that are initiated by NGOs or private companies. They form better links with farmers, although they do not succeed in involving men and women equally. (Matshalaga, 1998)

- Levels of participation, in irrigation design and scheme management are affected by:
  - the institutions,
  - the attitudes of individuals within these institutions, and
  - the attitudes of the community members (both men and women)
- Participation is more effective in NGO or Private schemes
- Participation seldom involves all stakeholders
- Participation risks reinforcing established inequities
- Poor results from participation have strong negative effects

Recommendations:

- ***The positive lessons learnt from participation in private and NGO schemes should be used by governments, especially for increasing women's participation in decision-making and control of resources***
- ***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.***
- ***Information about the potential gains and problems that irrigation brings should be widely available so that farmers can enhance their knowledge.***
- ***The cost of knowledge transfer to farmers should funded when budgeting.***
- ***Participation should include both men and women; to ensure that women are considered, separate preliminary meetings are required and women's groups must be consulted.***
- ***Training of women in all aspects of irrigation is vital. Programmes should be on-site and flexible to meet the needs of women with domestic responsibilities.***
- ***The roles of men and women need to be investigated. Irrigation developers must recognise the importance of irrigators' livelihood strategies and gender-based needs.***
- ***Information must always be available in local languages***

5.2 Design and Management

Irrigation equipment in smallholder schemes in Zimbabwe has been found to have significant impacts on livelihoods, especially where imported pumps are used.

- Land preparation is a key issue for men and women. It is strongly affected by choice of layout and application method
- Pump use introduces increased risk
- Spare parts for imported pumps are scarce
- Attention to ergonomic aspects of equipment design can:
  - increase productivity,
  - reduce fatigue and
  - ameliorate gender disparities.
- Use of inappropriate technology can adversely affect health and income
- Poor crop choice results in marketing difficulties

Recommendations

- ***When designing a scheme, gravity-fed methods should be considered before pumps.***
- ***Low cost technologies should be promoted where possible***
- ***Although donated pumps maybe free of charge, local pumps should be considered as spare parts will be easier to find and maintenance will be easier to obtain.***
- ***Pump management, should be undertaken at scheme level to avoid delays that affect the farming process***
- ***Equipment should take account of personal capabilities to aid in ameliorating gender disparities and to prevent adverse health impacts***
- ***Farmers must participate in selection of crops***
- ***Involve men and women in developing appropriate technology that is affordable and accessible.***

5.3 Capacity Building and training

Women in smallholder irrigation generally have less access to training than men.

- Training coverage is poor
- Training is seldom demand-led
- Training is seldom gender-sensitive
- Interactive demonstrations are highly effective
- Farmer involvement in experiment builds confidence
- Gender awareness does not ensure capacity to address gender issues

Recommendations

- ***More demand-led, on-site training courses are needed.***
- ***Training courses should be timed to suit both men and women.***
- ***The use of lightweight equipment for women must be demonstrated.***
- ***Illustrated local language manuals should be made available on a wide variety of irrigation issues.***
- ***Posters presenting simple illustrated instructions should be prominently and permanently displayed adjacent to pumps.***
- ***Involve farmers in experiments***

- ***Gender awareness training should aim to reduce existing biases in labour and income distribution***

5.4 Sustainable Livelihoods

Some schemes have seen a reduction in poverty levels whereas others have not. A rise in poverty level is associated with unreliable irrigation facilities, which may result from poor infrastructure design, institutional arrangements or market conditions. For successful irrigation all these aspects need to function properly. This will be supported by continued access to advice from government or NGOs. If any of these functions are neglected, then the risk of failure increases.

- Smallholder irrigation can provide sustainable improvements in livelihood
- Where distribution of benefit is not linked to provision of resources, sustainability is threatened
- Women tend to be significantly under-rewarded
- Widespread support for a design can be more important for sustainability than technical perfection

Recommendations

- ***New technologies must be accompanied by support services and training***
- ***Adequate services should be in place for maintaining, operating and repairing technologies such as pumps, so that farmers are not left unable to irrigate.***
- ***Farmers should be encouraged to buy their own fuel in emergencies***
- ***Communication should be facilitated promoted between government departments and irrigators***
- ***Developers should maintain an holistic approach in considering issues***
- ***Consider restructuring the marketing process to reduce farmers' need to travel long distances***

6. REFERENCES

Chancellor, F (1997) Developing the skills and participation of women irrigators. Experiences from smallholder irrigation in Sub-Saharan Africa. HR Report, OD 135.

Emelda Berejena, Jim Ellis-Jones & N. Hasnip (1999). An assessment of the implications of pump breakdown and community participation in irrigation schemes, Masvingo Province, Zimbabwe. OD143, Part 5.

Neddy Matshalaga, (1998). Gender-Sensitive Irrigation Design. Consultation on gender issues in smallholder irrigation. OD143, Part 6.

Appendices

Appendix I

Gender-Sensitive Irrigation Design - Phase I Report to DFID, March 1998

Appendix 1 Gender-Sensitive Irrigation Design Phase I Report

1 Introduction

The Gender-sensitive Irrigation Design project is organised in two phases. Phase I identifies and prioritises the design issues which have important gender implications in the region. Phase II will be devoted to testing hypotheses that address the prioritised research issues. The recent Workshop in Masvingo marked the close of Phase I, which began in October 1997.

The participants in Phase I were:

- HR Wallingford, UK
- Silsoe Research Institute, UK
- Institute of Development Studies, University of Zimbabwe
- AGRITEX (Ministry of Agriculture), Zimbabwe
- Support and assistance has been given by CARE, Zimbabwe

Phase I activities were:

1 Identifying a representative sample of smallholder irrigation projects

From nine irrigation schemes visited and evaluated, five were selected for further investigation. The selection was based on criteria such as identification of gender issues, identification of potential for changes to take place, typifying smallholder irrigation types found in the region, accessibility for researchers, being representative of socio-economic rural groups and willingness to participate.

The final selection included schemes under the auspices of AGRITEX, CARE and Ministry of Cooperatives. Schemes included those where water was delivered by gravity flow and by pump and where supply was dam backed and came from groundwater. Application methods included flood, sprinkler and bucket and the scale of individual holdings ranged between garden plots of less than 0.005ha and commercially viable units of 1.5 ha.

2 Investigating gender roles in the projects through surveys and focus groups to identify potential research issues.

A primary identification of issues was facilitated by a random sample questionnaire carried out at the five selected schemes. In-depth focus groups discussed the issues identified, expanding and augmenting where relevant, to produce an understanding of the different gender issues that emerged from different irrigation situations. Detailed reports from the investigation can be found in the folder (N. Matshalaga, Nov 1997; F. Chancellor & N. Hasnip, Jan. 1998). The main findings are summarised in Section 2 of this note.

3 Investigating potential pilot interventions

At three of the schemes the team, in conjunction with the irrigators, identified issues where specific investigation or information could be agreed to promote further understanding of the gender issues in particular aspects of irrigation work. At one scheme, it was agreed that a demonstration of the correct use of existing equipment would help men and women to assess their equipment needs to achieve the desired ploughing depth. The intervention has led to a greater appreciation of the possible uses of different tools and equipment. At another site, farmers experiments succeeded in stimulating women to consider their equipment needs more critically. At the third site, an attempt was made to analyse and cost use of existing equipment. A detailed account of the interventions is in preparation.

4 Formulating and organising a workshop in which regional irrigation professionals participated in a prioritisation process

A Workshop was held in Masvingo, Zimbabwe from 10-12 February 1998. There were 20 participants including the research team, representatives from Zimbabwe, including AGRITEX, CARE and other DFID supported projects, and participants from South Africa, Zambia, Namibia and Tanzania. (A detailed list of participants and papers from the Workshop can be found in the folder).

The workshop aimed to:

- Identify issues from the Masvingo investigation
- Identify issues from the region
- Prioritise the issues identified
- Facilitate participation in region-wide research on the prioritised issues in Phase II

2 Findings from investigation and workshop

The issues that emerged from the preliminary investigation in Masvingo Province, Zimbabwe, illustrate the complexity of the gender disparities that occur in irrigated agriculture and the difficulty that arises in clearly identifying the impacts of these disparities on production or on the levels of poverty experienced by people of different gender. In all of the aspects mentioned below there were gender disparities evident.

- Irrigated agriculture is highly valued – men and women may place different values on it.
- The importance of land preparation and weeding and the associated benefits of deep ploughing on water use and weeding*
- Marketing difficulties – eg. access and transport is different for men and women*
- Use of unsatisfactory agricultural tools
- Lack of knowledge about hardware – such as pumps*
- Division of labour - often women do more than half the work but have less access to resources and to support services*
- Women are not often involved in decision-making*
- Importance of time scheduling (eg. water delivery, timing of training, information delivery and meeting times) and how irrigation planning influences the workload of women*

(* Subsequently confirmed at the workshop)

These findings formed that basis of discussion at the workshop alongside the contributions of the invited participants, which can be found in the workshop folder. These contributions were augmented by contributions from the participants, which will be circulated shortly.

The main findings from the workshop (in addition to the survey) are:

- Inappropriate design of equipment eg low-lift pumps
- Different crop preferences eg. men often prefer cash crops and women food crops
- Access to training and women's availability to attend training
- Access to information and the importance of having literature in local languages and use of pictures for illustrating important issues
- The success of women's clubs and their efficient use of money
- Improved irrigation leads to marginalisation of women farmers

2.1 Workshop priorities

The Workshop participants were divided into three groups of balanced interests to discuss: **farming factors, equipment factors** and **human factors**. The participants then reconvened to receive the group reports and reach a consensus on the cross-cutting issues. The participants agreed on nine critical issues. These nine issues were prioritised using both pair-wise priority ranking and urgency priority ranking methods. The top three issues were taken from each list and combined to produce agreed areas for future activities.

Table 1 Results of the two methods of priority ranking

Pair-wise priority ranking	**Urgency priority ranking**
Gender disparities	**Equipment and land preparation**
Marketing	**Gender disparities**
Access to resources	**Marketing**
Participation	Access to resources
Support services	Management and Institutions
Equipment and land preparation	Training
Indigenous Technical Knowledge	Indigenous Technical Knowledge
Training	Participation
Management and Institutions	Support Services

In moving forward from the findings of the Workshop, it was decided that identification of "gender disparity" is relevant to every activity proposed in the project and is not an issue in its own right. Participants had emphasised the need to flag the issue at national level in the spirit of promoting gender awareness. It was therefore agreed that the three main areas for future activities should be:

- Marketing
- Access to resources
- Equipment and land preparation (including indigenous technical knowledge)[1]

2.2 Marketing

Although there is much evidence showing that marketing is a widespread agricultural problem, the investigations carried out in Phase I confirm that there are gender disparities in marketing which need to be addressed.

Although transporting produce to potential markets can be a major problem for both women and men, women tend to find it more difficult. In many cases where vehicles are available, males tend to have greater access to them, leaving the women to carry produce on foot or to wait for infrequent buses.

Women have more problems with sourcing markets than men, partly because they tend to be responsible for marketing small quantities of vegetables, for which contracts are not usually sought and partly because they have more social difficulty in travelling away from the homestead. Many farmer committees (both men and women) stressed that they would appreciate training in marketing, especially how to source for potential markets.

Competition when markets are flooded with produce reduces prices and leads to produce remaining unsold. Farmers, who have less access to extension advice, commonly bear more losses and these are often women.

[1] The participants agreed that Indigenous Technical Knowledge is very strongly linked with equipment and land preparation and thus should be treated as one issue

The papers from South Africa (Oral presentation – Chris Stimie) and Tanzania (R. A. D. Kweka, 1997) also stressed that the lack of well-defined markets is a major problem for most small-scale farmers and that adequate crop marketing strategies are needed. One participant pinpointed a problem in that in the rural communities women are unaware of "marketing" as a concept and see only a problem in selling which limits their ability to address the problems they face.

2.3 Access to resources

Throughout the region land tenure arrangements favour men. Women landholders are often widows whose access to other resources is limited. However, for many irrigators in the region land ownership is not an option and access to user rights is the central issue.

In Zimbabwe in communal areas, user rights are commonly dispensed by the state through its agencies or departments or by traditional leaders or chiefs. In such systems the area of land controlled by women is generally less than that controlled by men, although barriers to women in obtaining user rights are not necessarily formal or even recognised as existing. Where women's ownership is promoted there are positive impacts for productivity, also experienced in Tanzania (see contribution from R. A. D. Kweka, 1997).

Access to water is closely linked to land rights, but rights to land do not necessarily confer access to water. The geographic position of the plot influences water delivery (N. Matshalaga, 1997, page 27) as do social and cultural pressures, for example treadle pumps in Zambia (contribution from D. Moono, 1998) or physical restrictions such as individual strength (contribution from D O'Neill). Operational requirements of the system in terms of timing and duration also influence the individual irrigator's access to water. For example, domestic obligations of women and stock-keeping activities of men, may restrict their access to water at certain times of the day. Clearly these factors should be taken into account to ensure that neither group suffers unduly.

The ability of the irrigators to pay for the inputs themselves, the transport costs and the logistics of field application are crucial. Women have restricted access where there are social and economic constraints to their reaching distribution points. Collateral links credit availability to land tenure. The attitude of banks to women borrowers is unsympathetic. Physical access to lending institutions (often in distant towns) is poor.

Energy has to be purchased, either as electricity or fossil fuel or as work by draught animals or hired labour. Use of purchased energy implies prior purchase of capital equipment such as pumps and ploughs. Women on their own and elderly men and women, due to weak finances and control of other assets, may have poor bargaining power and pay excessively for such services and equipment or receive a lower level of service.

2.4 Equipment and land preparation

The preliminary investigation and the Workshop raised several issues regarding the hardware and mechanical inputs used by small-scale irrigators. Most prominent in the investigation were the importance and difficulties of land preparation (Chancellor and Hasnip, 1998), particularly in achieving a good depth of ploughing (eg c 150 mm [N. Matshalaga, 1997], but depending on soil type). Shallow ploughing was believed to be responsible for less efficient use of water and greater weeding demand. The main benefit of deep ploughing was the greater penetration of water and, thus, reduced run-off and less frequent demand in the scheduling cycle. The project was able to address this by organising a demonstration on the setting and operation of (animal-drawn) ploughs, which the recipient farmers (at Mushandike) found most helpful. They had been unaware of the significance of the design features on ploughs and they believed that the demonstration and practical experience gained would enable them to plough deeper, faster and with less strenuous demands on both themselves and their animals (field visit 6 Feb 1998). This was felt to be particularly helpful for women and farmers with donkeys.

The most prominent issue to emerge through the Workshop (also supported by the findings of the preliminary investigation) was the inappropriate design of pumps, be they human- or engine-powered. Other pieces of equipment and tools were also considered to be of unsatisfactory design, particularly for use by women. The problems of women operating low-lift pumps were described by D. Moono (1998) and, more generally, women's difficulties in dealing with minor breakdowns of engine-powered equipment were reported by Stimie (oral presentation, South Africa) and our investigation (N. Matshalaga, 1997). Many reasons (mainly cultural) were given, such as male dominance, lack of confidence, unavailability of training. Inappropriate selection of pumps, often in donor projects, because of unavailability of spares and technical knowledge were reported in 3 of the 5 of the participating schemes in Zimbabwe (Chinyamatumwa, Longdale, Rufaro).

The generally unsatisfactory status of tools and equipment can be succinctly summarised by quoting from Kweka: "Access to improved technologies is a right for men and women. The problem of women's workload can be minimised by the introduction of appropriate technology which will reduce working hours on the farm as well as simplifying the work" (R. A. D. Kweka, 1997). An important aspect that emerged in the workshop discussions was that opportunities to build on indigenous technical knowledge were often missed because women who hold that knowledge lack confidence in the value of what they know.

3 Discussion and conclusions

Although it is well known that addressing gender disparities in agriculture contributes to reducing poverty, the differences between the needs of men and women are often ignored or wrongly identified by irrigation designers. It is important that these gender disparities are recognised so that they can be considered in the participatory design process. Phase I identified several issues including:

Participation

Throughout the region there are social and cultural constraints, which result in women participating less in formal consultation on irrigation development than men. Research to evaluate methods of increasing female participation is in progress in Tanzania, detailed in "Women in Smallholder Irrigation in Tanzania" (R. A. D. Kweka, 1997). Formulation of the new Water Law in South Africa acknowledges the need to formally recognise women's rights in relation to allocation and use of water. The Workshop confirmed the need for widespread evaluation of the impact of women's participation on productivity and sustainability.

Infrastructure

Participants agreed that care should be taken to select irrigation infrastructure that enables both men and women to develop their preferred irrigated agribusiness. This implies that flexibility is given a high priority. For example, design for long furrows determines the need for engine or animal-powered land preparation, which may restrict women's opportunity to cultivate. In addition, long furrows do not readily permit different watering regimes for the different crops preferred by men and women. This constraint to diversification reduces sustainability (Experience of South Africa – Chris Stimie).

Organisations and Institutions

The links between organisations and irrigators are often heavily influenced by social and cultural conventions. The problems faced by men and women irrigators are therefore likely to be different. These differences must be taken into account in setting up crucial lines of communication, particularly those that relate to ensuring water delivery. The Chinyamatumwa case study illustrated that women's access to town restricted their ability to interact with the Ministry that controlled their water supply, with the result that their crop suffered and water use was ineffective (N. Matshalaga, 1997; Chancellor and Hasnip, 1997).

Tools and equipment

In Zambia the use of treadle pumps has been particularly targeted to women to promote their control of irrigation water. Men find the ungainly activity of their wives unacceptable while the wives find the

physical strain unacceptable. The pumps are regarded to be unsuitable to meet the objective. Unreliable pumps cause problems where the operational skills of either men or women are poor and where repair services is restricted for financial or social reasons.

Hand tools used in rainfed cultivation may be inappropriate in the irrigation context either because the gender of the user is different or because the task is different. For example (1) available hoes are unsuitable for use in close planted vegetable gardens, (2) often more physical strength than women can provide is needed – such as for moving long sprinkler pipes. These mismatches reduce productivity and increase energy requirements.

Training

Training is often less accessible to women than to men for a variety of social and temporal reasons. The importance of providing training, at times and places suitable for the trainee, was agreed. Providing training in the local idiom and the provision of training materials, manuals etc accessible to all users is thought to have a potentially large positive impact. emphasise

Suggested hypotheses:

I. The use of labour is of equal importance to the use of water.
II. Purchased inputs such as herbicides when used as a substitute for labour can raise profitability.
III. Alternative tillage techniques (eg ripping, mulching) can reduce or ameliorate (eg by reducing bottlenecks) overall labour demand.
IV. Gender-based Associations can operate constructively to raise scheme productivity / profitability.
V. Design factors to facilitate women's use of equipment can be identified.
VI. Lack of Standards and effective guidelines limit system performance / productivity / profitability.
VII. Taking into account age and gender variables influences sustainability.
VIII. Adopting an ergonomics approach to design will increase the extent to which the needs of both men and women are met.
IX. Participation based on work contribution can contribute to reduction of existing gender biases.
X. Attention to gender aspects of marketing for small-scale producers can improve the profitability of schemes and the livelihoods of individuals (i.e. reduce poverty).

4 Phase II Activities

In assessing the feasibility of research to support or refute the hypotheses, it must be borne in mind that some changes will be technically feasible, whereas others may take time, for example if a change of policy or law is necessary.

Zimbabwe

The question of appropriate pumps is of particular interest in Zimbabwe where a number of existing schemes rely on pumps which the farmers have a limited capacity to maintain and repair. Selection of the pump has in the past been heavily influenced by donor policy and has resulted in long term difficulties. There are two issues to be addressed. What are the criteria farmers and professionals should apply when selecting hardware? How can both men and women farmers access information about available technology and training and how are they motivated to do so? Hypotheses i, v, vi, and vii would be addressed in this context.

A second major concern is the gender aspects of land preparation. The long-furrow system, common in many existing smallholder schemes, has gender implications, which may support either government or donor policy objectives for rural women. Hypotheses viii and ix could be investigated in this context. Although, individuals within AGRITEX show interest in these problems, in the team's estimation there is doubt about the level of commitment to gender issues at policy level. Before proceeding with a detailed proposal for Phase II in Zimbabwe, we therefore wish to take advice from DFID, Harare, as to how the research could be linked to other DFID funded work in progress in Zimbabwe, such as the Small Dams Rehabilitation Project, to produce the best use of resources and opportunity

South Africa
The Ministry of Agriculture in Northern Province is in the process of compiling an inventory of some 170 smallholder schemes. Mainly sited in the former homelands of Lebowa, Venda and Gazankulu remarkably little is know about the schemes, their design, operational status, agricultural performance and impact on local economies. Some eleven have been selected for more detailed appraisal and it is planned to select two or three of these for development/improvement. At the same time DFID are supporting a programme of improvement in rural support services in the province. Our research partners in the Institute of Agricultural Engineering (ILI) have undertaken to link the Gender-sensitive Design Research with these on-going programmes. The intention is to use the current investigative work in the Province to identify sites that will allow us to use matched pairs of schemes, preferably one pair of "food plot or garden scheme" and one pair of smallholder, commercial schemes. Introduction of participation towards gender-sensitive design in one of each pair would be initiated to test hypotheses iv, vii and viii.

It is expected that research can begin in August/September of this year when the inventory and preliminary investigations should be complete.

Zambia/ Namibia
The issues surrounding the introduction of treadle-pumps were clearly brought out in Mr. Moono's paper (D. Moono, 1998). Further investigation of how participatory design can incorporate the physical and social needs of communities as well as production needs is recommended. The questions raised in hypotheses i, vii and viii should be answered. We await further details of proposals from Zambia and expect to be able to initiate work during the second quarter of 1998/9.

Regional
Hypotheses viii, ix and x will be addressed in all locations as these issues are fundamental to both irrigation scheme sustainability and profitability as well as impact on poverty alleviation.

5 Phase II Funding

The Workshop highlighted a greater range of issues than was envisaged in the original proposal and has clearly illustrated that professionals in the region accord high priority to dealing with the gender aspects in mainstream smallholder irrigation development. As detailed plans unfold it is increasingly evident that the amount of research time required to address the priority issues exceeds the original estimate. We would like to take the opportunity to flag the need for additional funds so that as detailed proposals become available in a few weeks time, adjustments can be made to the original estimate.

Appendix II

Scheme Descriptions

Mushandike Irrigation Scheme

AGRITEX developed Mushandike in the 1980s as a smallholder commercial irrigation scheme. It is approximately 20km from Masvingo and utilises water from Mushandike dam to irrigate some 400ha, which is divided into three blocks each serving a number of villages. Water is distributed in surface channels and applied to the fields using siphons. The farmers are responsible for organising their irrigation turns along the channel and for maintaining the channels. There are around 250 plot holders and the average plot size is around 1.5ha. Originally intended to grow cotton, maize and wheat there has been considerable diversification in response to changes in market prices. Although these crops are still grown there is considerable commitment to growing vegetables. Tomatoes are grown under contract with Cairns of Mutare and cotton is grown for the Cotton Company of Zimbabwe (COTCO). Both crops are collected from the site, as there is a very good tarmac road very close to the scheme. The scheme is managed by AGRITEX with the help of an irrigation management committee. The farmer management committee reports to the irrigation management committee.

The main issues at this scheme are:

- Land levelling and land preparation equipment
- Lack of communication between farmers and Department for Water Development over the large outstanding water bill
- Lack of training in the use of contracts and communication skills
- Selling/marketing crops such as wheat, beans and paprika

Chinyamatumwa Irrigation Scheme

The Chinyamatumwa irrigation scheme is located in Bikita District of Masvingo Province. It was initiated in 1992 on completion of Chinyamatumwa dam. Families displaced from their fields and homes by the dam and irrigation lands no longer have dryland plots and practice full time irrigation on larger plots (1.2ha), while others who participate in the project have smaller plots. The scheme is approximately 34ha of irrigated land and comprises two blocks. The plots range in size from 0.1 to 1.2ha. There are 128 participants (70 female, 58 male) who have lifelong tenancy of the plots. Water is pumped from the main dam to the night storage dam and distributed through a lined canal to the fields by gravity. Generally the irrigated land is prepared as long furrows. Water is applied to the furrows by syphons and the crops are planted on the ridges. All lands are ploughed by oxen or by donkeys, although most farmers, especially women, have to pay to hire animals and labour, as they do not have their own draught power.

There are two agencies involved. The Department of Water Development is responsible for the main dam, the two diesel pumps imported from Japan and the pump attendants, and AGRITEX is responsible for the night storage dam, distribution system within the fields and agricultural extension. The two diesel pumps, supplied by the Ministry of Water were imported from Japan. The farmers committee consists of five men and two women. There is also a marketing sub-committee of four men and one woman. Farmers are unable to obtain loans for inputs and therefore fertiliser application rates remain low. Nonetheless, farmers can grow up to three crops in a year, alternating between maize, wheat, beans, tomatoes and other vegetables. The extension worker has a demonstration plot, where correct procedures for ploughing are demonstrated.

Marketing is difficult due to location, lack of transport and poor quality access road. The lack of fencing at this scheme allows goats belonging to people outside the scheme to eat the irrigated produce.

The farmers experience many problems relating to pump breakdowns and the frequent lack of diesel delivery by DWD. Often the pump breaks down at a critical time for the crops risking crop loss. Because it is often difficult to find spare parts as a result of the pumps being imported a vicious circle tends to set in.

The main issues at this scheme are:

- Pump repair and maintenance
- Reliability of fuel delivery
- Poor communication
- Lack of training in marketing
- Transport and marketing difficulties
- Difficulties faced by female household heads in meeting deadlines for land preparation and planting

Rupike Irrigation Scheme

Rupike irrigation scheme was initially established and managed by Rio Tinto but is now managed by farmers with support from AGRITEX. AGRITEX propose the cropping programme and have demonstration plots for fertiliser trials. The scheme is 100ha, subdivided into 200 plots (women manage 150 of these plots as their husbands are away), each 0.5ha in size organised in five blocks. At present there are three extension workers, two pump attendants employed by DWD, one full time treasurer paid by the farmers, one welder and a tractor driver. The scheme has a pump house, which contains four Ecanorm 80-250 pumps connected to 60hp motors. On maximum demand three pumps are used delivering 128l/second to 600 overhead sprays. One pump is kept in reserve. Water is taken from Tugwane dam, which has a capacity of 3200m^3 10^3. The scheme has a pipeline system consisting of 17km main pipe and 10km of PVC pipes to laterally feed water to the plots. Each plot has three water outlets, which connect a 1" rubber hose supplying a moveable overhead spray. Infrastructure at the schemes includes an office block, two lecture theatres (where training is carried out), a workshop, a tools/spares store, storage space for grain and produce and nine houses. In 1990 there were only 20 farmers on the scheme, but this rose to 200 by 1993. Rio Tinto initially paid the bills, until the farmers could afford to start paying themselves. Each of the five blocks has a block committee with 7 members. The block chairman for each block attends meetings of the main Scheme management committee to report any problems that have arisen at block committee meetings, which are held once a week. Since hand over by Rio Tinto, farmers have had to pay for servicing and maintenance of the pumps. The farmers pay Z$510/season for each 0.5 ha to the scheme committee for services such as electricity, the welder, tractor driver and for maintenance of the pumps. The treasurer is in charge of banking this money. Rio Tinto assist in obtaining parts for the pumps and other pieces of equipment when necessary.

There is a marketing committee; one man and one woman, to which the farmers pay a percentage from every 1kg sold to raise money for sourcing markets. The marketing committee expenses are paid but they receive no salary. There are byelaws to make sure that everyone attends training courses, although topics covered are demand driven so attendance is not normally a problem.

This scheme is currently well run and organised, although farmers may experience problems in the future if they have to start paying for water. Also, the infrastructure such as hoses and sprinklers are now ageing and may soon need replacing.

The main issues at this scheme are:
The poor quality of the access roads and lack of transport causing problems for marketing
Women experience problems with repairing & maintaining sprinklers and hoses

Longdale Irrigation Scheme

Longdale was a Danida/AGRITEX venture started in 1993. It is situated close to the main road from Bietbridge to Masvingo. The scheme was originally to consist of two blocks, but a shortage of water resulted in only one 8ha block being developed for 15 farmers, each with 0.5ha. The remaining 0.5ha plot, was initially used as a demonstration plot, but is now a co-operative, so that the farmers as a group can sell the produce from this plot and use the money to supplement their electricity bills. The water comes from a borehole and is delivered through a sprinkler system using a 15HP electric pump, which was supplied by DANIDA. As the pump was a direct donation, the farmers were not involved in choosing the pump, or in

financing it. Two farmers are employed by the group to operate the pump (basically just starting and stopping the pump). These are paid a small fee of Z$100 each for a 3 month period, and tend to be men, as the women feel that it is not safe in winter to turn the pump off late at night. The pump has broken down a few times recently, and as a result of it being an imported pump, the farmers have experienced problems in trying to locate parts – even a small rubber seal took three months to be reconditioned.

Electricity costs are high to run the pump - approximately 160 to 2500$/month. The farmers have a bank account, into which they all contribute Z$160 month. This money is for electricity bills, but is also used to repair any pump breakdowns. If at the time of a pump breakdown there is no money in this account, then the farmers all contribute to the repair costs. Watering by sprinkler involves moving the unit, including 35 m of flexible hose, once per day. Watering takes place for 12 hours/day on 4 days/week.

There are 12 men and 3 women plotholders in the group. Most of the men work in nearby Masvingo and women do much of the work. The women are perceived to be good at attending meetings and the committee consists of six women and one man. The women do a lot of the decision making.. The main crops are maize, cabbage and tomato and marketing is not a major problem, however, September and October are difficult due to the glut of vegetables on the market. Originally people were confident about maize growing but were attracted to vegetables by the evident success of an ARDA farm nearby. Generally, vendors come to the scheme and from November onwards, green-mealies are sold on the roadside. Vegetables are preferred because the cash flow is more consistent, whereas maize is characterised by a five-month wait for cash return (longer if it goes to GMB). There is a marketing committee for the scheme, which consists of two people. The role of this committee is to go out and look for markets. There used to be one man and one women but the woman resigned. The women tend to be reluctant to go out and search for markets. It is difficult for women to negotiate contracts.

Both men and women do land preparation. Ox-ploughs and tractors can be hired and are generally used by men, the women following behind with the levelling hoe. Women weed, water and are responsible for roadside marketing. Weeding is labour demanding and people need to hire. This is usually done for payment in kind and there is plenty of willing labour to be had. Men take part in marketing too, finding contracts from Masvingo. They are reckoned to be better able to bargain as they are more familiar with the town conditions and another journey is not needed. Farmers at this scheme were feeling the effects of increased competition when selling vegetables.

The main issues at this scheme are:

- Reliability of pump, access to spare parts and cost of repairs
- Lost incomes due to pump failure
- Lack of training in simple trouble shooting and servicing of the pump
- Lack of training in selling and drawing up contracts
- Cropping calendar does not take account of women's needs and workloads

Rufaro Irrigation Scheme

The irrigation scheme is a co-operative venture dating back to 1985. It is situated close to Masvingo town and accessed by a dirt road. The people on this scheme originate from the Bikita area and came here for settlement. There were around 110 members comprising 52 families originally. However, the co-operative idea never worked well, and production improved when they abandoned the truly co-operative model and sub-divided the land, allocating 1ha of dry land and a number of rows of each irrigated plot to each member. Nowadays the scheme comprises a group of more or less private farmers although they maintain a co-operative effort in relation to common resources such as the irrigation water, tractor services and pump upkeep. The remaining 24 families still have difficulty with some of the co-operative aspects.

Water is obtained from the ground using electric pumps. The water is stored in a rehabilitated farm reservoir. None of the six electric pumps are in operation and so water is restricted. The cost of repair is around 14,000Z$/pump and to invest in new electric pumps they would have to be able to raise over

100,000$ credit. Subsequent to the failure for all six of the original pumps they took a loan and purchased two Mono diesel pumps for which spares and service could be obtained. The diesel pumps cannot fill the dam so water flows directly out again to the field channels. As a result watering the fields is slow and difficult. In the course of the project it was discovered that spares and service for the original pumps could have been obtained from South Africa. However, the farmers had no knowledge of where to go to get that sort of information, had no hand books on routine maintenance or trouble shooting.

At Rufao, the focus group discussions undertaken during Phase I revealed that there was considerable importance attached to the tractor. Discussion on subsequent visits showed, however, that men and women did not agree about the best use of the tractor when it was working. Women complained that the tractor was taken off to do errands in Masvingo when it might be more productive working on the land. Women regarded the tractor as crucial to their irrigated farming efforts because for those who were household heads, tractor ploughing was a benefit, saving them the hard work of ploughing with cattle or donkeys. In addition, to plough by tractor, because it was timely, allowed them to plant on time to get the best advantage of available rain. The deeper plough achieved with the tractor reduced the labour involved in weeding. The project suggested that better management of the tractor could improve results from irrigation.

However they also prioritise credit for pumps and cannot decide which of these is more important. It was apparent at this scheme that the men and women do not have a consistent view.

The main issues at this scheme are:

- Priorities for tractor use
- Budgeting tractor costs
- Lack of knowledge and support services

Chikava Garden Scheme

Chikava is a garden scheme run by the non-governmental organisation - CARE Masvingo, as part of the CARE Small Dams rehabilitation programme. The women originally got the idea of a garden from a neighbouring CARE scheme and the land for the garden was given to the women by the Kraal head in an attempt to boost the nutritional status of the families in the area by encouraging vegetable production. The dam was fenced and rehabilitated by Catholic Aid. Now a gravity-flow pipeline delivers water to the vegetable garden. The three-hectare garden is fenced and contains a series of open troughs, which run the length of the garden and allow participants to water the intervening beds by bucket. Construction finished in 1997, and also includes two pit latrines.

The 92 participants, who are all women, were very enthusiastic and participated in all the construction and planning activities. Each woman has ten vegetable beds and there are also a number of communal beds, from which the proceeds go into an educational fund. The women also hope to sell produce, although as the village is quite remote they are not in the habit of visiting Masvingo, instead they barter with local non-irrigators. Equipment in the scheme is in short supply, and even providing each woman with a bucket is a problem. There is an irrigation committee of seven women consisting of the office bearers and four members, one of whom is entitled the ‘police’ member.

Having come together to organise the garden, the women have organised a playgroup for the children, this allows women some time to work at the garden without the small children. Establishment of playgroups and nursery education near the garden is likely to produce lasting benefits for children as well as benefiting the mothers. The coming of the garden seems to have increased the community’s activities. Irrigation has given the women a social activity as well as a productive one and they appear to be confident and interested in trying out new ideas.

The main issues at this scheme are:

- Equipment not satisfactory – such as equipment for transferring water from troughs to gardens and also equipment for preparing the land and weeding
- Marketing – lack of strong demand in the area
- Lack of transport to source markets and to reach larger markets

Lowlands Irrigation Scheme

The Lowland settlement scheme in Gutu District was initially set up in 1985. Danida came in as a donor to promote irrigation in 1994. There are 18 families in the village, but three opted out of the irrigation scheme and farm dryland only. Each family has about 5 ha arable rainfed land and a very large shared area (1180ha) for grazing. The scheme has fifteen 0.5ha plots on fairly sandy soils. There are 13 men and 2 women plotholders and the committee consists of 1 woman and 6 men. The non-irrigating families are now keen to get an irrigated plot and the existing irrigators are keen to accept them. There might be potential to irrigate additional small plots within the perimeter without incurring additional fencing costs. Plots are divided into two halves and at the end of every half plot the farmers plant vegetables and tomatoes. Rotation is used to promote frequent harvest. The main crops grown in the scheme are maize, wheat, beans, vegetables and tomatoes. The AGRITEX extensionist works out a cropping programme, which he discusses with the plot holders. The farmers all meet once every two weeks with the extension worker. There seemed to be some doubt about how well this works out in practice. There are four women who have plots on their own. These women find it hard to make enough money to pay the irrigation committee the Z$400 every season

There are 3 Lister diesel pumps, of which only one is in operation at any one time (the remaining two are kept in storage). The farmers' pay for any repairs to the pump and each contribute Z$400 to the committee after each season. This money is then used to pay for diesel (apparently only for the main crops, not for the women's vegetables) and repairs to the pump. Enough diesel for 4 seasons is bought at one time, which costs Z$15,000. There are two 3400 litre tanks, which were donated by DANIDA.

The men operate the pump in shifts, two at a time in rotation. Two children have also been trained in pump operation. The pump is used from 7am to 4pm Monday to Saturday. Each farmer has three sprinklers and three 32m hoses. The performance of the sprinklers appeared to be poor, pressure was weak in places giving very uneven distribution of water. The women complained that the sprinklers have never functioned properly. The sprinkler heads pose a particular problem for women, they are very inefficient and always breakdown. The women have never been shown how to repair them, but have developed their own methods. The pump is also a problem for both men and women, it often breaks down and the farmers have never received training in simple trouble shooting and repair.

People come to the scheme to buy produce, some farmers encourage 'pick your own' as this reduces their labour costs. Other times it is hard for the plot holders to sell their produce due to the lack of transport and the bad road. Farmers at this scheme find it very difficult to sell wheat – it was suggested that perhaps some change to the cropping calendar could help overcome this problem.

Farmers perceive fencing to be a great problem – as the farmers have difficulty keeping the cattle out of the irrigated area. Women's part in livestock control appears to reduce the time they have for intensive irrigation work.

The main issues at this scheme are:

- Poorly managed sprinklers
- Lack of training in pump repairs and trouble shooting
- Marketing and contract difficulties, particularly wheat
- Poor access and poor quality roads
- Lack of fencing – time is wasted keeping animals away from crops
- Women's high diesel costs for irrigating vegetables
- Women's workload (stock control and irrigation labour)

Mubvute Irrigation Scheme

The irrigation scheme, in Zaka District, is 65ha in size, with 150 farmers of whom 70 are women. Fifteen women are widows but approximately 25 households are effectively female-headed. Landowners displaced by the building of the dam and the quarry each received compensation and 4 x 0.2ha plots, whereas those displaced by the irrigation scheme received only the four plots but no compensation. This may lead to conflict in the future.

The scheme consists of a dam, two night storage reservoirs and concrete irrigation channels. Two Japanese pumps owned and operated by DWD employees will pump water from the dam to the Night Storage Dam. The dam was built by DWD in 1993 and filled in 1996. There are three pump minders who will be in charge of operating the two pumps, filling the night storage dams, controlling the water going into the channels and reporting any faults. The pump minders each received five months training on how to operate the pumps and the engines. To date, the pumps and engines have only been used during construction of the canals and the night storage dams. The dam was built by hand, and the workers received Z$27/day, but the farmers had no idea about the costs and appeared not to have investigated this aspect. The farmers have not been told anything about the characteristics and capacities of the pumps or engines and do not have access to the pump house.

There is an irrigation committee with six members, three men and three women. Everyone had to pay to be a member of the irrigation scheme. The locals paid Z$11 and the outsiders paid Z$100. At present there is no account in which to keep this money, but there are plans to open one. The irrigation committee is to be responsible for listening to the farmers' views and problems and trying to help them with any problems that may arise.

The basic plot size is 0.2ha. Those farmers who were completely displaced due to the irrigation scheme were each allocated 4 x 0.2ha plots, the younger individuals from the area - 2 x 0.2ha and those who came from outside the scheme area each received just 0.2ha. Those farmers who have more than one plot do not have four plots in the same area. Instead they are scattered around for equality reasons (soil, slope etc). Each farmer has three siphons, which will be used to supply the crops with water from the canals. Each plot holder is responsible for his/her own fertilisers and seeds. Money is given up front to the treasurer, so that he can put in one order, which is then delivered to the scheme and distributed according to the contributions. Delivery is important to the farmers who mostly have limited access to transport.

This irrigation scheme has not yet been commissioned so achieved poor yields. All the land had been ploughed at the time of our visit (Aug 1998) in expectation of irrigation commencing in July/August. Land preparation is done using hired tractors. It costs Z$80 to plough 0.2ha and Z$60 to ridge 0.2ha. (Daily wage rates are around S28/day). Farmers are concerned at the amount of additional work that will be required when irrigation finally gets underway. Unfortunately the farmers had already paid for both ploughing and ridging to be done before DWD informed them that they would not receive any diesel supplies. The plot holders had also bought seed and fertiliser, which is presently stored on site waiting until diesel is delivered and irrigation can commence.

Although the plot holders own a lot of cattle, these are nearly all female (80%) as people are trying to build up the herd since they lost most of their cattle during the 1992 drought. Female cattle are not normally used to plough, so there is a lack of animals to plough. Only 30 plot holders out of the 150 have their own draught power. There is a 10ha irrigation scheme only 10km away and farmers from this scheme travel to Mubvute with their tractors to plough on a hire basis.

The maintenance of the irrigation channels will be the farmers' responsibility. Each farmer is responsible for the canals next to his/her plots. Siphons which have initially been provided by AGRITEX but when these have to be replaced will have to be replaced at a cost of around Z$34 each, the farmers will have to pay. When water is released into the canals from the night storage dam, the farmers will water according to a schedule drawn up by the extension worker, allowing around 15 siphons in action at one time.

The farmers at Mubvute were very disheartened by the current situation. They feel that they would be better off if they had continued with dryland farming. They even planted dryland crops on the scheme but slashed them down when they were promised irrigation water.

At the time of our visit – the main issues at this scheme were:

- Lack of fuel and hence irrigation water
- Poor communication with DWD
- Farmers were becoming poorer and livelihoods were suffering

These issues may have changed if subsequent to our visit the farmers received fuel and were able to commence irrigation

Nyamai Garden Scheme

CARE began working on this garden scheme in October 1997 and in January 1998 began visiting the farmers (inception stage). CARE will be involved in the project for four years, after which it is hoped that the farmers will have enough experience to carry on without the aid of CARE.

The size of the individual plots will be decided after the register is closed. Local people are all invited to register. If they work during the initial stages (eg building the dam wall or digging the gardens) then it is free to register, if they don't work than they will have to pay to register). At present three committees have been formed; the dam committee, irrigation committee and agronomy committee (marketing). Both men and women serve on the committees, each of which has 7 members. Since July 1998, every plot holder who has registered has to contribute Z$10 a month into a joint account which will be used to buy inputs when the garden begins operating. The account is held at CABS (Central African Building Society). The garden will be gravity fed from the dam and so there will not be a pump.

The farmers will grow vegetables on the plots all year round. The AGRITEX Extension Worker will instruct the farmers on appropriate cropping calendars. The farmers all have an average of 2ha of dryland, where they will continue to grow maize, sorghum, millet and groundnuts. CARE also plans to encourage the farmers to have orchards in the catchment area to try and prevent some of the soil erosion that has been taking place in the catchment. The farmers will then use the vegetables and fruit to feed their families, only the excess will be sold.

Benzi Garden Scheme (1996 CARD garden and 1991 Gardens)

Benzy dam, built in 1964 has only dried out once, in 1992, after which it took only one week to refill on next good rains. The source of water seems to be fairly reliable. There are three gardens at Benzi, two of which started in 1991 down-stream of the dam, and the third which began up-stream in 1996 and became operational in 1998, supported by (CARD) Communal Area Rural Development

1996, CARD Garden (up-stream garden)
Farmers contributed labour but made no financial contribution to the borehole and hand pump, which provide water to the 1996 Garden. The borehole is situated immediately adjacent to the garden. Fifty families can take water from this borehole. Each family needs to have contributed to construction to qualify to use the water. The size of the garden was limited by the cost of fencing. The Kraal head allocated the land to be developed into a garden. Each family has five 2x10 beds, on which most of the work is done by the women. Six to ten buckets of water are needed for each bed so women carry up to fifty buckets of water on each occasion. Watering is done on alternate days, starting at 5am and finishing around 9am. Women did say that it was difficult to find time to do all the garden work. Advice is given to the gardeners by an AGRITEX worker, who helps with crop choice decisions (alongside the Kraal head), sprays and advice on watering and fertiliser. Manure is used, as chemical fertiliser is too costly. The vegetables grown are primarily for home consumption and the remainder to be sold. Rape, cabbage, tomatoes and onions are grown.

1991 Gardens
Family consumption and sales seemed to be about 50/50. The villagers made these gardens in 1991. There were no restrictions as to who could have a plot and 65 people had plots on the first garden and probably about another 50 have plots on the second. Vegetables are sold locally. In the kale growing period, small bunches of leaves are sold bringing in about 30 $ /week. The women control the money from the garden and are able to buy soap or additional foods, maybe occasionally meat.

The gardens are about 200 to 300 metres from the dam so that women spend longer watering their garden than those using the bore-hole. They use only buckets and have no watering cans. When it comes to the dry land cultivation season, October to March, everyone leaves the garden to work in the fields despite recognising that sale of vegetables in this period could be particularly profitable. The gardens are virtually unused during this period as the women also work in the dryland.

The new CARE scheme is going to rehabilitate the dam, raising it by one metre and extending the arms to enclose more water, conserve the catchment, build fanya juu (infiltration pits), build cattle troughs and a laundry and create more gardens. The immediate dam area will be fenced to keep cattle out. Conservation of eroded areas has begun in the catchment, tree planting and fencing a new garden will start soon.

The main issues at this scheme are:
- Women's heavy workload
- Under use of reliably available water

Chemombe Garden Scheme
Chemombe is a small garden scheme with 1.5 ha under irrigation facilitated by CARE under their small dam rehabilitatio project. The scheme has been operational for two years. Sixty-three households have plots in the garden Each individual has 18 beds in the garden (each 1m x 5m). AGRITEX provides guidance on crop choice. The women mainly grow green maize in the summer season and then rape, cabbages and tomatoes in the winter. They have no problems selling the crops as communal farmers from the area come to the garden and place their orders.

A small mobile 5 HP Kingfisher diesel pump was supplied by local dealers with training provided by the supplier to two local residents, both men, despite the fact that all the users are women. One man has subsequently left the area and no follow-up training has been provided, since pump delivery two years previously. The pump minder is a well-respected elderly man, who keeps the pump at his homestead, when not in use. The pump minder has ultimate responsibility for pump operation, including diesel purchase and maintenance, although he does this in conjunction with irrigation users. He is also responsible for transport to and from the dam, some 2 kilometres from its point of use. The farmers pay Z$5/month to cover cost of fuel for the pump. The farmers have never received a manual for the pump. Although oil changes have been regularly carried out, the air filter has not been changed since new and no

other maintenance undertaken. As a result the pump is unlikely to last its 10-15 year projected lifespan, indicated by suppliers. To date the only problem has been the breakage of an aluminium water manifold inlet pipe as a result of the pump falling from a scotch-cart during transport, but this resulted in non function of the pump for a critical two month period during the winter months. A simple low cost (Z$200) weld, which could have been undertaken in Masvingo would have resolved the problem in less than a day. However local welders (who do not have facilities for aluminium welding) indicated that no repair was possible. It was only as a result of our visit that local irrigators became aware of repair facilities in Masvingo. As a result of this breakdown, irrigators reduced the area irrigated by half, carting water by wheelbarrow and bucket from the dam to the irrigated garden, a distance of some 200 metres. This drastically increased the workload for the women and resulted in loss of crops from half of the area.

The main issues at this scheme are:

- Lack of knowledge about pump operation and maintenance
- Lack of knowledge about locally available repair services

Appendix III

Farmer feedback sheets

Chinyamatumwa

Issues affecting scheme performance at Chinyamatumwa

Issues for both men and women	Issues having greater importance for women
Major issues	
Pumps • **Access to spare parts for the engines and pumps** • **Loss of crops due to pump failure** *Equipment* • **Problems with land preparation equipment** *Institutional* • **Lack of co-operation between farmers and the pump attendants** • **Lack of training in marketing, communication skills and pumps** • **Poor communication between Department for Water Development, AGRITEX and the farmers** *Marketing* • **Selling crops and drawing up contracts** • **Transport for the harvested crop** *Costs/money/credit* • **Finding out about credit**	*Pumps* • **Reliability of the engines and pumps** • **Reliability of fuel delivery** *Scheme layout* • **Adequate fencing** • **Meeting land preparation deadlines** • **Unequal water delivery between plots** *Marketing* • **Finding a suitable cropping calendar** • **Meeting deadlines for harvesting and selling**
Potential Issues for the future	
Pumps • **Cost of repairs to the engines and pumps** • **Cost of diesel** • **Trouble shooting and carrying out repairs**	

Comments

Potential Issues

In the future, farmers on irrigation schemes in Zimbabwe may have to provide funds for water, fuel & power and also maintenance costs. This will present problems for farmers on schemes such as Chinyamatumwa that rely on imported pumps for which spare parts are difficult to locate.

Issues affecting women

Pump breakdowns

Pump breakdowns at Chinyamatuwma seem to have had a greater impact on the women than the men. Women do about 80% of the work on the irrigated land and also provide food for families, therefore very aware of the effects that the pump breakdowns have on the crop, their workload and their livelihoods.

Fencing

Women are also the ones who complained about the amount of time that they have to spend chasing goats from their crops. Lack of adequate fencing in the scheme increases their workload and reduces yield.

Meeting deadlines (land preparation, planting and harvesting)

Female household heads at Chinyamatumwa struggle to meet deadlines. They often have to wait for other farmers to meet their own deadlines before they can ask them for help. This can cause conflict amongst the other farmers and with the extension worker, if the female household heads are not penalised for failing to meet deadlines.

Issues affecting men and women

Wheat is a difficult crop to sell for all farmers at Chinyamatuwma. Often farmers cannot sell wheat in time to buy inputs for the next crop. Here is what people said at the Focus Group discussions (August 1998).

Q **Generally do you sell as much as you would want?**
-Wheat has always been very difficult to sell
(Female)

Q **How long does it take you to sell all your produce after harvest?**
-It depends on the crop, for beans it takes about 3 months but crops such as wheat can take the whole year
(Male)

Transport is also a major problem for both men and women. It is expensive, especially if farmers buy inputs and market crops on an individual basis.

Farmers, who have plots at the far end of the irrigation canals, complained that they get an unfair proportion of water compared to those at the top and often they receive so little water that they cannot complete their irrigation.

Recommendations

Problem	Suggestion	Main actors
The water bills seem too high and there seems to be no clear explanation of how it was calculated, and how interest is charged	As a group discuss what you don't understand about the water bill From the discussions write a list of questions to ask the Department for Water Development Ask AGRITEX to help arrange a meeting with a representative from the Department for water Allocate at least two farmers to meet with a DWD representative. Think carefully about which farmers to allocate - maybe one man and one woman to get a good balance.	**All Farmers** **Committee** **Committee/AGRITEX Extension Worker** **Men & woman good at communicating**
There is lack of co-operation between the farmers and the pump attendants	Speak to the pump attendants and ask if they can show a group of farmers around the pump house, engines, meter system and night storage reservoir Choose a day and time suitable to both men and women farmers and also the pump attendants. (Choose a time when women will not be busy doing household chores) On the allocated day make sure that women as well as men turn up – the pump house is not just for men Chat with the pump attendants about farming practices, crops and invite them to attend farmers meetings	**Committee/Extension worker** **Committee/extension worker** **Group of men and women** **Group of men and women / extension worker and representatives from the committee**
Farmers feel that scheme performance can be improved with more training	Divide into two groups – men and women. Get each group to discuss and produce a list of areas where they feel they need training. (For example – budgeting, teamwork, meeting deadlines). Compare the two lists and produce one list which will benefit both men and women Discuss this list with the extension worker and work out a program of training. The extension worker will probably need to contact the AGRITEX Office in Masvingo to request help or training materials. When deciding on a program, try and choose times that are good for both men and women. For example, after the women have finished their household chores and before the children come home from school.	**Men and women** **Men and women** **Men and women** **Men, women and extension worker (AGRITEX)** **Men, Women and extension worker**

Recommendations continued

Transport is expensive and marketing is difficult. **Women spend a lot of time trying to transport their produce to local towns on infrequent buses, which often refuse to carry produce**	Enquire about discounts for buying inputs in bulk. Try to negotiate free delivery to the scheme as part of the deal on bulk orders Consider the advantages and disadvantages of marketing as a group. Discuss these with the extension worker. Ask the marketing committee to look for buyers that want to buy in bulk. This will save in terms of money for transport costs and also in terms of the time, that women currently spend travelling to local towns. If transport is necessary, think about forming a transport committee to work with the marketing committee to look for better forms of transport, which will save money and also women's time.	**Marketing committee** **Marketing committee** **Men and women / Extension worker** **Men and women / Marketing committee** **Men, Women, Extension worker, Marketing committee**
Women find wheat very difficult to harvest and carry. **Wheat is also very difficult to market**	Spend some time at farmers meetings discussing the advantages and disadvantages of different crops. Consider the impact to both men and women in terms of workload and time. Also think about marketing opportunities. Discuss these with the extension worker and together build a new cropping calendar, which will benefit women as well as men.	**Men, women, committee** **Men, women, committee** **Men, women, Extension worker**
It is difficult to find money to pay the water bill and other communal costs	Think about setting up a common fund into which every farmer can contribute a certain amount every month or after every harvest. Choose one or two people to look after this money and keep records of money going in and out. Alternatively, the money could be put into a bank account. This money could then be used for communal costs such as water bills. Another alternative could be to consider starting up a common plot. Plans will have to be made about how to manage the plot, what will be grown on it and what any profits will be used for.	**Men, Women** **Men, Women** **Men, Women**

Mushandike

Issues affecting scheme performance at Mushandike

Issues for both men and women	Issues having greater importance for women
Major issues	
Scheme layout • **Water delivery** • **Hand levelling** *Equipment* • **Problems with land preparation equipment** *Institutional* • **Lack of communication between farmers and Department for Water Development over water bill** • **Lack of training in contract forming and communication skills** *Marketing* • **Selling crops and drawing up contracts** *Costs/money/credit* • **Cost of water (Accumulation of large water bills)**	*Scheme layout* • **Land preparation & levelling**

Comments

Issues affecting men and women

At Mushandike, paying for water seems to be causing large problems for most farmers. The Department for Water Development has the ability to stop the water at the scheme in the event that a water bill is not paid. The farmers have accumulated a very large water bill over the last few months, which they are struggling to pay. Also at some of the villages farmers feel that they are being forced to pay for water which has leaked out of the night storage reservoir. The female household heads feel that they are being cheated – here is what some of the female household heads said at the focus group discussions (August 1999)

Q	**Do you have any other questions?** -Why can't meters be put per plot, we don't know what they mean by cubic metres. We don't know how the money is calculated because some of us are not educated. Funny calculations are done, we think we are being cheated because we are told terminology that we don't understand – (Female HHH's)

Farmers at this scheme have also had problems with contracts – for example, the contract with Cairns of Mutare for tomatoes at the beginning of 1998. Farmers at this scheme would benefit greatly from training and advice on contract forming and marketing skills and the shortcomings of 'gentleman's agreements'.

Q **What are your biggest problems in marketing?**

- Marketing is the biggest worry that we have, we can even call it a disease.
- When we make contracts, everything is well, come harvest time the prices fall from $20.00 to $5.00. Beans and Paprika are a problem to sell.
- The contacts are not properly done, some of them are verbal and even if you are given a written contract you can't sue the defaulters.
- Last year we entered into a "Gentleman's Agreement" for tomatoes and we lost thousands of dollars when the company did not come to collect the crop
- This year we are in another gentlemen's contract with the same company but now involving smaller area.
- We are again taking a risk but this time with half area
- One thing is that tomatoes are highly perishable so Cairns are allowed us to sell to anyone if they to not turn up at the time of harvest.
- Cairns told us that it would close all its other farmers during our time of harvest. (Males)

Farmers feel that selling wheat is a major problem, yet it demands a lot of resources in terms of labour and inputs. The cropping calendar should be discussed with AGRITEX.

Q **How long does it normally take you to sell a crop after harvest**

-Most crops take a long time
-It can take almost a year for wheat or beans to be sold

The women also feel that transport is difficult and that once they get to Masvingo they are only allowed to sell up until 10.00am. Here is what the women said at the focus Group discussion in August 1998.

Q **Is your market easily accessible?**

-Transport is very difficult, we hire scotch carts to take us to the main road and it costs $20.00 whether it's full or not.
- If three people team up they still have to pay $20.00 each.

Q **Where do you sell your produce?**

- In Masvingo, the problem is that nowadays we are only allowed to stay in the producer's market up to 10:00am. After 10:00am we are chased out of the market even if we haven't finished selling the produce.
- Retailers at the nearby market complain that we if we stay long we take away their customers. We therefore end up selling our produce at very low prices so that we won't take them back home.

Recommendations

Problem	Suggestion	Main actors
There is a very high outstanding water bill. There is no clear explanation of how it was calculated and how interest is charged. It is unsure how pay the bill so that water will not cut off again.	As a group discuss the water bill in detail. Write down a list of questions to ask the department for water development covering everything that you don't understand – such as how it is calculated and how interest is charged.	**All farmers**
	Still as a group, discuss the financial situation and try to plan a budget for how much you feel is affordable per month considering different crops.	**All farmers**
	Set the budget out clearly along with the list of questions and ask AGRITEX to help arrange a meeting with a representative from the Department for water Development	**Committee/AGRITEX Extension Worker**
	Allocate at least two farmers to meet with the DWD representative. Think carefully about which farmers to allocate – a balance of men and women	**Men & Women good at communicating**
	Show the DWD representative the budget and try and come to an agreement on a plan of action for paying the outstanding bill	**As above**
Farmers feel that scheme performance can be improved with more training. The men who are the plot holders receive more training and advice than the women.	Divide into two groups – men and women	**Men and Women**
	Get each group to discuss and produce a list of areas where they feel they need training (for example, budgeting, teamwork, meeting deadlines, how to form good contracts, sourcing markets).	**Men and Women**
	Compare the two lists and produce one prioritised list which will benefit both the men and women on the scheme	**Men and Women**
	Discuss this list with the extension worker. Also discuss with the extension worker about why the men appear to receive more training and advice than the women. Work out a program of training taking into account existing duties and chores. Choose times that are suitable to women as well as men – for example after women have finished their household chores and before the children come home from school.	**Men, Women and AGRITEX Extension Worker**
	The Extension worker will probably have to contact the Masvingo Office to request help or training materials	**Extension worker**

Recommendations continued

Wheat is difficult to sell – it sometimes takes up to a year to sell yet it demands a lot of resources in terms labour and inputs	Spend some time at farmers meetings discussing the advantages and disadvantages of different crops Consider the impact on both men and women in terms of workload and time. Also think about marketing opportunities Discuss these with the extension worker and together decide on a new cropping calendar, which will benefit women as well as men	**Men, Women & Committee** **Men, Women, Committee** **Men, Women, AGRITEX Extension Worker**
Marketing is organised separately from transport	Discuss whether the marketing committee should be expanded to include transport issues such as arranging communal transport for selling and marketing, sourcing markets and locating cheap forms of transport. If it is decided that organising communal transport is a good idea, allocate at least two people to take charge. Discuss ideas for cutting costs – such as trying to negotiate free delivery	**Men, Women & Marketing Committee** **Men, Women & Marketing Committee**
It is difficult to find money to pay for the water bill and other communal costs	Think about setting up a common fund into which every farmer can contribute a certain amount every month or after every harvest. Choose one or two people to look after this money and to keep records of all money going in and out. Alternatively, the money could be put into a bank account. This money could then be used to pay for communal resources Another alternative could be to consider starting up a common plot. Plans will have to be made as to how this plot will be managed and by whom, what will be grown on it and what any profits will be used for. For example, the women may like to grow vegetables.	**Men, Women** **Men, Women** **Men, Women**

Longdale

Issues affecting scheme performance at Longdale

Issues for both men and women	Issues having greater importance for women
Major issues	
Pumps • **Access to service providers** • **Access to spare parts** • **Repair/trouble shooting/routine maintenance** • **Cost of mending breakdowns & buying spare parts** *Institutional* • **Lack of training in marketing , simple trouble shooting and servicing of pumps** *Marketing* • **Selling and drawing up contracts** *Costs/money/credit* • **Lost incomes due to pump breakdowns**	*Pumps* • **Unreliability affects irrigation and thus women's work and also availability of food to feed families** • **Roster on – and off times for women** *Marketing* • **Finding a suitable cropping calendar**

Comments

Farmers at Longdale are beginning to feel the effects of increased competition when selling vegetables. New strategies are perhaps needed – such as alternate high value crops or different marketing techniques.

Farmers should perhaps seek training on how to negotiate good contracts so that they are not treated the same as the farmers at Mushandike who had not received any training on contracts before they formed an agreement with Cairns. It is also becoming dangerous to sell at the side of the road especially for young children. Alternate methods of marketing need to be considered.

Below is a comment from Focus Group Discussion, July 1998).

Q Do you ever make contracts?
Never, but we intend to do so with Cairns but it did not treat Mushandike and Arda well so we decided to stop (Farmer – Longdale).

At Longdale there have been problems with the electric pump, which was donated to the scheme by Danida. Farmers think that their knowledge about the pump is scarce. Crops have been lost due to breakdowns.

It would be good for the farmers to receive training so that they can attend to minor breakdowns and servicing requirements themselves. It would save time at the scheme if women could be trained, as they are the ones who work in the fields. The men are often away during the day working in the nearby towns and often the women have to spend whole days waiting for the men to come home and look at the pump.

Below are comments from the Focus Group Discussions (August 1999)

Q What is your knowledge about the pump
- Our knowledge of the pump is scanty and was gained through curiosity and desperation.
- We have not serviced the engine because we do not know where to send it.
- When it breaks down, we tell the extension officer who will arrange for someone to repair it.

Q How long did it take to repair it last time it broke down?
- It took a long time because the electricians delayed (for about 4 months).

Q Do women ever repair anything?
- Never, we call the young boys and the men.
- The engine was broken down from 9 December to 5 May.

Q Do you think you need training about the engine?
- It would be good if we could get 2 or 3 people who are trained to repair it.

Recommendations

Problem	Suggestion	Main actors
The pump breaks down and the women working there don't know what to do. **This wastes time whilst women wait for men to return to the scheme.**	Find a supplier who can provide a list of things to check when the pump stops and basic pump operation. Get someone to write it in Shona. Cover it in plastic and place it next to the pump. Use demonstrations to make sure everybody understands how to do the checks Make people have a go so they are confident they can do it. Make women have two goes, as they are not used to fixing pumps. If women are not strong enough to tighten or loosen screws and bolts show them how to use a linger handle to make it easier Ask AGRITEX about the possibility of the Extension Worker or Masvingo Office keeping a register of contact details for pump experts in the case of a break down which cannot be attended to by the farmers	**Committee** **Committee** **Pump expert, committee member or driver** **Men and Women** **Women working on the scheme** **Men who are good with tools / women** **Committee, Extension Worker**
The pump needs to be regularly serviced and no one has received any training.	As a group nominate one or two individuals to take responsibility for facilitating contact between the pump mechanics and the farmers and for making sure that the pump is regularly serviced. As women do most work in the fields make sure one of the individuals is a willing female. Ask AGRITEX if it is possible for the nominated people to receive some training on how to service the pumps. Choose one man and one woman – who are both willing to take on this responsibility. As a group discuss how these two individuals can be rewarded for their time and efforts. Decide on a plan – will they be paid a small sum monthly or per season? Will they be paid from the common fund? Draw up a simple contract for the two individuals laying out how much they will be paid. Ask a committee member or the Extension Worker to sign the contract. Make sure that after receiving the training - the nominated people pass on their knowledge to others and don't keep it all to themselves.	**Men and women** **Man and women will to be trained and AGRITEX Extension Worker** **Men and women, Committee member and Extension Worker** **Men, Women, Committee member, Extension Worker** **Farmers who have received training**

Recommendations continued

Farmers feel that scheme performance could be improved with more training	Divide into two groups – men and women. Get each group to discuss and produce a list of areas where they feel they need training. (For example – budgeting, teamwork, meeting deadlines, marketing, forming contracts, pump operation). Compare the two lists and produce one list which will benefit both men and women Discuss this list with the extension worker and work out a program of training. The extension worker will probably need to contact the AGRITEX Office in Masvingo to request help or training materials. When deciding on a program, try and choose times that are good for both men and women. For example, after the women have finished their household chores and before the children come home from school. If only a small group can be trained, select carefully – choose people who will have time and who will use the training wisely and pass the knowledge onto others.	**Men and women** **Men and women** **Men and women** **Men, women and extension worker (AGRITEX)** **Men, Women and extension worker** **Men, Women**
It is becoming difficult to sell produce at the side of the road as individuals. There is too much competition from nearby farms.	Divide into two groups – men and women. Get each group to discuss the advantages and disadvantages of forming contracts, changing market practices, and spending time finding reliable buyers. Discuss the benefits to women and men. Bear in mind the cropping patterns. Also discuss the advantages and disadvantages of the different crops (how time consuming they are for men and women) and also how changes may increase marketing opportunities. Compare the two lists and decide upon relevant actions. Speak to AGRITEX about your decisions and ideas. And ask them to comment. For example, growing high value crops may benefit Longdale farmers due to the good location near to Masvingo	**Men, Women** **Men, Women** **Men, Women** **Men, Women** **Men, Women, AGRITEX**

Lowlands

Issues affecting scheme performance at Lowlands

Issues affecting both women and men	Issues having a greater impact on women
Major issues	
Scheme layout • **Water delivery** *Pumps* • **Loss of crops due to pump failure** • **Need training in repairs and trouble shooting** *Equipment* • **Sprinklers not very efficient** *Marketing* • **Need training in selling crops (marketing) and drawing up contracts** • **Transport to and from scheme is difficult**	*Scheme layout* • **Lack of fencing** *Costs* • **Cost of diesel for women's vegetable plots**

Comments

Farmers at Lowlands find it very difficult to sell wheat. Perhaps some attention to the cropping calendar could help overcome this problem. There is also no marketing committee in place. Here is what people said at the Focus Group Discussions (August 1998)

Q **Which crop if most difficult to sell?**
-Wheat
-There was a time when we had a very good wheat crop and the Vice President Muzenda came here with officials from DANIDA for a field day but after harvesting the wheat crop we could not sell any of it
(Men)

Fencing is clearly a problem to the farmers who have difficulty keeping the cattle out of the irrigated area. All of the 18 families have on average 25 animals each. The animals frequently enter the irrigated plots and eat the produce. Women's part in livestock control appears to reduce the time they have for intensive irrigation work.

The presence of a strong entrepreneur in the community clearly stimulates commercial activity.

Although the scheme has three pumps, there is clearly a problem with the pumps breaking down. At present only one of the three pumps is in working order.

Q **How often does the pump break down?**
-We have 3 engines in total but two are completely broken down
-One has never worked since its installation
-Two engines were working well but when we send one to AGRITEX for repairs, it came back in a worse state with other parts missing
(Men)

Q **Does the pump ever break down?**
-It breaks down on many occasions
-One engine was sent to Aritex in Harare and came back in a worse state
(Women)

It may be useful if the farmers were to receive some training in simple trouble shooting and repairs. In fact the women at the scheme said that they would do be able to do anything if they were shown how.

The sprinkler heads seem to pose a particular problem, especially for women. They are inefficient.

Q **Do sprinklers give you any problems?**
-Our sprinklers have always had problems
-We complained to the suppliers (Stewart and Lloyds) and they promised to do something about it, up to now they have done nothing
-They never trained us how to use the sprinklers we just had to discover on our own
Q **How big are the sprinklers?**
-15 mm and they produce very little water
-On a windy day the soil never gets wet
-They waste diesel
(Men)

Q **Do your sprinklers ever break down?**
-They always breakdown
-When they breakdown we do all sorts of tricks, blow, hit it or tighten using wire. Sometimes it works
-We have our ways of repairing the sprinklers
(Women)

Recommendations

Problem	Suggestion	Main actors
The pump breaks down the farmers working there don't know what to do	Find a supplier who can provide a list of things to check when the pump stops	**Committee**
	Get someone to write it in Shona. Cover it in plastic and place it next to the pump site by the dam	**Committee**
	Use demonstrations to make sure everybody understands how to do the checks	**Pump expert, committee member or driver**
	Make people have a go so they are confident they can do it.	**Men and Women**
	Make women have two goes, as they are not used to fixing pumps.	**Women working on the scheme**
	If women are not strong enough to tighten or loosen screws and bolts show them how to use a linger handle to make it easier	**Men who are good with tools / women**
	Ask AGRITEX about the possibility of the Extension Worker or Masvingo Office keeping a register of contact details for pump experts in the case of a break down which cannot be attended to by the farmers	**Committee, Extension Worker**
The pump needs to be regularly serviced	As a group nominate one or two individuals to take responsibility for facilitating contact between the pump mechanics and the farmers and for making sure that the pump is regularly serviced.	**Men and women**
	Ask AGRITEX if it is possible for the nominated people to receive some training on how to service the pumps. Choose one man and one woman – who are willing to take on this responsibility.	**Man and women will to be trained and AGRITEX Extension Worker**
	As a group discuss how these two individuals can be rewarded for their time and efforts. Decide on a plan – will they be paid a small sum monthly or per season? Draw up a simple contract for the two individuals laying out how much they will be paid. Ask a committee member of the Extension Worker to sign the contract.	**Men and women, Committee member and Extension Worker**
	If the pumps were mended and regularly serviced, the additional pumps could be used to expand the irrigated are or to improve performance on the existing area.	

Recommendations continued

Farmers feel that scheme performance can be improved with more training	Divide into two groups – men and women. Get each group to discuss and produce a list of areas where they feel they need training. (For example – budgeting, teamwork, meeting deadlines, marketing, forming contracts). Compare the two lists and produce one list which will benefit both men and women Discuss this list with the extension worker and work out a program of training. The extension worker will probably need to contact the AGRITEX Office in Masvingo to request help or training materials. When deciding on a program, try and choose times that are good for both men and women. For example, after the women have finished their household chores and before the children come home from school. If only a small group can be trained, select carefully – choose people who will have time and who will use the training wisely and pass the knowledge onto others.	**Men and women** **Men and women** **Men and women** **Men, women and extension worker (AGRITEX)** **Men, Women and extension worker** **Men, Women**
The sprinkler heads are not efficient and women spend a lot of time trying to improvise to make them work better	Spending money now to replace sprinkler heads could be cost effective in the long term through increased irrigation efficiency. This will probably increase yields more than enough to cover costs. (Stewart and Lloyds quoted $200 for a 3.5mm nozzle sprinkler head in February 1999) Replacing sprinkler heads will also give women more time to spend on other tasks – maybe to attend training courses.	**Men, Women** **Women**
Wheat is very difficult to market	Spend some time at farmers meetings discussing the advantages and disadvantages of different crops. Consider the impact to both men and women in terms of workload and time. Also think about marketing opportunities. Discuss these with the extension worker and together build a new cropping calendar, which will benefit women as well as men.	**Men, women, committee** **Men, women, committee** **Men, women, Extension worker**
It is difficult to find money to pay for communal resources such as fencing, a paddock, transport. **Women find it difficult to pay for fuel for their vegetable plots (which is separate to the funds for diesel for all other crops)**	As a group consider forming a common plot. Plans will have to made as to how to manage the plot, what will be grown on it, how any profits will be used. Decide whether men or women should run the plot. For example, women could run the common plot and use the money to pay for fuel for their own vegetable plots.	**Men, Women** **Women**

Rupike

Issues affecting scheme performance at Rupike

Issues affecting both women and men	Issues having a greater impact on women
Issues	
Marketing • **Bad roads and lack of transport** • **Selling**	*Equipment* • **Problems with sprinklers and hoses**
Potential Issues	
Pumps • **Cost of repairs to the engines and pumps** • **Cost of water** • **Trouble shooting and carrying out repairs to pumps and engines**	

Comments

Farmers at Rupike Irrigation Scheme were involved to some extent in scheme design and have received valuable training on issues ranging from proper use of sprinklers to recipes for cooking their own produce. The main problem at this scheme is the poor transport and bad roads, which cause problems in marketing and selling.

Potential Issues

In the future, farmers on irrigation schemes in Zimbabwe may have to pay for water, fuel & power and also maintenance costs. This may pose problems at Rupike Irrigation Scheme, where at present farmers do not have to pay for water.

Marketing

Farmers feel that having the use of a telephone could greatly help them with their marketing techniques. (Comments from Focus Group Discussions, August 1998).

Q **Why didn't you take over the phone from AGRITEX?**
-It was going to be difficult because we would require a telephonist to take care of incoming and outgoing calls
-We would prefer a public booth which could be used by many people

Q **Did you ever approach the PTC?**
-Yes but they did not have lines

At Rupike, one problem seems to be the lack of training in how to mend sprinklers. At present a lot of improvisation seems to be used. The women we spoke to in August 1998 said that they would welcome training so that they can stop improvising.

Q **Do women know how to repair sprinklers?**
-We can repair small problems, things like tightening the bolts etc
-for major problems we call the pump attendants

Q **Do you think it is necessary to get more training on sprinklers**
-Learning never ends

-It is good to learn the proper ways so that we stop improvising

Q **How do you improvise?**
-When we can't buy a new sprinkler head ($200.00), we use papers on the old one and it works
-When pipes crack we use soft rubber to bandage the hose
-When the pressure is low we put a stone to boost the pressure
-Some men do not even know some of the tricks that we use, if we call them to help they even disrupt our work trying to do the right things

(Females)

Q Where you trained to repair sprinklers?
-No but there are some men who were involved in the installation of the pipes and sprinklers. These men are more knowledgeable that they repair most of the breakdowns

(Males)

Selling small quantity produce seems to cause a few problems for the farmers at Rupike. The bad road and lack of transport don't help.

Q **How do you sell small quantity produce?**
-Sometimes by the roadside, sometimes we go to Renco but it is not always viable. We have to make good timing and go there soon after they receive there wages
-Supermarkets in big towns buy perishables but they want us to deliver the goods every morning. We cannot do that because we do not have our own transport
-It is very expensive to hire transport so we end up not realising any profit
When Mr Norton was here, things were better because we used his transport

Q **Why don't you buy your transport?**
-Some people think that it is a waste of money and it is difficult to convince them

Recommendations

Problem	Suggestion	Main actors
The sprinklers often break and the women have to improvise as they have not been taught how to fix them properly	Find a supplier who can come to the scheme and do a training session on locating and repairing problems. Ask AGRITEX for help. Make sure that the supplier uses demonstrations so that everybody can see what they have to look for Make people have a go so that they will be confident when necessary Make women have a longer go than the men as they spend more time in the irrigated fields	**Committee, AGRITEX Extension Officer** **Committee** **Men and Women** **Women**
Farmers feel that their marketing opportunities could be increased with the use of a phone.	Allocate someone to speak to PTC again about installing a pay telephone in the area. IF PTC insist that it isn't possible – call a farmer's meeting and discuss the options for re-connecting the telephone in the AGRITEX Office for the farmers to use. Discuss ideas for raising money to pay the telephone bills – such as establishing a common plot from which all profit can be used to cover the costs of the reconnection charge and bills. If it is decided to go ahead with the common plot, it will have to be carefully planned as to how the plot will be managed and who will be in charge of it. Alternatively, choose one or two farmers – maybe the marketing committee, to investigate the cost of a mobile phone that could be used like a pay phone to recoup the costs.	**Committee** **Committee, Men and Women** **Men and Women** **Committee, Men and Women** **Committee, Marketing Committee, Men, Women**
Personal equipment is getting old and farmers don't know what checks they should do. **Women find it hard to use old heavy equipment that hasn't been checked over or serviced since new.**	Ask the AGRITEX Extension Worker to find out when a representative from the AGRITEX Mechanisation Office will next be visiting the scheme to check the tractor. Ask the Extension Worker to find out if this representative could stay around the scheme after he has finished his tasks to demonstrate to the farmers what checks they should be doing on their privately owned equipment, such as ploughs. Make sure he does demonstrations and that he allows farmers to have a go themselves. Allow women to have a longer hands-on session as they tend to use the equipment more often than men.	**AGRITEX Extension Officer** **AGRITEX Extension Officer** **AGRITEX Mechanisation Officer, Men, Women**

Recommendations continued

Transport is a problem, and therefore women have to sell goods at the scheme which often go to waste if they are not sold	As a group discuss the advantages and disadvantages of forming a transport committee to work with the marketing committee. If you decide to go ahead, allocate at least two people who could do this job. Discuss methods of financing these people as are the marketing committee. Make sure that the allocated people, explore alternative methods of transport and look into communal buying of inputs with transport costs included etc.	**Women, Men, Marketing Committee** **Women, Men, Marketing Committee** **Transport Committee/Marketing Committee**

Benzi

Issues affecting scheme performance at Benzi

Issues affecting both women and men	Issues having a greater impact on women
Major issues	
Pumps • **Farmer awareness and knowledge of pump operation and maintenance** • **Repairs/trouble shooting** *Marketing* • **Selling produce and drawing up contracts with local buyers** • **Transport**	*Pumps* **Reliability** *Marketing* • **Cropping calendar** • **Meeting deadlines** *Scheme layout* • **Fencing** • **Water scheduling** • **Water delivery** *Equipment* • **Buckets**

Comments

The farmers at this garden scheme feel that there is too much competition in the area, as the market is becoming flooded. However, during the dry land season, from October to March, everyone (including the women) leaves the garden to work in the dryland fields despite recognising that sale of vegetables in this period could be particularly profitable. Below are some comments from the Focus Group Discussions in August 1998.

Q **What problems do encounter in selling your produce**?
- There is too much competition and the market is flooded

Q **Do you know anything about contracts?**
- No

Q **Do you have a marketing committee?**
- No

Q **If it is a good harvest, how much do you normally get?**
-The problem is that there are too many gardens around this area so we cannot make much.

The farmers have not received any training on marketing or contract forming and also feel that they do not see their allocated extension officer very often – perhaps because he is very busy visiting more than one scheme in the area. There is no marketing committee in place.

Q **Do you know anything about contracts?**
- No

Q **Do you have a marketing committee?**
-No

Q **When you planted the current leaf vegetables, what plans did you have for selling?**
-There is no planning, we just plant the traditional crop that we are used to

The farmers at Benzi seem to plant the same crops each year, because they are traditional. It could prove beneficial if time was spent on thinking about new cropping patterns to target markets.

At Benzi, it is mainly the women who do the work in the gardens, it may therefore be more beneficial if women could take a more proactive role in the committee. At present the garden committee is mainly composed of men. Below are some comments from the focus group discussions, August 1998

Q **How many beds do HH have?**
We don't know, ask the women as they the ones who work in the garden

Q **Are you saying men do not work in the garden**
-Women are the ones who work in the garden it is their domain

Q **If that is the case, how come the garden committee is compose of mostly men?**
-We did that to please everyone
-Men will also be useful when things like repairing the fence are required
-The thing is, the old garden belonged to women but this new one is going to be a joint effort
-Why should I help a woman who does not want to share with me the proceeds of the garden

(Males)

Q **Women, do you get any help form the men in the garden?**
-Most of them don't help, we usually do our own work
-We see men digging on very rare occasions

(Women)

Recommendations

Problem	Suggestion	Main actors
Farmers have problems selling due to flooded markets. Garden performance is not as efficient as it could be.	Split into small groups and get each group to discuss and write down a list of all the things they feel would improve garden performance and selling and marketing of produce. **For example:** - Better budgeting - Teamwork - Planning ahead so that cultivation carries on during the dryland season -which is when vegetables could be very profitable - More efficient water scheduling and delivery - Improved fencing - Drawing up contracts - Different & improved marketing practices - Alternative crops/vegetables at certain times of the year to meet market demand - Selling as a group to reduce costs and bring transport advantages Bring the groups back together and discuss the lists. Produce two final lists which everyone agrees on: **List 1:** Areas where you feel that training is necessary **List 2:** Tasks which you think feel can be implemented by yourselves. Show the list of training requirements to the AGRITEX Extension Worker or a CARE representative and discuss the possibility of receiving training on these matters. Discuss tasks to be undertaken by yourselves, and consider who should be responsible for co-ordinating the tasks. Consider forming a marketing and transport committee. As a group set targets for the committees and also for individuals. For example, the committees should be able to find suppliers who will deliver inputs to the scheme if inputs are bought in bulk. Buying in bulk is also cheaper than buying individually.	**Women who work in the gardens and the Garden committee** **Women who work in the gardens & Garden Committee** **Women who work in the gardens, the Extension worker, CARE representative** **Women who work in the garden & Garden Committee** **Women who work in the garden, Garden Committee and any new Committees**

Recommendations continued

It is difficult to fond the money to pay for common resources such as fencing, new buckets or for communal transport	As a group, discuss the advantages and disadvantages of creating a common garden (or number of beds). Consider how it would be organised and financed initially. For example, the women could have a rota for working on it. All the profits from this garden/beds could then be used for paying for common resources. Work out a plan – for example, think about whether the committee members should work on the plot as they are spending time benefiting the garden owners in other ways.	**Women who work in the gardens** **Women who work in the gardens**
Women who have gardens the furthest away from the dam, spend a lot of time and energy carrying buckets of water.	Discuss with CARE or AGRITEX the possibility of buying a few communal wheelbarrows. These could then be used to carry water from the dam to the gardens – which will put less strain on the women's heads, necks and backs. It will also mean less trips to the dam site and therefore save on time to allow other household duties to be carried out.	**Women who work in the gardens**

Chikava

Issues affecting scheme performance at Chikava

Issues affecting both women and men	Issues having a greater impact on women
Major issues	
Water Management • **Ensure sufficient storage for irrigation and livestock needs.**	*Equipment* • **Improving buckets and other equipment for transferring water from the troughs to the plants.** *Institutional* • **Lack of training opportunity** • **Lack of commercial opportunity market links** *Marketing* • **Sourcing markets** • **Transport**
Minor Issues	
	Equipment • **Land preparation and weeding tools** *Marketing* • **Contracts**

Comments

Water Management

At Chikava, irrigation water is easily accessible in the irrigated garden. As far as the project could find out there seems to be no current difficulty in the dam supplying water both to livestock and to the irrigated garden. It might be important for the community to be aware that this might not always be the case and monitoring the levels in the dam regularly would be wise.

There is room for improving the way water is lifted from the troughs and applied to the garden. At present, most of the women use large empty tins which means they have to bend a long way to fill the cans. The research project encouraged women to experiment with a watering can and cheap plastic buckets, sometimes using a rope to ease the task of lowering and lifting the buckets in and out of the troughs and record their assessment of how well or badly the alternatives worked. This was successfully done, and recommendations about watering given in the table below were provided by the women who worked with the can and buckets.

The garden is used by women to grow maize in summer and vegetables in winter. The maize needs quite a lot of water when the rain is not sufficient. The women find the watering and weeding hard work but are pleased to do it to get a little extra income and extra food for the family. Those who have to carry the water far find it is slow and tiring, so sometimes the beds that are furthest from the troughs get less water than those that are close. The vegetables grown in the distant beds sometimes don not do so well.

Crop Choices

Each vegetable has different watering needs and at different stages of growth different application methods are suitable. Seedling are easily washed out if water is not applied gently and some deep rooted crops, when they mature, need several applications before they have enough to meet their needs. Using cans it is difficult to control the flow of water around the plant. The women also have difficulty in applying the water in such a way that it does not float away the manure they have placed around the plants. It is sometimes difficult to know which crop to choose for easy management and if it will bring a good price.

Vegetable crops like rape, cabbage, tomatoes and onions are popular. But because most people grow these, there is difficulty in selling the fresh produce and some women have tried drying the leaves for sale later. Often they say there is still a lot of competition for buyers. There is limited potential for trying new vegetables unless you are sure of a good demand for them.

Workload

Women complain that using the traditional hoe in the small beds is quite difficult and that it is sometimes difficult to avoid damaging the plants. Alternatives like hand forks are not readily available near the scheme and are regarded as expensive. They also complain of the hard work of preparing the plots with the hoes.

Marketing

Marketing vegetables locally is not easy because of the lack of strong demand in the area. The time and energy difficulty and high cost of transport makes it hard to take produce to bigger markets. Women find it hard to leave their families and the duties of cooking and fetching wood and water to make long journeys. Some families have tried bartering locally, exchanging their vegetables for use of an oxen team or some other useful bargain, which has helped ease the situation. Arrangements to supply local schools seem to be a possibility and are being followed up on behalf of the scheme. There might be similar possibilities around and it may be necessary to find a suitable person to seek them out on behalf of the scheme.

Social

Having come together to organise the garden, the women have organised a playgroup for the children, this allows women some time to work at the garden without the small children. Establishment of playgroups and nursery education near the garden is likely to produce lasting benefits for children as well as benefiting the mothers.

The coming of the garden seems to have increased the communities activities. Irrigation has given the women a social activity as well as a productive one and they appear to be confident and interested in trying out new ideas.

Recommendations

Problem	Suggestion	Main actors
The capacity of the dam is not well known	Recording the level of the water and keeping an eye on the amount of silt that is gathering in the dam will give the community early warning of the water supply diminishing. Ask Care or AGRITEX about the best way to make measurements. Select one member of the committee to keep a note of these measurements. Make sure the committee looks at the records once a year to see if there is a problem coming up.	**Dam committee**
It is difficult to lift the water	Use buckets with handles that are easier to lower into the troughs. Set up experiments to find the best way to attach ropes to the buckets Some women found the cheap buckets wobbled on their heads: look out for better quality plastic buckets that are still light. Discuss your needs with local shop owners. If they know you want to buy, they will look out for suitable buckets. Ask Care or AGRITEX if they can help you experiment with treadle suction pumps. They are not so expensive as a diesel pumps and they cost nothing to run. You stand to pump, like riding a bicycle, so it is quite hard work but it cuts watering time by more than half. If people organised carefully, one pump could be used by all.	**Irrigation committee** **Men and women** **Women** **Irrigation committee** **Care agents** **Irrigation Committees**
Selling the produce of the garden is difficult	It is worthwhile putting effort into solving the problem. If you can find out what customers want, you are helped to chose what to plant. In this way marketing becomes easier.	**Irrigation Committee**
It is difficult to find opportunities for training and marketing locally	Working through your committee, one person could be financed to find out opportunities on your behalf. You could put aside a little more on the fund so that one person could be helped with any expenses. It might be a good idea to find someone who has not too many other duties, perhaps a young person who has just left school.	**Irrigation Committee**
It is hard to apply the water gently and watering cans are too costly	On other schemes women improvise by making holes on the base of plastic containers; this is easily done with a hot piece of wire.	**Women**
Transport is difficult	When you are searching for sales try to find people who can collect from the scheme. Try to find out about entering simple contracts with local shops, schools or clinics to supply vegetables regularly.	**Men and women**
Tools and equipment are unobtainable or too costly	Think of adjusting the size of the beds to suit the tools. Discuss this with Care or AGRITEX.	**Men and women**

Chemombe

Issues affecting scheme performance at Chemombe

Issues affecting both women and men	Issues having a greater impact on women
Major issues	
Pumps • **Pump transport** • **Pump repair and maintenance** • **Access to spares**	*Pumps* • **Reliability** • **Roster** • **Repairs/trouble shooting** • **Loss of crop** *Institutional* • **Lack of training** *Marketing* • **Selling** • **Transport**
Minor Issues	
	Scheme layout • **Water delivery** *Marketing* • **Contracts**

Comments

The lack of knowledge about pump maintenance, operation and repair has led to a major loss of income in the last season at Chemombe Garden Scheme. Through lack of knowledge, the farmers thought that an aluminium pipe that had broken on the pump could not be welded. As a consequence the farmers made a decision to only plant on half of the normal area, thus loosing out on potential income. Increased knowledge of pumps and trouble shooting could help prevent this type of problem.

The women at Chemombe rely on the chairman to transport the pump to the dam every day and then to start the motor. When the chairman is not available, the women use buckets to carry the water from the dam to the garden, which is very time consuming and also hard work.

The garden is remote from the village and from major roads so that transport and marketing are major problems. Although the vegetables grown here have a good effect on the nutrition and health of the community, it is necessary in the long-run to establish good markets for the excess as income is needed for other essential items and for maintenance and repair of the engine, pump and fencing.

Recommendations

Problem	Suggestion	Main actors
The pump has to be moved a long distance each day so it is likely to need more attention and maintenance than a pump that stay in one place.	As women are the main users of the pump and it is they who suffer when it breaks down it would be sensible for women to learn to care for the pump. It may be possible to apply to Care for help in finding out how women can be trained in pump maintenance, who would need to organise for a trainer to come to Chemombe and how much that would cost. Thought needs to be given to who are the best people to receive training. It would be worth considering the following issues and deciding how important they are for your situation here: ▪ How many people do we need to train to be sure the pump will be well cared for throughout the year ? ▪ What will be the main characteristics needed in the people to be trained? ➢ Interested in machinery? ➢ Able to read and write? ➢ Is keen to do the work? ➢ Member of the irrigation garden? ➢ Will be at the garden every day? ➢ Is reliable and helpful? ➢ Has time between their other commitments? ➢ Can travel to town to buy spares? ➢ Will get support from husband/ family?	**Irrigation committee** **Irrigation committee**
The chairman cannot always be available to transport the pump and start it.	The chairman could train the women in starting the pump so that he has help. The chairman could be in charge of organising a rota of women to start the pump and be on hand to repair it. It might be possible to have a rota for transporting it too. Good organisation is very important if everything is to work smoothly.	**Women trainees**
Training is not readily available. Sometimes when people are trained they want to leave the community to use the new skill to earn more money.	Use contacts with Care, AGRITEX and other irrigating farmers to find out what is available. If people are trained to do a new job it is good for their self respect and respect from the community. They might soon be resentful if they do not benefit from payment. The community should discuss how this is to be handled. ▪ Will the committee pay pump minders a set fee? ▪ Will fees be paid according to the number of breakdowns? Are there other applications of the training that the trainee could use to benefit his/herself?	**Men and women who come into contact with these groups** **Elders, Dam committee and irrigation committee and all stakehoders in the village**

Recommendations continued

Marketing in town is difficult and expensive	▪ Other schemes have found that establishing links with schools, hospitals and local shops is a good way to sell as the amounts needed can be predicted. It gives the customer a chance to say what vegetables they want and sometimes a contract can be made with them.	**Marketing committee**
	▪ Women in other schemes like Rupike have good selling tactics and try to make agreements that the customer collects. These arrangements cuts down your transport problems but you have to have the produce ready at the appointed time.	**Marketing committee**
	▪ It is important to establish a good relationship if you are to keep your customers and develop a reputation for reliability, good quality produce and fair prices.	**All growers**

Rufaro

Issues affecting performance at Rufaro

Issues affecting both women and men	Issues having a greater impact on women
Major issues	
Scheme layout • **Land preparation** • **Water delivery** *Pumps* • **Repairs/trouble shooting** • **Access to spare parts** • **Cost** • **Farmer awareness and knowledge** • **Loss of crops due to pump failure** *Equipment* • **Problems with land preparation equipment** • **Transport** *Institutional* • **Lack of training** • **Participation in scheme design** *Marketing* • **Selling** • **Access to transport** *Costs/money/credit* • **Access to credit** • **Lost incomes** *Health and livelihoods* • **Workloads**	*Scheme layout* • **Access to land with good water supply** • **Land preparation** *Pumps* • **Reliability** *Equipment* • **Access to equipment** *Institutional* • **Lack of training** • **Participation in scheme decisions**
Minor Issues	
Scheme Layout • **Fencing**	*Scheme layout* • **Water scheduling**

Comments

Agreeing objectives

Farmers prioritised repair of the tractor initially, however they later felt that repair of pumps was the priority issue. It is clearly difficult to proceed with only one of these although the costs associated with either option are so relatively high that the farmers feel they can only manage one at a time. There is a lack of accurate information both about the options for pump repair or tractor costs. Over the years, farmers failed to charge enough for tractor hire to provide a fund to pay for professional servicing or replace worn parts. The lack of information about the pumps given to farmers at the time of installation led the farmers to make expensive replacements. The farmers here need to investigate and analyse what is happening on their scheme and agree on future objectives, then start planning for the future.

Participation

Although women participate in meetings they are slow to argue with the men even though they have very different views on the priority use of the tractors. Women are not involved in the day to day arrangements with the drivers and the committee. Women are acutely aware of the problems that pump breakdown causes in the irrigated fields and appear to be keen to acquire the skills to address pump problems.

Pumps

The non-functional electric pumps are still at the scheme and should be reviewed for possible repair. The new diesel pumps have been operated but could be operated more successfully if more people including the women who are entrusted with the watering task had training in trouble shooting

Water management

The problems with pumps have reduced the flow of water to such an extent that water management is now more difficult than when the scheme functioned as it was originally designed to do. The farmers need advice about the best strategies to follow.

Marketing

Although the scheme is not far from Masvingo, access is difficult and only a limited number of buses ply the dirt road. Sometimes it is not possible to use the buses for marketing. Much of the marketing is done using the tractor and trailer when these are roadworthy. However, this is an expensive option especially when the delay the tractor's absence from the scheme costs in terms of lost production is taken into account.

Finances

The farmers were able to finance the purchase of the Mono pumps through credit and clearly can organise repayment. They should build on this success to increase water availability further. At the same time there is a clear need to budget for keeping the tractor in working order. The present system of charging makes it difficult to keep the tractor moving between hirers and does not provide for repair or replacement. As a result the tractor is in very poor condition and will now be expensive to restore.

Recommendations

Problem	Suggestion	Main actors
The two MONO pumps cannot lift enough water to fill the dam or supply as much land as the farmers would like.	Make enquiries in Masvingo, or through AGRITEX, about the possibility and cost of repairing the electric pumps.	**Farmer committee**
	Develop a medium term plan for funding future repairs and running costs. This will help in developing a budget and in convincing a credit organisation that the scheme is credit worthy	**Farmer committee in consultation with all the men and women farmers on the scheme and calling on assistance from AGRITEX**
	Ask advice from AGRITEX on managing the existing pumps and storage dam differently to create better flow in the channels from the storage dams to the field.	**Farmer committee**
Trouble shooting for pumps	Discuss with AGRITEX the options for training. Select people who are in the irrigated area most of the time to take part in training. Make sure that at least half of the people selected are women. Encourage the trainees to share their knowledge	**Farmer committee** **Farmer committee and all farmers**
Tractor maintenance	The tractor has to be restored to running condition before it can be hired out. Potential hirers should be consulted to assess their willingness to contribute and how they will be credited for their contribution.	**All farmers**
	A new method of charging for use of the tractor should be developed that includes a contribution to the cost of repair and replacement as well as fuel costs.	**Tractor drivers, committee and all farmers**
	The farmers should agree priority uses of the tractor and draw up a schedule of uses and charges.	**All farmers**
Marketing	Co-ordination of transport needs could reduce the no of tractor journeys required , leaving more time for agricultural uses of the tractor and making each journey to town more cost-effective	**All farmers**
	Alternatives to tractor transport need to be investigated. Women may find alternative transport for small amounts of produce.	**Women farmers**

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