Many irrigation schemes and land reallocation projects have failed to incorporate appropriate gender strategies in design and implementation. In many cases in Africa in general and in Zimbabwe in particular women's access to land for agricultural activity are intertwined and interwoven by patriarchal stereotypes and attitudes. The perceived benefits of communal irrigation schemes are normally piecemeal, unsustainable and are an albatross in the neck of women's economic empowerment. From the case study approach, this book reveals that women contribute more labor than men and yet they remain marginalized, impoverished and subjugated in their own schemes which seek to empower them. Decision-making in terms of land ownership, choice of cropping patterns and utilization of income accrued from the scheme is predominantly biased towards men. The government, NGOs and other stakeholders need to take drastic measures to ensure that policies and programmes to be implemented are gender-sensitive and realistically address the concerns of women sustainably.
Gender, Irrigation Schemes and the Empowerment Question
Gender, Irrigation Schemes and the Empowerment Question

Untold Experiences of Communal Irrigation Plot Holders in Zimbabwe
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ABSTRACT

With an estimated 70% of the 11.6 million Zimbabweans living in impoverished rural areas, and dependent on smallholder agriculture for their livelihoods, it follows that improvements in this sub-sector can contribute to poverty alleviation, particularly food insecurity. This depends on appropriate water management in such a semi-arid climate, like that of Umzinyatini Irrigation Scheme of Matabeleland South. This scheme possesses a lot of potential to boost food security in the district of Umzingwane. Gender sensitive policies from NGOs and Government Institutions need to be developed to harness the gigantic agricultural potential of the Scheme. Little information is recorded on smallholder irrigation schemes in Africa. Most of the information, which does exist, relates either to the area of land irrigated or volume of production. On farmer-managed schemes, recorded information generally relates to the financial needs of the system. There are virtually no data relating to the activities of men and women separately. A major paradigm shift is needed to address the imbalances related to gender and sustainable smallholder irrigation.

Key words: smallholder irrigation, water management, sustainability, and empowerment.
DEDICATION

This book is dedicated to the bone of my bone and flesh of my flesh. My God-given and wonderful wife.
ACKNOWLEDGEMENTS

The completion of this research was made possible by the valuable assistance I received from many people. I am especially thankful and grateful to my work colleague, Mr M. Sibanda for his valuable input into the whole research process. Acknowledgement is also given to the assistance I received from Mr D. Nyathi who assisted me in data collection. I am thankful to the staff from Umzingwane Rural District Council, Agritex and World Vision for the valuable data that they gave to me.

I am also indebted to all my respondents who provided all the necessary information during fieldwork. The completion of this research would not have been possible without the moral and spiritual support of my wife Sibonokuhle. She is a rare inspiration.

To you all may the Almighty God bless you abundantly.
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ACRONYMS

AGRITEX- Agriculture and Extension Services
FAO- Food and Agricultural Organisation
FGDs- Focus Group Discussions
FHHs- Female Headed Households
AIDS- Acquired Immune deficiency Syndrome
IDE- International Development Enterprise
IFPRI- International Food Policy Research Institute
IMC- Irrigation Management Committee
NGO- Non-Governmental Organization
PIM- Participatory Irrigation Management
PHHE- Participatory Healthy and Hygiene Education
ODI- Overseas Development Institute
OECD- Organisation for Economic Cooperation and Development
HIID- Harvard Institute of International Development
HIV- Human Immune Virus
GAD- Gender and Development
WFP- World Food Programme
WID- Women in Development
WCED- World Commission on Environment and Development
WUAs- Water User Associations
UNCED- United Nations Conference on Environment and Development
UNDP- United Nations Development Programme
CHAPTER ONE

INTRODUCTION

Irrigated agriculture provides some 40 percent of the world’s food and consumes about 75 percent of the world’s renewable freshwater resources (FAO, 2008). However, while most farmers depend on traditional systems of irrigation, investments in irrigation worldwide have tended to focus on large-scale projects (dams, canals) benefitting rich farmers often at the cost of small and marginal farmers who have been evicted, displaced, or had their land expropriated. These projects coupled with intensive private-owned micro-irrigation (tube-wells, bores) have led to severe environmental damage – water-logging and saline intrusion – and competition over the availability and quality of water for domestic purposes. Overexploitation of groundwater and growing pollution from leaching of fertilizers and pesticides compels women (and girls) to walk further to collect safe water for their domestic needs.

Irrigation planning and policies have typically ignored gender differentiated needs and priorities as they have focused on the construction and maintenance of systems, the efficient distribution of water and increased agricultural output, rather than the nature of crops grown or the impact of irrigation on labor markets or the co-existence of productive and consumptive water uses (Cleaver 1998). For example, small women farmers in rain-fed agricultural areas in Africa use less water for nutritious crops than is used in male farming systems growing one or few crops often including ‘thirsty’ ones like sugar and rice. Nevertheless, increasingly,
particularly during extended periods of drought, crop choice is also a function of other factors such as access to labor (many men migrate) and animal draught power as livestock are severely affected by water scarcity (lack of fodder and water for drinking or bathing cattle). It is often stated that women are responsible for more than half the world’s food production overall and produce up to 60 to 80% of basic foodstuff in Africa (Fresco, 1998). The role women play in agriculture and the rural society is fundamental to agricultural and rural development in sub-Saharan Africa. The Technical Centre for Agriculture and rural cooperation (CTA, 2005) reported that women in Africa make up more than one third of the work force.

According to (FAO, 2008) the majority of people directly involved in irrigated agriculture in Southern Africa are women and they are involved to the greatest extent at the lowest level. They provide much of the human labor in the fields although they do not usually have either land or water rights. Although they participate in the management of small schemes, they are usually outnumbered on committees and take a minimal role in decision-making.

The trend for women to be solely responsible for irrigated farming has increased significantly as urbanization accelerates and the AIDS pandemic takes effect. This change has not been matched by women’s increased control of resources or involvement in management decisions. Yet future development of smallholder irrigation in Southern Africa will depend on improved returns to investment in irrigation and more than ever this means that women’s needs must be prioritized in the face of climate change, which
compromises food security and exacerbates poverty particularly in the remote areas. (Keller, 2008)

Women’s role as plot holders in irrigation schemes has now become a common feature in Zimbabwe (Mullen, 1999). Studies reveal that women are the majority of the participants in both urban and rural irrigation schemes. The current debate hinges on the sustainability of irrigation schemes on the context of gender. Most studies like that of Matshalaga (1999) and Auret (1990) tend to glorify the economic benefits of irrigation without closely examining the challenges that are faced by women plot holders. A great deal has been written about the gendered patterns of African peasant farming in the region. According to Goebel (1999), it has become a truism to state that in societies such as Zimbabwe, that were historically hoe cultivating, women constitute the majority of farmers, but that their subordinate cultural and social position often curtails their abilities to farm as productively as possible. It is ironical that their contributions to agriculture and rural development are seldom noticed. Gaidzanwa (1995) postulates that gender inequality is therefore dominant in the sector and this constitutes a bottleneck to development, to the economic emancipation of women. Due largely to the legacies of colonial processes of land alienation and the undermining of African farming, subsistence farming in the region is characteristically insupportable without remittances from husbands working in waged work in urban areas or outside the country like South Africa and Botswana; hence farming wives remain dependent on husbands’ contributions.

In 2007, it was estimated that about 70% of rural households in Zimbabwe were de facto female-headed (Mandishona, 2008). In this context, women
play the role of primary farm worker and household manager, with the husband (ideally) providing inputs through earnings from wage work. In most cases, a woman’s entitlement to the land and home in Communal Areas comes through her marriage to a man with rights to a plot in that particular area, although widows and divorced women may obtain access to small plots in their place of birth or married areas. FAO (2000) asserts that, while rural women’s lives has been distinctly tied to the land, this relationship to land has historically been mediated through male entitlement and control through the institution of marriage and the allocative powers of traditional authorities. Consequently, women have little or no control to land in terms of ownership and utilization of the produce of the land thereby exacerbating their subordinate position and maintaining gender inequality.

BACKGROUND OF THE STUDY
A number of barriers to women’s participation in agricultural activities have been identified. The study seeks to explore the challenges that are faced by women as plot holders in irrigation schemes. Burkey (1993) notes that systemic gender biases may exist in the form of (a) customs, beliefs and attitudes that confine women mostly to the domestic sphere, (b) women’s economic and domestic workloads that impose severe time burdens on them and (c) laws and customs that impede women’s access to credit, production inputs, employment, education, or medical care. A careful examination alludes to the fact that there is definitely need for sensitivity on the social and cultural barriers that may inhibit women’s participation in agricultural activities. The projects have marginal returns that are temporal and normally collapse with the exit of the development agent that can be either an NGO or
a government institution. However, Burkey (1993) and other scholars did not discuss the contribution of politics on how it determines access to irrigation plots. Furthermore, the study further interrogates family feuds in irrigation schemes.

Women are the principal producers of food in subsistence agriculture in developing countries. Men also share in agricultural fieldwork. In addition to farm work, women are solely responsible for housework including preparing meals, taking care of children and the elderly in the family and in most cases engaging in off-farm income earning activities. Women who are also heads of households find it particularly difficult to satisfy household food needs from own production only. For instance, women in Africa are central to the region’s food security for the following reasons: most African farmers are women and increasing their productivity will determine agricultural performance and rural incomes. Women support children, mostly through subsistence farming and petty trade, and head many of the households most at risk of food insecurity. Women are most likely to suffer from malnutrition during pregnancy and from carrying out such arduous and time and energy consuming tasks as fetching water and firewood (ODI, 1997).

(Ubels & Horst, 1994) suggest that women’s contribution to on-farm; off-farm and non-farm activities are highly acknowledged by governments, donors and NGOs, but not fully tackled at policy-making levels. Many national governments produce plans of actions in an attempt to improve the status of poor women, fail to achieve its objectives simply because it was either mainstreaming women’s concerns or treating their issues as an added component to their development programme. Both approaches proved to be of no relevance to solving the many problems, which women might face in
their daily life and in trying to produce enough food to feed their families and some surplus for the market and to ensure food security at household level.

According to (ODI, 1997) smallholder irrigation is favored in Southern Africa for a number of reasons: small-scale development is often physically appropriate to the resources available and suits traditional farming practices. Smallholder irrigation, despite its small scale, is complex; success and sustainability demand careful holistic design. Yet in general, schemes are or imposed on users, sometimes quite overtly, as in the case of resettlement schemes, and sometimes in a well-meaning attempt to reduce poverty and increase production. In either case, design is centered on water and plants and not on the people who will use the system. Now, not surprisingly, much of the complaint that surfaces in dialogue with irrigators relates to the difficulty of handling an irrigation enterprise with the resources available (Ubels & Horst, 1994; Chancellor& Hide, 1997).

Lamming (2001) argues that women engage in irrigation schemes to earn financial resources, as well as being a family tradition and personal interest. The scenario whereby more and more of men either temporarily or permanently migrate to urban areas or cross the border to South Africa has caused shortage of labor in rural areas like Umzingwane. As a result, more women are left behind, to do much of the farm work as paid or unpaid family labor. Other reasons that have been identified include the lack of other alternative occupations; acquisition of technical expertise; and husband’s influence. Davison (1997) also observed that religion and
availability of funds or farming facility also influence degree of women’s involvement in crop production. Apart from providing employment and income for resource-poor small farmers, especially women, family poultry also serves as a means of capital acquisition and accumulation.

In an effort to reach and engage the poor, it must be noted that some issues and constraints related to participation are gender-specific and stem from the fact that men and women play different roles, have different needs, and face different challenges on a number of issues and at different levels. The study does not assume that women will automatically benefit from efforts involving poor people in project design and implementation. Experience has also shown that unless specific steps are taken to ensure that women participate and benefit, they usually do not. (Van Koppen 1998)

Many irrigation and land reallocation projects have failed to incorporate appropriate gender strategies in design and implementation, which, in many cases, has exacerbated inequities in resource allocation. In many cases, women’s access to land and water has declined because of the introduction of irrigation schemes (Van Koppen 1998; Zwarteveen 2006a). The project improved family incomes and indirectly benefited women, but women lost their control over resources (land and money) and became dependent on their husbands.

Gender dynamics are very crucial in determining power, access, ownership, and control in any development endeavor. Sustainability is conceptualized as continuity of any given project and community participation is seen as a vehicle to achieve permanent development. Dressner (2002) argues that
sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their needs. Community participation is essential for any project to be sustainable. In order to sustain a project, people need to participate in it and be committed to it.

**Theoretical Framework**

The Umzinyatini Irrigation scheme is being assessed on the Sarah Longwe Framework. Leach (2003:56) explains that ‘the Sarah Longwe framework is intended to help policy makers, planners, managers, and evaluators assess the extent to which a policy, organization, or programme is committed to women’s empowerment, and if so, to what kind of empowerment and with what impact. However, the Sarah Longwe Framework is not the only Gender Analysis Framework. There is the Harvard Analytical Framework and the Caroline Moser Framework among others.

**Harvard Analytical Framework**

The Harvard Analytical Framework (sometimes referred to as the “Gender Roles Framework” or the “Gender Analysis Framework”) was developed by researchers at the Harvard Institute of International Development (HIID) in collaboration with USAID’s Office of Women in Development. It represents one of the earliest efforts to systematize attention to both women and men and their different positions in society. It is based upon the position that allocating resources to women as well as men in development efforts makes
economic sense and will make development itself more efficient – a position labeled as the “efficiency approach.” (Overholt, et al, 1985)

Key to the Harvard Analytical Framework is adequate data collection at the individual and household level, and adapts well to agricultural and other rural production systems. Data is collected on men’s and women’s activities which are identified as either “reproductive” or “productive” types, and is then considered according to how those activities reflect access to and control over income and resources, thereby “highlighting the incentives and constraints under which men and women work in order to anticipate how projects will impact their productive and reproductive activities as well as the responsibilities of other household members.” Data is collected in three components: an activity profile, an access and control profile that looks at resources and benefits, and a list of influencing factors. The approach helps those with little understanding of gender analysis useful ways of documenting information in the field: according to one donor, “It makes men’s and women’s work visible.” (Rao, et al, 1991)

Because the approach emphasizes gender-awareness and does not seek to identify the causes of gender inequalities, it “offers little guidance on how to change existing gender inequalities.” There is the expectation that having good data on gender will, on its own, allow practitioners to address gender concerns in their activities; it assumes that both the problem and the solutions are technical ones. Compared to more recent and more participatory approaches, the Harvard method does not involve informants in describing their own views of the development problems they face. (Rao, et al, 1991)
**Caroline Moser Framework**

This framework, developed by Caroline Moser, links the examination of women’s roles to the larger development planning process. The approach introduces the idea of women’s “three roles” in production, reproduction, and community management, and the implication that these roles have for women’s participation in the development process. In making these links, both between women and the community, and between gender planning and development planning more broadly, Moser’s framework encompasses both the technical and political aspects of gender integration into development.

The framework is composed of several components (or tools). In the first, the triple roles of women are identified by mapping the activities of household members (including children) over the course of twenty-four hours.

**Reproductive Roles:**
Childbearing and rearing, domestic tasks that guarantee the maintenance and reproduction of the current and future work force (e.g., cooking, cleaning, etc.)

**Productive Roles:**
Work done for remuneration, in cash or kind. (e.g., wage labor, farming, crafts, etc.)

**Community Management Roles:**
Work that supports collective consumption and maintenance of community resources (e.g., local government, irrigation systems management, education, etc.)

The second component identifies and assesses gender needs, distinguishing between practical needs (to address inadequate living conditions) and strategic needs (for power and control to achieve gender equality).
The third component, or tool, disaggregates information about access to and control over resources within the household by sex: who makes decisions about the use of different assets.

The fourth component identifies how women manage their various roles, and seeks to clarify how planned interventions will affect each one.

Finally, the WID/GAD policy matrix evaluates how different planning approaches (welfare, equity, anti-poverty, efficiency, and empowerment) have addressed the triple roles and women’s practical and strategic needs.

**Sarah Longwe Framework**

Sara Hlupekile Longwe, a gender expert from Lusaka, Zambia, developed the Women’s Empowerment Framework. Her model is explicitly political, arguing that women’s poverty is the consequence of oppression and exploitation (rather than lack of productivity), and that to reduce poverty women must be empowered.

The researcher specifically chose this model because the Longwe Framework was intended to help planners question what women’s empowerment and equality means in practice, and to assess critically the extent to which a development is supporting this empowerment (King, 2001). The ultimate aim of this Framework was to achieve women’s empowerment by enabling women to achieve equal control over the factors of production and participate equally in the development process alongside men (ILO, 1998). The Longwe Framework is in line with the researcher’s objectives that investigates issues of control, access, concientization, participation, and welfare of women in the Umzinyatini Irrigation Scheme.
This Framework was geared primarily toward improving planning, monitoring and evaluation, so has limited direct applicability to enhancing understanding of non gender aspects of intra-household difference (although improved planning can contribute indirectly to this understanding); however, the framework still raises some useful issues. The Framework develops the concept of practical and strategic gender needs into a progressive hierarchy, which depends on the extent to which an intervention has potential to ‘empower’; and emphasizes that empowerment is intrinsic to development (ILO, 1998). The Framework is also useful in identifying the gap between rhetoric and reality in interventions (King, 2001).

Sarah Longwe argues that poverty arises not necessarily from lack of productivity but from oppression and exploitation. She conceptualises five progressive levels of gender equality, arranged in hierarchical order, with each higher level denoting a higher level of empowerment. According to Longwe, these are the basis to assess the extent of women’s empowerment in any area of social or economic life. The levels of equality are demarcated as follows:

**a. Control**

This level of empowerment is seen as the highest and it means using the participation of women in the decision-making process to achieve balance of control between men and women over the factors of production, without one in a position of dominance.

**b. Participation**
This level of empowerment is the second highest in the hierarchy. It pertains to women’s equal participation in the decision-making process, policy-making, planning, and administration. In development projects, it includes involvement in needs assessment, project design, implementation, and evaluation.

c. Conscientization
This level of empowerment is the third highest in the empowerment levels hierarchy. It pertains to an understanding of the difference between sex roles and gender roles and the belief that gender relations and the gender division of labor should be fair and agreeable to both sides, and not based on the domination of one over the other.

d. Access
This is the fourth lowest level of empowerment in the empowerment hierarchy. It pertains to women’s access to factors of production, which include land, labor, credit, training, marketing facilities, and all publicly available services and benefits on an equal basis with men. Equality of access is obtained by securing equality of opportunity through legal reform to remove discriminatory provisions.

e. Welfare
This is the fifth and lowest level of empowerment. It pertains to the level of material welfare of women, relative to men, with respect to food supply, income, and medical care, without reference to whether women are themselves the active creators and producers of their material needs.
Operational Definitions

A number of conceptual problems are associated with the definition of community. One reason for this is that communities are seldom, if ever homogeneous and unified (Emmett, 2000:3). Swanepoel (1992:11) defines a community as a living entity, which like its people, continuously changes physically and psychologically. A community means interaction, equality, and opportunity within the group and the possibility to grow in a collective consciousness (Oakley et al., 1991:220).

Brown (2000:173) states that community participation is the active process by which beneficiary groups influence the direction and the execution of a project rather than merely being consulted or receiving a share of the project benefits. The beneficiary groups do this with a view of enhancing their well-being in terms of income, personal growth, self-reliance or other values they cherish (UNDP, 2000; Theron, 2005b:115-116). Nghikembua (1996:2) states that community participation is about “… empowering people to mobilise their own capacities, be social actors …, manage the resources, make decisions, and control activities that affect their lives.” Theron (2005b:117) agrees that community participation “… implies decentralization of decision making” and “… entails self-mobilisation and public control of the development process.”

Oakley et al. (1991:8) conclude by defining sustainability as continuity of what the community has started, and these researchers see participation as fundamental to developing self-sustaining momentum of development in a particular area. Honadle and Van Sant (1985:7) regard sustainability as the
ability to manage post-project dynamics with a permanent institution. Dressner (2002:1) states that **sustainable development** is development that meets the needs of the present without compromising the ability of future generations to meet their needs.

**Research problem**

Most studies on the sustainability of irrigation schemes tend to focus on the technological factors of irrigated agriculture (Gruhn, 2000; Khan, 2006 and Keller, 2008). Their main concern hinges on inputs, soil fertility, and efficiency of irrigation schemes mechanically. However, there is no information related to the characteristics of the irrigation plot holders in as far as gender is concerned. Moreover, their study is limited to commercial irrigation schemes in Chile and Bangladesh and ignores the experiences of communal irrigation plot-holders in sub Saharan Africa, particularly in Zimbabwe. The views of the irrigation plot holders concerning cropping patterns, politics of ownership of land, access, control, welfare and the nature of participation is not known. It is from this angle that the research seeks to unravel the information gap related to the sustainability of irrigation schemes in the gender context. Furthermore, research carried out by Chancellor, 1997 and Booth, 1999 tended to focus on Mashonaland irrigation schemes on cash cropping to the neglect of Matabeleland irrigation schemes. Their findings were on the need to develop appropriate technology for women in irrigation schemes. It must be acknowledged that the experiences of men and women in both provinces are different and therefore cannot be generalised. The socio-economic factors and the tribal dimension necessitate further investigation to the latter province, which is generally
marginalized. Umzinyatini Irrigation scheme is unique in the sense that it is located in the dry natural region IV that is subject to low rainfalls and periodic and seasonal droughts. There is no known case study research that has been done to ascertain the sustainability and the gender dynamics thereof.

Poor operation and maintenance of irrigation schemes, particularly smallholder schemes has been widely reported to affect the performance of irrigation schemes. The design of the scheme, availability of capital and other resources of the institutions and individuals running the scheme affect operation and maintenance. In Zimbabwe, commercial farmers make decisions on their schemes because they own the entire infrastructure and merely give orders to their workers on what to do in operation and maintenance. However, in smallholder irrigation many people are involved in making decisions and carrying out operation and maintenance of a single irrigation scheme. Men, women, and children are all involved in operation and maintenance. However, there is no adequate information on gender roles in operation and maintenance of smallholder irrigation schemes in Zimbabwe.

There is insufficient knowledge on the roles, responsibilities, and labor commitments of men and women in smallholder sprinkler irrigation schemes. Some schemes are designed such that they are not appropriate for operation by women (Chancellor, 1997), but all the same women operate them. As an example, pump operation may be too heavy and difficult for women. According to Mvududu (1994), women (widows) head most families and in some cases, men work in towns leaving their wives to work
in irrigation schemes. Planners must be aware of such possibilities. Schemes must be user friendly to both men and women and must be designed as such. There is no information on the appropriateness of the drag-hose sprinkler irrigation system in alleviating labor shortage particularly that of women and children. This also means that operation and maintenance training may not be targeted to the appropriate gender group.

Consequences of inadequate knowledge on who carries out operation and maintenance activities are that training may be wrongly targeted and planners may design irrigation technologies that are not appropriate for some communities. Women and female children have other major responsibilities at home that include household chores. These responsibilities may affect their roles in operation and maintenance of irrigation systems. Planners should consider this when designing irrigation technologies. In this context, the study will investigate the women’s marginalization, social roles, coping mechanisms, access to markets and recommendations that need to be made to scale up women’s meaningful participation in the irrigation scheme.

**Objectives of the study**

The study aims at achieving the following objectives:

- To understand factors determining women’s position as perceived by the community in general.
- To determine social influences that affect women’s agricultural production on plots.
- To explore challenges faced by women in the irrigation schemes.
To understand coping-mechanisms used by women to sustain agricultural activities.

To establish how women access markets and how the benefits are utilized.

Draw lessons and make recommendations, on how to scale up women’s meaningful participation in the irrigation schemes policy, programs and projects.

**Research Questions**

1. What are the factors determining women’s status or roles in the irrigation scheme?
2. What are the social influences?
3. How do women cope with agro-based gender inequalities?
4. Who makes the decision on the cropping patterns in the irrigation scheme?
5. What are the challenges faced by women in the access to markets?
6. What recommendations can be made on policy, programmes, and projects to improve women’s meaningful participation in irrigation schemes?

**Significance of the study**
The study seeks to explore the gender dimensions that are associated with smallholder-irrigated agriculture. Since 70% of the women are located in rural Zimbabwe as highlighted by Rugalema (1999), development projects implemented should seek to empower them socially and economically. Chancellor (1997) has shown that most income-generating projects purporting to empower women are imposed, increase domestic chores on women and are often male dominated in as far as decision making of irrigation produce is concerned. Oakley (1991) postulates that women’s indigenous knowledge systems are often ignored. Highlighting such dangers would help development practitioners to come up with a more holistic approach that is more involving for all members of the community particularly women. The World Bank Report (1994) states that the community participation strategy must recognize the need to maximize the participation of women, who are primarily responsible for household maintenance and hygiene. To ensure women’s participation, the project’s gender action plan requires equal representation of women and men on decision-making processes, equal access to employment and training opportunities, encouragement to women’s groups to apply for credit facilities, and other measures. The study will suggest recommendations specifically to government organizations like Agritex and the Rural District Council and the NGOs that deal in food security, poverty and women empowerment to gain further understanding on the significance of gender in sustainable irrigation in policy, programme and project level. The recommendations will encourage mainstreaming of gender in smallholder irrigated agriculture in the district through addressing challenges facing women. The suggestions will lobby for more support for women by all stakeholders in the scheme through training for marketing skills, giving
loans to women and exposing women in the scheme to other successful schemes in Zimbabwe through field visits. Moreover, a shift from top-down decision making to bottom-up decision-making shall be encouraged in issues related to cropping patterns and recognizing endogenous knowledge of smallholder irrigation plot holders in all activities.

Description of study area

Mzinyatini irrigation scheme is located in Umzingwane District of Matabeleland South Province. It is one of the most successful farmer managed surface irrigation schemes in Zimbabwe. Established in 1965, the scheme has never suffered from any problems, except in 1979 when it had to close down because of the liberation war, which was at its peak. The scheme is in the dry Natural Region IV and acts as a source of food security for the surrounding communities. Maize and wheat are sold locally and in most cases, they are used to pay hired labor. Crop yields are significantly high due to the use of recommended levels of inputs by most farmers. An average income of Z$ 20 000/ha was realized during the 1996/97 season. This is ten times the average income obtained under dry land. The successes of Mzinyathini irrigation scheme are the result of good planning, group cohesion and a capable IMC. The scheme now needs some rehabilitation since this has not been done since its implementation in 1965.

The Mzinyatini irrigation scheme is in the Mzinyatini communal area of Umzingwane District, Matabeleland South Province. The scheme is about 20 km from Esigodini business centre. The scheme is close to a number of business centers, which are Mawabeni (5 km), Mbalabala (10 km) and
Esibomvu (20 km). Roads from the scheme to all these centers are tarred except for that one to Esibomvu, which is a well, maintained all weather gravel road.

The scheme is located in Natural Region IV, a region that receives low rainfall and is subject to periodic seasonal droughts. Average annual rainfall is about 563 mm. Mzinyatini scheme is 32 ha large with 81 plot holders, each having 0.4 ha. The scheme draws water from the Umzingwane Dam, which is across Mzinyatini River. A surface irrigation system is used and water is gravitated from the dam to a night storage reservoir. From the reservoir, water is distributed into the fields through concrete lined canals.

Area Study Map and Demographic Composition (Figure 1)

**UMZIGWANE DISTRICT: CENTRAL STASTICS OFFICE 2002**

**Source: World Vision Files**
### 7.2 Table 1

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*Source: World Vision files*
History of the Scheme

Mzinyatini scheme started to operate in 1965, after the construction of the Umzingwane Dam. The scheme was a result of an agreement made between the Bulawayo town municipality and the government Department of Native Affairs in 1959. The two parties agreed to have a dam constructed on the Mzinyatini River. Included in the agreement was the understanding that the government was to be permitted to abstract 1 million m$^3$ of water from the dam free of charge for communal area development. Under the dam agreement, the Bulawayo municipality donated £30 000 (Rhodesian pounds) to the government for any purpose considered beneficial for the Mzinyathini communal people. Part of the money was used to develop Mzinyatini irrigation scheme and part of the money was used to provide piped water for domestic use and livestock in the Mzinyatini communal area. This involves pumping water from the night storage reservoir in the irrigation scheme to a command point and then bringing it by gravity to domestic supply points.

World Vision Objectives and Planned Activities in the Scheme

(a) Dam and Irrigation Rehabilitation in Umzingwane District in integrated with the promotion of sustainable production of maize, vegetables and legumes for HH consumption and surplus sale

The project will rehabilitate 10 collapsed and underutilized dams and irrigation schemes in Umzingwane that have high yield prospects for maize, vegetables and legumes. The project will sub-contract “A Technical Support Service Provider” to carry out the required dam and irrigation rehabilitation
works and to train local stakeholders on how to avoid and reverse environmental damage (e.g. siltation).

While maize will mainly be produced for HH consumption, beneficiaries will be able to produce vegetable and legume surplus for sale & barter. The proximity of Bulawayo (approx. 50 km) with its unmet demand for fresh vegetables bears high potential for significant income generation. 1200 food insecure HH will receive maize, vegetable and legume seed as well as fertilizer during year 1 and 2 of the project. They will be trained in appropriate cropping practices. They will also be trained on seed retention and multiplication in order to retain sufficient seed for year 3 and beyond. Training on the use of organic manure is another crucial element. In combination with nutrition and food utilization education, the produced vegetables will, improve the diet diversity & nutritional intake of the targeted HHs. Vegetable inputs will include conventional vegetables as well as high value vegetables and legumes (e.g. baby marrow, chilli, peas and butternut) for income maximization.

An assessment of factors impeding market linkages will be carried out and low cost measures to help farmers overcome these will be promoted by the project (e.g. facilitation of business related information flow, facilitation of transport arrangements garden input package consist of 10 kgs of maize, vegetable pack, 20 kgs of AN fertilizer and 20 kgs of Compound D fertilizer. Vegetable inputs will include conventional vegetables as well as high value vegetables carrot, cabbage, onion, rape, sugar beans and tomato. The vegetable pack will also include 10 kgs of vegetable fertilizer. While maize will mainly be produced for household consumption, beneficiaries will be
able to produce vegetable and legume surplus for sale and barter (at the same time HH consumption of vegetables and legumes will be promoted as much as possible through nutrition education and food utilization demonstrations with the aim of improving HH nutrition diversity and quality.)

The proximity of Bulawayo with its unmet demand for fresh vegetables bears high potential for significant income generation. An assessment of factors impeding market linkages will be conducted as part of the activity. The project will promote low cost measures to help farmers overcome factors identified by the assessment. Low cost measures may include but not limited to activities such as facilitation of business related information flow, and facilitation of transport arrangements.

In addition to provision of agricultural inputs, the targeted households will be trained in appropriate cropping practices and the use of organic manure. They will also receive trainings on management and maintenance of vegetable gardens including basic training and operations of pumps, as well as training in marketing of garden products.

While receiving training in vegetable cropping and management of water catchments, target households will also received training in health and hygiene education through Participatory Healthy and Hygiene Education (PHHE) programmes. PHHE programmes are developed to be locally sensitive and relevant and therefore involve a broad number of players including government institutions, community members and other technical persons. Typically, the information shared is focused on HIV & AIDS, malaria, water supply, latrines, balanced diet and control of diarrhea and
dysentery. The tools used to carry these messages include pocket health charts, the sanitation ladder, and a model nurse promoting health and hygiene. As part of this sub-activity, latrines will be constructed at the irrigation site to provide farmers with access to sanitation facilities while cultivating their gardens.

Selection of beneficiaries

- Low/No Productive Assets (Cattle, goats, ploughs, scotch carts, hoes etc)
- No or very limited livelihood strategies/capacities that a household is able to engage in— No or very limited off farm income, remittances, formal employment etc.
- HH Dependency ratio
- Vulnerability criteria such as the presence of chronically ill household members in a HH
- No/Low Food stocks/production
- Other factors/characteristics deemed by the target communities (established by community consultation prior to the targeting exercise).

9.1  *File photograph (1)*
Umzinyatini irrigation Scheme- wheat at soft dough stage-81 plot holders& each farmer has 0.4 hectares of land.

File photograph (2)
Maize in Umzinyatini irrigation Scheme

**De-limitation of the Study**

The study was done in Umzingwane Rural District in Mawabeni ward 5. The respondents consisted of both men and women involved as plot holders at Umzinyatini Irrigation Scheme. The study was confined to plot holders who have been members of the irrigation for the past two years and more.
CHAPTER TWO: LITERATURE REVIEW

Introduction

This chapter discusses the concept of sustainable development from a global and historical context. It explores the overview of irrigation schemes in Zimbabwe. The chapter discusses different methods of irrigation before introducing women and smallholder irrigation schemes, the impact of irrigation on men and women, two case studies of irrigation schemes and the challenges faced by women in irrigation schemes. The chapter concludes by focusing on women’s participation, control and Women’s User Associations in irrigation schemes.

Conceptualizing Sustainable Irrigation

Sustainability is an important topic in development intervention and discourse, especially related to the use of natural resources. Concern comes from evidence of the depletion and deterioration of resources, particularly water. This paradigm has become mandatory for governments, donors, practitioners, and a generalized concern in international spheres during the last three decades. At the same time, it has constituted a strong argument to get funds for development programs and projects implemented by governments and nongovernmental organizations (NGOs). Within academic spheres, the topic has also been dealt with from different perspectives, some trying to specify and present explicit content, others advocating its importance without providing concrete measures, and finally other streams
tend to be prescriptive by applying in “developing countries” what is supposed to be working in the “developed world”. It is generally agreed that sustainability is understood as “the need to ensure the preservation of natural resources involved in economic activities over time for future generations”. In this context, sustainability of irrigated agriculture is an obvious issue because it relates two key, mutually dependent, and critical global concerns: food supply and water access and use.

**Sustainable Development in Global and Historical Context**

Sustainable development entered the development discourse in the early 1970s. The 1972 UN Stockholm Conference on the Human Environment may be argued to be the first international conference that brought the concept of sustainability to the international arena. However, there is a general consensus in the literature that it was the 1987 World Commission on Environment and Development (WCED) that was largely responsible for providing the normative-conceptual bridge between environmental concerns and development outcomes (Langhelle 1999: 145). Sustainable development was further legitimized following the United Nations Conference on Environment and Development held in Rio de Janeiro, Brazil in 1992 (known as Earth Summit); the United Nations Conference on Sustainable Development held in 1993; and the World Summit for Sustainable Development that was held in Johannesburg in 2002. These conferences facilitated the globalization of the concept and the establishment of an international consensus on the concept of sustainable development by the formulation of such action plans and guidelines such as the Brundtland Report and Agenda 21.
Owing to what Meadowcroft (2000) describes as the “sweeping nature of this ideational construct”, a variety of definitions have been conferred on the concept of sustainable development. However, the most popularly employed definition, provided by the Brundtland Report (WCED1987), argues, “Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs”. Another often-quoted definition of sustainable development is the one provided by Caring for the Earth: “improving the quality of human life while living within the carrying capacity of supporting ecosystems” (cited by Munro, 1995).

Among the multiplicity of definitions and interpretations there is a general view that identifies ecological and environmental factors as the limiting factor on development. At the core of these views is the notion of an “inter-temporal conflict of interest” between the development practices of present generations and the perceived needs and capabilities of future generations (Langhelle 1999). Critical to this agenda is the requirement of compromise between ‘needs’ and ‘wants’, hence the idea of limitations placed on the development process in order to sustain or improve the balance between homocentric and nature-centered development (Galtung 1996).

Sustainable development has traditionally been focused on an environmentalism framework that gives priority to the issue of ecological degradation. One can safely argue that environmental concerns are the cornerstone of sustainable development. Until recently, sustainable development was viewed solely through the lens of the environmentalist but as the concept has matured, increasing emphasis has been placed on its interconnection to social and economic dimensions of development.
Indeed, contemporary mainstream notions of sustainable development portray it as a tri-dimensional concept featuring the interface between environment, economic, and social sustainability” (Bell, 2003; OECD 2001).

The economic dimension of sustainable development (economic sustainability) reflects, according to Munro (1995), the need to strike the balance between the costs and benefits of economic activity, within the confines of the carrying capacity of the environment. Economic progress should not be made at the expense of intergenerational equity. Therefore, resources should not be exploited to the extent that their re-generative ability is compromised.

**Defining the Objectives of an Irrigation System**

According to Lipton et al. (2004) cited by Haile (2008), there are four interrelated mechanisms by which irrigated agriculture can reduce poverty, through: (i) increasing production and income, and reduction of food prices, that helps very poor households meet the basic needs and associated with improvements in household overall economic welfare, (ii) protecting against risks of crop loss due to erratic, unreliable or insufficient rainwater supplies, (iii) promoting greater use of yield enhancing farm inputs and (iv) creation of additional employment, which together enables people to move out of the poverty cycle. In the same way, Zhou et al. (2008) mentioned that irrigation contributes to agricultural production in two ways: increasing crop yields, and enabling farmers to increase cropping intensity and switch to high-value crops. Therefore, irrigation can be an indispensable technological intervention to increase household income.
Overview of Irrigation Schemes in Zimbabwe

Small-scale farmers dominate the agriculture sector of most developing countries and are now perceived as key players in increasing global food production and achieving food security (Frausto, 2000). In the past, it was though that large-scale irrigation schemes could help overcome production shortfalls in these regions. Unfortunately, few of the large-scale schemes have met the ambitious targets identified at their conception (e.g. Samakande et al., 2004; Senzanje et al., 2003). The cost of continued maintenance are often not met, and a large number of schemes throughout Zimbabwe have been identified by the Ministry of Water Resources and Infrastructure Development as requiring rehabilitation to allow for better utilization of existing irrigation potential (News net, 2005). Furthermore, many dams developed for irrigation purposes are heavily underutilized (Love et al., in press; News net, 2005).

In an effort to address these issues interest has been growing in recent years to develop alternative water management practices that will improve productivity and livelihood of small-scale farmers (e.g. Chigerwe et al., 2004; Maisiri et al., in press; Nkala, 2003; Polak et al., 1997). It is in this context that a global initiative has been developed for small- holder irrigation. This initiative for smallholder irrigation is one of the world’s most ambitious poverty reduction plans. It is designed to enable 2 million poor households a year to take a major step on the path out of poverty. This initiative is expected to benefit 30 million poor and landless households around the globe by 2015 and should bring 1 million hectares under irrigated cultivation over the next 15 years (Hussain et al., 2002). The focus on
upgrading smallholder agriculture is essential, since smallholder farmers make up around half of the food insecure population of the World (FAO, 2004).

Most governments in arid and semi-arid regions are supporting the development of irrigated agriculture either at small or large-scale levels. This is aimed at mitigating the adverse impacts of climate and variability on the social, economic, political, and environmental well being of their populations. Irrigation development serves to achieve double or treble cropping per year, utilize land and water resources more efficient than rain fed farming (Makadho, 1994, Pazvakavambwa and van der Zaag, 2002).

Despite the considerable potential of irrigation, several smallholder irrigation projects in developing countries have been labeled ‘socio-economic failures’ (Makadho, 1994; Chancellor and Hide, 1997). Poor performance of most smallholder irrigation systems (assessed in terms of water delivery, agricultural production, and socio-economic indicators) is largely affected socio-economic and biophysical factors. The under-performance of smallholder irrigation schemes in most developing countries is largely a result of complex interrelated factors. These include; inadequate inputs, inaccessible markets (Adams, 1990; Meinzen et al., 1994; Makadho, 1994; Rukuni et al., 1994), government policies on land tenure which do not create a conducive environment for successful operation of irrigation schemes (Tafesse, 2003), sub-standard infrastructure (Croxall and Smith, 1984; Motsi et al., 2001; Manzungu, 1999a).

The Government of Zimbabwe’s strategy to increase food production through irrigation has faced a number of challenges. The performance of most irrigation schemes has been heavily compromised by management
problems mainly emanating from the communal ownership and management of the irrigation infrastructure. In some cases, farmers have failed to meet electricity and water bills. Some of the water sources, mainly dams, have been heavily silted because of poor catchment management up-stream. The dominant irrigation system in use in Zimbabwe is flood irrigation with low water-use efficiency yet water is the main limiting factor to irrigation development in Zimbabwe. (Tafesse, 2003)

The apparent convergence of the findings suggests that smallholder irrigation has always had a political dimension as it embodies land and water, two of the most contentious issues in Zimbabwean history (Rukuni, 1984). Similar studies carried out by Matiza-Chiuta, (2000) concur that water access tensions are omnipresent between smallholders, large-scale farmers and users. The problem of water sector include: competition for a scarce and finite resource between and among large-scale and smallholder farmers; poor resource management; declining quality of the limited resource; disappearance of expensive irrigation infrastructure during the land transfer; competition for state generated finances; lack of a common policy or benchmark by which to judge actions in the sector; too little coordination; and recurrent drought.

The central argument raised by Matiza–Chiuta, (2000) is that the political changes brought about by the fast track land reform programme have renewed the debates on access to water for irrigation purposes. The successful implementation of water reforms in the late 1990s were overshadowed by the political conflict over land. Land distribution largely ignored the issues of the allocation of water resources. However, the
droughts of 2001 and 2002 coincided with the implementation of the fast track land reform and brought the water access issue to the forefront. Conflicts arose over the allocation of land endowed with water, resulting in theft and destruction of equipment on settled farms. Conflicts also sprung up over government financing for irrigation rehabilitation and highlighted the importance of irrigation for enhanced agricultural productivity. Nevertheless, the above study does not address the policy and legal framework before and after independence, which tended to favor large-scale irrigation schemes at the expense of smallholder irrigation schemes in communal areas. The norm was that smallholders have always had limited access and inadequate state support in matters of water resources.

In marked contrast to political influences to sustainability of smallholder irrigation schemes, (Manzungu, 2003) declares that most smallholders lack the technical and expertise and resources to maintain the schemes. Several problems have emerged from the technologies designed for smallholders. In most cases, the operation and maintenance of infrastructure is inadequate. Many of the smallholders face delays in repairing pumps. Electricity is sometimes disconnected due to non-payment of the bills or due to load shedding by the Zimbabwe Electricity Supply Company. In some schemes, the gate valves and infield hydrants leak and canals are rarely repaired on time. This compromises the sustainability of any irrigation scheme.

Senzanje, (2000) blames the failure of smallholder irrigation schemes to be sustainable on central government departments. The argument is that such schemes presided by the central government often have poor marketing arrangements, poor access to water and inability to meet operational costs due to poor fee structures and the lack of a sense of ownership. Besides,
financial viability and poor governance are major hindrances. He further argues that some of these problems have necessitated government-transferring responsibility to farmers. The government, however, has often failed to recognize traditional common property systems of water management. Whilst in communal areas of Zimbabwe common property resources, such as land, water, and grazing rights, are often determined and administered at village level by chiefs, irrigation schemes are managed by government. In turn, governments have tended to enforce rigid land and water regulations and tended to ignore the realities of social organizations in rural Africa (Spore, 2000). Smallholder irrigation has tended to be seen as eroding the social functions of village systems and make them beneficiaries of resources and services.

Several evaluation studies have suggested that smallholder irrigation schemes (initiated and constructed by the government, which may be community- or government-managed) have poor performance and are not sustainable. Problems identified include poor water utilization, in terms of its timeliness and adequacy to the field, and poor water application to the field (Pearce and Armstrong, 1990; Donkor, 1991; Makadho, 1993). Crop yields have been low and way below those achieved in the commercial farming sector. The poor agricultural performance has translated into poor financial and economic viability, thereby necessitating heavy government subsidies, up to 75% in some cases. The Rukuni Commission (Rukuni, 1994) found that the irrigation subsector in the communal and resettlement areas was dramatically under budgeted by the state and required change.
Methods of Irrigation

Irrigation methods are the systems how to obtain water for irrigation purposes from its sources. According to Dupriez and De Leener (2002), irrigation methods depend on several factors such as topography, water resources, the plants cultivated, the land tenure systems, the growing seasons and the rain and water regimes.

Surface Irrigation

There are only two general methods of applying irrigation water. The first is surface irrigation. Surface, irrigation means above the ground, and is the method generally adopted in all countries. There is a great variety of methods of surface irrigation, most of which do not merit serious consideration, because either they fail to recognize the natural laws underlying irrigation, or their cost of installation is unaffordable in the current context. The second is sub-surface irrigation, the application of irrigation water from below. Sub-surface irrigation has the advantage that water so applied is not subject to such direct evaporation from the surface as of necessity accompanies surface irrigation. According to Widtose (2001), surface irrigation methods are furrow irrigation, flood irrigation basin irrigation and boarder irrigation. The choice and adoption of these irrigation methods are depending on the nature of the soil, the contour of the land, the head of the water stream, the quantity of water available, and the nature of the crop.

Basin Irrigation
A basin is a piece of land, small or large, surrounded by earth bunds in which water is ponded. The water can be impounded within it to irrigate trees, vegetables, or crops grown in patches. The field is divided into compartments or checks wholly surrounded by levees. The water is contained at the upper end and completely fills the compartments until it overflows at the lowest point of the levees.

**Furrow Irrigation**

In this method, the water is guided in the furrow or channels that pass through the whole field, but the water covers only part of the soil surface, so it results in less evaporation. The furrows are separated with ridges. At each ridge, water is conveyed into furrows that can be perceived as narrow basins or borders. Furrowing is applied on steep slopes. The following file photograph shows an example of furrow or canal irrigation at Umzinyatini Irrigation Scheme.

*File photograph (3)*
Flood Irrigation

In flood irrigation, the water applied covers all of the soil. It is the least controlled of all surface irrigation techniques. Water is conveyed in a ditch at the upper part of plot and allowed to spread over the land in a manner directed by the natural landscape. Flooding is best applied when the slope is limited.

Border Irrigation

The border method of irrigation is an open-field method. Here the land is divided in to elongated plots confined between low earth banks and configured to slope uniformly from the point of supply. The land surface
should slope gently in the direction of flow and it is generally leveled laterally, along all cross sections perpendicular to that direction. Water is guided over the land by field ditches.

**Sprinkler Irrigation**

According to Dupriez and De Leener (2002), Sprinkler irrigation imitates rainfall. It is also called overhead irrigation. The water is broken up into fine droplets and falls on the ground or the vegetation. It is the application and distribution of water over the field in the form of a spray, or a jet which breaks into drops or droplets, created by expelling water under pressure from an orifice.

In contrast to surface irrigation, sprinkler systems are designed to deliver water to the field without depending on the soil surface for water conveyance or distribution. To prevent pondings and surface runoff, sprinklers are designed and arranged to apply water at a rate that does not exceed the soil’s infiltration. Water application efficiency under sprinkling irrigation is strongly affected by wind, especially during daytime when the air is warm and dry, and if the droplets are small and the application rate is low.

**Drip Irrigation**

The principle of drip irrigation is to wet dry ground with small amounts of water just where the plants can absorb it. Drip irrigation is practiced in dry,
arid regions where water is scarce and must be used sparingly. Water is delivered to the points via a set of plastic lateral tubes laid along the ground or buried at a depth of 15-30 cm and supplied from a field main. These tubes are left in place throughout the irrigation season. Drip irrigation can save water by reducing the portion of the soil surface that is wetted thus, decreasing the amount of direct evaporation.

Women and Smallholder Irrigation Schemes

Irrigated agriculture accounts for two-thirds of the water withdrawn from the earth’s--rivers, lakes, and aquifers and produces approximately 40% of total food production (FAO, 1996). Demand for water to satisfy the needs of industry and populations are increasing. On a global scale, agriculture will be obliged to give up water for higher-value uses in cities and industries. Water to satisfy these demands can be found by irrigated agriculture becoming more efficient. The challenge is to sustain irrigated food production with less water. In Africa, difficult climatic conditions, a general lack of suitable crop varieties and sufficient fertilizer inputs, labor scarcity, insecure land and water rights all militate against large-scale developments. Much of the irrigation development is small-scale, therefore, and involves smallholder families who typically irrigate plots ranging in size from 0.1 ha to 5.0 ha. Water-use efficiency in smallholder irrigation schemes is in the range 30% to 60%, leaving substantial room for improvement (Chancellor & Hide, 1996). As irrigation, development is crucial to ensuring food security in both the short and long terms, and small-scale irrigated production will have to supply an increased amount of food with less water in the future.
Another feature of African irrigation is that women are major contributors to the irrigation workforce. They also bear a heavy responsibility for fetching and carrying water for their families. Water scarcity problems fall particularly on them. To achieve improvements in water-use efficiency in Africa will require women to become more efficient water users. A complex interaction of physical, economic, and social issues to improve the skills and participation of women needs to be addressed if smallholder production is to ensure sustainable improvements and water savings. (Chancellor & Hide, 1996,)

Senzanje, (2000) further argues that the situation of smallholder farmers is further exacerbated by poor infrastructure namely, poor access to roads, lack of market information, poor transportation and poor storage facilities (resulting in post- harvest losses). It is estimated that up to 15% of production in Sub- Saharan Africa is lost between farm gates and consumers, owing to poor roads and storage facilities. This results in low incomes for smallholder farmers. Apart from supporting infrastructure, smallholder farmers need assistance in setting up appropriate marketing information systems so that they have access to market information regarding prices, market demand, and other external information. Emphasis on quality of produce and products should be a source of sustainable competitive advantage for smallholder farmers in the long run.

**The Differential Impact of Irrigation on Gender: Evidence from Case Studies**

The direct impact most often attributed to (and aimed for) with irrigation is increased agricultural production. The literature on gender and agriculture
provides a long list of examples of how women and men may differentially contribute to, and are differentially affected by, increases in agricultural production. These differences relate to:

1. The allocation of labor, land, water and other resources to the cultivation of irrigated crops; to construction and maintenance activities and to participation in users’ organizations.

2. The use of the outputs of irrigated agricultural production, e.g. consumption, storage for use, exchange or sale. Several studies of irrigation development in Africa show that women and men may be differentially motivated to invest labor and other resources in irrigated crop production. Some show how women, because of new irrigation interventions, have lost access to land and to the proceeds of harvests in favor of their husbands and male relatives (Case study 1).

Similar examples have been found elsewhere. A study of an irrigation project in the Cameroon for example, showed that women tried to minimize their labor contributions to the newly irrigated rice crop controlled by their husbands in favor of their individually controlled sorghum production. The serious intra-household conflicts over the income from rice was a significant factor in depressing the amount of labor available to rice production, which in turn negatively affected cultivated areas (Jones, 1983; 1986).

**Case study 1. The Jahally Pachar Project, the Gambia**

A well-documented example is that of the Jahally Pachar Project in the Gambia (Dey, 1990, Carney 1988; van Hooff 1990). In this project, an initial
assumption was made that men were rice growers with full control over the necessary resources. Incentive packages included cheap credit, inputs, and assured markets offered to male farmers. Negotiations about the allocation of land to be irrigated were made with male elders of the villages, as a result of which land traditionally controlled by women now came under the control of men. All access to inputs, labor, and finance was mediated through husbands. Women were expected to contribute their labor to the newly irrigated fields, but they became increasingly reluctant to do so as they did not directly benefit from the higher yields. They demanded compensation from their husbands for their work, in the form of cash, a share of the rice harvest or access to their own irrigated plot. If the husbands were not willing or able to provide their wives with some sort of compensation, women withdrew their labor from the irrigated plots. This had a far-reaching impact on the social organization of the household production, and on the overall productivity of the project. In the first year of the project, when women had not yet withdrawn their labor (1984), average dry season pump-irrigated yield was 7.5 tons per hectare. In the 1985 and 1986 dry seasons, the yield averaged only 5.7 tons.

Case study 2. The Mahaweli Ganga Irrigation System, Sri Lanka

This project was initiated in the late 1960s with food production as the main aim. However, 10 years since the first constructions were started in the so-called H-area; this region had the highest percentage of chronic under nutrition in the whole of Sri Lanka: 38.5% compared with the national average of 6.6% (Siriwardena, 1981). The women attributed the nutritional
shortcomings to the fact that they were unable to grow their own food crops in the settlement. The land had been allocated for producing cash crops from paddy and the income from the sale of paddy were given to the male farmers. It was difficult for women to make legitimate claims to this money, and it often occurred that very little of it was spend on household needs. Traditionally, rain fed millet cultivation had been the responsibility of women, whereas men were much more associated with paddy production. In the new settlement area, women no longer had access to land for the cultivation of rain fed crops, and thus became entirely dependent on the paddy crop for feeding themselves and their families. The compound around the house was hardly big enough for a latrine and some fruit trees. According to all, the diet had severely worsened since living in the colony, and mothers complained that their pre-school children were continuously ill (Schrijvers, 1986).

A Gender- Sensitive Approach to Irrigation Management

Women tend to be invisible actors in irrigation, partly because they commonly do not own land, partly because they are identified with low technology or traditional subsistence farming and partly because of gender-biased social structures and support services, including irrigation agencies themselves. However, women are crucial to successful smallholder irrigation because they contribute most of the labor requirements. Innovation or change to empower women to perform irrigation better will therefore have a strong impact on irrigation performance. Few irrigation departments keep separate records relating to men and women irrigators and, therefore, are blind to differences in conditions or performance. (FAO, 2008)
Opinions about the role of women in irrigation are often based on results of small, intensive sociological studies. While the quality of such studies is good, there are inherent dangers in expanding the experiences of isolated studies to policy level decision making. On the other hand, understanding of the roles of men and women stakeholders is essential to interpretation of statistical information (Zwarteveen, 1994). Participatory development techniques are often adopted in an attempt to resolve these difficulties but women are relatively inactive in the participation process. Social, cultural, institutional, and physical constraints all contribute to women’s apparent reluctance to participate (Olson, 1995: Silva-Barbeau, 1996).

Women are major contributors to household and national food security, particularly in irrigated areas. Yet their contribution in this sector often goes unrecognized and is not rewarded. This further reduces their lack of bargaining power, their ability to participate or gain access to resources, and training that might enable them to improve their contribution.

During the “Women in Development” decade, (1975-1985) attention focused on directing development projects to women beneficiaries. As a result, “Women's projects” were promoted. Subsequent evaluation reveals mixed results. Although there were some successes, projects commonly marginalize women from mainstream economic development, either by selection of inappropriate technology or by increasing women's workload. The attitude that women can be provided for in a minimalist way whilst the real business of development remains in male control is common among governments and donors. Other projects were found to be unsustainable; in many cases because they were socially unacceptable. Unfortunately, many
projects were not evaluated and the long-term impact on women remains unrecorded.

Recently, the importance of women to the success of sustained irrigated production has received wide recognition. In Africa particularly, women provide labor for irrigated production on a day-to-day basis especially in female-lead households, which now account for some 25% to 35% of smallholder irrigators (Chancellor, 1997). Thus many women are entirely responsible for the household irrigated production and many more consistently increase the range and intensity of their activities as their men spend longer periods working away from home. In most rural irrigating households, women have a key role in production. It is imperative for all these women and their families that they are able to improve food production and sustainable agriculture through effective irrigation. Rural women still lag behind men in attainment of literacy and numeracy. Women come from low skill levels so that investment in the education and training of women can have a significant impact on irrigation performance and irrigated production. The case for targeting women in training programmes is further supported by the findings of the World Bank who claims that investment in the education of females had the highest rate of return of any possible type of investment in developing nations (FAO, 2008).

The 1992 UN Conference on Environment and Development (UNCED) declaration “Agenda 21” calls on countries, funding agencies, and institutions, to redress the imbalance, which now exists between men and women, in control and access to resources and rewards for work. Agencies
such as UNIFEM and INSTRAW are dedicated to the principle of equality of opportunity and reward. This international commitment to equal opportunities has policy implications that cannot be ignored. The International Food Policy Research Institute (IFPRI) and World Food Programme (WFP) emphasized, during the World Food Summit in Rome, November 1996, the positive and far-reaching social benefit of money in women's hands. Women spend family incomes on health, nutrition, and education.

Furthermore, studies done by (FAO, 2008) suggest that a profile of best farmer characteristics was found and significantly, more of the best farmer heads of households were men who were managing the farm. This is also true according to Dlova et al (2004), who found that it was expected because males are physically capable of coping with the manual demands of farming practices. Women are also expected to perform domestic chores in the household. The exclusion of married women from decision-making activities of the farm even though their husbands were not farmers had an impact on the ability of the females to be successful (Dlova et al, 2004). This means that males would be more likely to succeed compared to females.

**Challenges Facing Women in Irrigation Schemes**

The majority of people directly involved in irrigated agriculture in Southern Africa are women and they are involved to the greatest extent at the lowest level. They provide much of the human labor in the fields although they do not usually have either land or water rights. Although they participate in the management of small schemes, they are usually out numbered on
committees and take a minimal role in decision-making. The trend for women to be solely responsible for irrigated farming has increased significantly as urbanization accelerates and the AIDS pandemic takes effect. This change has not been matched by women’s increased control of resources or involvement in management decisions. Yet future development of smallholder irrigation in Southern Africa will depend on improved returns to investment in irrigation and more than ever this means that women’s needs must be prioritized. (Chancellor and Hide, 1997)

HIV/AIDS frequently has severe consequences for rural widows of AIDS victims. In sub-Saharan Africa and Asia, women contribute to more than half the food production and are usually involved in the most labor-intensive farming activities like irrigation schemes (UNAIDS, 2002). However, in areas where women are not permitted to inherit property, they may lose access to land and other assets when their husband dies (FAO and UNAIDS, 2003). In some cases, the cultural division of labor makes it impossible for women to assume the farming tasks previously performed by their husbands, and they are forced to abandon farming. Inequality in access to credit, employment, education and information all make women more vulnerable to the negative impacts of HIV/AIDS (Stokes, 2003). Moreover, the stigma of the disease may inhibit widows from seeking community and extended-family support, which are vital safety nets in rural areas.

More than 50% of Zimbabwe’s population reside in rural areas and are dependent on smallholder agriculture for their livelihood. Impact studies reveal a decline in cultivated acreage for the 1997/98 season due to reasons
related to HIV/AIDS: shortage of labor, lack of essential inputs, draught power, and farm implements. Besides the decline in crop acreage, AIDS-affected households showed poor crop management and harvest, experiencing losses in marketed output of more than 50% in maize, cotton, and sunflowers. The loss of husbands, who are often solely responsible for marketing, led to marked declines in revenue and marketed produce, especially maize and cotton. So far, Zimbabwean data do not indicate a dramatic switch from cash to subsistence crops. (Kwaramba, 1997)

According to (Stokes, 2003) ownership of an irrigation plot in Zimbabwe had always been a preserve of men, often a source of problems when husband and wife did not share the same level of commitment in the venture. Some husbands even destabilized management of the plot or misused earnings to discourage their wives. At Hama Mavhaire, however, about 50 percent of the plot holders are women.

Cultural and Social Constraints on Women in Irrigation Schemes
The fact that separate meetings are needed to allow women to speak freely indicates the strength of cultural and social constraints. In the field, there are in most places, clearly defined roles for women in irrigated production processes. The gender allocation of work or crops is determined by established gender roles such as women’s role on food provision and men’s role in animal traction. Increased commercial activity in smallholder farming is leading to change and affords opportunities for women to increase income generation from irrigated agriculture. (FAO, 2008)
The argument for increased efficiency of water use because of female involvement may do much to encourage men to support policies to offer training to women. In general, men do not oppose training for women and accepted women extension staff without problem. Although men commonly claim to consider women and make decisions for the good of women, they appear blind to the possibility that women may view development differently to men. Techniques to encourage farmers to investigate strengths and weaknesses of sub-groups of irrigators in their schemes would improve the gender-awareness of both men and women farmers. Involving men and women in identifying training needs has the potential to increase participation in training and to enhance the adoption rates of new techniques. (FAO, 2008)

Women regard personal capacity building as important. A lack of control over their productive agricultural resource makes it difficult for women to control benefits and they are challenged to improve their situation. In marriages, although women’s difficulties are as important as in households where men are absent, the challenges are different. Both groups suffer heavy workloads but additionally married women are subject to the view of their husbands, although they also derive physical and financial support from the men. Female “heads of household” gain experience in making decisions but loose in terms of physical and financial support. (ibid)

The lack of female participation at higher levels of irrigation policy formulation contributes to the neglect of women's views, lack of emphasis on the positive aspects of female participation and inattention to gender aspects of irrigation design and rehabilitation. Male professionals accept this
aspect as the perceived natural outcome of women’s failure to take an interest in technology. The strategic disadvantage created through lack of women at a policy level limits the benefit derived from women's participation in “women's meetings” at the community level. (ibid)

Women and Control

Women's contributions to food production and food security would be far greater if they enjoyed equal access to essential resources and services. In many societies, tradition and laws bar women from owning land. According to (FAO, 2011) In South and Southeast Asia more than 60 percent of the female labor force is engaged in food production but, in India, Nepal and Thailand for example, less than 10 percent of women farmers own land. Without land to serve as collateral, women is also cut off from access to credit. Moreover, without credit, they often cannot buy essential inputs – such as seeds, tools, and fertilizer – or invest in irrigation and land improvements. In Jamaica, for example, women typically receive only 5 percent of loans granted by the Agricultural Credit Bank. Because their role in food production is rarely recognized, women rarely benefit from extension and training services that would teach them about new crop varieties and technologies. A recent FAO survey found that female farmers receive only 5 percent of all agricultural extension services worldwide. In Egypt, where women make up more than half the agricultural labor force, only 1 percent of extension officers are women.
Factors Determining Women’s Participation in Water Projects

Recent attempts at the devolution of irrigation management to the local level, such as participatory irrigation management (PIM) policies, only target ‘landowners’, typically male household-heads as members of Water User Associations (WUAs) responsible for decision-making on the distribution and management of water. The rural household is perceived as a unit of congruent rather than conflicting interests and women in this model are seen to benefit indirectly as co-farmers through their husbands’ rights to water. (Koppen, 2005)

However, while women may share similar irrigation related needs on family plots – sufficient water for growing one or more crops a year – there may be differences of opinion regarding the timing and timeliness of water delivery (Zwarteveen 1997). Women often have to balance other household tasks along with irrigation and usually find it difficult to irrigate at night, particularly if they are single women, because of social norms defining mobility and security concerns. Female-headed households usually have to hire (male) labor to help with irrigation or depend on social networks of family and friends during the peak season. Moreover, female farmers who grow the same crops as men, and should be entitled to receive an equal amount of water, find it difficult to claim and receive their water entitlement, especially when water is scarce.

Sometimes irrigation can lead to food insecurity because of the shift to cash crops, thus increasing household dependency on the market and devaluing indigenous knowledge systems. For example, in the Gambia, traditional swamp rice farming practices and knowledge are being lost as more land is
pushed into irrigated fruit and vegetable production for export purposes (FAO, 2008). Research in Malawi shows that children of cash crop cultivators are less well nourished than those of small women subsistence farmers.

Irrigation also has an impact on female labor participation, albeit mixed, providing employment opportunities for women on their husband’s plots (unpaid, extra work), or as agricultural laborers on land belonging to large farmers. At the same time, the introduction of irrigation in dry land or rain-fed areas may reduce distress migration, particularly by women, as it enables families to grow a second or third crop (Ahmed 1999). Women also use irrigation water for other purposes, such as watering cattle, washing clothes and utensils in canals or watering their kitchen plots gardens.

Gender-sensitive technology is another important, but seldom considered factor, for enhancing women’s access to irrigation. In a study of peri-urban agriculture in Nairobi, a growing income-generating opportunity, many women farmers found the water pumps in use too costly and not easy to operate or manage (Hide and Kamani 2000). Women find themselves excluded from male networks, remaining at the back of queues for spare parts and repairs (Chancellor et al. 1999). In contrast, in water-rich areas of eastern India, the non-profit organization International Development Enterprise (IDE) changed its marketing strategy based on market research to target the purchase and maintenance of treadle pumps to small and marginal women farmers (Prabhu, 1999).
The experiences of female irrigators, who are officially entitled to join users’ groups, illustrate that women often find it difficult to bring their opinions and needs forward. Attending meetings and discussing matters in public may be thought of as typical ‘male’ activities, associated with political gatherings, which are often traditionally confined to men. In some cases, women are not expected or encouraged to speak in front of men or in public. Moreover, they frequently lack the confidence and the experience to deal with irrigation matters in public, since all interactions with outside institutions mostly take place with men, and since men often receive the bigger part of information and training. Women in Nepal were reluctant to attend water users’ meetings because they were sure that nobody would listen to them (Bruins and Heijmans, 1993).

In Sri Lanka, female farmers often prefer to send a male relative to meetings rather than going themselves. They may also ask a male friend or neighbor to represent their interests, send a letter to the irrigation officials, or try to meet separately with one of the office-bearers of the water users’ organization. It may also be that participation in meetings is simply not judged efficient and rewarding. In Peru, women stated that it was of little use going to meetings, since the most important decisions were not taken in those meetings but during informal get-togethers of men (van de Pol, 1992).

**Gender and Irrigation Scheme Nexus**

Despite the growing recognition of the different needs of women irrigators, their participation in community water management associations is limited or lower than men’s for a variety of social and institutional reasons. Formal membership is often restricted to those who legally own irrigated land, or are
household-heads, or sometimes a combination of both factors (Zwarteveen, 1997). Since these categories largely apply to men, women farmers are not considered eligible for membership although in many cases they are cultivating and managing land in the absence of men who have migrated.

Policy changes in the context of irrigation devolution policies in India increasingly stipulate a quota for women’s membership on the executive committee of Water User Associations (WUAs), despite the fact that they may not be legally members (Prabhu, 1999). Although such nominal participation does not give women voting rights, it does allow them to articulate the specific concerns of women farmers; such as the time and timeliness of water delivery. Single women, widows, and women from marginalized households find it easier to approach women committee members if they are facing water distribution problems, and women are more efficient in collecting water user fees and resolving WUA conflicts.

However, prevailing beliefs about appropriate male and female behavior – for example, talking in public meetings in front of male elders – restricts active female participation in much of the South Asian agrarian context. In the Chhattis Mauja irrigation scheme in Nepal, women claimed that they never attended meetings of the WUA because they were not able to raise their concerns and needs. Many of these women found it easier to ‘steal’ water (free riders) than participate in formal institutional structures (Zwarteveen and Neupane 1996). Urban irrigators in several African cities prefer not to formalize their activities because for many it is an opportunistic activity and for some (many of them women), it is illegal. Poor urban women engaged in-group gardens on landholdings without tenure
(encroached riverbeds) in the Gambia and Zambia have little access to water taps and are dependent on wastewater discharged from treatment plants.

While it is clear that access to irrigation is a source of power and conflict, the role of participatory and gender-sensitive external facilitators in capacity building and communication processes in order to encourage the articulation of socially inclusive rights and obligations is critical. Examples of the ‘social construction’ of irrigation in the Ecuadorian Andean community illustrate the importance of multi-stakeholder decision-making involving diverse social groups (Boelens and Appolin 1999). The Irrigation Sector tools developed by FAO (2001) provide irrigation engineers, government agencies, and NGOs with participatory planning frameworks that can improve the performance of irrigation schemes while strengthening the position of rural women and disadvantaged groups. In addition, many civil society organizations are beginning to use ‘models’ of successful WUAs where the participation of women farmers and other marginalized groups has made a difference to the sustainable management of water for agriculture and to negotiations on changes in legislation that will essentially de-link access to water from land ownership.

**Women and Users’ Associations**

In the Philippines several irrigators’ associations insisted on including both husbands and wives in the association. One reason for this was that it allowed for more flexibility; the woman, the man, or both would then be able to attend the meetings. Another reason was that, even though agricultural decision-making is very much a joint affair of husband and wife, women, and men have distinct domains of influence. As most women
control the cash flow within the household, it was found that unless the women were involved in formulating policies regarding irrigation and membership fees collection schedules, associations encountered problems when collecting irrigation fees. Community organizers also learned that unless women were encouraged to participate, financial obligations of farming households could not be guaranteed (Illo, 1988).

An IIMI study of a farmer-managed irrigation system in Nepal showed that the discrepancy between women’s involvement in irrigated agriculture on the one hand, and their absence in water users’ organizations on the other negatively affected management performance. De facto female heads of farms used more water than their official entitlement, while at the same time contributing less labor to maintenance than they do should. This occurred because it was difficult for the system’s organization to enforce their rules on women, who are not members. Although non-membership is thus in the interest of female farmers, because it allows them to become free riders, the long-term sustainability of the irrigation system is at risk (Zwarteveen and Neupane, 1995).
CHAPTER THREE: METHODOLOGY

Introduction

This chapter is designed to explain how data was collected, analyzed, and interpreted throughout the stages of research work. This section also presents the researcher's choice and rationale of methodological approaches to the study and provides a critical analysis of qualitative techniques used, looking at both their strengths and their weaknesses as data collection tools. The chapter further describes the sources of data, mainly primary and secondary and attempts to evaluate the fieldwork, discuss the problems encountered, as well as solutions and techniques enacted to counter those problems. Techniques for data analysis are also discussed and so are issues of validity and reliability.

Description and Experience in the Field

The data collection period was spread over the month of November 2011. It begun with submitting an access letter from the Lupane State University introducing the researcher as a staff member who needed to carry out field research at Umzinyatini Irrigation Scheme. Three access letters were sent to the following institutions: Umzingwane Rural District Council, AGRITEX, and World Vision, as they are the major stakeholders and as key informants to the study. On the first day of my visit to the Umzingwane District Council, the researcher was directed to the World Vision Programme Manager who became my first key informant. The Programme Manager provided me with the activities that they carry out in Umzinyatini Irrigation Scheme and the information was rather scanty.
The Programme Manager declined to give the researcher soft copy material for the photographs and the map for the Umzinyatini Irrigation Scheme until they sought approval from the Programme Coordinator. However, the researcher managed to jot down notes from the face-to-face interview that was carried out with the World Vision Programme Manager.

The researcher’s second face-to-face interview was executed on the same day with an AGRITEX official who also operates from the Umzinyatini Irrigation Scheme and happens to be an official. He gave information related to the history of the scheme and the demographic nature of the beneficiaries. He further highlighted the roles of AGRITEX and the challenges faced by irrigation plot holders. The interview was very helpful and thorough. He even offered to accompany the researcher to the site of the Irrigation Scheme to interview the irrigation plot holders and do observations. The third and last key informant from Umzingwane Irrigation Scheme was also very helpful and she facilitated the researcher’s clearance to carry out field research from the District Administrator’s office.

The next day the researcher visited Umzinyatini Irrigation Scheme with the research assistant and the official from AGRITEX who happened to be an extension worker. The majority of the irrigation plot holders were busy at the site constructing a chicken fowl run sponsored by European Union to complement their efforts in the Scheme. The AGRITEX official introduced the research partners to the Chairperson of the Scheme who happened to be a man. Permission was granted to carry out face-to-face interviews with individual plot holders before doing focus group discussions.
The research assistant interviewed female plot holders whilst the researcher interviewed male plot holders. The researcher did some observation of the Scheme in the process of interviewing. The research partners interviewed 10 respondents of which six were female while four were male. The face-to-face interviews were on a voluntary basis since most of the respondents were in the irrigation scheme on that particular day. All the respondents cooperated well and gave us the information we requested after explaining the purpose of the research to them. The majority of the respondents (80%) were over 50 years of age and most of them had primary education only. 20% of the respondents were between the age of 40 and 50. Six respondents were married whilst four respondents were divorced. After carrying out some face-to-face interviews, we had to wait for close to two hours for the irrigation plot holders to finish their meeting with the World Vision field monitors, which was planned to be thirty minutes.

In the process of waiting for focus group discussions, the researcher shot photographs of the maize crops, canal pipes, and construction of the fowl run and the banner of Umzinyatini Irrigation Scheme. The research partners did a focus group discussion for fifteen minutes with 81 irrigation plot holders of which 51 were women while 30 were men. The paradox of the focus group discussions was that men were dominant in the discussion despite the fact that women were the majority. The researcher noticed that women remained silent in the focus group despite nudging them to also air out their views. However, the World Vision field monitors were reluctant and unwilling to release their reports and the map for the Umzingwane that they have on soft copy.
The researcher had to excise some patience and continued to call and visit the local authority for two and a half weeks in November until the map and some file pictures were released from the NGO in question.

**Selection of Informants: Characteristics of Respondents (Table 2)**

<table>
<thead>
<tr>
<th>Household Number</th>
<th>Case no.</th>
<th>Gender</th>
<th>Age</th>
<th>Marital status</th>
<th>Educational Attainment</th>
<th>Household size</th>
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</thead>
<tbody>
<tr>
<td>1.</td>
<td>1</td>
<td>Male</td>
<td>40 to 50</td>
<td>Married</td>
<td>Sec Edu</td>
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<tr>
<td>2.</td>
<td>2</td>
<td>Male</td>
<td>50+</td>
<td>Married</td>
<td>Pry Edu</td>
<td>5</td>
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<tr>
<td>3.</td>
<td>3</td>
<td>Female</td>
<td>50+</td>
<td>Widowed</td>
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<td>4.</td>
<td>4</td>
<td>Female</td>
<td>50+</td>
<td>Married</td>
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<td>5.</td>
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<td>Married</td>
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<td>7.</td>
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<td>Female</td>
<td>50+</td>
<td>Widowed</td>
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<tr>
<td>8.</td>
<td>8</td>
<td>Female</td>
<td>50+</td>
<td>Widowed</td>
<td>Pry Edu</td>
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<td>9.</td>
<td>9</td>
<td>Female</td>
<td>50+</td>
<td>Widowed</td>
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<tr>
<td>10.</td>
<td>10</td>
<td>Female</td>
<td>40 to 50</td>
<td>Married</td>
<td>Sec Edu</td>
<td>10</td>
</tr>
</tbody>
</table>

*Source: Field Research*
Research Methodology

According to Strauss and Corbin (1980), methodology is a way of thinking about and studying a social reality. It thus gives a vision to what the research should involve and how it should be carried out. To some scholars such as Kitchen and Tate, (2001), it is a coherent set of rules and procedures, which can be used to investigate a phenomenon. This line of argument is supported by and Shurmer-Smith (2001) who adds that methodology is then a theory of how inquiry should proceed. It is therefore not a matter of practicalities and techniques but combines theory with practice in research. Methods on the other hand are a set of procedures and techniques that can be used for gathering and analyzing data. Through these techniques, researchers are able to the see the ordinary and thus can arrive to new understanding of a social phenomenon (Strauss and Corbin, 1980).

The choice of methodological approach used in a research generally depends on the nature and purpose of the study. In most cases, it is largely determined by the research question to be investigated and to a smaller extent by available time and interest of the researcher. The researcher employed a qualitative approach to the study, which captured the views and perceptions of irrigation plot holders.

Qualitative Research Methodology

Kvale (1996) observes that qualitative research has come to be regarded as progressive research because over the last decade there has been an expansion in the use of qualitative methods in research especially in the field of Development.
Crang (2002) supports this view and argues that finally qualitative methods have arrived and been accepted as established approaches in research. With a need for in-depth understanding of human behavior and needs, qualitative methods have come in handy and are being used extensively. Kvale (1996) adds that this type of methodological approach is very sensitive to human situation and involves emphatic dialogue with studied subjects. Unlike quantitative approach where there is not much connection between the researcher and those researched, qualitative approaches seeks to understand phenomenon in context specific settings, with emphasis on a close relationship between the researcher and the subjects. Patton (2002) qualifies this idea by arguing that in qualitative research the researcher does not attempt to manipulate the issues of interest but seeks to understand the behavior and feelings of the respondents.

Qualitative methods give the intricate details of phenomenon difficult to convey with quantitative methods. Strauss and Corbin (1990) argue that this is because qualitative techniques tend to emphasize quality, depth, richness, and personal understanding of people's feelings and behavior. Qualitative methods thus become very useful when the researcher is interested in multiplicity of meanings, representation, and practices.

**Reasons for Choosing Qualitative Research**

The study was conducted using a qualitative approach. Using this approach means stressing the socially constructed nature of reality, the intimate relationship between the researcher and what is studied, and the situational constraints that shape inquiry and they seek answers to questions that stress
how social experience is created and given meaning. The idea of this approach is to try to understand the phenomena from the actor’s point of view. (Maxwell 1996)

Qualitative approach was also used because it is multimethod in focus, involving an interpretative, naturalist approach to its subject matter. This means studying things in their natural setting, attempting to make sense of, or interpret phenomena in terms of meanings people bring to them. Its use of multiple methods reflects an attempt to secure an in-depth understanding of the phenomenon in question. (Maxwell 1996) Hence, the face-to-face interviews and focus group discussions were used to capture as much information as possible from the respondents.

It is important to note that qualitative and quantitative methodologies are not simply different ways of doing the same thing. They have different strengths and weaknesses and are suitable for different set of research questions (Maxwell 1996). There are however many reasons for choosing qualitative research over quantitative research. These reasons stem from preference, prior knowledge and experience with the methodology to nature of the research problem often it is the nature of the research problem together research questions and theoretical framework used through the research that has a strong bearing on the methodology likely to be used in research. Maxwell (1996) further adds that the strength of qualitative research is in its inductive approach and its focus on people than on numbers and statistics.
In order to get such detailed information there is a need for a close contact with the subjects. Information, which relates to personal views, beliefs and feelings about irrigation schemes as a livelihood strategy can be obtained in detail through use of qualitative methods.

Quantitative methods can also be used for such a study but they will limit the research in that they will not give adequate information on people's feelings and beliefs about gender and sustainable irrigation having a positive or negative impact on their lives. Qualitative research is also characterized by flexibility. The researcher can change the research questions to suite the information that is investigated. This flexibility ensures that complex and seemingly, sensitive questions can be investigated without making the subjects uncomfortable.

It can be argued therefore that for researchers who seek to understand the behaviour, attitudes, feelings and perspectives of people, qualitative methodology is superior to quantitative methodology. It is always argued that qualitative research is sensitive to the human situation involving a close dialogue with the subjects. It allows the subject to convey to the researcher their situation from their own perspectives. Limb and Dwyer (2001) thus argue that qualitative research is very powerful in that it does not start with the assumption that there is a pre-existing world that can be known. It sees the world as always constructed through interaction of culture, economic, social and political processes. This means that qualitative methods recognise diversity and acknowledges voices of those who are powerless in the society. Similar sentiments are supported by Smith (2001) who observes that qualitative methods try to recognise the relevance and importance of `lay or folk` perspectives on the practicalities of everyday lives.
Research Design

The research design is a structure of ideas that guide the study. It sets the parameters for the understandings of the meanings by specific methods and methodologies. Maxwell (1996) thus argues that research design is like a philosophy of life; no one is without one but some people are more aware of theirs than others are and can thus make decisions that are more informed. In qualitative research, research design is an iterative process involving ‘tacking’ back and forth between the different components of the design, assessing the implications of purpose, theory, research questions, methods and validity threats for one another (Ibid). The researcher used a case study research design for an in-depth studies for Umzinyatini Irrigation scheme and taking into consideration the time constraint to investigate another irrigation scheme.

Data Collection Methods

Different data collection methods were used in order to increase the validity and reliability of the research. All these methods are qualitative and were chosen because of the nature of the research questions that demand certain kind of data. It is important to note that qualitative methodologies have various data collection techniques. Limb and Dwyer (2001) outline them as follows; first, there are in-depth open-ended interviews, which can be conducted with individuals or groups. Then there are group discussions that may be single meetings, focus groups or consecutive meetings. There is then the participant observation and lastly interpretations and analysis of a wide variety of different kinds of text.
These discussions will attempt to highlight the strengths and weaknesses of these techniques and give the reasons for them being chosen. Some secondary sources such as library documents were also used to verify and supplement data from the field.

**Interviews**

Qualitative interviewing is a kind of guided conversation where the researcher carefully listens to understand the meaning of what is being conveyed. Kvale (1996) supports this line of argument and argues that most often qualitative research interview attempts to understand the world from the subjects’ points of view, to get the meaning of people's experiences and uncover their lived world before scientific explanations. This allows the researcher to produce a rich and varied data set through a thorough examination of experiences; feelings and opinions that closed questions could never hope to capture (Kitchin and Tate, 2000). This makes interviews very appropriate for the study as they provide information that relates to people’s experiences, opinions, feelings and, expectations.

Questionnaires with semi-structured open-ended questions were used to conduct the interviews with the respondents (See Appendix 3). These allowed for further probing into responses and seeking clarification on answers given. This also made it possible for us to re-phrase the questions if they were unclear to the respondent. The questions were translated from English to the local language that was Ndebele.
**Focus Group Discussions**

According to Lewis-Beck et al (2004), a Focus Group Discussion is a research interviewing process specifically aimed to uncover insights from a group of individuals. This is usually guided by a set of questions deliberately sequenced to lead discussions towards issues of interest to the researcher. Bedford and Burgess (in Limb and Dwyer, 2001) express similar sentiments in those focus groups are brought to discuss particular topics chosen by the researcher. Information comprising different views, beliefs and perceptions may be gathered within a short space of time. Some people have confidence when they have the comfort of other members.

Initially there was supposed to be two Focus Group Discussions that is of women alone and the one that combines both sexes. However, time constraint did not permit, as the irrigation plot holders were too tired and committed to do two FGDs. Thus only FGD was done. A checklist was used to guide the discussions that were in English. The research assistant translated the questions into Ndebele though they were written in English because the majority of the respondents did not understand English. The researcher took down detailed notes on the responses given.

**Direct Observation**

Observation is an inductive method of data collection (Kitchin and Tate, 2000). There are two types of observation, direct and participant observation.
In participant observation, the researcher becomes part of the community learning to act in such a way as to blend into the community so that its members will act naturally, then removing oneself from the setting or community to immerse oneself in the data to understand what is going on and be able to write about it (Bernard, 1994). In direct observation, on the other hand the researcher takes a passive role while noting the behaviours and activities of people under study. Observation is very essential in all stages of the study as it provides additional information, which could not be obtained through other methods such as interviews.

Frankfort-Nichanias and Nichanias (1996) in Kitchin and Tate, (2000) who argue that in observation directness is the major advantage support this view. Researchers are able to watch their respondents do and to listen to what they talk about rather than asking for their views and feelings.

Direct observations were done during both the interviews and the group discussions. They helped to understand the responses given by observing the way respondents reacted to questions posed to them. The importance lay in helping to see the difference in reaction between men and women posed with the same questions and; the difference in reaction if the respondents were in a group or were interviewed alone. The researcher observed that women are still trapped in the traditional patriarchal system, which does not allow them to speak freely in the presence of men when the focus group were done. Moreover, the researcher noticed that women are now doing the tasks, which were traditionally done by men in the irrigation scheme. A good example is construction of the fowl run in Umzinyatini Irrigation Scheme, which was done mostly by women.
**Sampling**

According Mikkelsen (1995) the critical and controversial areas in the use of qualitative methods is selection of respondents and sampling. Normally in such studies, the number of selected research subjects is small and the selection procedures are not random as to give everyone equal chance of being included. Qualitative inquiry typically focuses in depth on relatively small samples, even single cases. However, the issue of small samples have been criticised as not being a reason enough for generalisation of findings (Kvale, 1996).

Nevertheless, no matter how small the samples are, there is a great need from researchers to get suitable respondents in suitable numbers to gather credible and reliable data. Sampling becomes critical in this sense, as Maxwell (1996) would argue that even single case studies involve a choice of this case as well requiring sampling decisions within the case itself.

The researcher employed a non-probability technique and executed it as a purposive sample method. The purposive sample method deliberately selected ten irrigation plot holders of the Umzinyatini irrigation scheme. Six of the respondents were women while four were men. All of them were interviewed face to face. The focus group discussions involved all men and women who were present in the irrigation scheme on that particular day. The researcher also solicited data from the Umzingwane Rural District Council official, AGRITEX official and World Vision official through interviews, as they are the custodians of the irrigation scheme. The researcher also requested their reports as secondary data to validate the findings of the research.
Data Analysis and Interpretation

There are different ways to approach the analysis of data produced. According to Kitchin and Tate (2000), these include use of interpretative approach, which emphasises the role of patterns, categories and descriptive units; grounded theory approach, which emphasizes different strategies of data coding and quasi-statistical approach which seeks to minimise interpretative analysis and introduce a prescriptive approach to analysis. Dey (1993) however, argues that despite the differences in emphasis the various approaches all seek to make sense of the data produced through categorisation and connection.

In this study, Dey’s (1993) approach which seeks to combine different aspects of other approaches shall be employed. This approach is prescriptive in nature as it provides a clear set of guidelines for analysing data. Kitchin and Tate (2000) have recommended it for researchers not yet familiar with qualitative data analysis. Under this approach, the core of qualitative analysis consists of the description of data, classification and connection of concepts.

Data analysis in this study followed a prescriptive approach. It begun by data transcription, then categorization, description and classification to facilitate interpretation while also seeking connections, which were useful in identifying relationships and associations. The Sarah Longwe framework was used intensively in the classification and description of data. Data was described in different categories that form parts of the framework. For example, control, participation, conscientization, access and welfare.
Reliability and Validity

Doing a social research is a challenging task that as it involves analysis of data in a more subjective manner that opens the research to a lot of criticism. Issues of reliability and validity thus become of paramount importance if the study is to be accepted as credible. According to Kvale (1996), in research, the term reliability refers to the consistency of the research findings. It should start from the inception of the study and be maintained up to the presentation of the work.

Silverman (2005) argues that reliable work has to show a certain degree of independence of the findings from any accidental circumstance. Moreover, Kitchin and Tate (2001) that not only the findings should be reliable but also the methods and procedures followed in the field during data collection should be reliable enough to guarantee the integrity of the whole study have argued it. Validity on the other hand concerns the soundness, legitimacy and the relevance of a research theory and its investigation. Qualitative studies should thus be much more than ‘telling convincing stories’ but be vigorous in nature so as to have conclusions accepted (ibid).

Given that the tape recorder was not used during data collection, the researcher sought data of the study area from other sources. The sources included reports of surveys that had been carried out previously and interviewing officers from AGRITEX as well as field monitors from World Vision that have been working for some time now with the irrigation plot holders.
This way the information given by respondents was crosschecked against that of the above named sources in order to ensure the reliability of such information. However, given that, the data collected was not meant for replication, but rather to answer the research question and meet the objectives of the study, the information was held as valid as at the time of data collection. The situation is liable to change.

**Ethical Considerations**

This study also had some ethical dilemmas, particularly the invasion into peoples’ private lives. The areas of discussion, which were covered, bordered on what one might consider to be private matters within and between spouses. Some respondents were not comfortable with discussing how they use the money from the produce in the scheme. Thus, the skill of probing came to be very useful. Therefore, the researcher thus asked much more general questions to avoid breaking the rapport that had been created.

Furthermore, confidentiality was assured to the respondents and issues of answers being traced back to them were taken care of by ensuring that there was anonymity. That is why during data analysis respondents were given a code and their names were not mentioned. This way they remained anonymous and their answers were kept in strict confidence.

At all times the commitment that no harm should come to respondents in and through the nature of the research process will be adhered to. Consent forms were designed which were duly approved by the thesis supervisor.
Identities were kept confidential if that would be the respondents’ wish or when the researchers can foresee that harm could arise in the future from divulging these. When research respondents wanted to be acknowledged, they were also accommodated.

**Limitations of the Study**

Respondents were very busy at the irrigation scheme with the construction of the chicken fowl run. Consequently, we appeared to be interrupting their busy programme. What further complicated the situation was the fact that the World Vision field monitors who were also in the scheme were suspicious of our research right on the onset. They directed us to some informants of their own choice and they were very unhappy when the researcher took some photographs of the produce in the scheme. They deliberately delayed their thirty minutes meeting with the irrigation plot holders, which stretched to two hours. As a result, our Focus Group Discussions were limited to fifteen minutes because the irrigation plot holders were already tired and hungry. Furthermore, it took more than three weeks for the World Vision staff to release the map of Umzingwane and the demographic composition of the study area.
CHAPTER FOUR: DATA PRESENTATION AND ANALYSIS

Introduction

This chapter introduces the analysis part of the research. It covers themes such as women and participation in irrigated farming, gender equality and sustainability, ownership patterns and inheritance, patriarchy, beliefs and religion. The last section deals with opportunities and constraints in irrigated agriculture. All the findings were based on Umzinyatini Irrigation Scheme.

*File photograph (4)*

![Image of Umzinyatini Irrigation Scheme banner](image)

*The banner of Umzinyatini Irrigation Scheme. (Source: Field Research)*

**Women and Participation in Irrigated Farming**

*a) Key informant A*

Irrigation plot holders participation in the Umzinyatini irrigation scheme is thought to be an important phenomenon to the sustainability and viability of smallholder irrigation. From our discussion with the key informant A, it emerged that women outnumbered men in the scheme.
Fifty-one are women and thirty men of eighty-one irrigation plot holders. Each plot holder owns 0.4 hectares of land of the total 32 hectares of land in the Scheme. However, despite the fact that women are the majority, in terms of decision-making, men are taking the key role. The irrigation committee is such that the Chairperson, the Vice Chairperson, Treasurer, and Secretary are men whilst women are merely committee members. These unfortunate scenarios were attributed to the fact that most women are illiterate and therefore are not confident to take positions of influence. Moreover, culture and tradition (patriarchal system) inhibit women from asserting themselves over men in as far as aspiring for top positions are concerned. As far as the key informant A was concerned, women are happy or have otherwise accepted that they are subordinate and inferior to men.

Similar studies by FAO (2008) reveal similar trends that, women play an active role in irrigation management but are usually outnumbered on committees and take a minimal role in decision-making. This finding is in harmony with what is happening in Umzinyatini Irrigation Scheme. Van de Pol, (1992) shares the same views from his studies carried out in Sri Lanka that men in decision-making represent female farmers in smallholder irrigation plots. He argues that formal meetings combining men and women irrigation plot holders are super ceded by informal get-togethers of men on important decisions to be taken on the Scheme. Women play a peripheral, marginal, and subordinate role in most irrigation schemes even though they contribute a greater percentage of labor. Thus, women’s decision-making is limited though they are the majority.
On the issue of decision making on cropping patterns, the informant highlighted that inputs on Umzinyatini Irrigation Scheme are donor imposed and therefore a top-down approach to development. However, he highlighted that they carried out some baseline surveys before implementing the activities in the irrigation scheme. On the other hand, the key informant A acknowledged that not much has been done to mainstream gender in the scheme through trainings, seminars, and workshops. Most of their projects are merely reinventing the wheel. As noted earlier, the endogenous knowledge of the locals in seed varieties are not prioritized.

However, on a different note the irrigation plot holders of Umzinyatini irrigation have been to an extent empowered with the following in view of the Sarah Longwe Framework:

**Control:** widows in the irrigation scheme make independent decisions concerning how the cash is utilized from the sales of the produce in the scheme unlike those women with spouses. Most beneficiaries are now able to pay for the fees of their grandchildren and food security is assured throughout the year. Some beneficiaries have actually acquired asserts like wheelbarrows, scotch carts and improved their economic status as a direct result of the proceeds from the scheme. Control is the highest level of empowerment.

**Participation:** the irrigation plot holders all participate in the scheme as demonstrated through rehabilitation of the scheme through erecting a new fence, revamping the irrigation canal, constructing the toilet and other related activities. Men and women work at an equal level in those activities. However, some men with spouses in the scheme have a final say on how money will be spent after the harvest.
**Conscientization:** although women now participate in the activities that were traditionally meant for men like fencing and construction, it appeared that women are still trapped in the patriarchal thinking where they vote for men to take top position in the committee. This is in spite of their huge numbers in contrast to men.

**Access:** In terms of access, women in the scheme have been greatly assisted to acquire different seed varieties like wheat, maize, vegetables, and fertilizers. Moreover, they are taught marketing skills for their produce. Their livelihood base has improved.

**Welfare:** the fifth and lowest level of empowerment has seen women improvement to food security but there is need to commercialize the scheme so that it can become more productive and beneficial to irrigation plot holders in general and women in particular.

**Recommendations from Key Informant A to Ensure Sustainability**

Key informant A suggested the following ideas to ensure that irrigation scheme are sustainable and gender sensitive: Contractual farming in irrigation farming is more profitable than communal farming because each plot holder will be forced to work extra harder so that they can be awarded another contract. Extension services need to be intensified and improved. The government particularly the Ministry of Agriculture needs to subsidize inputs for the irrigation plot holders and consider offering loans and credit without demanding collateral security.
The implementing partners mainly the NGOs should move away from imposing projects and programmes to the irrigation plot holders but should encourage a bottom – up approach stemming from the grassroots. NGOs must regularly monitor and evaluate the programmes so that the plot holders can constantly give feedback of what they want and need.

**Gender Equality and Sustainability**

(a) Key informant B

Key informant B initially narrated the roles of their organization in the irrigation scheme and gave a brief history of the Scheme. He pointed out that they offer technical advice to the plot holders and conduct lessons related to the farming activities in the scheme. They also assist the farmers with planting different seed varieties and dealing with diseases that affect the crops and vegetables in the scheme. He further explained that the Umzinyatini Irrigation Scheme started in 1964 during the colonial era. By then, women were not allowed to own land, it was state land. However, things have changed for the better since now women have equal chances and opportunities to access and control irrigated land like men. According to our discussion, all Chief Gwebu communities in Umzingwane are entitled to the land. He cited that the Umzinyatini Irrigation Scheme is a combination of both commercial and communal farming which combined both men and women irrigation plot holders. According to key informant, B the Umzinyatini Irrigation Scheme is sustainable for the following reasons: The Scheme was established in 1964 and has operated for forty-seven years without any disturbances. The irrigation plot holders are free to make choices on seed varieties they want to plant.
Most of the irrigation plot holders are comfortably employed in the Scheme and have managed to erect houses and pay school fees for their children. The irrigation plot holders are exempted from rental fees, water, and electricity bills.

Some of the irrigation plot holders sell their agricultural produce to not only Gwanda and Filabusi but supply fresh rape beyond the Zimbabwean border that is Gaborone in Botswana. The Umzingwane Dam that supplies Umzinyatini Irrigation Scheme has never dried up and therefore has ensured food security for the plot holders. They are no longer dependent on rain-fed agriculture, which has been disturbed by climate change. Unlike what is written in literature, there is no conflict of ownership over land in Umzinyatini Irrigation Scheme. If the male spouse passes away, the committee makes sure that the wife and children take over the remaining plot. The system is watertight and does not in any way disadvantage the widows.

**b) Key Informant C**

On the process of discussing with key informant C, she painted a rather negative picture about the on goings of the Umzinyatini Irrigation Scheme as far as gender sensitivity and sustainability of the project is concerned. Although she initially acknowledged what she described as piecemeal benefits to empowering women in the Scheme, which was rather a drop in the ocean. She highlighted a few positive contributions of the Scheme to women as follows: Food access from the irrigation Scheme has greatly reduced hunger and improved on food security.
The recent FAO sponsored chicken project within the Scheme will not only create a market for sale of eggs but will ensure a constant supply of manure to their plots. However, the key informant respondent lamented on the following observations in the Scheme: There is a possibility that in the near future the Umzingwane Dam may dry up due to erratic rains attributed to climate change. Therefore, the sustainability and continuity of the Scheme may be threatened and the livelihood base of the irrigation plot holders will be greatly compromised. She argues that there is no collective market for the agricultural produce for the irrigation plot holders and therefore their profits are marginal.

Generally, there is poor timing of when to harvest a crop resulting in the Scheme selling the same crop at the same time causing stiff competition. In addition, the plot holders are not free to plant whatever they want, they have to follow a strict calendar, which is compiled by the implementing NGO. Because of this, crops that are difficult to sell are still being grown even though the irrigation plot holders do not appreciate the crop. The poorer households have poor yields compared to the rich households. The chairperson of the Irrigation Scheme has been in that position for fifteen years and he may not appreciate the needs of women who are the majority because he is male. The empowerment of women is thus compromised.

**Recommendations from Key Informant C**

Women plot holders must be trained to assume top position in the Scheme unlike the current scenario where men are the minority but they are dominant. The government and NGOs should consider offering soft loans and credit for the plot holders taking into cognizance their financial plight.
There should be a collective market and adequate transport that allows the plot holders to sell their produce to cities like Bulawayo at competitive prices and fair market value. The Umzinyatini Irrigation Scheme must be transformed from communal farming to commercial farming. Cash crops must be emphasized over and above the traditional food crops.

**Focus Group Discussions**

The FGDs in Umzinyatini Irrigation Scheme sought to address the challenges faced by women in the irrigation scheme and suggests recommendations that could be taken to scale up their meaningful participation at programme, project, and policy level.

**Gender Roles and Irrigation Work**

There is general agreement that irrigation work increases the workload at household level and that in general female members of the household have to shoulder most of the burden. Focus Group Discussions showed that women find it more difficult than men to combine their many tasks some of which are fixed and frequent, with work in their plots. Women are responsible for most of the food processing and preparation, the care of children and general household maintenance and yet they are the ones who provide more than 60% of the labor required in the plots. Men on the other hand also have roles that clash with the irrigation, these include housing construction and repair, working outside the home to raise extra income, working in other farmer’s plots when hired to do land preparation and repairing/fixing farm. One woman reported that:
Men always find good excuses not to help, they leave us with no choice but to do the work on our own, especially weeding, watering, and harvesting. However, some men justified their actions by claiming that:

Apart from looking after livestock, we need to meet with other men to drink beer and discuss social issues. We cannot spend the whole day in the irrigation scheme.

When the crops are about to ripen, their yield is greatly reduced by problematic animals like baboons, monkeys, kudus and warthogs. The FDGs revealed that the plot holders are most of the time forced to guide their plots during the night to protect their produce. They complained that the gun, which used to be shot at certain times to chase away these problematic animals, was confiscated during the political upheavals of 2008. Moreover, some men lamented that some of their spouses work too hard at the irrigation plot to an extant that their sex life is disturbed.

Plot holders are obliged to work on the scheme as and when they are required. Such duties include tasks like repairing the fence, cleaning the canals and so forth. Some households like the female- headed ones where there is only one adult, who is available to do the work, face problems of clashing roles and are therefore left with no choice but to neglect or ignore all the other roles and fulfill the scheme duties. Despite the conflict between irrigation and other household roles, the discussions indicated that irrigation agriculture appears to be given preference in terms of labor time allocation.
This can be attributed to the fact that partly to the fact that irrigation agriculture is their main source of food and to the pressure from extension workers who encourage the farmers to meet deadlines and who have an interest in the success of the scheme.

These findings concur with Chancellor and Hide (1997) who argue that women bear a heavy responsibility in irrigation labor on top of the domestic tasks that they have to perform in their households. In Africa, women provide labor for irrigated production on a day–to–day basis especially in female–lead households, which account for some 25% to 35% of smallholder irrigators.

**Choice of Cropping Patterns**

Focus group discussions revealed that cropping patterns are beyond the control of the plot holders in the irrigation scheme. The extension workers and NGOs decide on what and when to plant a crop. The norm in most irrigation schemes is that crop production has to be uniform throughout. The irrigation plot holders do not know the reason for this. Men in the focus group discussion reported this.

According to respondents in the focus group, there is a tendency for poor crop timing whereby some crops are harvested in such a time when they are in abundance in dry land farming. This makes it difficult for plot holders to dispose of such crops through the market as there is bound to be stiff competition and lowering of prices.
Some crops are well known for their being difficult to sell. Focus group showed that wheat is one such crop that is labor intensive and water demanding but very difficult to sell. One-woman plot holder said:

*Wheat is very difficult to sell; it can take up to almost a year before I finish selling a harvest*—(respondent 1, female)

*I have never been able to sell wheat, I always end up taking it to the millers to grind it into mealie-meal and cook sadza with it.*—(Respondent 2, female)

*I wish we could stop growing wheat that often, it is better to grow maize than wheat because if we cannot sell maize we store it for sadza.*—(Respondent 3, male)

Despite the difficulties that irrigation plot holders face in selling wheat and the fact that wheat is not regarded as a staple food in Zimbabwe. World Vision staffs continue to put on the crop calendars year by year. This scenario reveals a clash of interest between the World Vision staff and the irrigation plot holders who seem to have different objectives when choosing the crop.

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

Matshalaga (1999) asserts that it has always been traditional for NGOs to impose cropping patterns on smallholder irrigation farmers because it is donor specific, time bound and based on their own baseline surveys. There are a few NGOs if any, that genuinely engage farmers to freely chose the seed varieties that they want. Thus, the research findings are consistent with data from other scholars. It is a general norm for smallholder farmers to have seed varieties imposed on them because of their limited options sustainable livelihood base.

**Marketing Challenges**

The focus group revealed that the government and the NGOs are virtually doing nothing to assist the irrigation plot holders to market their produce. Though the Umzinyatini Irrigation Scheme is close to the main road, the farmers are not assisted in terms of marketing. One respondent actually reported that GMB came to collect tonnes of wheat with haulage truck but never paid the farmers. The respondents reported that the government is not prioritizing them concerning access of loans but instead prefers to give loans to dry-land farmers. They also raised the shortage of fertilizer as one of the key inputs that is limiting their productivity.
This is consistent with the findings of Senzanje (2000), as reported in the literature review, that smallholder farmers face market challenges in relation to poor infrastructure, lack of market information regarding prices and demand. However, the major difference with Senzanje’s findings to that of Umzinyatini Irrigation Scheme is that they have a good access to roads not withstanding the other marketing challenges outlined in the literature review.

**Ownership Patterns and Inheritance**

Findings from the focus group revealed that the security of irrigated plot tenure for women is guaranteed. Unlike the traditional system where a woman looses land after the death of a spouse from the husband’s relatives, Umzinyatini Irrigation committee has devised a system that protects the women in the scheme. The Irrigation committee prevents any confiscation of land from women by male relatives or whosoever. They do this by making sure that all plot holders are registered in their official records endorsed by the local authority. Any change of ownership or transfer of irrigated plot is reported to the Chairperson of the committee who convenes a meeting to make a decision on the issue. Their constitution bars any outsider from taking land away from irrigation plot holders particularly women. Several relatives from husbands have tried to confiscate plots away from widows without success. Therefore, the widow and her children are guaranteed security of tenure in the irrigated plot. One man in the irrigation committee said:

*It is impossible to confiscate land away from widows or for any irrigation plot holder for that matter. The constitution strictly bars such attempts for anyone who is not a member and has no approval from the committee.*
Another woman who was threatened by her late husband’s brother with land dispossession reported that:

*My late husband’s brother from Kwekwe wanted to take my irrigated plot but was promptly denied entry to the plot and was threatened with legal action if he trespassed in the Scheme by the committee. He never bothered me again afterwards.*

According to one of the leaders in the irrigation committee, the system of inheritance in place is that once the plot holder dies, the surviving spouse takes over. If both spouses die, the children inherit the irrigated plot. In some cases, where a registered irrigation plot holder feels he is too old to manage the 0.4 ha, he gives portions of his plot to one or more relatives. In return, these relatives pay the full levy of the plot and/or provide labor for the "landlord". From the survey, it was established that 23% of the farmers were leasing out their plots for labor. The scheme byelaws allow the leasing to take place, but the owner of the plot will be fully responsible for the operation and maintenance of the scheme infrastructure.

There is a marked discrepancy here with the work of Stokes (2003), as outlined earlier in the literature review, that ownership of an irrigation plot in Zimbabwe had always been a preserve of men. In addition, FAO, (2011) asserts that in many societies traditions and laws bar women from owning land. It further goes on to argue that women are not permitted to inherit property; they may lose access to land and other assets when their husbands die.
Nonetheless, the findings from Umzinyatini Irrigation Scheme show that women are in total control of the irrigated plots and there is no possibility of them loosing ownership rights of land even when the husband passes away. This finding is very different from what literature says concerning women and control of land in smallholder agriculture.

**Recommendations from FGDs**

Fertilizer and seeds must be supplied and sold directly to the plot holders. Fertilizer should be subsidized by the government. The current $33 per bag is too expensive. The irrigation plot holders suggested that the government should support them in their agricultural activities through offering loans and credit, which in cash that will enable them to buy inputs like fertilizer and farming implements like hoes, wheelbarrows and other tools. They also requested the NGO that is operating in the Scheme to make transport available for them to sell their produce in Bulawayo and surrounding areas. The plot holders want exchange programmes with other successful irrigation schemes like Makwe in Gwanda and Silalatshani in Filabusi, which will enable them to exchange ideas and learn from each other. The respondents wish that extension services should be done more frequently in relation to pest control and new farming methods. The plot holders suggested that the NGOs should consult them on their own preferred cropping mechanism rather the current scenario where they are imposed on them.
Emerging Issues from Face to Face Interviews

The findings from face to face interviews show that most of the irrigation plot holders ended up their formal education at primary level. The interview findings show that access to and control of irrigated plots is through family inheritance. It is also worth noting that inputs for the irrigation are mainly acquired from the implementing agency, which is World Vision while at other times the plot holders purchase the seeds and fertilizer on their own. Moreover, the majority of the plot holders are totally dependent on the scheme for food security and as a main source of their livelihood. However, decisions making in terms of labor, income utilization and marketing is determined by patriarchy, beliefs and religion of the plot holders.

Patriarchy, Beliefs, and Religion

Marital status: Widows are more independent when it comes to the use of cash obtained from the sale of produce compared to married women whose husband’s makes decisions on expenditure and labor related issues. However, the widows in general and Female Headed Households in particular are treated differently in the community compared to households that are male-headed. A woman respondent pointed out that she relies on close relatives or friends to assist her with land preparation or any other strenuous related activity in the Scheme. She expressed that if they approached married men, there was usually resentment from married women who consider them a threat to the stability of their marriages. Two female respondents expressed these sentiments concerning Female Headed Households in the Scheme:
We treat widows with respect. However, if she is a loose widow, we make life difficult for her by not allowing our husbands to entertain her.

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

Female Headed Households are therefore, expected to behave in a particular manner that is acceptable to that particular community. The situation is however different where the female head is an elderly woman. Face to face, interviews showed that men and women in the Scheme tended to be more sympathetic to elderly women heads of households. They are normally assisted by the plot holders in any way they can as long as they request their assistance. These findings are in line with Matshalaga’s (1997) report from the literature review who argued that in land preparation, control of farm power is a critical issue and affects men and women differently. To hire tractors, cash is needed; if oxen or donkeys are mobilized, men control the timing. Women have significant problems with these aspects of land preparation. Their efforts to hire men to do their ploughing for them are sometimes subject to social judgments.

**Religious beliefs:** Households that upheld Christianity from the face-to-face interviews indicated that decisions on how to spend money where done jointly between the spouses. On the other hand, traditional men allowed their wives to use a certain portion of money provided a certain amount was left for beer. A female respondent aged about 54 years said that:
*My husband is a Christian and we have never faced problems emanating from income accrued. However, those with husbands who drink beer always face problems because their husbands disappear after a successful sale.*

**Age:** The elderly men and women in the scheme made decisions on labor because they are no longer physically fit to do rigorous work in the irrigation. Activities like watering, land preparation and weeding are mainly done by their children and grandchildren. Age is one of the factors that determine decision making of a person. Advanced aged households are more reluctant to accept new technology and ideas about irrigation production styles than younger household heads as claimed by FAO (2006).

**Women and Farming Workload**

Most of the female respondents on face- to – face interviews admitted that they are the main users of the irrigation while men commonly participate in irrigation farming on a part- time and supervisory basis. Women’s labor is particularly increased by irrigation farming due to the cultivation of land, weeding, and the burden of land preparation. The heavy burden is also complicated by the domestic tasks like cooking, fetching firewood and water and taking care of the sick. Men are normally visible in the scheme after harvesting of when there is some maintenance work like fencing. Otherwise, the greater part of irrigation activities are borne by women. Thus, women are over worked in the scheme. The female respondents said they have accepted this unfair reality and they have learnt to live with it.

Chancellor and Hide (1996) in the literature review shares the same report with the research findings that, women are the major contributors to the irrigation workforce in Africa.
They bear a heavy responsibility for fetching and carrying water for their families. Water scarcity problems fall particularly on them. Moreover, Chancellor (1997) argues that women are entirely responsible for the household irrigated production and many more consistently increase the range and intensity of their activities as their men spend longer periods working away from home. Female-headed households normally endure the most of heavy loads from both irrigated agriculture and domestic tasks. The research findings are therefore consistent with what is reported from other scholars as highlighted.

**Benefits of Working in the Scheme**

All the respondents from that were interviewed admitted that their food security situation has improved as a direct result of being a participant in Umzinyatini Irrigation Scheme. Actually, most of the plot holders have abandoned dry land farming and are now relying on the scheme for their livelihood. One respondent who is a widow reported that:

*I have managed to buy a plough and a wheelbarrow and I can afford to send my children to school and buy groceries and irrigation inputs like seed and fertilizer.*

A couple that has worked in the Scheme for more than twenty years reported that:

*We have constructed a four-roomed brick house through the proceeds of the Scheme. We have never hungered ever since we became members of Umzinyatini Irrigation Scheme. We are totally reliant on the Scheme for our livelihood.*
One woman who happened to be in the irrigation committee was also excited about the developments that were taking place in the Scheme and the benefits thereof. She was quoted saying:

*The new chicken fowl-run we are constructing will go a long way in empowering us and complementing our efforts in the scheme. EU has promised us fifty chickens, which will assist to get meat, eggs, and manure for our plots.*

Generally, the majority of the plot holders’ first priority was given to food. Very few households opted to acquire other items such as agricultural implements over food and hardly any households invested their savings in other ventures before ensuring that they had all the food they needed in their homes. A few households however, did tend to buy other items before food, like agricultural implements and inputs like fertilizer and seeds. It was found for most of such households the men are the ones that preferred to buy or invest in other items while the women preferred to buy food first.

Accordingly, Chancellor (1997) asserts that food security is one clear benefit of smallholder irrigation Schemes. Women are particularly sensitive to food needs and emphasize it more than men emphasize. However, cash generation is important at all irrigation schemes for both men and women and they are anxious to sell profitably in the market. She further argues that although irrigation schemes are not the sole source of income, for most families, irrigation provides almost ninety percent of total cash available.
In addition, FAO (1996) reports that men recognize that women work longer hours in irrigation schemes but emphasize this aspect less than women emphasize. Equally, they accord less importance to the fact that women, because they work longer hours, are deprived of opportunities to earn money for their own private use. Some women clearly feel the work they put in the irrigation does not bring corresponding benefits. Even at irrigation schemes dominated by women, men control expenditure decisions for the money generated through irrigation.

**Photograph (5) : Irrigation Plot holders in a meeting**

*SOURCE: Field Research*

Opportunities and Constraints in Irrigated Agriculture

Scheme Operation, Management, and Maintenance

Irrigation Management Committee
The scheme is farmer managed through an Irrigation Management Committee (IMC). The committee consists of seven members who are:

i. Chairperson and deputy chairperson
ii. Secretary and deputy secretary
iii. Treasurer
iv. Two committee members

The IMC is tasked with the day-to-day running of the scheme. This involves settling disputes, organizing repairs and maintenance of the scheme infrastructure and collecting the irrigation levy. Overall, the IMC is managing to run the scheme. It has been able to collect the fee on a yearly basis. It persuades and motivates the irrigators to pay the O&M fee and difficult irrigators are summoned before the committee as a last resort.

The ability of the management committee to mobilize farmers to do maintenance work as well as O&M fee collection is evidence of irrigators' desire to remain in the scheme as well as their capability to run their own affairs. The only problem mentioned by the IMC as hindering the smooth operation of the scheme was lack of back-up service from the police. The IMC has no power to arrest or detain offenders. There were cases where thieves were caught stealing, they handed them to the police only to be released the same day.

Although there is a proper leadership structure in the Scheme, it has no power to deal with offenders who may vandalize irrigation equipment and property as highlighted above by key informant A from his annual report.
The key informant A reiterated that women are reluctant to take a leading role in the Irrigation Management Committee. The chairperson who is a man has been in that position for fifteen years and it is the women in the Scheme who continually vote for him on every election.

The study identified many problems in irrigation development through focus group discussions and key informant interviews. The main problems were lack of inputs, poor market access, too much workload on women, and inadequate government support among others.
CHAPTER FIVE: CONCLUSION AND RECOMMENDATIONS

Introduction

This chapter consists of recommendations that relate to the objectives of the study and the research findings. Conclusions based on the findings shall be made and then finally, areas that need further research shall be highlighted.

Improve Irrigation Infrastructure

From cost-benefit analysis, research findings revealed that productivity of irrigated land is also affected by input use such as variety of seeds, fertilizer, pesticides, herbicides and other important inputs. Hence, institutional interventions should be made on the availability of support services such as credit extension, input supply, and marketing, especially that Umzinyatini Irrigation Scheme is close to the city of Bulawayo. The benefit found from the marketable crop being grown, depends on market and infrastructure accessibility. Thus, efforts should be made in improvement of infrastructure as well as in creating a market linkage.

Promote Women Participation

The most disadvantaged group of irrigation plot holders are female-headed households particularly widows, who are found in lower economic status of the community and have a problem of family labor constraints. Moreover, the participation of women leadership levels is limited due to the wrong perception existing in the society.
Thus, government support will be essential to improve the livelihood of women plot holders and efforts should be made to raise awareness towards gender equality in the community. In addition, policy intervention is needed to encourage the participation of women at irrigation schemes, particularly in the top positions of the IMC.

**Improve the Marketing System**

The marketing channel affects returns to irrigation, in part because the main irrigated crops (vegetables in particular) are harvested at similar times by farmers and are perishable. An effective marketing system will yield to the desired profits and benefits. Hence, the concerned bodies like governmental extension workers, the local authority, and NGOs should support the development of the efficient marketing systems in Umzinyatini Irrigation Scheme. This may include provision of marketing facilities, information provision and monitoring of costs and returns in the supply chain.

**Ensure Access to Inputs**

The provision of inputs like chemical fertilizer, herbicides, and pesticides are of paramount importance in Umzinyatini Irrigation Scheme. In the study area, these inputs are below the recommended level because of their high cost and shortage of supply. Access and proper utilization of agricultural inputs are important for sustainable agricultural productivity and improvement. All stakeholders should give attention on the supply of these inputs on time and in adequate amount. Further studies of the marginal returns to the inputs compared to their costs could facilitate development of approaches to increase input use, when appropriate.
**Strengthen Water Use Associations**

Water user associations should be established to improve water management and access within irrigation schemes. Although not analyzed in this study, it has been reported that water management and marketing functions undertaken by some irrigation schemes have a significant impact on the current and future returns from irrigation use. That is, it is not simply access to irrigation water that per se that increases household income, but an organizational and institutional structure that maintains adequate access to water and provide information for improved management and marketing decisions. The concerned bodies should further study the impacts of, and encourage the establishment of additional water use associations to promote irrigation development.

**Strengthen Education and Training**

Education has paramount impact on income improvement and poverty alleviation overtime. High literacy levels are having a positive impact on household income and reduce the likelihood that a household will be in poverty. These effects likely occur because illiterate households have difficulty accessing extension services and adopting recommendations from them. Education and training facilitates effective communication between plot holders and the agricultural information providers like the extension workers. Although the specific approach to be recommended requires further study, attention should be given to strengthen education and training for sustainable poverty alleviation in the end.
In conclusion, the study area marketing system does not always facilitate outcomes desired by the plot-holders. One reason is the similarity of products and marketing patterns; maize and wheat and at times vegetables as dominant crops, often harvested at the same time by plot holders. This leads to high availability and low prices during the marketing period. Compounding this is the absence of an efficient storage system in the study area. Consequently, products quality deteriorates rapidly, which means plot-holders sell at a short space of time, often at what they consider low prices. Plot holders also perceive that market intermediaries are not pricing products fairly, which suggests reduced returns and less incentives to invest in the use of irrigation.

Crop diseases are another important factor in Umzinyatini irrigation Scheme. The study area is intensively cultivated with the same crops for long period. Vegetables and crops like wheat and maize are cultivated repeatedly. This cultivation strategy facilitates crop diseases, which the plot holders are not able to deal with because pesticides and herbicides are costly for them to purchase. Therefore, diseases and pests limit the economic benefits and sustainability of the irrigation in the study area. Furthermore, cropping patterns are of paramount importance if sustainability of smallholder irrigation is to be achieved. Mainstreaming gender in irrigated agriculture cannot be overemphasized. Women empowerment through trainings and education are of significant importance, which will influence how society perceives them and how they view themselves. Patriarchy and beliefs can be transformed to suit the needs of women in the irrigation scheme.
Areas for Further Research

The relationship between education levels and productivity in the smallholder irrigation schemes are avenues that need further research in the study area. In addition, it will be of interest to know whether the assumption of women on top positions in Water Use Associations in Irrigation Schemes in comparison to men has a bearing to the effective management of these schemes.
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