UNDERSTANDING SOCIO-ECONOMIC OUTCOMES OF TECHNOLOGICAL INNOVATIONS OVER ACCESS, USE AND MANAGEMENT OF NATURAL RESOURCES IN ZIMBABWE: A CASE STUDY OF ZUNGWI VLEI (ZVISHAVANE DISTRICT)

BY

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Submitted: May 2008

A thesis submitted in partial fulfilment of the requirements for the Master of Philosophy degree in Social Sciences, to the Centre for Applied Social Sciences (CASS)

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Harare

Chapter 1

Introduction

1.1 Background

The role of modern technology in economic transformation and sustainable development of Africa has been a subject of debate particularly on communal agriculture. The debates are now more complex as they are taking new dimensions as a result of rapid technological and scientific advancement, increased poverty, environmental concerns, climate change and socio-political factors. As a result, two schools of thought have characterised the debates, namely: pro-modern technology and the other against. At the policy level scientific technologies are being recommended and implemented for community development. This study focuses on a technology known as the Broad-Ridge and Broad-Furrow system designed to curb degradation and promote higher yields. The technology was introduced on Zungwi vlei in 1999 with funding from Smallholder Dry Area Resources Management Project (SDAMP). The project was done as part of an experiment to test the effectiveness of Broad-Ridge and Broad-Furrow system in conserving vleis and increase agricultural production in Communal Areas. The study, thus, sought to critically examine socio-economic outcomes of implementing Broad-Ridge and Broad-Furrow system on a key common pool resource, such as Zungwi vlei.

Achievements of technical solutions (technocentricism) in development programmes are a subject of debate as in some cases development is achieved and in others it is not. Usually socio-political factors have been blamed for the failures of technology (Mugabe 2003, WCED 1987). Thus, there is more to development than technology. I argue in this thesis that socio-political variables are important in achieving development through scientific technologies. It is argued in this thesis that implementation of the Broad-Ridge and Broad-Furrow irrigation technology as a development initiative presents a classical case of the interface between modernity and traditional African customary practices and beliefs. Implementation of Broad-Ridge and Broad-Furrow technology on Zungwi vlei cased changes on access, use and management regimes. Implementation, worse imposition of an alien technology on Zungwi vlei caused rapid change that ushered in new beneficiaries and redefinition of relations and wealth distribution in Mazvihwa Communal Area (CA).

Scholars have frequently blamed technocentricism for ignoring community history, traditional uses and values associated with resource units (Makumbe 1996, Scott 1985). Known lessons from earlier attempts to change the status quo of Zungwi vlei through restricting access and use were resisted by communities. The colonial government attempted to fence off vleis to restrict access especially for cultivation. Local communities found ways of circumventing the restrictions (Mukamuri and Mavedzenge, 2000) and continued with their traditional systems. The communities attach a lot of value to Zungwi vleis as they have livelihoods and religious significance to their lives. Imposition of Broad-Ridge and Broad-Furrow on a communal vlei was overlooking

important socio-ecological factors. Fencing off the vlei is a sign of exclusion of the larger community who are not scheme members.

Before implementing the technology on Zungwi vlei the scenario was sensitive. Scoones and Cousins (1991) who have done research on dambos in Mazvihwa allude to struggles/conflicts over dambos resources. The struggle for control over resources is often centred on those that are the most valuable for local production (Scoones and Cousins, 1991) such as vleis. Given this an understanding of the community socio-political and political ecology dynamics would have demonstrated the need for a participatory approach. Participatory Rural Approach (PRA) or scenario planning could have been very handy in understanding community dynamics and improve on the implementation model. Participatory methodologies help minimise conflicts, while improving legitimacy of the technology amongst the communities and guaranteed success.

Agricultural technological innovation's outcomes are measured by their impacts on production, social capital and environmental sustainability. Harmony and conflicts are important indicators for social capital, hence they will be a running theme in the thesis. Numerous studies have shown conflicts over natural resources in Africa (Magadza, 1986; Rahim et al, 1991; Scoones and Cousins, 1991; Rampele and McDowell, 1991; Mhlanga, 2001; Mukamuri and Mavedzenge 2000; Gefu and Kolawole, 2002). Conflicts are defined in this study as hostilities or clashing of opposing principles, needs or wishes. Buckles and Rusnak (1999) have come up with three reasons as to why conflicts over

natural resources occur; firstly, natural resources are embedded in an environment or interconnected space where actions by one individual or group may generate effects far off site. Linked biophysical or ecological processes in a specific environment disperse cumulative and long range impacts such as erosion, pollution, or loss of plant and animal habitats (Bastidas, 1999; Buckles and Rusnak, 1999). Secondly, natural resources are embedded in a shared social space where complex and unequal relations are established among a wide range of social actors such as peasants, agro-export producers, ethnic minorities, government agencies and donors. Actors with access to power are best able to control and influence natural resource decisions in their favour (Peet and Watts, 1996). Finally, natural resources are subjected to increasing scarcity due to rapid environmental; change, increasing demands, and their unequal distribution (Homer-Dixon, 1991; Kelly and Homer-Dixon, 1991; Howard and Homer-Dixon, 1991; Gizewski and Homer-Dixon, 1991; Percival and Homer-Dixon, 1991 and Homer-Dixon and Blitt, 1998).

The centre for conflict resolution at University of Cape Town has come up with ways in which people are affected by conflict and change, which are:

- Concerns arise over meeting basic needs
- Current norms and values are called into question
- Competition over scarce interests such as power and resources
- People may experience feelings of general helplessness

In times of change human beings worry about the security of their needs like food, shelter and cloths. Abraham Maslow called human beings ‘wanting animals’ because we are

constantly striving to satisfy our needs. Consequently, uncertainty in terms of attaining needs due to change breeds conflict.

Table 1. 1 The Pillar of Conflict

Unnecessary Conflicts			**Necessary Conflicts**	
Relationship Conflicts	**Data Conflicts**	**Value Conflicts**	**Structural Conflicts**	**Interest Conflicts**
• Strong emotions • Misperceptions • Poor communication • Negative behaviour • Stereotyping	• Lack of information • Misinformation • Differences on what data is important • Differing interpretations of data • Different ways of assessing data	• Negotiable day to day values • Different ways of evaluating ideas • Self defining or religious values	• How a situation is set up • Role definitions • Time constrains • Geographic or physical relationships • Unequal power • Unequal control of resources	• Psychological • Procedural • Resources

Adapted from Moore, 1986

Moore (1986) formulated "the pillars of conflict" as presented in Table 1.1. Moore (1986) developed a model to analyse the types of conflicts and the issues related to each one of them (Table 1.1 above). He categorised the issues into the following types of conflicts:

- Data or information conflicts; these involve lack of information, misinformation, and differing views on what data is relevant, the interpretation of that data and how one performs the assessment
- Relationship conflicts: are a result of strong emotions, stereotypes, miscommunication and repetitive negative behaviour

- Value conflicts; are caused by unequal or unfair distribution of power and resources. Time constraints, destructive interactions and non-conducive geographical or environmental factors contribute to structural conflict
- Interest conflicts; involve actual or perceived competition over interests, such as resources, the way a dispute is to be resolved, or perceptions of trust and fairness.

1.2 Controversies around Vleis

Wetlands have been on the spotlight in the past three decades amongst researchers because of their vastness and perceived importance in Africa. There are 200 million hectares of wetlands in Sub-Saharan Africa (Whitlow, 1984). Whitlow (1989) estimates that there are 1, 28 million hectares of wetlands in Zimbabwe that cover about 4.6 per cent of the national land surface. In Zimbabwe wetlands ecosystems include vleis (dambos), flood plains, artificial impoundments and pans (Mharapara, 1995). Vleis (dambos) are the most widespread form of wetlands in Zimbabwe and it is estimated that they cover about 3.6% of the land area (Whitlow, 1984). Vleis are widely distributed on the southern African plateau and Zimbabwe is situated on this plateau hence it is well endowed with vleis (Matiza, 1992, Mharapara, 1998). With the recent land reform beyond doubt majority of the vleis are in Communal Areas (CA). Communal Areas have been argued to have weak natural resources management regimes, yet they account for the majority of vlei area in Zimbabwe. What will be the impacts of Broad-Ridge and Broad-Furrow system on the management regimes in Communal Areas?

The Broad-Ridge and Broad-Furrow technology was designed for vleis ecosystems only, yet their definition has been a subject of debate. Furthermore it makes it impossible to come up with guidelines for vlei cultivation or implementing the technology. It is not disputed that vleis are wetlands, which are generally defined by the Ramsar convention, as:

> "Areas of marsh, fen, peatland or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, include areas of marine water depth of which at low tide does not exceed six meters." (Ramsar, 1996)

Different scholars have brought up several definitions of vleis changing over time and these have had little influence on policy. Legally there is no attempt to define the term vlei. Academics have however tried to define and characterize the ecosystems that should be called vlei. Rattray et al (1953) defined vleis as, "A low-lying gently sloping, treeless tract of a country which is seasonally waterlogged by seepage from the surrounding high ground assisted by rainfall, and which frequently contains the natural drainage channel for the removal of excess run-off from the surrounding high ground." Rattray's definition was officially accepted up to the early 1970s. Whitlow (1990) defined vleis as seasonally waterlogged and grass covered depressions that are often associated with headwaters of rivers draining plateau surfaces. According to Mharapara (1998) vleis are valley bottoms or depressions that form natural drainage systems with or without a developed and distinct stream. Mharapara, (1995) also views vleis as a combination of residual moisture and shallow lift ground water, derived in part from recharge water that infiltrates into the

upland catchments and flows laterally underground to the vlei areas. The thesis will use the definition by Mharapara (1998) to describe vlei ecosystems.

In Zimbabwe vleis are commonly referred to as mapani or matoro in Shona. Elsewhere, terms like 'inland valley' (Sierra Leone), mbuga (Tanzania), dambo (a Chichewa word used in Zambia and Malawi), vlei (adapted Afrikaans) and fadama (Nigeria) are used to describe these ecosystems. The terms Dambo or Vlei have now been adopted for use by the scientific community within the Southern African region for purposes of uniformity. These ecosystems are commonly referred to as vleis in the Zungwi community of Zimbabwe. Thus, for the purpose of this thesis the term vlei will be used.

Hydrology is an important factor in the formation and maintenance of dambos. A study by Bullock (1988) concluded that the amount of precipitation, the lateral movement of water, impedance of channel drainage, promote the development and maintenance of Dambos. Rain, catchments run-off and seepage are the major inputs into the dambo system. The importance and significance of any of these input sources to the hydrological status of the dambo is variable and dependent of such factors as catchment's size, infiltration rates, dambo size, ratio of dambo size versus catchment's size, rainfall amount and location (Mharapara, 1998). The presence of an undulating impermeable layer causes water to be found close to the surface and causes high levels of organic matter. Most of the water within the dambos during dry seasons is derived from upstream, since the dambos have a small storage (DRU, 1987). Very little of the water in the dambos finds its way to the lower parts of the dambos as much of it is lost through evaporation.

Policies on vlei utilisation have had a checked history. Vleis utilisation started well before the coming of the white man to Zimbabwe. Prior to colonisation of Zimbabwe, governance of vleis and other natural resources by local institutions used tribal laws and knowledge (Mukamuri and Mavedzenge, 2000 and Mhlanga, 2001). Balancing interests amongst players was done well since natural resources were thought of as being communal unlike after colonisation were they are nationalised. Environmental policy has shifted from a traditional approach of the pre-colonial period to a new tradition of parliamentary procedures of today (Chenje (ed) 1998).

Since the colonial era, policy on vlei utilization has had to juggle between government interests and those of the communities. Government interests have tended to dominate through imposing the ban on vlei cultivation. Numerous prescriptive and prohibitive laws have been enacted to manage vleis utilization and governance (Chenje (ed) 1998). The Land Tenure Commission of 1939 suggested that exploiting vleis for cultivation caused environmental degradation, consequently the Water Act of 1927 and Natural Resources Act 1941 (revised in 1951) banned vleis utilization for crop production. The Water Act prohibited cultivation within 30 meters of vleis and water channels. Although the official reason for banning vlei cultivation was to protect the environment, it is believed that the ban was intended to make it difficult for Africans to compete with whites in agriculture production such as winter wheat (Wilson, 1986).

Despite the fact that the Water Act and Natural Resources Act were not based on any meaningful research, the Environmental Management Act (20:27) continued the ban on vleis cultivation. Considerable research has proved that vleis can be cultivated using proper technologies without being degraded. A proper management regime needs to be in place to guard against degradation. Although an exception is provided for in statutory instrument 7 of 2007 were development or cultivation of vleis can be done, policy remains very restrictive. Statutory instrument 7 of 2007 provides for vleis cultivation when authority has been sought from the Agency in consultation with the Board and Minister responsible for water resources. The application process is either expensive or too laborious for the rural farmers, hence very few have pursued the option.

The policy on vlei utilisation has failed to cater for the community's interests, which are to cultivate the fertile vleis. Communities in pursuit of their interests have simply ignored legislation and continued to cultivate vleis illegally. Consequently, semi-formal irrigation schemes account for about 20 000 hectares out of the 1.28 million hectares of known vlei area in Zimbabwe (Owen(ed) 1995). The illegal cultivation of vleis was more pronounced in rural areas, which only accounted for 28 000 hectares. These figures could have increased significantly because of the economic hardships and unpredictable rainfalls in the past years. If not properly managed and monitored, the fragile vlei ecosystems are at risk of degradation.

1.3 Broad-Ridge and Broad-Furrow irrigation technology

The Research and Specialist Services have developed the broad ridge and broad furrow tillage system, which has been successful in conserving vleis natural resources and increasing hectarage of wetlands. Figure 1.1 below shows a typical Broad-Ridge and broad furrow system. Furrows and ridges are developed in an alternating sequence starting from the highest point of the vlei. The furrows are designed in such a way that they will hold water to a level of approximately 30 cm before it over flows into the next furrow below. The furrows at the highest point feed the next furrow below when they are filled to capacity, the water finally drains into a small dam. The furrows are about 2 meters wide and the ridges are also about 2 meters wide. On the ridges, plants that do not need a lot of moisture are grown, for example maize during rain season. In summer, mainly rice is grown on the furrow because of the water logging conditions. While during the dry season, wheat and green mealies are grown in the furrows.

Zungwi vlei was developed using the Broad-Ridge and broad furrow tillage system. Construction of the ridges and furrows started in late 1999 and completed in 2001. Caterpillars and graders were used in the clearing and construction of the ridges and furrows, and people using handy tools prepared it for cultivation. Since 2001, the scheme members have used the vlei for agricultural purposes. Those families that used to benefit are no longer benefiting as they did from the vlei.

Like all other vleis in Communal Areas of Zimbabwe, the vlei is supposed to be communally owned but the Ngwarati technology can only support a limited number of people and uses. This raises questions such as; what happens to those who are no longer benefiting but have the right to benefit? What are the outcomes of this quick change in property rights? How does this affect the natural resource management regime of the vlei? These questions form the background against which this study is based upon.

Figure 1.1 Typical Broad-Ridge and Broad-Furrow Irrigation Technology

1.4 Statement of the Problem

The need to increase food production has necessitated utilization of vleis for agricultural production illegally in Communal Areas of Zimbabwe. This has made vleis very key resources in Communal Areas, with bundles of access, use and management rights. On the other hand, vleis are fragile ecosystems and prone to degradation. The Agriculture Research and Specialist Services (Ministry of lands and Agriculture) developed the Broad-Ridge and Broad-Furrow tillage and irrigation technology, as a sustainable way of utilizing the vlei without depreciating its resource base (see fig 1.1). The technology under experimental conditions has increased yields by five folds and increased the wetland size. The technology has been praised as novel in physical sciences, however its social outcomes are vaguely understood when it is implemented on common property vleis. Imposition of the technology on Mazvihwa Communal Area resulted in social and economic changes that generated conflicts over access, use and control of resources between different resource users. This is aggravated by the fact that cultivation of Dambos (vleis) in Communal Areas is organized along family lines (Kundhlande et al 1995). It is against this background that the study sought to understand the results of imposing a technology on a key natural resource in Communal Areas of Zimbabwe.

1.5.1 General Objectives

To explore socio-economic impacts of the implementation of Broad-Ridge and Broad-Furrow system on issues surrounding access, use and management of a key common pool vlei in Mazvihwa CA.

1.5.2 Specific Objectives

- To explore effects of the technology on access, use and management regimes over Zungwi vlei and community responses to the changes.
- To explore and determine causes and nature of conflicts and/or social benefits over Zungwi vlei as a result of the implementation of the technology.
- To asses the perceived outcomes of the technology on agricultural productivity, conservation and social harmony at Zungwi vlei
- To come up with recommendations on future implementation of technology on key communal resource and conflict resolving mechanisms.

1.6 Justification of the Study

In order for technocentrism to attain its goal of boosting agricultural production while conserving natural resources it has to seriously consider social variables. Thus, an in-depth understanding of socio-economic variables and outcomes of the implementation of technology is needed. Insights from this study will assist understand effects of implementing Broad-Ridge and Broad-Furrow irrigation technology on communal vleis, since little is known about the implications of the technology. The literature review (Chapter 2) demonstrated resource use, access and management regimes on vleis under traditional use in Zimbabwe and resulting conflicts from competing claims (Sithole, 1999; Scoones and Cousins 1991; Matiza, 1992 and Mukamuri and Mavedzenge, 2000). The literature review conducted suggests that little is known about changes in access, use

and management regimes and conflicts, which result from developing vleis using the Broad-Ridge and Broad-Furrow tillage system. Hence, the data generated will go a long way in bridging the literature gap.

Further, the study will provide useful methodological issues associated with use of participatory and non-participatory approaches in resource use and conflicts research. This thesis appreciates the need to further refine participatory research to recognize the complex, diverse and risk prone environments of resource-poor people (Chambers 1989; Scoones I and Thompson 1994). The social context were research is carried out are diverse but present similar pit falls. Methodological lessons learnt will benefit other academics that want to study forced tenure changes and conflicts, as they are both sensitive issues in society.

The thesis provides information useful in policy-making regards utilization of communal vleis under Broad-Ridge and Broad-Furrow technology. This study emphasizes the notion that the Broad-Ridge and Broad-Furrow technology has potential for widespread acceptability provided that it addresses issues of tenure, access and use rights. In addition, findings tend to support the idea that the technology will be even more acceptable under conditions characterized by private tenure or low human population densities.

Socio-ecological dynamics associated with implementation of the technology on key resources held under communal tenure are also addressed by this study. The Integrated Water Resources Management (IWRM) project has highlighted resource use conflict as

the major setback to their programmes especially in Asia, Latin America and Africa. It has called for policies that bring about the needed change permitting adjustments to be made without threatening the base of relations. The Environmental Management Act governing utilization of vleis does not consider the issue of conflicts over resources as a major issue in agricultural production and natural resources management. The proposed study will provide information with the following policy implications:

- How to deal with technologies that lead to reduced access to key resources by sections of the rural community
- To make sure that projects take into consideration resource use conflict and put up strategies for resolving the conflicts,
- Actor participation or scenario planning when implementing technologies in Communal Areas especially when dealing with perceived key resource.
- Enable officials to come up with a conflict monitoring and evaluation systems,

1.7 Organization of the thesis

The first chapter presents and discusses the concepts to be addressed by the thesis. Chapter 2 presents the review of relevant literature. Chapter 3 presents a framework from the concepts raised in the literature review, which informs this thesis. Descriptions of the interface and possible outcomes from the dialectics form the epi-centre of chapter 3. Chapter 4 describes in detail the methodology chosen, methods and sampling strategies used in the study. Given the research task methods used gathered mostly qualitative data than quantitative data. Chapter 5 is meant to provide the background and context of the

conflicts that emerge after the transformation of the vlei using Broad-Ridge and broad furrow technology. Chapter 6 presents the results of the cases studied that addressed objectives of the study. Chapter 7 discusses the findings presented in chapters 5 and 6 and draws conclusions. Chapter 7 also links the various chapters together to arrive at a conclusion.

Chapter 2

Literature Review

2.1 Introduction

This chapter presents literature and debates centred on aspects of externally driven development technologies as tools for addressing natural resources degradation at the same time alleviating poverty through access and use of natural resources. The central question in this chapter is whether technology or modernization of the rural areas necessarily translates into social development as previously assumed by development agents or programmes. Literature exists on development and vleis utilisation in sub-Saharan Africa, but they are gaps in literature that have been identified and this thesis purports to fill. In the past decade vleis under communal ownership have been of concern to academics and policy makers because of their fragility and weak management regime. There is a dilemma amongst stakeholders on whether vleis can be used for cultivation without depleting their resources. The Broad-Ridge and Broad-Furrow tillage system has been forwarded as a possible technology for vleis cultivation and conserving its resource base. This chapter demonstrates that little socio-economic dynamics associated with the technology are known, as evidenced by scant literature.

2.2. Approaches to Rural Development

For the greater part of human history development initiatives have been predominated by modernisation paradigm centred on western technology and knowledge (Hall, 1988 and WCED, 1988). Science seems to have been thought of as western, ignoring African science. Hence, in critically analysing technology one raises questions like what is technology/knowledge, whose technology/knowledge and for whom? According to Scoones and Thompson (1994), three approaches have been developed in literature to try and explain knowledge and technology. The first approach perceived Rural People's Knowledge (RPK) as primitive, unscientific and wrong. They assert that formal research and extension must educate, direct and transform rural people's production and livelihood strategies in order to develop (modernise). The second approach argues that RPK is valuable and underutilised and needs to be intensively and extensively studied, and incorporated into formal research and extension practice to make agriculture and rural development strategies more sustainable. The third perspective holds that neither RPK nor western science can be regarded as unitary bodies or stocks of knowledge. Instead they present contrasting multiple epistemologies produced within particular agro-ecological, socio-cultural and political economic settings.

Literature that argues for scientific technology as key to rural development in third world countries are centred on the concept of modernisation (Hall and Midgley 1988; and Berger, 2005). Manifestations of modernisation as an ideology have roots in the claims of civilisation by the west. The Modernisation approach is enshrined in the philosophy that

development is exposing "backward" men to the benefits of modern behaviour, institutions and technology, with the expectation that "he" will then adopt them with beneficial effects (Berger, 2005). The White people thought that all other races were barbaric and backward and that it was their duty as the civilised group to bring non-barbaric thinking and action to Africa (Kemp, 1972:15-33 and Kegley and Wittkopf, 1997). The major similarity between civilisation perspective and modernisation is the belief in the superiority of science and western technology over the indigenous knowledge and technology (Wilson and Mukamuri, unpublished). According to Wilson and Mukamuri civilisation had its counterpart in barbarism, so modernisation has its counterpart in backwardness, superstition and tradition.

According to Jeater (1993) proponents of the civilisation argument have been dropping in numbers because of the failures of civilisation philosophy and since the term has been dropped from White people's discourse and steadily replaced by modernisation. The new term propagates the same ideology as that provided in the pro-civilisation discourse. According to Benvenuti (1975) modernisation of agriculture tends towards increasing scientification as shown by developments of technology in the form of hybrid seed and new chemical inputs. The pinnacle of modernisation is the belief in inherent superiority of western cultural values, sciences and technology (Scoones and Thompson, 1994; Drinkwater, 1994, Berger, 2005).

In third world countries, development is derived almost exclusively from findings of the research station and transmitted to the farmer through hierarchical, technically oriented

extension services. The farmers have no much say in the technology as they are reduced to being either adopters or rejecters of the technology (Long, 1988). Chambers and Ghildyal (1985) called this practice Transfer of Technology (TOT) model or approach. The proponents of the above perspective seek to solve socio-economic problems by using technical solutions only. The TOT approach views agriculture as constituting a set of ideal practices. Drinkwater (2000) argues that proponents of TOT see agricultural development as a mere process seeking to persuade farmers to follow technical recommendations in order to move up the rungs of the technical development ladder. This thinking ignores the fact that rural people are active social actors who desire to shape their destiny.

According to Mommsen (1995) Max Weber viewed social development as a direct result of advances of modern industrial capitalism. Weber predicted the triumph of capitalism over traditional bound social structure and that this process was irreversible (Mommsen, 1995). Weber lived in a generation that witnessed the development of large industrial combinations, trusts and monopolies and he noted how this new reality conflicted with political economy ideal image of capitalism (Haralambos and Holborn, 1998). It became clear to him that even under industrial capitalism development is not determined exclusively by material interests but also by dynamism of ideal interests. Weber therefore, argues that ideal interests can initiate circumstances that can have revolutionary effects although they have nothing to do with economic interests.

Marxist theory has challenged the thinking that technology equals to development for the rural people. Since the purpose of technology has been to make farmers produce more for the market hence drawing them more into the logic of capital and commoditisation (Janvry, 1981). Thus, a few who own and control modes of production become wealthier and the poor farmers remain poor. This scenario has made Marxism to be the main focal point for debates about modernity and its impact on the world. Marx viewed capitalism has having an inner dynamism derived from the desire by capitalists to invest and make more profit (Kemp, 1972). Hence development through modernity is targeted and benefiting a few, thus creating a rural bourgeoisie.

The economic drive of capitalist expansion fuelled the spread of western institutions across the world, incorporating or eradicating other cultures wherever they encountered (Hodgkin (1972). Agricultural development therefore means increasing capital penetration through investing in technology so as to derive more profit from little labour cost (Long, 1988). Those who control the means of production, wealth or capital are able effectively to monopolise power in the political and cultural sectors on the basis of their status. Those who do not own means of production are underdeveloped and exploited by the powerful. Through this interaction the periphery has come to be depended on the centre's ideologies and technologies (Kemp, 1972). This relates well to what De Janvry (1981) calls 'functional dualism' whereby the peasants are tied to the needs of the modern capitalist sector. Marxism has been widely criticised especially after the fall of Russian communism, in this section the criticism will not be considered in detail.

De Janvry (1981) used the Marxist theory in his studies in Latin America. For example he studied the Peruvian land reform of 1969 that aimed to modernise the export-oriented estates leading to the consolidation of middle-size commercial farms. The result of this reform was the increased socio-economic differences and proletarianisation. De Janvry (1981) concludes that the reforms hidden aims were to increase central control over the rural population and increase production. He argues that dominant class interests represented either directly or indirectly by state power were critical in determining the types of policies adopted and their effectiveness. The rural bourgeoisie usually in alliance with the urban bourgeoisie usually had a lion's share of development projects and benefits.

Clearly from the forgoing arguments the few who own or control technology have power and they dominate society due to the dependency syndrome. Habermas an influential social thinker with allegiance to Marxism thought argues that a few powerful people dominate society. Habermas, like Marx, argues that capitalist society is subject to crisis, but he sees the crisis as enshrined in ideas rather than in the economy (Haralambos and Holborn, 1998). According to Habermas modern capitalism creates new strains and tensions outside those of socio-economic class cleavages (Haralambos and Holborn, 1998). Modernisation in practice is fraught with internal contradictions, giving rise to inconsistent policies. These policies will not succeed and eventually in the long run resistance and conflicts would result.

The populist or farmer first perspective has challenged the predominance of the modernisation theory in Third World countries rural development. For a long time rural people's knowledge (RPK) has been discredited, ignored and generally undervalued in development initiative by governments (Scoones and Thompson, 1994). The 'farmer first' approach argues that farmers should be provided with a menu of options in the form of genetic material, principles, practices and methods for them to test and incorporate as appropriate rather than packages of technology (Chambers *et al*., 1989:185). Chambers *et al* (1989) argues in 'farmer first' that approaches and methods of TOT which served industrial and green revolution agriculture do not fit the resource poor farming of third world countries which is complex, diverse and risk-prone. The focus of this perspective was on Indigenous Technical Knowledge (ITK). Recently this perspective has been expanded to consider indigenous knowledge as cultural knowledge, producing and reproducing mutual understanding and identity among members of a farming community, where technical knowledge, skills and capacities are inextricably linked to non-technical ones (Scoones and Thompson, 1994).

The researcher or scientist and farmers use different reference frames when conceptualising agricultural development (Scoones and Thompson, 1994). Farmers' practises and knowledge are linked to certain cosmologies, but not to assume that they are primitive. It is only that they have evolved with the knowledge and the technologies changing in a sequential line, Scoones and Thompson call this 'progress'. The gradual change has been in response to environmental and socio-political factors. The farmer values fitting available resources to changing circumstances well enough to make it

through the season (Scoones and Thompson, 1994). On the other hand scientific change brings discontinuity in social progress. Scientist's livelihoods are not affected by change in policies or practices in as much as the peasants are yet they dominate decision-making. Thus the end results are also different, replication and comparison is valued and pursued by the scientist.

Farmer first approach has been superseded by "Beyond Farmer First" perspective, which takes the analysis much deeper than the former. Scoones and Thompson (1994) argue that 'beyond farmer first' presents a more radical programme that incorporates a socio-politically differentiated view of development where factors such as gender, ethnicity, class, age and religion are highlighted with important implications for research. Beyond farmer first perspective focuses on the actors and sees society as heterogeneous. Actor oriented approach stresses perspectives of different individuals and groups and sees them as active political, social and economic agents (Haralambos and Holborn, 1995). These two perspectives should not be viewed as 'polar opposites' but rather as representations of points on a continuum, and different ways of viewing the life-world (Drinkwater, 2000 and Scoones and Thompson, 1994).

The farmers are the one's who attach meanings and value to innovations meant for development. They accord different meanings depending on how it is applied and the impact it has on their life-world. The farmer is involved in constructing his/her own farming world, even if s/he internalises external modes of rationality (Long and Villareal, 2000). Knowledge is a social construct that results from continuous encounters and

discontinuities that emerge at the points of intersection between actors' life-worlds. The social actors to adapt or produce new definitions and meanings can merge external knowledge and technologies with rural people's knowledge and technologies. Scoones and Thompson (1994) have called this interaction between 'theory (science) and practice (RPK)' interface, while Geertz (1983:69) describes it as 'dialectical tacking'. Long and Villareal (2000) see knowledge as a result from an 'encounter of horizons', since the processing and absorption of new items of information and new discursive or cognitive frames can only take place on the basis of already existing networks of knowledge and evaluative modes, which are themselves reshaped through communication. The dissemination and creation of symbolic benefits and materials is an interpretive and cognitive process entailing bridging of the gap between a familiar world and a less familiar set of meanings.

Dialectic of horizons does not guarantee equality amongst the knowledge systems or actors. Generation and utilisation of knowledge is not merely a matter of instrumentalities, technical efficiencies, or hermeneutics but involves aspects of control, authority and power that are embedded in social relations (Norman and Villareal, 2000). It is clear that they are certain definitions that dominate society and come to be internalised by others. According to Long and Villareal (2000) for actors meanings to be upheld by communities they have to win the struggles that take place over the attribution of specific meanings to particular events actions and ideas. Development interventions can be used as weapons or tools in advancing interests of agencies controlling them. In

extreme cases the farmer becomes ‘invisible men’ in contrast to the experts who become ‘visible men’ (Mukamuri and Matose, 2000).

The implementation of external innovation brings about an interface characterised by changes in meaning. At different interfaces discontinuities are characterised by discrepancies in values, interests, knowledge and power. Thus interactions between outsiders and locals in development programmes are part of the on going processes of negotiation, adaptation and transfer of meaning that take place between the specific actors concerned. It is therefore necessary to study the intended and unintended outcomes of Broad-Ridge and Broad-furrow innovation in the context of the cultures they occur.

2.3 Technocentricism

According to Bassala (1990) technology is the vast universe of objects used by humankind to cope with the physical world, to facilitate social intercourse, to delight our fancy, and to create symbols of meaning. Techno-centrism is therefore the belief that technology addresses human problems in life. Indeed, human life is more and more mediated, impacted and transformed by technology, which determines who we are, how we work and how we live (Hamel 2006).

According to Charles Darwin’s *Origin of Species* (1859), both diversity of life at any given moment was a result of evolution and Butler (1968) uses the same analogy to explain the emergence of novelty throughout time as resulting from evolutionary process.

The variety of made things mimic the living world (Schlereth, 1982 and Bassala, 1990), hence scholars use the evolutionary approach to study technology. Both scientific and rural people knowledge systems and technologies have their own epistemology. This section of the thesis shall discuss views on technology.

Traditional wisdom about the nature of technology has customarily stressed the importance of necessity and utility. Necessity was then thought of as the mother of invention. Necessity and utility alone can not account for the variety and novelty of existing artifacts, hence need to turn to organic evolution to understand novelty of technology (Bassala, 1990). For example the gasoline-powered motorcar reveals that it was not necessity that led to its development because there was no international horse crisis or shortage (Flink, 1976). Thus real necessities would be the universal needs across cultures at a particular time. According to functionalist anthropologists and socio-biologists, culture is humanity's response to the fulfilment of its nutritive, reproductive, defensive and hygiene needs (Bassala, 1990). Critics argue that technology is developed to meet our perceived needs and not a set of universal needs legislated by nature. According to Bachelard (1964) conquest of the superfluous gives us a greater spiritual stimulus than the conquest of the necessary because humans are creations of desire, not need. Thus one can conclude that history of technology is a part of the much broader history of human aspirations, and the plethora of made things are a product of human minds replete with fantasies, longings, wants and desires.

Following the argument that technology evolves, Pitt-Rivers (1906) believed that technological change was not accomplished by a series of great-unrelated leaps forward by a few heroic inventions. This thinking pictures inventors as geniuses who use their wit and ingenuity to come up with new technology when placed in seemly difficult situations (Bassala, 1990). According to Karl Marx (1867) invention is a social process that rests on accumulation of many minor improvements not the heroic effort of a few geniuses. Ogburn (1922) defined invention as combining existing and known elements of culture in order to form a new element. No artefact is totally new or an individual scientist effort for example a radio is as a result of bringing together small components made by others to come up with some thing new (Bassala, 1990).

There is no technology that is novel out side a cultural setting. Cultures define novelty basing on the usefulness of an artefact in relation to other social concerns. Scientists and development practitioners at times ignore or underestimate issues, such as those associated with the contextualisation of technology, the adaptation of alien technology to culture and culture to alien technology, and the larger anthropological, civilizational and political issues related to the technologization of pre-modern Africa.

A number of issues necessitated the creation of the Broad-Ridge and Broad-Furrow tillage system as witnessed by literature attempting to come up with a sustainable way of utilising vleis. Firstly, continued illegal cultivation of vleis without major degradation and lack of scientific knowledge on vlei cultivation triggered a change in attitude amongst researchers. Furthermore the prohibitive legislation that banned vlei cultivation

(Whitlow, 1985; Matiza, 1992; Mharapara, 1995, Mukamuri and Mavedzenge, 2000) was outdated and it had no scientific base. Thus, research was necessary to dispel misconceptions and failures of the suggested vleis utilisation structures led to the development of the Broad-Ridge and Broad-Furrow technology.

To address the weaknesses of approaches to vleis utilisation and contradictions amongst users, policy makers and the science community, Lowveld Research Stations experimented with a variety of practices for vleis cultivation. The research work showed that [1]Broad-Ridge and Broad-Furrow tillage system is a promising cultivation practice for use in vleis. This conclusion takes into account how the system closely addresses the factors and parameters contributing to sustainable vleis management which are; soil conservation, hydrological capacity, organic matter retention, gully reclamation and cropping (Mharapara, 1995). The factors considered for commissioning the technology did not consider socio-political factors except for sweeping assertions that it will enhance livelihoods if production is increased. The approach is not ethnocentric but centred on preserving the vlei ecosystem. More social science research is needed to inform policies and the implementers.

The invention of Broad-Ridge and Broad-Furrow technology is not as a result of unrelated leap-forward in science but borrowed a lot from local technologies that controlled the flow and level of water. Vleis users even before Broad-Ridge and Broad-Furrow tillage system had developed sustainable vleis management strategies, which had evolved in response to the socio-technical constraints they were facing. Evidence of past

[1] Refer to chapter 1 for description of Broad-Ridge and Broad-Furrow tillage system.

vleis cultivation has shown ridges and furrows to have been used in Zimbabwe and Zambia. Drinkwater (2000) has shown that small ridges and furrows were constructed on vleis in the Ndola rural areas in Zambia. Whitlow (1983) observed cultivation relics in the form of intricate patterns of ridges and furrows around present day settlements in Marondera, Nyanga and Rusape districts. The ridges and furrows were found in places where they were large population involved in extensive agriculture (Scoones and Cousin, 1991 and Matiza, 1992). These ridges and furrows were called *mipanje*. Without ox ploughs, hoe cultivation and ridging required a lot of labour input. This was made possible with a pattern of close patriarchal clusters of kin-based settlement, which required the payment of tribute labour to the 'big man' of the group (Scoones and Cousins, 1991). In Mazvihwa area farmers who controlled such fields were very wealthy and usually from the royal family (Scoones and Cousins, 1991).

The ridges and furrows were designed to improve crop performance, control water and soil movements (Scoones and Cousins, 1991). Ridges were constructed parallel to the stream flow if the vleis was too wet and required some drainage. In the case where water conservation was the objective, ridges would be constructed at an angle or along the contour. The central area of the vleis was left with dense grass, which was too difficult to clear. Crops were planted along the ridges with an intercrop of maize and rice closest to the stream channel. The ridge cultivation system of vleis agriculture appears to have been highly sustainable (Scoones and Cousins, 1991).

Just like all other technological inventions, the broad ridge and broad furrow can it be said to exhibit continuity in change. The science community and others have received the technology as a novel technology and ended there. Very little work has been done to show whether communities were this technology has been put in place hold it as a novel innovation. Vleis cultivation has been legalized on the basis that the Broad-Ridge and Broad-Furrow tillage system is put in place. Studies have proved that the Broad-Ridge and Broad-Furrow tillage system conserves the vleis resources, enlarges the wet area and ensures high productivity (Mharapara, 1998), but its social consequences are poorly understood.

2.4 Application of Technology, Reaction and Resistance to Agricultural Innovations

2.4.1 Top-to-bottom Approach

The approach to development and legitimacy of different institutions has often determined the implementation and reaction of communities to external development initiatives (Powell, 1988 and Castillo, 1983). The state centred approach to development has been widely used in third world countries (Makumbe, 1996). This is commonly referred to as the top-to-bottom approach. The post independent state's development interventions assume the superiority of state policies over local practices basing it on scientific and technical knowledge, which would have resulted from superior research. Numerous African states have taken indigenous knowledge systems and structures not as

serious as they deserve and have tended to ignore them. They have perceived Rural People's Knowledge (RPK) as primitive, unscientific and wrong. They assert that formal research and extension must educate, direct and transform rural people's production and livelihood strategies in order to develop (modernise). As a result of this ideology agrarian change has been driven by what one might call 'central tendencies to development'. The programmes and technology implemented is external to the targeted community and the state implements or forces it on to the people. An act of opposition is labelled as rebellion against the whole system and interpreted as a sign of a backward culture (Scoones and Thompson, 1994).

Governments and donor agencies have been resorting to external models and technologies for development projects. Some of these technologies would have been said to succeed in other parts of the world. For example experts overlooked Africa's diversity, complexity and uncritically recommend the adoption of the Asian Green Revolution model for Africa and importing institutions from other continents (Eicher 2003). FAO has been promoting its Special Program for Food Security (SPFS) in 62 countries around the world. External models have unfortunately not succeeded in transforming African communal agriculture (Eicher 2003). Hamel (2006) has blamed moral, spiritual and religious factors as limiting the uptake of technology. Given the low level of technological development in much of the continent, many African cultures appear to be subdued, lukewarm, unexcited or indisposed toward technology (Hamel 2006).

Farmers can react either by being integrated or resisting external and state driven innovations. Benvenuti (1975) uses the institution incorporation model to analyse how farm enterprises become integrated into the wider technological and administrative environment. Benevenuti argues that incorporation of farmers into the institutional system contrasts the traditional idea that farmers are autonomous decision-makers who operate in a free market governed by an invisible hand. The farmer is drawn into a system of production characterised by financial institutions, government agencies and farmers unions (Benvenuti and Mommas, 1985). The farmer himself gradually perceives this system of links as some kind of quasi-organisation with central decision-making located at the top and implemented at the bottom. Benvenuti suggests a corporatist view of intervention in agriculture, which assumes integration among external institutions and the farmer to the point of developing same rational and objectives. The degree of incorporation and the bargaining power varies among different social actors.

A few examples are presented here of the central tendencies to development and the farmers reactions. During the 20th century dams have been valued since they were focal point for the interests of governments, natural scientists, politicians, international aid donors and dam building industry (world commission on dams, 2000). Construction of dams increased rapidly since they were viewed as symbols of modernisation and humanity's ability to harness nature and have secondary and tertiary benefits (world commission on dams, 2000). Project planning and appraisal for large dams was confined primarily to technical parameters and the narrow application of economic cost benefit analyses. Some of the dams have caused a lot of social problems for example conflicts,

displacement and land use changes. Populations have had to live with these establishments and adjust their livelihoods.

Benvenuti's view holds water but it creates the image of a passive peasantry, yet farmers can resist innovations by the state or any external institution. For example dam constructions have resulted in resistance and conflicts in Zimbabwe, studies carried out by Mhlanga (2001), Magadza (1986), have shown conflicts on Lake Kariba. Land reform programmes have also been widely resisted by other groups in society (Ramphela and McDowell, 1991). For Marxists group consciousness has to develop before the farmers can resist a technology as a group or institution. This resistance leads to conflicts among different classes or ideologies (Haralambos and Holborn, 1998). That is to say the power of the weak is in their numbers. The actor-oriented approach has taken it further to analysing individual resistance (Scott, 1990). Farmers are heterogeneous hence they have differential responses to changing circumstances depending on the farmers themselves and the situation confronting them. All forms of external intervention necessarily enter the life-worlds of the individuals and groups affected and form part of the resources and constraints of the social strategies they develop.

Contrary to the Marxists peasant rebellions, let alone peasant revolutions are few and far between. According to Scott (1985) not only are the circumstances that favour large-scale peasant uprisings comparatively rare, but also when they do appear revolts are nearly always crushed unceremoniously. This is not to think that conflicts between farmers and those with ideas and interests that oppose theirs do not exist. The forms taken by this

struggle stop well short of collective outright defiance. Scott (1985) identified behaviours by the powerless used as weapons (he called them 'weapons of the weak'), which are; foot dragging, dissimulation, false compliance, pilfering, feigned ignorance, slander, arson and sabotage. The weapons are adapted to different situations and a sub-culture that supports rebellion develops. Scott (1985) argues that:

> "In the light of a supportive subculture and the knowledge that the risk to any single resister is generally reduced to the extent that the whole community is involved, it becomes plausible to speak of a social movement. … this is however a social movement with no formal organisation, no formal leaders, no manifestoes, no dues, no name and no banner. By virtue of their institutional invisibility, activities on anything less than a massive scale are, if they are noticed at all, rarely accorded any social significance."

Literature on rural development in Third World countries show a number of unpopular policies and innovations reduced to extinction by the passive resistance of the peasantry. Colonial agricultural policies were resisted by peasants passively for example unequal market price, high taxation, disobeying conservation laws and forced labour which led to active resistance by the masses as in the case of Chimurenga in Zimbabwe and Maji Maji in Tanzania (Mukanya, 1998). Some of the most ignored agricultural policies were contour ridging and banning of vleis cultivation (Mukamuri and Mavedzenge, 2000). Mukamuri and Mavedzenge (2000) studied the reactions of Chivi and Mutoko Communal Areas to the banning of vleis cultivation in Zimbabwe. They have identified ways used to circumvent contour ridging and vleis cultivation ban which are; extend their

fields into the vleis area when inspectors left, have fields surveyed during the dry season, farmers did the pegging themselves and claim it was the inspectors and many farmers just ignored the policies altogether.

Another example of centralised development initiative taken down by peasantry is the Ujamaa (familyhood) village programme in Tanzania (Hyden. 1980). The Ujamaa policy had two phases one of voluntary joining Ujamaa villages and that when force was used. People were relocated into the *Ujamaa* villages and given agricultural equipment and inputs such as certified seed, tractors, ploughs, planters and other implements. The ideology of *ujamaa* villagisation is to be presented in terms of modernisation theory. Despite the good investment the targeted population resisted joining the villages by all means including running away and vandalising equipment. *Ujamaa* villages were directed towards poor peasants however; no more than 15 to 20 per cent of the population ever joined and efforts to promote communal production were generally unsuccessful. In almost all cases the peasant emerges as the winner though unceremoniously.

Resistance is done to deny or mitigate claims made by much powerful classes in society in order for them to be heard and express their interests. More frequent than not, these resistances are not taken seriously because they do not threaten the political order since they are concerned with *de facto* gains. Little literature explores these resistances as collective effort with symbols. Scott (1985) warns against ignoring their consciousness that is the meaning they give to their actions for two main reasons. First acts of resistance and thought about resistance are in constant communication. Secondly, intentions and

consciousness gives a kind of privileged access to lines of action such as revenge that may become plausible in future.

The African states return again and again to claim to be acting in the interests of modernization, despite the failures of this claim to win popular support and its objectives in the past. The ideology of modernization has internal contradictions, which become very apparent in practice. Whenever modernization attempts fail the communities in which they are implemented are criticized. Peasants in Tanzania were no longer seen as proto-socialist, but as thorns in the State's side, whose problems were based fundamentally on their traditional outlook and unwillingness to accept change. Blaming 'tradition' for the failure of modernization policies did more than just excuse failure: the insistence on the inherent traditionalism of Africans also underlined claims about their technical incompetence, and urged the modernizers to further efforts. The implementers of technologies in rural areas frequently blame the farmers and rarely do they blame their model or approach to development. An alternative approach that is participatory will ensure success of technologies. There exists a gap in literature, which explains peasant resistance to new external technology.

2.4.2 Participatory development (Bottom-to-top approach)

The top to bottom approach has been attacked and opposed by radical thinkers. This has led to a lot of criticism of 'centralised' development initiatives, favouring participatory rural approaches (PRA) to development. Participatory rural approaches are assumed not

to create resistance, conflicts and program being seen as for externals, hence are bound to succeed. Participatory rural approach values the contribution of the populace and sees them as active social actors who strategize rationally about their future (Scoones and Thompson, 1994). Literature on 'participation' demonstrates that many different interpretations are attached to the concept (Hall, 1988 and Makumbe, 1996). Generally it has been taken to mean development by people rather than by elites, which is commonly known as bottom up approach. This can be equated to democracy, which is rule by the people. Montgomery and Esman (1971) define participation as exerting influence on administrative behaviour and on the outputs of official action. Uwakah (1981), define participation as a process of cooperative action, in which a group of individuals willingly share in the responsibilities and consequences of a common undertaking or the achievement of a particular task.

Participatory rural approach has recently been found wanting and criticized for being superficial, extractive, transitory, unable to initiate change and build local capacity (Cook and Kothari, 2001). Critics have advocated for a new approach known as Community Visioning (CV). According to Sanginga and Chitsike (2005) CV is highly interactive as it engages farmers in dialogue to identify their opportunities and facilitate community action planning. Thus, it facilitates development with what the community has at their disposal. This approach forms a new window towards rural development and research. PRA and CV have a lot of similarities but also differ significantly in their starting points and thrust.

Which ever participatory approach one use, the question of who participates and to what extent is important for programme implementation. There are three ways of viewing popular participation in development; mass contribution to the development effort, mass sharing of benefits and mass decision-making in development. Popular participation is considered severely limited when the masses are merely being asked to choose between alternatives initially selected for them (Makumbe, 1996). The assumption in consensus between government and the populace is dominant in Africa and communities are only expected to collaborate. Involvement of people is sought after major development parameters have been set by external institutions and the roles of all actors already prescribed (Hall, 1988). In the Zimbabwean case community leaders like District Administrator, VIDCOs, councillors and chiefs have the final say and decide on the implementation and sharing of profits (Castillo, 1983). Makumbe (1996) argues that if representatives of the masses are used they have to be "truly people" meaning have to be elected by people to represent their interests, values, aspirations, norms and goals, without any influence from the top. Appointed leaders owe their position to the one who appointed them and not to the people, thus do not represent interests of the masses.

When implementing agents seek people's participation in ready-made plans, projects and programmes, they often meet with stiff resistance as people feel left out of the initial processes which would have enabled them to acquire some proprietary values of the programmes or projects (Makumbe, 1996). Programmes and projects fail to attain the expected goals, or they collapse as soon as they are handed over to the people for maintenance (Powell, 1988 and Makumbe, 1996). Authentic participation according to

Hall (1988) involves a broad spectrum of the community in all phases of development activities from project selection, design, execution and evaluation. According to Hall 'participation' has been frequently used to manipulate the scheme members of development initiatives rather than allow them greater control over directed socio-economic changes affecting their lives.

Despite the vast literature on participation and constant mentioning of the concept, development initiatives whether undertaken by government or aid organizations remains overwhelmingly a top-to-bottom process characterized by the blueprint approach (Hall, 1988, Makumbe, 1996). The local leadership has only been used to rubber stamp policies and projects by external institutions. There is a gap in literature on how external technologies can be implemented in a participatory way. This thesis goes a step further and questions the assumption that technology is the answer to development problems.

2.5 Conflicts over Access, Use and management on Vleis resources

2.5.1 Management of Vleis and Conflicts

Studies in vleis management have identified a lot of institutions that are involved in vlei management (Sithole, 1999) which include: household, community, traditional leadership structures, political parties, Non-governmental organisations, universities and government departments. Due to a number of players in vleis management- sets of overlapping rights exist with varying degrees of effectiveness in ensuring control over the resource (Scoones and Cousins, 1991). This has generated conflicts between different

external institutions versus the community institutions (Sithole, 1999). The most documented and probably the important conflicts are between communal societies versus government and political structures.

According to Matiza (1992) before white settlement in Zimbabwe, vleis were used for shifting cultivation and grazing, and were probably governed by the communal tenure system. Due to dearth of research on vleis management before colonialism and in Communal Areas during colonialism, knowledge on traditional resources management is scant. A number of studies are now reviewing the traditional natural resources management through retrospective research, mainly oral accounts (Schoffeleers, 1978, Matiza, 1992, Sithole, 1999 and Mukamuri and Mavedzenge, 2000). A study conducted in Mutoko and Chivi by Mukamuri and Mavedzenge (2000) reviewed that vlei use was controlled by local rules, which were generally enforced by members of the ruling lineage. Traditional ruling lineages used mythical taboos that defined areas of the vleis as sacred and not to be exploited or set up rules for exploitation (Mukamuri, 1988, Sithole, 1999). Mythical water spirits (*Njuzu*), and animal spirits such as *mhondoro* (Lion spirits) where said to have control and power over resource exploitation within vleis (Mukamuri, 1988). The sacred laws were used to exclude the immigrants from vleis resources management and use (Mukamuri, 1988, Sithole, 1999). Fortman (1995) describes these controls as real and mythical fences over resources.

In a study conducted by Sithole (1999) in Chiduku and Mutoko, she documented the rules observed at springs, sacred grooves, collecting clay and at sponges within the vlei.

People respected traditional values and obeyed these regulations which were loosely policed by mini-states. Going against the rules was associated with calamities in the family and to the community at large. Studies on vleis are showing that the sacred fences and controls are going down (Sithole, 1999 and Mukamuri and Mavedzenge, 2000). Sithole observed that externals were still being forced to uphold these sacred myths yet the community members were not following them strictly. Although these controls are fading away there are still in considerable force upto today. Rapid population growth has necessitated the ploughing of the vleis including the sacred sites. Thus the traditional value of sacred places is falling apart together with traditional structures. The traditional leaders were increasingly marginalized after independence as a punishment for cooperating with the colonial government.

Vleis like other resources were transformed from being communal assert into state assert with the subsequent rise of the state in the 19th century. Settler policies on vleis emerged only after they had occupied central watershed of Zimbabwe extensively (Matiza, 1992). The settler government passed a number of laws to restrict utilisation of vleis. The most notable acts passed at the time were Water Act (1927) and the Natural resources Act. It was thought that draining and cultivating of the vleis would result in rapid and permanent loss of moisture and organic matter hence irrigation engineers and other conservationists pushed for legislation to address the problem (Matiza, 1992; Mukamuri and Mavedzenge 2000). Many of such environmental degradation statements were made without technical evidence and have since been shown to contain inaccuracies (Scoones and Cousins,

1991). It is believed that the ban was intended to make it difficult for Africans to compete with whites in agriculture production such as winter wheat (Wilson, 1986).

Before independence the policy on vleis management had a dualistic approach, since it discriminated on the bases of colour. Questions like was the policy only aimed at conserving vleis ecology or it also had political motives are raised. Wilson (1990) argues that it was imposed for both hegemonic and economic reasons, as the colonial state wanted to stop local farmers from growing winter wheat for sale, and keep prices high by pushing them out of the market. Mukamuri and Mavedzenge (2000) assert that some supported the ban on purely aesthetic grounds, as the perennial greenery of the wetlands appealed to western notions of beauty. On these grounds two scholarly camps have developed with other supporting vleis utilisation (Mukamuri and Mavedzenge, 2000; Mharapara, 1995; Maseko and Bussink, 1995) and others arguing against vlei utilisation (Whitlow,1985). Scholars in the natural sciences and in the social sciences are continuously seeking for an answer as to whether the vlei can be utilised sustainably. This thesis will address problems of natural resources management that are associated with vlei utilisation.

A number of studies have been done to assess the reactions of the people to barring vleis utilisation (Matiza, 1992; Mukamuri and Mavedzenge, 2000). The most obvious result of the ban was that previously productive agriculture on vleis became illegal (Scoones andCousins, 1991). The farmers developed various methods of circumventing the ban and the contour ridging requirements of the Natural Resources Act. Mukamuri and

Mavedzenge (2000) Chivi and Mutoko people managed to dodge the ban by; those with yield close to the vlei would join up the contours to include the vleis once the extension agent had left, another strategy was to adjust the pegging themselves and claim that it had been done officials. Thus vlei cultivation continued illegally (Matiza, 1992; Maseko and Bussink, 1995, Mukamuri and Mavedzenge, 2000) and conflicts between communities and state agents resulted (Scoones and Cousins, 1991). There is lack of knowledge on whether similar conflicts between farmers and state exist on vleis legally accepted for cultivation.

2.5.2 Conflicts over Vleis Utilization and access

Resource-use rights can be characterised in terms of property and access relations and their allocation can be characterised in terms of the exclusivity and transferability of these rights (Grima, 1989). Although there are many resource use categories research and policy discussions have tended to focus on the commons more. Much of this research has begun to question the orthodox views about use and access to resources (Sithole, 1995). For many years the term ‘Communal Areas’ has been tainted by the misconception and misunderstandings about the meaning and nature of communal resources use within traditional and modern African society (Peters, 1987 and Bruce, 1988). The misconception is also shown in Hardin’s (1968) ‘tragedy of the commons’ for failing to distinguish between open access and common access.

The concept in human tradition is that of treating resources as mere assets for the creation of human satisfaction or utility (factors of production), not desirable in themselves, but rather means to an end. Recently this stance has been challenged and scholars and policy makers are now advocating for sustainable use of resources. There are a number of complex factors that inhibit sustainable utilisation of resources. A number of studies have identified land tenure and use rights as the most important limiting factors to sustainable resource use (Murombedzi, 1990). Private property resources users have been proven to use resources in a sustainable way (Sithole,1999; Murphree,1996). Privatisation has been linked to security of tenure that is in turn linked to incentives that allow the resources to be conserved (Sithole, 1999). While, resources under common property and open access management regimes have been said to degrade the environment since they lack conservation incentives and ownership. The challenge is that cultural relativity operates to define the most sustainable property rights as argued by Grima and Berkes (1989); "In western societies, the individual self-interest is seen as supreme. In many other societies, however, as well as within certain groups in western culture, the individual is not the dominant locus of choice; the community is the relevant decision making unit."

Murphree's (1995) argument that the communal people in Zimbabwe have a strong awareness of their community as shown in the Shona proverb [2]*nyama yemusango haigochwi*, substantiates Grima and Berkes (1989) point. This helps to explain why African societies are not strict on tenure rights up until recently. Instead of focusing on tenure status, it would be helpful to examine the diversity of relations involving property and access conditions under which a resource is held.

[2] When you have hunted take the animal to the village and eat it in the village with others.

The ideology that, nature has a temporal existence of a different magnitude than human life span, and humans are merely given rights to use natural resources, with the injunction that people act as good 'stewards' is very pervasive and cuts across cultures` (Grima and Berkes, 1989). Most industrial societies have overlooked this line of thinking and have thought of resources as mere property. According to Grima and Berkes (1989) the notion of property implies exclusion of non-owners. Thus, common property should be restricted to those resources for which communal arrangements for exclusion of non-owners and for allocation among the owners exist.

Once market economy has developed, communal ownership and control are extremely difficult to maintain. Capital economy brings about competition, individual gains which directly lead to unequal wealth and power. Capitalism makes it necessary to allocate resources through the market process, communal agreement or coercive decision. Allocation confers rights of access and use of a resource, rather than the right to the resource. Such rights to the use of a resource need to be based on a common interest or sense of commonality if they are to be successfully implemented through policy. The allocation of rights to use needs to be perceived as being fair within the institutional cultural context otherwise they lead to resource degradation and the related injustice among resources users (Regier and Grima, 1985). When there are too many users, limited resource and allocation disorders and violation of access and use rights then conflict occurs and the degradation of the resource.

In cases where market solutions are difficult to institute central governments have stepped in to regulate the rights to use. In some cases, central governments have declared a particular resource to be state property or have nationalised a communal-property resource. The Zimbabwean government has been regulating access and use of resources like communal land, wildlife and wetlands. Permits have to be sort from custodian institutions for access or and use of those resources regulated by the state.

Migot-Adholla and John (1994) state that the somewhat romanticised suggestion of equality of access implied by communal obscures important variations in traditional rules of access to and control and use of resources and organisation of livelihood systems (as cited by Sithole, 1999). Studies in Zimbabwe have shown that the traditional religion is very important in stipulating rules for resource use and access (Mukamuri, 1988).

Vleis cultivation is a centuries old tradition of the communal Black population in Zimbabwe (Matiza, 1992 and Mukamuri and Mavedzenge, 2000). Three phases (pre-colonial, colonial and contemporary) can be distinguished, where different factors of control are important (Scoones and Cousins, 1991). Early Portuguese and other European travellers noted and documented vleis cultivation. A traveller Thomas Leask noted hill surrounded by rice gardens. He explains that the rice fields were located in swamps designed into ridges like a turnip field or in beds much resembling a grave yard" (Leask, 1867, quoted by Wilson, 1986: 80)

Oral accounts of the time and archaeological evidence points to the point that the vleis were very important for the communities (Matiza, 1992; Mukamuri and Mavedzenge, 2000 and Scoones and Cousins, 1991). Numerous scholars have identified the various used or benefits derived from the vleis. The vleis were mainly used for cultivating and grazing. Intercropping was practiced and the following crops grown rice, maize, pumpkins and tsenza. Intensive use of vleis areas under a system of tribute labour organised by powerful patriarchs appears to have been the dominant pattern. Although there is no much data available of this time oral account assert that traditional institutions governed access. Resources depletion and Conflicts over access and use of resources was slight and insignificant to be noted.

The status of vleis was radically changed with the establishment of the colonial regime. When the gold dream had evaporated, Whites started acquiring land for agriculture displacing the Africans from much of the central water shed (Matiza, 1992). The Black peasants were well established in agriculture so they resisted selling their labour and intensified agriculture especially by utilising vleis. Dualistic agricultural policies resulted as an attempt to cut competition from black farmers. Numerous repressive laws were enacted and some of them affected vleis management, access, use and ecological status.

The Water Act of 1927 was the first law affecting access by Africans to land and specifically banning vleis cultivation. According to a study in Mutoko and Chivi respondents seemed to have no recollection of the Water Act, which seemed over shadowed by the Land Apportionment Act of 1930 (Mukamuri and Mavedzenge, 2000).

Due to a dearth of data the impact of Water Act on African communal farming is not known (Matiza, 1992). Vleis cultivation on commercial farms continued unabated while it was restricted in Communal Areas. African communities found ways of circumventing the law so as to continue with vleis cultivation.

Throughout the 1930's and 1940's there was substantial increase in vleis use (Whitlow, 1990) and even competition between different uses and users. White commercial farmers favoured vleis cultivation because of limitations in technology at that time. The Black communal farmers intensified vleis farming because of market forces, improving technology (Matiza, 1992), over population, tax levied and breakdown in traditional vleis management institutions. Since the colonial era to date vleis have been subjected to numerous uses, which include: gardening, livestock grazing, water supply, mining, burial grounds and raw material for building. Scoones and Cousins (1991) reports argued that vleis are importance resources, hence conflicts often arise among users, notably the agriculturalists and agro-pastoralists.

To disqualify the notion of 'the tragedy of the commons' vleis degradation continued especially in the commercial sector were land was under private property rights. Between the 1920's and 1940's, vleis in both commercial and Communal Areas were very much in bad shape due to intensive cultivation and drainage. The Land Tenure Commission (1939) recommended a nation wide ban of vleis cultivation, and this translated into the Natural resources Act of 1941.

In 1948, the Department of Conservation and Extension (CONEX) was created to help farmers reclaim and preserve vleis and the commercial farmers stopped vleis cultivation (Matiza, 1992). The extension officers forced communities to construct contours and not to cultivate the vleis. Communities went around these regulations in three ways: extension of fields into the vlei area when the officers went away, have fields surveyed in dry season and adjusting of field pegs (Mukamuri and Mavedzenge, 2000). The war of liberation worsened the vleis degradation problem. Peasant farmers were encouraged to flout legislation by the freedom fighters (Matiza, 1992 and Mukamuri and Mavedzenge, 2000). Vleis cultivation in Communal Areas has continued up to today.

The legislation and official attitude towards vleis use has not significantly changed after independence. The Government of Zimbabwe has legitimised vlei cultivation through statutory instrument 291 of 1991 but much of the vlei cultivation is done illegally. Despite statutory instrument 291 of 1991 the official attitudes have changed little, as use of vleis is still restricted (Maseko and Bussink; 1995). By 1995, Semi-formal irrigation schemes accounted for about 20 000 hectares out of the 1.28 million hectares of known vlei area in Zimbabwe (Owen1995). With the on going land reform programme more than 20 000 hectares are under illegal cultivation.

Vleis use continued illegally because of the support of the farmers by politicians. When Natural Resources Board (NRB) officials attempt to restrict vleis use communities appeal to politicians (Matiza, 1992). The politicians gained support by supporting communities in flouting the ban. The majority of the smallholders had supported the guerrilla war,

under the new regime the balance of power shifted from local state institutions to farmers (Mukamuri and Mavedzenge, 2000). However from 1985 to date the balance of power has shifted back to the government through the District Councils Act of 1982.

Lineage leaders, ordinary people and the state have made claims over control of vleis over time. Each group justifies their claim to be legitimate on different grounds (Scoones and Cousins, 1991). Lineage claims range from ancestral residence, to political-religious articulations of spirit ownership of the land. Ordinary people claim the right to access and produce food. The states interests are justified on the bases of conserving the environment. Conflicts over access rights have resulted between the locals themselves and the locals versus the state (Scoones and Cousins, 1991). In the late nineteenth century, vleis control was concentrated in the hands of the 'big men' who dominated the local political system.

Today sets of overlapping rights exist with varying degrees of effectiveness in ensuring control over vleis resource. Access to vlei areas is controlled by chiefly lineages although amidst other institutions chiefly the state (Sithole, 1999, Mukamuri, 1988 and Scoones and Cousins, 1991). The lineage authority is enhanced by making claims of sacredness over wetland sites (Mukamuri, 1988 and Wilson, 1986) and ancestral spirits pass rights to ruling lineages enabling their ritual and political dominance (Wilson, 1986). Control is exerted through ancestral lineage spirits via autochthonous spirits or through individual spirits (Scoones and Cousins, 1991). Sithole (1999) noted that the local tribes were decreasingly observing sacredness of vleis in Mutoko and Chiduku, although they forced

externals to observe the taboos. On the other hand state agents and political structures are increasing influence in resource control. Conflicts of interest arise both over local control of resources and over state intervention in grazing management (Scoones and Cousins, 1991).

Literature shows that there are bundles of access rights on vleis (Scoones and Cousins, 1991and Sithole, 1999). Sections of the vleis are controlled by few powerful individuals, who monopolise access rights (Scoones and Cousins, 1991 and Sithole, 1999). Sithole (1999) reported that although water resources are thought of as free for all, in reality access to water is controlled even during periods of abundance. Water can be collected from sacred springs, as long as certain practices are followed (Sithole, 1999). Farmers who enjoy exclusive use of water on their plots initially resist sharing with other people. The phases individuals tries to restrict rights of other people is short except where resources are accessed by influential people especially politicians (Sithole, 1999).

A study by Sithole, (1999) has demonstrated sanctions over vleis access. Migrants are accused of breaking common rules of resources use. This is used as bases for excluding them from accessing the vlei area freely. Women gain rights to access vlei resources through males in the household. Women in Mutoko and Chiduku generally have smaller gardens (mean size .6449 hectare) than men (mean size .8648 hectare) (Sithole, 1999). There is significant difference in access to gardens by wealth in Chiduku. Data on access to vleis by age in Mutoko show that young households have the least access to gardens (Sithole, 1999).

2.6 Conclusion

Literature reviewed here demonstrates that the modernisation model has dominated development practice. The modernisation theory has been critically analysed here factoring issues such as technology, implementation and communities' reaction. It has lacked the peasant input through their participation. Although there is literature that advocate for utilisation of indigenous knowledge in rural development very little is evident on the ground in that direction. Each one of these approaches modernisation or indigenous knowledge theories has their strengths and weaknesses, which need to be appreciated. Studies that seek to harmonise the strengths of the populist perspectives and those of the structuralists are still needed if development is to be realised. This also has implications on the methodologies of both the researcher and the implementer.

The novelty of the Broad-Ridge and Broad-Furrow still needs to be internalised and valued by the communities. Very little literature critic the technology since it has only been implemented on 6 vleis in Zimbabwe. Much literature that exists on vleis is from the physical scientists who studied vlei morphology and hydrology. Little social science literature exists on vleis under Broad-Ridge and Broad-Furrow technology. Thus, the communities' reactions of whether adapting or resisting the technology is vaguely understood.

Literature reviewed here has shown that development projects affect communities' norms, values, culture and hegemony. Impacts of the Broad-Ridge and Broad-Furrow tillage system on resources management need to be understood. The gaps identified in the existing literature reviewed here inform the objectives and scope of the thesis.

Chapter 3

Study Area, Methodological issues, and Methods

3.1 Introduction

There are a number of researchers in Zimbabwe who are interested in rural communities. A lot of research that has been done covers rural livelihoods, population dynamics, policy issues and vast other areas. The multiple levels of complexity presents real challenges to research as one must frequently move between scales to understand issues (Sithole, 1999). Scoones and Thompson (1994) suggest that existing methods must be refined so that they can recognise the complex, diverse and risk-prone environments of the resource poor people. The methodology and the approach of this study have been influenced to a great extend by the theoretical framework. The study adopted both participatory and non-participatory approaches. This chapter describes the study philosophy, setting and methods used in the study.

3.2 History of Study Area

3.2.1 Communal Areas in Zimbabwe

Zimbabwe lies in the tropics and covers an area of 396 000 Km^2 extending from $15^0$30's to $22^0$30's and from 25^0E to 33^0E. By 2002 the total population of the country was 11 634 663 and an annual growth rate of 1.1% (CSO, 2002). Communal lands occupy 42% of

Zimbabwe's total land. Before the land redistribution exercise, much of the communal lands where located in regions with low rainfall and poor soils.

Communal lands are governed using the Communal Lands Act [Chapter 20:04], the Rural District Councils Act [Chapter 29:13] and Environmental Management Act [Chapter 20:27]. The Communal Areas are characterised by multiple structures namely the government structures, political and traditional structures. The Rural district Councils Act empower the district councils to provide social services, water, sewage works, roads and dams (Chenje, et al 1998). The local authorities are composed of elected councillors representing a ward each. Generally traditional leadership structures still exist in Communal Areas of Zimbabwe but their power has been significantly reduced. Environmental Management Act gives control of the resources in the rural areas to the state through the president, yet the state or its lower structures are not the day to day managers or users of resources. Despite numerous researchers proving that communal resources can be sustainably utilised by communal communities, the state insists on centralised control.

3.2.2 Mutambi Communal Area

The study was conducted between 2005 and 2006 while based in Mazvihwa Communal Area (CA). One of the main reasons why Mutambi ward was selected is that this project was part-funded as a component of a Trans-disciplinary programme funded by Systems Wide Initiatives on Malaria and Agriculture (SIMA). The other reason for selecting the

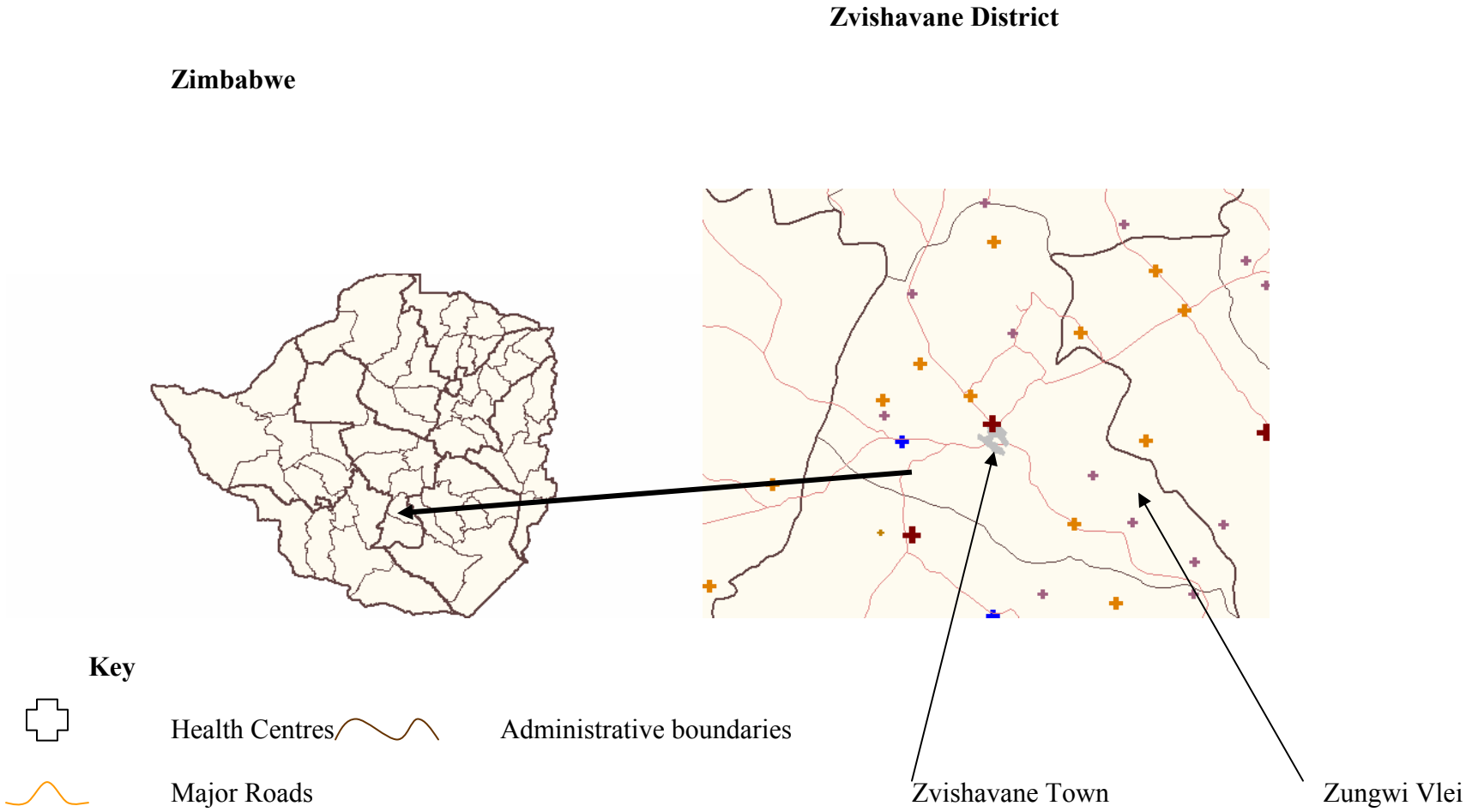
study area is that Zungwi vlei, which is in Mutambi ward, was transformed using the Broad-Ridge and Broad-Furrow system.

Zvishavane district is located in the south-central part of Zimbabwe (see Figure 3.1). The District Administrator's offices are based in Zvishavane town. Mazvihwa CA is 25 kilometres from Zvishavane town while Zungwi vlei is 60 kilometres. Mazvihwa Communal Area is divided into 4 wards and Mutambi is one of them. Mutambi ward incorporates a number of headmen including one village (namely Virimayi) from headman Musibandi's area. Virimayi village administratively it is under Mutambi ward while traditionally it is under Murowa. The village was included into Mutambi ward so that the number of households needed to form a ward was reached. The vlei is currently in Virimayi village.

3.2.3 Chieftainship

The ruling lineage is Mazvihwa family of the fish (*Hove*) totem. In the eighteenth century a people of the *Shumba* (Lion) totem known as vaMhari occupied the Mushandike valley. The *Shumba* managed to control the area from Mushandike valley to west of Tokwe River. This brought them in conflict with the Ngowa or *Dziva* (water) people. The Ngowa dynasties of Mazvihwa, Mataruse and Mazirofa were very hostile to the Chivi until 1896 (Beach, 1986). In the eighteenth century the *Ngowa* of *hove* (Fish) totem under Mazvihwa moved across Runde River, displacing the Rozvi who were now weak (Beach, 1986). The people of Mazvihwa settled west of Runde.

Figure 3. 1 Map showing the study area and the location of the vlei



The *Ngowa* dynasty of Mazvihwa had straightforward succession rules that the title should pass from son to son of the ancestor who founded the dynasty. Mazvihwa had 6 sons and he divided his area into 5 areas each headed by his son. The youngest son stayed with him at his court. Today, in each Zone there is a headman who is a descendant of Mazvihwa's sons. At the time of the study Machova's son was acting Chief Mazvihwa after his father's death. The traditional leadership is still in place and respected by the subjects. The traditional leadership still has a lot of influence on resource use and access. Functions of the traditional leadership include administration of Mazvihwa area, religious, guardians of the land and running of community courts.

3.2.4 **Organisation**

Mutambi ward has a population of 3 944 and a total of 803 households (CSO, 2002). Majority of the people in Mazvihwa are referred to as Shona. Until the 20th Century people identified as Shona, used their various dialects for identification. The word Shona was first used by the Ndebele in the 1830's to refer to Rozvi and was generally applied by Europeans in the 19th century to shona speakers as we know them today (Beach, 1986). Although the population in Mutambi ward is generally referred to as Shona, various groups of the Shona exist and identify themselves by totems. The people uphold the totem identity and it is effective in politics and social life. People of the Hove totem dominate the study area but other ethnic groups exist like those of *Shumba* totem, *Moyo* totem.

The principal activity of the people in Mutambi is farming. Opportunities for non-agricultural activities that help support their livelihoods are varied from short contract work (piece work), gold panning and selling of livestock. A number of the school leavers in the community have been employed by Murowa Diamond mine. Murowa Diamond mine is a recent establishment and community members are employed on part-time bases mainly and few are permanent employees. The norms highlight that the father or husband is the owner of fields and the homestead. Women are allocated potions of the fields were they grow crops like groundnuts, round nuts and other crops defined as feminine. Divorcees and widows can get fields in their own names and have total control over them. Until recently both males and females are engaging in gold panning.

The society is patriarchal, thus off springs of a family are traced on the father's lineage. The children take up their father's family name and totem. Marriage amongst people of the same totem is taboo. The concept of the extended family as a social safety net has been weakened because of poverty, HIV and AIDS and introduction of capitalist economics. Children provide labour when they are not in school or visiting. Women are also starting to be more involved in community activities and even rising to positions of authority.

There are two major religions in Mutambi ward namely Christianity and traditional religion. It is common to have people practicing both religions at the same time but being more devote to one. The common Christian denominations are Lutheran, Catholics and

apostolic sects. These philosophical stand points shape the way members perceive and react to issues.

3.2.5 Physical Characteristics of Study area

The landscape of Mutambi ward is broken with granite outcrops with vleis in the valleys. The study area is a catchments area for Runde and Ngezi rivers. The study area straddles two distinct ecological zones namely natural agro-ecological region 3 and 4. This means that Mutambi receives an annual rainfall of between 450 and 750 mm. The study area has mid-season droughts to periodic seasonal droughts. When there is a drought the area is greatly affected. During the course of the study the area experienced one drought season. In one part nutrient poor sandy soils support dry miombo woodland dominated by Julbernardia globiflora and Brachystegia spp.. In the other Part, heavy clay soils derived from doleritic intrusions support woodland dominated by Colophospermum mopane, Combretum apiculatum and Acacia sp..

3.3 Methodological Issues

Today a number of social scientists have abandoned the positivistic approach to an array of alternative research methodological approaches that have emerged. Phenomenologists argue that statistics in social science are simply the product of the catergorisation procedures used (Haralambos and Holborn, 1995). The ever increasing criticism and abandoning of positivism puts methodological concerns at the centre stage in rural

research. Over the past 20 years social science research methodology have put much emphasis on the qualitative understanding of meaning, rather than the measuring the regularity of occurrences of precisely defined concepts (Holy, 1984). Rather than logic of verification, these approaches employ logic of discovery, which aims to develop theories grounded in concrete human realities (Jorgensen, 1989, Cousins, 1996). Qualitative researchers regard their research task as coming to understand and interpret how various participants in a social setting construct the world around them (Glesne and Peskin, 1992: in Leeds). According to Scoones and Thompson, (2000) this has broken the boundary that was there between the researcher and the community.

The way one conceptualizes the research problem and research environment will determine the methodology to be adopted. The choices that are made during the application of the methodologies stem from personal experiences, beliefs, resources, time and assumptions (Cornwall, *et al* 2000). Methodologies should remain neutral and objective in coming out with results and interpreting them. Since this study sought to understand responses to a new technology that had revolutionalised the vleis use, access and environmental management regimes, it adopted the qualitative approach. The qualitative paradigm is also known as constructive or naturalistic approach.

The study was exploratory and analytical in nature. Participatory methodology was preferred because landscapes have been conceptualized as created by people through their experiences and engagement with the world around them (Bender *et al*, 1990). Secondly, qualitative paradigm probe more deeply the ‘why’ and ‘how’s’ of an issue than

answering the how much and how many (Ulin, et al 2002). Qualitative data is richer and more vital than quantitative data because it presents a true picture of a way of life, people's experiences, attitudes and beliefs (Haralambos and Holborn, 1995). It is difficult to come up with a comprehensive definition of qualitative design. Punch (1998) explains that qualitative research is not a single entity but an umbrella term that encompasses enormous variety. Creswell (1994) defines a qualitative study as an inquiry process of understanding a social problem, based on building a complex, holistic picture, formed with words, reporting detailed views of informants, and conducted in a natural setting. This gives reliable data because people rely directly on their natural surroundings for their livelihoods. Thus, they develop an intimate knowledge of their surroundings and that informs their actions (Croll and Parkin, 1992; Davies et al 1991). The qualitative methodology was useful in collecting data on the impacts of the technology and community responses. Qualitative methods could not address such questions as; how many accessed the vlei before its transformation? The weaknesses of qualitative data were augmented by a questionnaire survey.

Although the study used qualitative design it also borrowed some aspects of quantitative techniques. Giving ear to the recommendation of Ulin et al (2002) who advised that it is valuable to combine both qualitative and quantitative methods in a single study since it results in a more powerful design than either used alone. Mainly base line data and data on awareness, access and knowledge levels was quantified and analysed. For example data on how many community members were aware of Broad-Ridge and Broad-Furrow technology were quantified. The questionnaire survey was very useful as it helped

identify groups, key informants and issues for the participatory exercises. Data from the questionnaires had weaknesses, as people did not open up and say the truth for one reason or another at different stages of the data collection exercise.

Numerous methods were employed in this study to allow for triangulation of the data. This is particularly important when studying a sensitive subject like reactions to a technology, changes in tenure and conflicts over resources. Conventional interviewing techniques rely heavily on respondents' verbal responds to a framework of questions. Revealing of the truth by a respondent will depend to a large extent on memory, who is asking, question phrasing, say what one thinks is expected, political environment, expected benefits and customs. Although good data was collected using questionnaires, it should be mentioned that questionnaire respondents intentionally deformed some of the data. For example in the baseline questionnaire respondents did not converse awareness of or discuss issues to the conflicts. After two, three visits to the study area, they were discussing issues to the conflicts openly.

Although the community was studied in its natural context, they were methodological challenges encountered by the researcher. Firstly, the Zungwi vlei scheme members accepted the research team easily as they thought we were donors. The local communities attach the word 'project' and a 4 X 4 car with donors. It took a lot of explaining that I was not representing any donor but a student. At the same time non-scheme members were angered because they thought I support the scheme that displaced and disadvantaged them. I was labelled *munhu weku vlei* (vlei person). Nhira, 1994 and

Hasler, 1994 have cautioned against researchers being identified with certain group in the study area. It took a long time to create rapport and to be accepted by the displaced peasants. Demystifying the donor identity and visiting displaced peasants made them to gain trust and open up to me.

The study contends that society is heterogeneous thus knowledge, technology and reactions to innovations differ amongst farmers. The researcher sought to understand variations at that micro level, which creates a methodological problem of distance between researcher and subject. This requires keeping an open door to everyone and creating rapport with community at the same time. I needed to be close enough to them to open up their hidden truths. As noted by Drinkwater (1991) the researcher should be close enough to people to understand their perspectives, but at the same time needed to maintain enough distance to avoid being expected to share their life worlds and aspirations, drawing me into partisan stances. To reduce methodological challenges the data was frequently checked for researchers own perspectives and triangulation was done during analysis. Further the researcher decided to stay outside the study area. As noted by Dzingirai (1992) living outside the village would be less involving with study subjects, therefore more objectivity. My camp was at Mrowa clinic, which is about 8 kilometres from the vlei. Very little of my research agenda was known by people around Mrowa business centre.

A control site would be useful in this type of research as it allows manipulation of variables and seeing their effect. Funding limitations could not allow for a control site to

be studied in this case. This was replaced with previous research done in the area and elsewhere in rural Zimbabwe. Scoones and Cousins (1991) have studied conflicts on vleis in Mazvihwa area that were not developed using Broad-Ridge and Broad-Furrow technology. Other studies done in Zimbabwe, that explored vleis utilization and conflicts, include those by Sithole (1999), and Mukamuri and Mavedzenge (2000). Further to strengthen the thesis retrospective data on access, use, management and conflicts over Zungwi vlei were gathered as baseline. Thus, any issues that are as a direct result of Broad-Ridge and Broad-Furrow technology could be isolated and studied.

Research subjects can change their normal behaviour because of the researcher's presence. Communities always change the way they behave in the presence of a person they label *mutorwa* (outsider). Differences are made subtle when outsiders are there. This raises questions of whether the researcher should disclose their objectives and activities. The researcher is caught up between ethics and quality of data. I had to disclose that I was a student in social ecology studying management of vleis, but did not disclose what variables I had come to study. I did this for a number of reasons, which are; the project started after elections, to demystify the donor label, to be accepted by both parties to the conflict and not to raise suspicion or wrong identity since I was an outsider. Some sectors of the community associate the Vlei scheme with party politics. At first people were hesitant to say anything bad against the vlei as this could be interpreted otherwise. Taking of demographic data and asking questions was suspected to be political.

Mazvihwa community where this study was done is a patriarchal society as indicated above. Traditionally male researchers have been thought as ignored women's knowledge, considering that they were less educated than man and had less power. This study involved women as equals to man since they interact with the environment everyday more than man. Were preferences and views of women and man differed both data sets are presented in the thesis. Cross tabulations were done with gender as the independent variable. The researcher probed women to speak their mind in focus group discussions. Depending on issues separate FGDs for men and women were held. At times men were protective of their wives not to speak to the researcher. At times concert had to be sought from the women and the husband as well. In a case one man likened me to a snake in the house when he found me interviewing the wife within the homestead.

3.4 Sampling

Mutambi ward is further divided into sub-chief, which are Mwedzi, Chishapira, Mupesi, Mabona, Makanyire and Mutanga. Out of the six areas Mwedzi was selected to participate in the study because of its proximity to Zungwi vlei and that the majority of the vlei members are in Mwedzi. Virimayi village was included in the study because Zungwi vlei is in this village and those who benefited before development of the vlei into Broad-Ridge and Broad-Furrow were from Virimayi.

The population was divided into groups depending on their relationship to the vlei. That is the non-vlei scheme member were one stratum while the vlei scheme members formed

another. This is an effective method of choosing a sample because it allows the researcher to control the variables seen as important (Haralambos and Horlborn, 1995). Likelihood of one group being under played is minimal. All the 42 members were purposively sampled. To draw an equal number of respondents from the community systematic sampling was used. Mwedzi area and Virimayi village have 213 households thus, every fifth household was sampled. The population for the In-depth interviews included councillor, traditional leadership, extension officers and ex-members of the vlei. The complete sample was taken for these key informants.

3.5 Methods

The objectives of this thesis and conceptual framework have determined data to be collected and methods to be used. Creswell (1994) advises that it is important to consider the method for data collection and analysis to be associated with the selected paradigm. A questionnaire was used to collect data at the household level. All other methods used in this study were adopted from the Participatory Rural Appraisal approach (P.R.A). Questionnaire was used amongst PRA tools which include key informant interviews, focus group discussions (FGD), pair wise ranking, narratives, time analysis and resource mapping (Scoones and Thompson 1994 and Chambers 1992).

Participatory research tools have to be employed so that information collected captures local people's perceptions and aspirations (Chambers 1983). The local people are involved not only as sources of information, but as partners with the researchers in

gathering and analyzing the information (Scoones and Thompson, 1994). Mwanje and Gotu (2001) warned that data generated by PRA is seldom not conducive to statistical analysis, thus alternative ways may be used to ensure validity and reliability of the findings. The study used numerous methods to collect data for triangulation purposes. For example in the study data from interviews was triangulated with data from focus group discussions (FGD's), observations and the questionnaire survey.

Interviews with key informants collected data on the nature of response to Broad-Ridge and Broad-Furrow technology in Zungwi vlei, highlighting changes in access, use and management regimes, causes of resource use conflict and assessing the impact of the conflict on agriculture, conservation and social harmony. The vlei committee checklist was used to solicit for their experience of the technology and how it affects their operations and explores internal reactions and conflicts amongst the scheme members. Interviews were selected because of a number of reasons which include they allow researchers to gather subjective opinions as well as factual information (Pons V, 1992). Interviews were key in this thesis since they allowed the researcher to probe further on issues raised.

For the purpose of this thesis eight (8) Focus Group Discussions (FGD) were conducted with Non-members and members (See Figure 3.2). The purpose of the FGD's will be to clarify and validate information from the interviews (Creswell 1998 and Moser and Kalton, 1979). In selecting participants for the FGD's the individual's relation to the vlei in question was considered. Thus, the target population shall be split into members; non-

members and external the numbers of attendants to the FGDs were controlled to not more than 15 participants. At times it was difficult to turn back people when they exceeded 15. FGDs created a forum for people to argue and in the process diverse views, perceptions and priorities came out. Besides creating group solidarity FGDs opened up drying wounds.

Figure 3.2 The researcher conducting an FGD in Virimayi Village

Community members draw a resource map of the Zungwi vlei before the Broad-Ridge and Broad-Furrow tillage system. The results of this activity are presented in chapter 5. In

this study the villagers near the Vlei were assembled to draw the map. The map shows useful information on the location of resources and what resources were lost to the scheme. Access and use of the vlei was made clearer with the drawing of the map.

The study made use of narratives. One person would narrate to a group meeting. The members of the group will add or subtract the constructed story. Claims by different people for ownership of a resource emphasise aspects of truth since rights in a resource are highly ambiguous and contextual. Narratives were very useful in tracing the history of the vlei. The dynamics of rights over the vlei came out clearly.

The study made of two visual techniques, which are pair-wise ranking and time chart. Visualization has proved particularly innovative within agricultural development since local people represent their ideas in a form they can discuss, modify and extend (Cornwall *et al* 1989). Pair wise ranking was used to gather data on development priorities. Ranking and scoring exercises draw out some of the complexities involved in decision-making, which are rarely accessible through formal surveys and which enable researchers to appreciate farmers differing needs and preferences (Cornwall *et al.,* 1989). The exercise was carried out in a group setting and using various groups. Pair-wise ranking brought out relative importance of a project in relation to other development needs.

The second visual tool used in the study was time line. Timelines help to understand the many dimensions of seasonal welfare (Chambers, 1993), and highlight the dynamics of

rural livelihoods (Cornwell *et al* 2000). Time chart were used to gather data on time series analysis over the last few decades. The group that did this included the aged people. Some of them were over 80 years of age. Prominent events were used to replace years for example *nguva yatanga ZAPU* (the time ZAPU started), *Nguva yasungwa Musibandi* (When Musibandi was arrested). The exercise yielded a lot of good data on rainfall, grazing, vlei use and social fiber.

Observation is the systematic watching and recording of phenomena as they occur (Francis, 1992). The major advantage of using observation is that information is obtained directly, rather than through the reports of others (Moser and Kalton, 1979). This thesis made use of observations. The issues observed were recorded at the end of the day. Observations provided useful information on the after effects of the conflicts on productivity, social relations and conservation.

A questionnaire was administered to collect quantitative information. Questions focused on the socio-demographic data, nature of conflict, causes of conflict, assess impact of conflict, perceptions and assess their responses to the conflict and what they think to be the solution. A combination of open and closed ended questions made up the questionnaires that were administered to the members and non-members.

3.6 Data Analysis

All the questions in the questionnaire were coded and entered into a computer package called SPSS for windows. Analysis of this data was done using SPSS for windows. Frequencies of numerous variables were done. Vlei status was used in cross tabulations with other variables. SPSS was used to generate tables and graphs presented in this thesis.

Much of the data generated from this thesis is qualitative. The qualitative data was divided into manageable sets. Data from Time analysis and pair-wise ranking is already data ready for analysis and is used in this thesis in its row state. The issues, which rose from interviews, narratives and FGDs were grouped in terms of their similarity or differences. Putting data into categories was not an easy task. Creating categories is both a conceptual and an empirical challenge so that the context is appropriate (Dey 1993:96). The data was categorised and analysed using content and discourse analysis. Content analysis the researcher went through the bulk text making informed inferences based on evidence. While by using discourse analysis the researcher focuses on language to get information.

Chapter 4

Use, Access and Management of Vleis Resources And Villagers Livelihoods Before Inception of Broad-Ridge And Broad-Furrow Technology

4.1 Introduction

Zungwi vlei is a key resource because it provides numerous functions and benefits to the livelihoods of the Mazvihwa community. Zungwi vlei is a key resource in Mazvihwa hence the questions of access, use and management become pertinent. This chapter sets the groundwork for understanding reactions and resistance to the Broad-Ridge and Broad-Furrow technology in Mazvihwa community. The chapter examines the vlei's history, uses, access, its governance, conflicts and Institutional dynamics around the vlei. The chapter shows a picture of Zungwi vlei without the interference of the technology, thus impacts of the technology can be isolated.

4.2 History of Zungwi Vlei

A time line was compiled using data from narratives and interviews to trace the history of Zungwi vlei (box 4.1 below). Local people came up with a way of making categories by referring to periods using famous events such as time of the Whites, *nguva ya Nkomo* (time of the rise of African nationalism in Zimbabwe), *Nguva yekusungwa kwa Musibandi* (When Musibandi was arrested), *Nguva yehondo* (time of war), *mumashure*

merusununguko (after independence)*, nguva yeESAP* (time of the Economic Structural Adjustment Programme) and *nguva* yevlei (After development of the vlei using Broad ridge and broad furrow technology).

Box 4. 1 Zungwi vlei timeline

Before 1950	Cultivation of the vlei had started but grazing was the main land use of the vlei. They grew rice and rapoko and stored it in caves and constructed granaries on Zungwi Mountain. The vlei was well managed and not degraded because of controlled draining, shifting cultivation and the use of hand tools. Tribal Trust Lands (T. T. Ls) saw more people being moved into Mazvihwa communal lands from other areas. Migration weakened the cultural ties and practices of the area. People started disobeying customary laws observed in Zungwi vlei. Vlei cultivation increased and grazing area reduced. News of banning vleis cultivation reaches the area but cultivation of Zungwi vlei continued unabated.
1951 – 1970	Extension workers monitor the ban on vleis cultivation and other imposed agricultural practices. Linear settlement patterns were introduced in Mazvihwa replacing the scattered settlement pattern. Colonial government implemented Road networks and other development projects. Cattle grazing became a major land use of the vlei.
1971 – 1979	Over exploitation of Zungwi vlei. Beacons (*zvidzoramombe*) were created to mark the end of permitted cultivation area. Contours were constructed on all fields in Zungwi vlei and one big dead end furrow constructed upslope. Change of ownership of the vleis fields. Boundary re-drawing exercise was done under the supervision of Mr. White (the then District. Administrator). Guerrilla fighters encouraged people to disobey the colonial agricultural policies and laws. The vlei was over exploited and degradation resulted. The extension services workers fled the area.
1981- 1989	At independence people perceived independence to mean free to do what one wanted with land resources. The colonial agricultural policies and practices were ignored. Farmers in the vlei did what they wanted including extension of fields into the vlei area, subdividing the vlei fields and giving fields to their siblings. The traditional leadership was weakened and could not effect resources management as they did before. National political structures dominated governance of resources. Extension workers only returned in the late 1980's.
1991 -1999	Zungwi vlei remained the single most important pasture and water source during the 1991/2. Human activities intensified to include fish farming and better organised orchards. The idea of Broad-Ridge and Broad-Furrow was introduced in Mazvihwa in the late 1990's. Construction of the Broad-Furrow and Broad-Ridgetillage system on Zungwi vlei starts in 1999.
2000 +	54 members joined the vlei scheme. The scheme started and operates autonomously. The scheme has been faced with a number of challenges including resource use conflicts with outsiders and themselves.

Source: compiled from narratives

Data from narratives with villagers suggest that use of Zungwi vlei for cultivation commenced before the white settlements in Zimbabwe. The Mafenya family was the first to cultivate Zungwi vlei. The family was a member of the ruling family in Mazvihwa. The Mafenya family's descendents cultivated the vlei up to mid- 1970's. Although the accounts were detailed, villagers did not agree on whether Chikamhe (nickname of Mafenya's wife) had to use her son's name as a condition for them to continue cultivating the vlei after Mafenya's death. Elderly respondents suggested that she could not own the field in her name since Mafenya had sons who were of age. Further, they said it is a recent thing in Mazvihwa that women can own fields in their names if they are divorced or widowed.

The Mambeu family of *Shumba* totem took over fields in Zungwi vlei from Mafenya's family. Mafenya's family was forced to give up the vlei fields by a District administrator of the colonial government. This is one of the issues to the boundary conflicts that will be discussed in detail later in this thesis. Cultivation of the vlei intensified in the late 1970's after the Mambeu family took over. Much of the vlei area was put under cultivation because of the weak extension services and increased number of farmers. Accounts from in-depth interviews with the Mambeu family members suggest that their grand parents sub-divided the vlei land to allocate fields to their children who had married. In some cases deceased parents left their fields to their children as part of their inheritance. In 1999 the Broad-Ridge and Broad- Furrow scheme members displaced the Mambeu family from the vlei.

Data collected suggests that Zungwi vlei has been affected by government policies over history. Although colonial government policies restricted vlei cultivation, livelihood was made difficult so much that communities ended up intensifying vlei cultivation to get food and income. For example the Land Apportionment Act (1930) coupled with high taxes forced Africans to cultivate vleis as a coping strategy. Although the post-independent government maintained the ban on vlei cultivation, cultivation on Zungwi vlei continued unabated. FGDs showed that extension services in Mazvihwa were weak in the 1980's and farmers took advantage of this. One of the villagers at a FGD said they cultivated the vlei because the war of liberation was to free them from colonial policies that restricted use of such key resources. The group expressed shock at the continued restrictions on vlei cultivation by the Zimbabwean government.

4.3 Changing Times

The members and non-members prepared separate time matrix (Tables 4.1 and 4.2) to show changes in the vlei and the surrounding community. The matrixes show a general decline of natural resources like trees, grass and water. While the natural resources are seen as declining, population, conflicts, vlei cultivation and sanitation standards are increasing. There are no significant differences in the scores awarded by the scheme members and non-members. Most of the variables changed after independence. According to interviews the freedom fighters encouraged people to disobey the rules and restrictions on vlei cultivation and other resources. After independence the community used resources such as trees, grazing areas and vleis as they pleased.

Table 4. 1 **Trend chart prepared by non-vlei members to show perceived changes over time, using a scoring system that was out of ten, with 10 being the highest and 0 meaning absents.**

Variable	Before 1959	1960 - 1969	1970 - 1979	1980 - 1989	1990 - 1999	2000 – Present
Conflicts	0	0	1	1	5	8
Trees	10	10	10	8	5	3
Vleis cultivation	2	2	7	9	10	10
Water way	10	9	10	8	3	3
Grazing area	10	8	8	6	6	6
Water and sanitation	4	4	4	6	5	7
Yields	10	9	3	2	3	5
Livestock	10	10	8	3	3	5
Population	3	4	6	8	7	6
Rainfall	10	10	10	5	7	6
Extended family	9	9	9	5	0	0

Source: group meeting with the non-members

Both members and non-members have attributed the increase in population to high birth rates and inward migration. HIV and AIDS have also been blamed for the increased deaths and curbing population growth. Interview accounts with community leaders' show that the population increase that took place in the 1960's was as a result of inward

migration. New groups like those of shumba totem who came from the Zambezi valley came into Mazvihwa.

Table 4. 2 Trend chart prepared by vlei members to show perceived changes over time, using a scoring system that was out of ten, with 10 being the highest and 0 meaning absents.

Variable	**Before 1959**	**1960 - 1969**	**1970 - 1979**	**1980 - 1989**	**1990 - 1999**	**2000 - Present**
Population	2	5	7	9	10	10
Rainfall	10	10	9	5	3	5
Deaths	1	1	1	5	3	5
Water and sanitation	4	3	3	5	6	6
Trees	10	10	10	6	3	2
Grazing area	10	10	4	5	5	6
Yields	10	10	4	5	5	6
Vlei cultivation	1	2	5	7	8	10
Conflicts	0	0	0	2	4	9

Source: Group meeting with members

The data in the matrixes show that expansion of one variable affects others. The matrixes show that intensification of vlei cultivation has seen the shrinking of waterway, pasture and trees. Decline in the resource base varies directly with decline in yields. The community seems to be sure as shown in Table 4.1 and 4.2 that desiccation is taking place in the vlei. Informants blamed frequent droughts and disloyalty to the ancestral spirits as the main reasons for desertification. Non vlei members identified conflicts at an earlier time than members. These conflicts in the 1970's will be considered in-depth in this chapter. For both members and non-members conflicts over Zungwi vlei reached a new high level in 2000.

4.4 Use and access to Zungwi vlei

Traditional leadership indicated that everyone who resided in Mazvihwa Communal Area had the right to benefit from natural resources in any vleis. Community responses showed that not everyone who had the right to access Zungwi vlei did so (Figure 5.2). Everyone from Mazvihwa Communal Area could unrestrictedly accessed resources, which were not located on an individual's field. Resources on people's fields were difficult to access as one had to ask for permission. Permission to benefit from natural resources on one's field was also dependent on the planting calendar. When there were no plants in the fields natural resources on one's field were easy to access and benefit from. It was relatively difficult to access natural resources on one's field when their crops would be in the field. Each of the natural resources had rules governing use and harvest see table 5.3.

Zungwi vlei was identified with the name of the family or household cultivating it. For example at one time it was known as *guvi ravaMafenya* (Mafenya's vlei), *guviravaMambeu* (Mambeu's vlei) and currently is referred to as *guvi revanhu vekuvreyi* (vlei scheme members'vlei). The term vreyi (local people's pronunciation of the word vlei) came about with the Broad-Ridge and Broad-Furrow tillage system. The communities call a vlei under Broad-Ridge and Broad-Furrow technology as vreyi, while other vleis under traditional use are called guvi or makuvi (shona word which means vlei or vleis respectively). For example a nearby vlei is called *guvi ra*November (November's vlei) after the name of the prominanent farmer with fields in the vlei.

Households with fields in the vlei had considerable control over the natural resources in them. Interviews with vlei members indicated that one had to be in good relations with the field owners so as not to jeopardise your chances to benefit from the vlei. Although they had control over resources, their fields were still defined as communal land and state property legally. The Shona terminology was confusing when it says *munda wa*John (John's field). It appears as if the field is John's personal property yet John is only holding the field in trusteeship. It was a subject of great debate in FGDs whether the field owners hold the land under private or communal property tenureship. One group of people argued that the field is personal property because leaders have given it to him or her. On the other hand others argued that the land belongs to chief Mazvihwa hence the land and other resources are communal. According to the councillor the land and all natural resources belong to the Zimbabwean government and the chiefs, because no one

bought the land. He emphasised that what belongs to the farmer are the improvements made because you pay for them.

Zungwi vlei was endowed with numerous resources, which the local communities made use of and benefited in the process. Interviews indicated that many benefits were derived from these resources units (Figure 4.1). The questionnaire survey showed that 33% (n =36) of vlei scheme members used to benefit from the vlei before its development. Majority (68%) of the 34 non-members who participated in the survey said they benefited from Zungwi vlei. Those who did not benefit from the vlei used resources used elsewhere in the area. Data from F. G. Ds showed that many of those who did not come to utilise Zungwi vlei had alternative vleis or pasture and water sources nearby. Others indicated that distance from the vlei was an inhibiting factor for them to access the vlei.

Villages close to the vlei were to have had the highest number of people benefiting from the vlei and more uses derived from Zungwi vlei (Figure 4.2). Virimayi village was the only village with people cultivating in the vlei. Those from distant villages like Vurayayi only benefited by bringing their livestock for grazing (Figure 4.2). Some of these distant villages are over 7 kilometres away. Such villages from far away came to derive benefit from vlei resources in times of drought or during the dry period. Amongst those who benefited, 66 responses from the questionnaire show that 44% grazed their livestock, 21% fetched water, 12% fetched grass, 11% gathered wild fruits, 8% cultivated the vlei, 3% fetched worms and 2% had gardens in the vlei. FGDs highlighted hunting of small

animals, collection of herbs, wild vegetables and rituals as important benefits derived from the vlei in addition to those identified in the questionnaire.

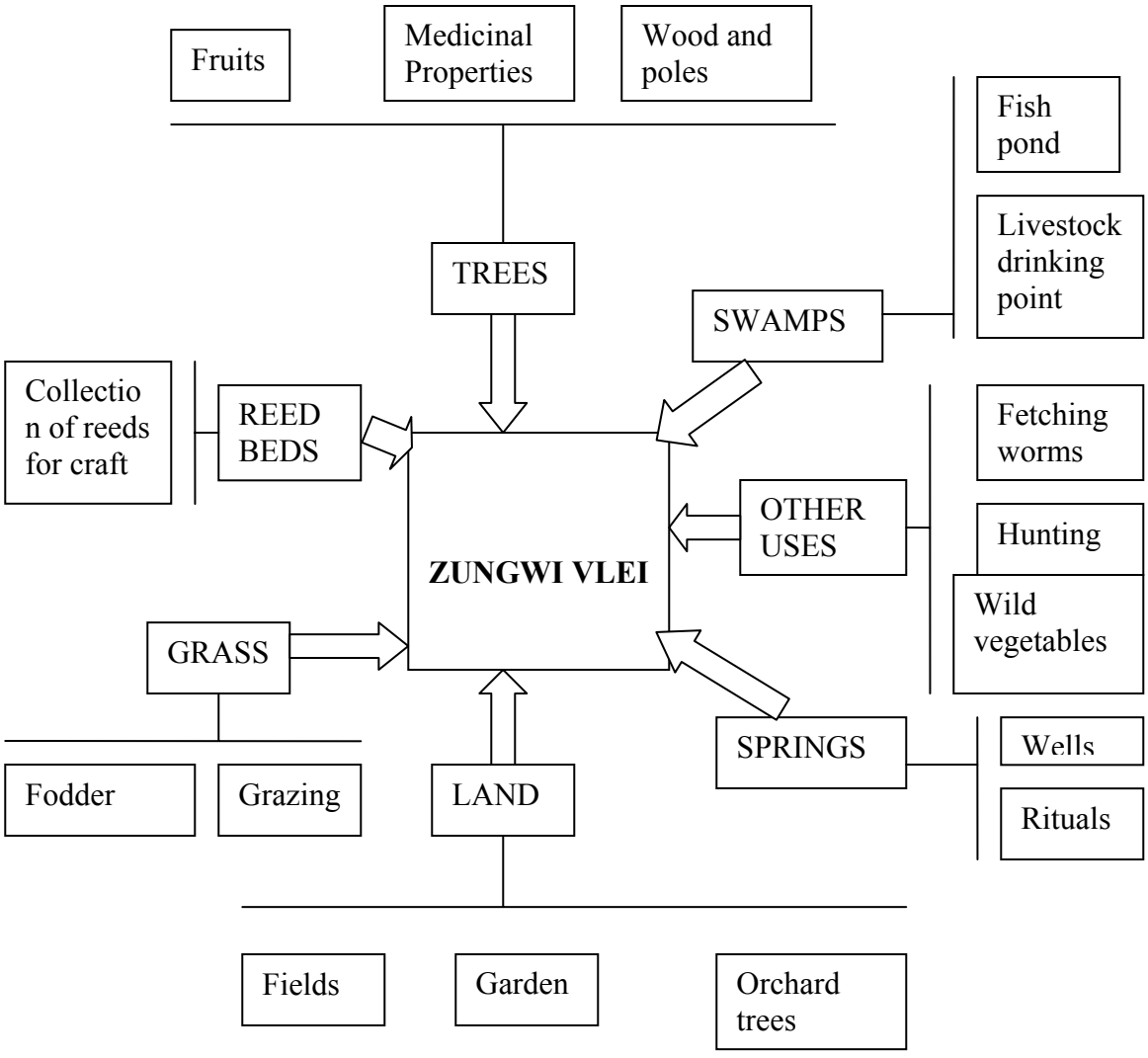


Figure 4. 1 The resource units of Zungwi vlei and the benefits derived from them by the community

Access to the vlei was not equal along gender lines. Responses from the questionnaire indicate that males derived the most benefits from Zungwi vlei (Figure 4. 3). Villagers located far from Zungwi vlei, men came to fetch water using scorch carts. The populace mainly used the vlei for cultivation. Customary rules reserve animal herding for males unless in the absence of males in the household. In-depth interviews showed that males controlled gardens although women and children did much of the work in it.

The local communities draw a resource use map, showing locations of resources before the implementation of the Broad-Ridge and Broad-Furrow technology (Figure 4.4). The water way had the most number of resource units and it was highly valued. This was the area the local communities defined as the vlei. The area marked the water way was generally open to anyone who wanted to benefit from it in any way other than cultivation. Only a selected few could access such areas as the ruling family's burial ground. Traditional institutions heavily controlled access to this area. There were times when people would go to the burial area for specific tasks. Some of the tasks included cleaning the area and to appease the spirits after a crime had been committed.

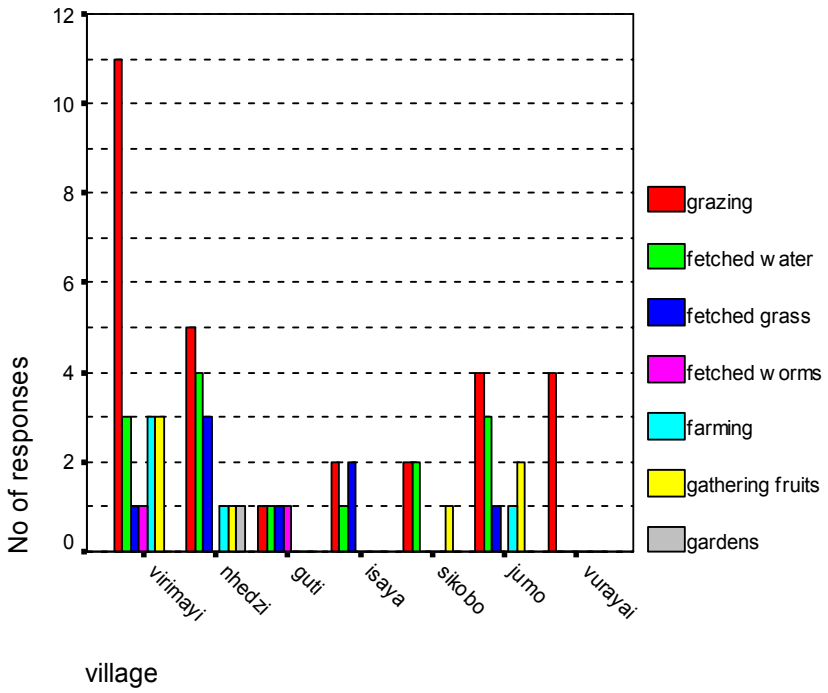


Figure 4. 2 Number of respondents who accessed Zungwi Vlei by villages

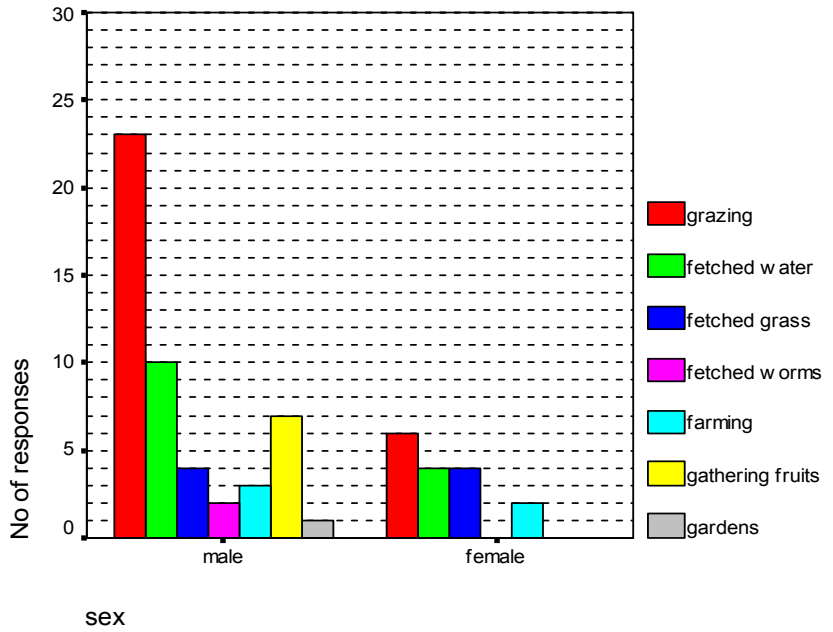


Figure 4. 3 Number of male and female respondents who accessed Zungwi vlei for different resources

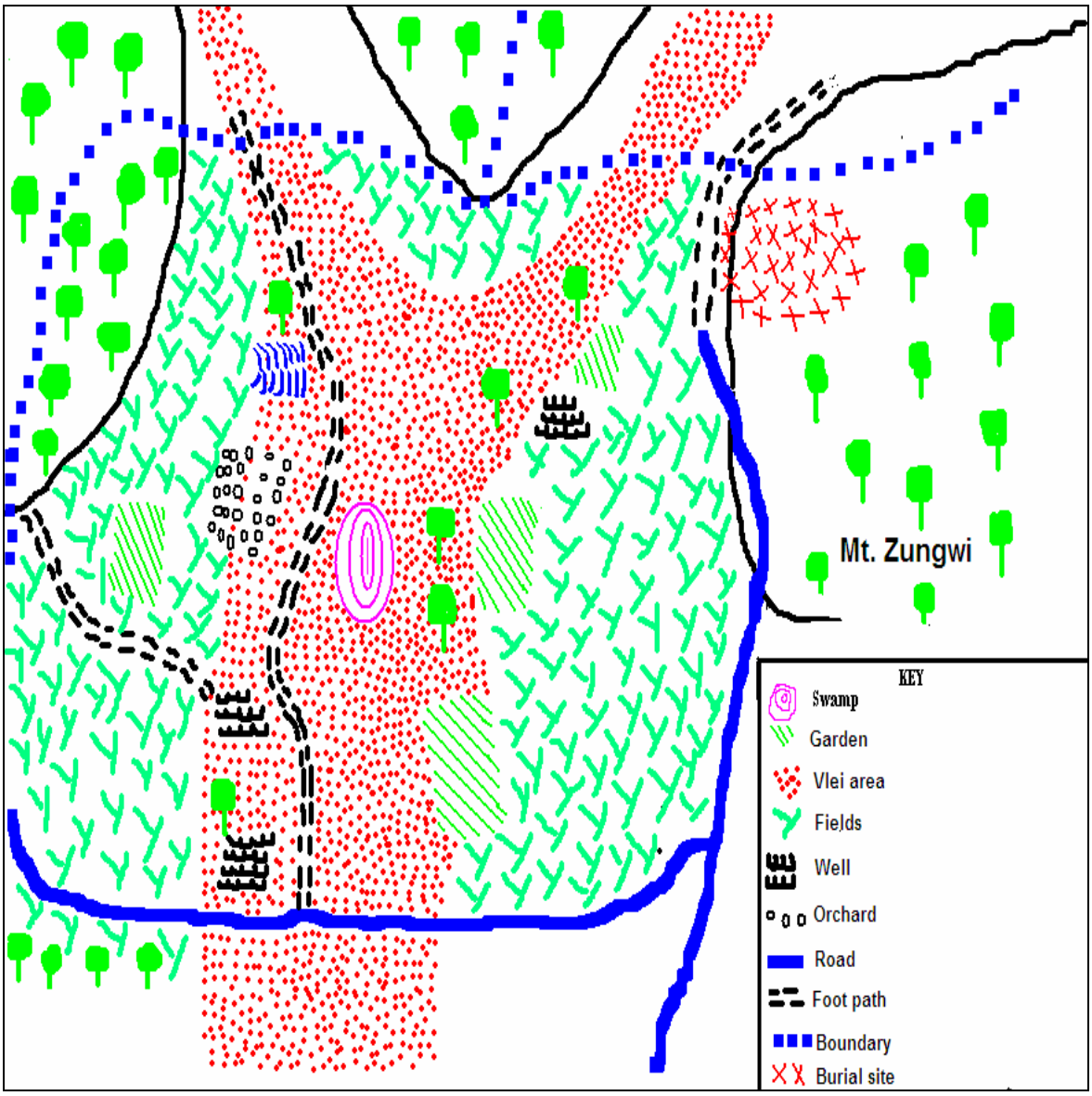


Figure 4. 4 The sketch resource and land use map of Zungwi vlei before development using Broad-Ridge and Broad-Furrow Source: drawn by the local communities

Table 4. 3 **Rules governing resources use and access**

Resources	*Rules over access and use*
Wells	Metal utensils were not to be used when fetching water from the wells
	Matende (gourd) were to be used when fetching water from the wells
	Utensils put on fire were not used when fetching water from the wells
	Women could not fetch water or access the water way during their menstrual periods
	No deodorized items e.g. soaps, lotions near the well
	No laundry was to be done near to the wells
Swamps	It was prohibited to walk across a swamp
Trees	All fruit bearing trees were not to be cut
	Permission from kraal head had to be sought before cutting a tree
	Everyone could harvest wild fruits unless the tree was on an individual's field
	It was stipulated that tree branches could be cut and used with permission from the traditional leadership.
	Permission to cut a tree had to be sort from the traditional leadership
	Wild fruits were not to be collected for sell
Land	Unmarried men can not be given fields in the vlei
	You could not fence fields using wire or metal objects
	Fields and gardens were to be outside (unspecified distance) the waterway (*traditional law)*
	Land was allocated by the traditional leadership to a particular family
	Households with fields had total control over their developments only and not the natural resources.
Grass	Everyone from Mazvihwa could graze their cattle
	Everyone from Mazvihwa could harvest grass for thatching and silage.

4.4.2 Trees

The vlei had the following tree species, *munyi (Launea discolor), mutohwe (Azana garckeana), mutamba (Strychnos spinos), chakata (Parinari curatellifolia), munhondo (Julbernadia globiflora), muwonde (Ficus sycomorus),mkamba (Afzelia quanzensis), shamvi (Ficus capensis), musekesa (Bauhinia thonningii) and muzhanje (Uapaca kirkiana).* These trees were located at different positions on the vlei. Uapaca kirkiana, musekesa and other trees were found at the periphery of the vlei because they do not need water logged conditions. Fruit bearing trees such as *Launea discolor*, *Azanza garckena*, *Strychnos spinos* and others were valued for the fruits they produced. Respondents to the questionnaire indicated that men gathered fruits from the trees while no women did gather fruits (table 4.3). FGD asserts that men had plenty of time to gather fruits when they are herding cattle. Further, they also climb up trees something frowned at if women do the same. Other tree species were used as poles such as *Julbernadia globiflora, Afzelia quanzensis.* Most of the trees found in the vlei had medicinal uses. All the trees could be used for firewood when they die.

Displaced peasants indicated that they had established orchards on the vlei. At least 4 species of fruit trees were identified as growing in the orchards namely banana, mango, guava and oranges. The fruit trees were mainly kept for their fruits that were harvested and at times sold. FGD with displaced farmer indicated that these trees were grown on the periphery of the vlei. The owner of the field with the orchard had total control over these trees and their produce. The household that plants these trees has the responsibility of looking after them.

Traditional leaders indicate that the wild trees were acceptably accessible to everyone. On the other hand interviews with community members show that trees on someone's field were not accessible to everyone. Permission had to be sought from the field owner to harvest tree's products. The owner of the field usually did not refuse unless you had personal grudges. There were rules to be observed when harvesting tree products like fruits (see table 4.3). The rules guided amounts to be harvested, what to say when harvesting and how to harvest the fruits. Tree products of trees that are planted by farmers are not accessible to everyone. The one who plants and cares for the tree is identified as the owner. Permission has to be sought from the owner before harvesting. While wild tree products are not to be sold those of planted trees can be commercialised.

4.4.3 Reed beds

According to interview accounts reed beds were useful as the reeds were harvested and made into artefacts. These artefacts included mates, food containers and others. Although some of these products ended up in the home, a lot of them were for sale. It was not permissible to sale the reeds but the made products. Arguments raised in interviews indicate that the local perception is one is paid for the labour only and not for the material. On this bases it is therefore justified that lower prices should be demanded for Mazvihwa residence and higher prices for outsiders. The reed beds are not on anyone's field or garden, thus everyone could have access to them (table 4.3). Interviews indicated that very few people who were in the craft business benefited from the reed beds. The reeds had to be cut out and not to be up rooted when harvesting them.

4.4.4 Swamps

The peasants took advantage of the swampy areas to develop fishponds. The swampy areas also served as drinking spots for livestock. FGDs with vleis members showed that some community members complained about the fishponds since they were believed to dry the swamps. The swamps were acceptably accessible by everyone from Mazvihwa. They were only exceptions on sections of the swampy were personal developments had been made such as the fishpond.

4.4.5 Springs

The vlei had 3 wells and two of them were located on springs. The main function of these wells is to provide water for the community and for rituals. More males indicated that they fetched water from the wells more than females (table 4.3). It was observed that for people from distant villages' males came to fetch water using animal drawn carts. When women came to fetch water they used small containers carried on their heads. According to FGDs tsime raChikamhe (Chikamhe's well) is the most important resource on Zungwi vlei. During the 1991/2-drought period it remained as the only water source for Mwedzi, Madzore and Mutonga people. The well was used for rituals. Chikamhe's well was the drinking place of the spirits before they went to rest in Rambotemwa. Traditional functions were done just before a dry spell so that the well would not dry. These ceremonies have been poorly attended since 1999. The communities agree to use one of the wells as animal drinking point.

Water is regarded as a resource accessible to everyone even foreigners. The communities have a saying, *mvura hainyimwi munhu* (water should be given to all for free). Vlei members stressed that a visitor should be given water regardless of whether there is food or not in the home. It is a serious offence to stop anyone from accessing water even in the home. These water sources had strict rules that had to be observed. Most of the rules applied to the well of Chikamhe, which is perceived to be sacred by some.

The wells on the springs were not dug by anyone, the community to form collection pond on Chikamhi's well did the stonework. The community worked together in laying the stones after performing necessary rituals. Construction of the collection pond had the blessings of the gods. The well was sacred. Respondents were not in agreement as to whether the well is still sacred today. The older respondents argued that the well is still sacred but people disrespect it. While the young adults and those converted to Christianity argued that the well was no longer sacred.

4.4.6 Grass

The sections with grass were used as fodder, grazing and fetching grass for thatching (Figure 4.4). According to interviews gathering of grass for later use as fodder was a relatively new practice. Non-Governmental organisations were the ones who encouraged and supported the practice. Men assisted by male siblings were the ones mainly involved in the preparation of fodder. The grass patches were mainly used for grazing livestock from the area. The grass patches between fields, gardens and the waterway were used as grazing area. Some of the grass species that grew in the vlei

were said not to be suitable for livestock consumption. The surrounding villages used to fetch grass for thatching from Zungwi vlei. Both man and females were involved in the harvesting of the grass for thatch (table 4.3). At times people from far away villages such as Jumo came to fetch grass for construction purposes from the vlei (Figure 4.2).

Grass patches that were not close to people's fields were accessible to everyone in the area. There were no measures of how much grazing could be done. Access to grass on someone's field was controlled by the field owner. Permission had to be sought before using the resource. If there were no crops in the fields permission was usually given.

4.4.7 Land

The vlei had fields, gardens and orchards as shown in (Figure 4.4). Fields, gardens and orchards were located on the edges of the waterway. At times these land uses would encroach on the waterway. Fields on the vlei were identified with the field owners. The people who had fields were the ones who owned the orchards and some gardens. Field owners could cut portions of their fields and allocate a garden to relatives or friends. Fields in the vlei were not treated differently from the upland fields. Farmers with fields in the vlei did not have upland fields. Resources on the fields were not acceptably accessible to anyone outside the field owner's household. The field owner could sale their fields with the approval of the traditional leadership. The cost is not for the field but for the developments made e.g. orchard.

4.4.8 Other uses

The vlei provided other benefits, which include; hunting, fetching worms and harvesting wild vegetables. Small animals were hunted in Zungwi vlei and the nearby Zungwi Mountain. The community asserted that before second war big antelopes and wild pigs were also hunted in Zungwi vlei as they came to destroy crops or to drink water. At the time of developing the vlei hunted animals included hares, birds and mice. Anyone with interest in hunting these animals was free to do so.

4.5 Contests over Zungwi vlei before Implementation of the Technology

Conflicts existed even before the inception of the idea of developing the vlei using the Broad-Ridge and Broad-Furrow tillage system. Table 4.1 and 4.2 has presented the increasing conflicts even before the inception of the scheme. There was an increase in the number of cases that pertained to the vlei from 1991/2 drought reported to the community court. Most of the 76 survey participants (86%) said there were no conflicts. Amongst those who said they were no conflicts 63% were non-vlei scheme members and 37% were vlei scheme members. A minority (14%) acknowledged that there were conflicts over Zungwi vlei before its development. Amongst those who said they were conflicts 22% were non-vlei scheme members and 78% were vlei scheme members. The questionnaire survey raised the following as the issues to the conflicts; limited access to pasture (46%), boundary redrawing (18), animal destroying crops (9%), limiting access to grass (9%), tenure of vlei (9%) and with extension workers (9%).

The growing population and dry climatic conditions currently experienced made the vlei an important resource for numerous land uses. Conflicts were more intense during drought periods such as the 1991/2 dry periods. During the 1981/2 and 1991/2 drought seasons Zungwi vlei remained as the only water source for domestic drinking water, pasture and animals' drinking water in the area. The households with fields in the vlei attempted to limit access to the vlei by people from other villages and people not their relatives. This created tension with those who had access rights and wanted to benefit from the vlei.

The increasing demands for both arable land and grazing land have led to conflicts over resources use. Farmers with fields in Zungwi vlei limited grazing access to other people's livestock. The farmers used to fence their fields, in so doing block access to the centre part of the vlei (Box 4.3), which was a communal grazing area. Customary law prohibited destroying of ones *ruzhowa* (fence made of thorny shrubs). Yet those with fields in the vlei would allow their livestock to pass through their fields into the centre of the vleis where grazing was free to everyone. Scheme members indicate that those with cattle had to risk bring their cattle into the vlei on the hill slope were there were no fields. Others were said to have paved way for their livestock through the fences and cut across the bare fields. This created conflicts and physical fights were common (box 4.3). In the case presented in box 4.3 the field owner was defeated but usually they succeeded and drove the cattle away. Young boys were also subjected to a number of punishments like forced exercises, singing and others.

The field owners (now the displaced farmers) did not want to admit cattle from far away into the vlei because the cattle transmitted diseases. Scheme members attributed

high cattle mortality in the area to droughts. While displaced farmers blamed diseases as causing livestock deaths. One of the displaced farmers interviewed said, "We only wanted people from Virimayi village only to have access and graze their livestock from the vlei. … because their cattle would come and destroy crops and us the villagers of Virimayi would remain quarrelling amongst us. We did not want them to use the vlei as pasture and we used force at times to expel them."

Box 4.3 A case of an attempt to limit access to vlei for grazing

John was herding the family herd during winter. He took the herd to graze in the vlei. One of the farmers who had been working in his family garden saw him. He instructed him to remove his livestock from the vlei. After he resisted the man came to confront John. The other small boys who were with him fled the scene and watched from a distance. John and the man had a physical fight. After realizing that this encounter was not going to be easy victory, the man scolded John and threatened him and went away to call others.

Due to the prolonged moisture in the vlei farmers usually had two harvests in a year, which encroached on grazing interests. It was customary that the community leaders set a date were livestock could graze unattended. By this date all the crops would have been removed from the fields. Usually the vlei fields still had crops beyond the set date. Livestock frequently destroyed crops in the fields and this created conflicts.

The community accounts indicate conflicts over the boundary between Musibandi and Mwedzi. The conflict was triggered by a general shortage of fields in Mazvihwa. People from Mwedzi were cultivating Zungwi vlei yet the people from Musibandi claimed it to be in their area. The then District Administrator identified as Mr. White came to redraw the boundary to its current position. Community leaders indicated

that natives in the D.A office were bribed to encroach into Mwedzi's area in order to give full control of the vlei to Musibandi. Both sides' mobilized young men to fight but the fight did not take place because the colonial government intervened. Musibandi settled homesteads along the boundary to monitor people from Mwedzi accessing the vlei.

The people of the Mwedzi kin cultivating in the vlei were removed and allocated other fields in Mwedzi area. On the other hand, those from the Musibandi kin with fields in Mwedzi area were also relocated back to Musibandi. Those removed from the vlei lamented their loss of more productive fields to less productive ones. Vlei scheme members indicated that field owners controlled and restricted access to grass that was beyond their fields. Field owners are said to have abused the customary rules only restrict harvesting of any resource on one's field without permission. At times people had to wait until the field owners had harvested the quantities of grass they wanted before letting everyone have access. Some of the community members harvested the grass without asking for permission. This frequently resulted in conflicts. A lot of these cases were tried at the traditional courts. Those with fields in the vlei would almost every time win the cases. Verbal abuse and hatred were used in waging the conflicts of this nature.

The community generally scorned at commercialisation of the vlei resources. Field owners made people to pay for harvesting grass and wild fruits on their fields. This was not an acceptable practice in Mazvihwa area and the chief was not aware of the commerce although the village heads knew about this. Other villagers came to harvest wild fruits for resale in the community, at Zeruvi Township and in Zvishavane. The

spiritual guardians were not happy about this and opposed the practice. Verbal abuse was said to be the common form of waging these conflicts.

There were several institutions working in Zungwi vlei and the surrounding communities. These institutions had different approaches to achieving their goals and these conflicted and left the community in a dilemma. Non-governmental organizations encouraged the community to harvest grass and feed it to their livestock in dry periods. On the other hand the NRB extension officer discouraged the harvesting of grass from the vlei area. The councillor intervened and networked NGOs with extension services to come up with one stance. This stance was never reached and from that time NGOs only started bringing food handouts only.

Another example of conflicting approaches reviewed by the community is between NRB and Forestry commission. Community members showed that NRB moved their fields further away from the water than did other extension workers like FC and AREX. NRB extension officer prohibited tree cutting totally. While on the other hand FC discouraged cutting of trees and would allow cutting of tree branches rather than the whole tree. F.C provided seedlings and encouraged people to plant gum trees and other species. NRB was perceived as being anti-development and working to see that people die in favour of fauna and flora.

Conflicts between extension officers and farmers started with the inception of the modern state's intervening in vlei use and management. The extension workers during the colonial period were scorned and said to be working for the Whiteman against their fellow Black people. Even after independence the conflicts between the

extension workers and farmers continued. The NRB officer always monitored vlei cultivation and stopped farmers' encroaching into the wetland. NRB officers burnt down people's gardens that were said to be in the vlei. The farmers disagreed that the gardens were in the vlei since their fields were outside the waterway. It is reported that he has had many threats from farmers.

Traditional leadership and extension officers showed competition of power over resources between the traditional institution and the extension officers. It was felt that there are too many institutions trying to manage natural resources and this has brought about disaster. The powers of the traditional leadership are not clearly defined in relation to extension officers. Council representatives argued that council manages the land and all resources on it. Thus, traditional leaders cannot allocate fields or any other land use without council's knowledge. Extension workers do not have power to allocate any resource but monitor and advice on best practices. It was mandatory for both council and traditional leadership to consult extension workers before making decisions on resources use. On the other hand interviews showed that the traditional leadership are said to be the owners of the land and every resource within Mazvihwa.

Traditional leadership and traditionalists have blamed the council for not respecting sacred sites. For example the establishment of homesteads and a business centre in the *Rambotemwa*, which is near to Zungwi vlei. According to traditionalists the business centre will never thrive and claims that shop owners experience strange things. Extension officers indicated that traditional leadership allocate fields without consulting the extension workers. Some fields have been allocated on fragile areas for example too close to the waterway or rivers. The traditional leadership do not even

monitor if contours are in place after allocating fields on fragile land. The extension officers feared victimization and witchcraft if they opposed the traditional leadership's decision. It is even more difficult when the decision has been made by a headman than if it has been made by a kraal head. The extension officers have reacted by reporting such cases to the councillor who then handles the issue.

Potential conflict exists between the traditional leaders and members of the ruling house. Kraal heads that are not of the ruling house have limited powers when dealing with members of the chieftaincy lineage. It was said by kraal heads that *muranda handi mukuru kunaishe vake* (a servant is not above his master). It was also echoed that no matter how young a member of the chieftaincy lineage is they are still masters. Thus, members of the chieftaincy lineage can compel a kraal head to award him a field and the kraal head only endorses. It was felt that the households with big fields and ploughing on vulnerable areas are of the ruling family.

4.6 Attempts to Resolve Conflicts

Conflicts over use and access were referred to the traditional leadership. The traditional leadership would table cases such as livestock destroying one's crop, and try the case. Usually the owner of the livestock that would have destroyed a neighbour's crop would ask to repay the owner of the field. The compensation was depended on extend of the damage. It was indicated that such conflicts were resolved amicably. The boundary conflicts were not resolved, but went latent. The colonial government officials attempted to resolve the boundary issue but made the situation worse, as the new drawn boundary encroached into Mwedzi area. Establishment of

the Broad-Ridge and Broad-Furrow system of cultivation helped in resolving the conflicts over management of the vlei. Such conflicts between the NRB and the vlei farmers, NRB and traditional leadership and AREX and NRB over the vlei just fell of. However competitions over other natural resources in the area are still present.

4.7 Summary of key findings

It has been established that cultivation of Zungwi vlei started before colonisation and it was a key resource. Accounts presented show that Zungwi Mountains has remnants of the granaries used by local people during the time of the Ndebele raids. Until its transformation, Zungwi vlei was a key resource as it provides numerous functions for the local population. Customary institutions govern and control the vleis and do this through a set of rules and taboos. Communities think that they are now too many institutions involved in vlei management and this has created problems.

Access to the vleis was open to some resources like water and was indirectly limited by those with fields in the vlei. The vlei was said to belong to the chief and the farmers were only tenants. The tenants had control over the resources in the vlei hence they guarded them jealously against abuse and degradation. Access to benefit depended on the rapport with field owners, cropping cycle, gender and distance from the vlei.

The community members highlighted numerous sources of resistance and conflicts over Zungwi vlei before implementation of Broad-Ridge and Broad-Furrow tillage system. The central issue to the problems is access. Attempts to restrict access to Zungwi vlei were resisted and frequently resulted in conflicts. Except for the conflicts

over the boundary issue, local leadership settled all other conflicts. Given the data presented so far a projection of conflicts can be made excluding the effects of the technology. Conflicts could steadily increase due to climate variability and population pressure.

Chapter 5

Socio-Ecological Impacts of implementing the Broad-Ridge and Broad-Furrow Technology on Zungwi vlei

5.1 Introduction

In the previous chapter, it has been demonstrated that Zungwi vlei provided useful resources, which were exploited by various members of the community. The imposition of the technology deprives access and use to those who previously enjoyed these rights. Thus, chapter 6 will examine the outcomes of the imposition of Broad-Ridge and Broad-Furrow tillage system. In this thesis, the outcome will either be acceptance or on the other hand resistance to the technology. The chapter will start by describing the implementation of the technology and then present resistance and acceptance of the technology. Furthermore, the impacts of the conflicts over Zungwi vlei were explored and the results are presented here.

5.2.1 Implementation of the Technology in Mazvihwa and Community Reactions

Although construction of Zungwi vlei under Broad-Ridge and Broad-Furrow technology started in 2000, the idea of transforming vleis under this technology had been introduced in 1995. The Broad-Ridge and Broad-Furrow technology is external to Mutambi community. The scheme members said the technology came from Chiredzi, where it had been developed. Before the development of Zungwi vlei using

Broad-Ridge and Broad-Furrow tillage system, the community used a technology known as dead end furrow. There was no consensus amongst the 72 respondents as to who came up with the idea of implementing the technology in Mutambi ward. 41% of the respondents said Agricultural Extension Services (AREX) introduced the project and 20.8% said they did not know how the project came about. Other responses were Smallholder Dry Area Resources Management Project (SDAMP) 18.1%, the councillor 13.9% and other responses 5.6%. It was established in interviews with officials that SDAMP appealed to councillors and chiefs at a council meeting to identify projects and they strongly emphasized vleis development under Broad-Ridge and Broad-Furrow tillage system.

Community members learnt of the scheme at very different occasions and from varied sources as shown in Figure 5.1. The majority of the vlei members learnt of the vlei idea from AREX officers while majority of non-members learnt from councillor and local leadership. A significant number (32%) of members learnt of the scheme at a meeting held at the vlei. In-depth interviews have referred to this meeting as the last before development of the vlei and it was meant to recruit members.

Seven of the vlei members learnt of the scheme from meetings held at the vlei while no non-scheme members learnt of the scheme at the similar event. This meeting was held just before construction started to recruit members. All the community members were invited to join the vlei at a fee of Zw$20 (US$3). Majority (59%) of the non-members respondents to the questionnaire survey learnt of the scheme in good time to join. Numerous reasons were advanced for not joining the scheme; not informed about the scheme in time to join (25.8%), had other time demanding commitments

(22.6%), distance to vlei (12.9%), could not afford joining fee (6.5%) and other responses that included age factor, no interest and presence of conflicts were highlighted in the questionnaire survey. On the other hand, those who joined had numerous reasons for joining. Their reasons for joining were; training on vlei benefits (23.1%), encouraged by the Shurugwi experience (20.5%), perennial cultivation (15.4%), mob psychology (12.8%), increased food (10.3%), good idea (10.3%) and other responses (7.7).

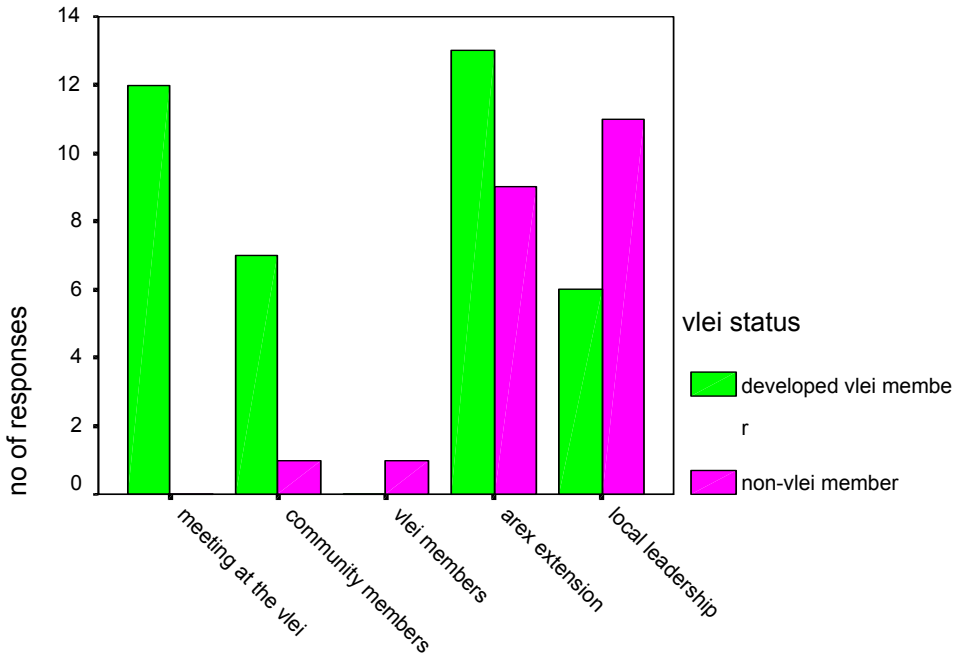


Figure 5.1 Perceived sources of Broad-Ridge and broad- furrow idea in Mutambi ward by vlei status

In order to understand community's reaction, pair-wise rankings were done to test for development projects priority between scheme members and non-scheme members. Results of the pair wise ranking exercises conducted with both members and ex-vlei members yielded very different results as shown in Figures 5.2, 5.3, 5.4 and 5.5. The scheme members highly ranked the Broad-Ridge and Broad-Furrow tillage system as

their most valued development priority before 2000 (Figure 5.2). Their second rank was the establishment of a grinding meal. FGD indicated that until the nearest grinding mill is 7 kilometres away. It was highlighted that a trip to the grinding mill will consume one's day. Projects, which ex-vlei farmers highly ranked namely fish rearing and bee keeping were lowly ranked by scheme members.

On the other hand, non-vlei members highly ranked dam construction as a development project in the area over the Broad-Ridge and Broad-Furrow idea (Figure 5.8). It was indicated that a dam would benefit the community more through establishing an irrigation scheme, animals drinking point and fishing point. Construction of blair toilets and drilling of a borehole were ranked as important development needs in the area by non –members (Figure 5.3). The rankings took a gender dimension during the discussions; in order not to under play one sex both views were captured (Figure 5.3). Women preferred Broad-Ridge and Broad-Furrow tillage system, in contrast with men who preferred bee keeping. Women also preferred cooperative gardening while men preferred bee keeping. Men preferred fruit tree planting and bee keeping while women preferred cooperative gardens (Figure 5.8).

The development needs of the vlei members and non-members have currently changed from the time before the scheme. The vlei members currently ranked the building of a school nearby as their current top priority development project (Figure 5.4). The nearest school is about 6 kilometres away. The pupils have to start off for school very early in the morning and return at sunset. The grinding mill has also been highly rated. The vlei members ranked heifer projects very high. The least ranked development projects were provision of seed, sewing projects and soap making.

Broad- ridge and furrow tillage system (B.F)								
Poultry (P)	B.F							
Gardens (G)	B.F	P						
Fish farming (F.F)	B.F	P	G					
Bee keeping (B)	B.F	P	G	B				
Sewing (S)	B.F	P	S	S	S			
Orchard (O)	B.F	P	G	O	O	S		
Grinding mill (G.M)	B.F	GM	G M	GM	GM	G M	G M	
	Broad ridge and furrow tillage system	Poultry	Gardens	Fish farming	Bee keeping	Sewing	Orchard	Grinding mill

Figure 5.2 Scheme members' ranks of development priorities before 2000

Dam (D)	D						
Blair toilets (BT)	BT	D					
Gardens (G)	G	D	BT				
Boreholes (BH)	BH	D	BH	BH			
Bee Keeping (BK)	BF (W) BK (M)	D	BT	BK (M) G (W)	BH		
Trees (T)	T	D	BT	G (W) T (M)	BH	T	
Fishing (F)	BF	D	BT	G	BH	BK	T
	Broad- ridge and furrow tillage system (B.F)	Dam (D)	Blair toilets (BT)	Gardens (G)	Boreholes (BH)	Bee Keeping (BK)	Trees (T)

Figure 5.3 Non-scheme members' ranks of development priorities before 2000

School (SC)							
Grinding meal (GM)	SC						
Poultry (P)	SC	GM					
Sewing project (SP)	SC	GM	P				
Soap making (SM)	SC	GM	P	SM			
Seed (S)	SC	GM	P	S	S		
Dairy cattle (DC)	SC	GM	DC	DC	DC	DC	
	School (SC)	Grinding meal (GM)	Poultry (P)	Sewing project (SP)	Soap making (SM)	Seed (S)	Dairy cattle (DC)

Figure 5.4 Scheme members' ranks of development priorities in 2006

Dam (D)				
Poultry (P)	D			
Bee Keeping (BK)	D	P (W) BK (M)		
Orchard (O)	D	P (W) O (M)	BK (M) O (W)	
	Dam (D)	Poultry (P)	Bee Keeping (BK)	Orchard (O)

Figure 5.5 Non-Scheme members' ranks of development priorities in 2006

Key

(W) Women's priority that differ from males priority

(M) Men's priority that differ from female's priorities

The non-members ranked the dam as the most important development need currently. Both sexes agreed on the most important development priority (Figure 5.5). Mostly women favoured poultry project while men favoured bee keeping. Women said men prefer beekeeping because they are lazy to do labour demanding tasks. Males wanted orchards over poultry while females favoured the opposite. Females preferred orchards to beekeeping, however males favoured beekeeping.

Displaced farmers and to some extent people from Virimayi village were omitted from the planning process because they had resisted implementation of the scheme. From the pair-wise ranking this is the group that ranked the scheme lowly. The councillor selected a steering committee and village development coordinators (VIDCOs) were incorporated together with others who supported the implementation of the scheme. Interviews with displaced farmers indicate that the councillor gave his friends and relatives to sign a community consent form that was supposed to be signed by those who were affected by the development. The councillor is said to have done what the majority of people wanted.

There were 21 people who were selected to go for an exchange visit to Shurugwi and Mfiri vleis under Broad-Ridge and Broad-Furrow tillage system. No one amongst those who went had a field in the vlei area. The steering committee, officials from council, SDAMP, AREX, Ministry of Health and District Administrator went for the exchange visit. Interviews with those who had taken part in the exchange visit showed mixed reactions. Some of the people were in favour of the scheme being implemented in Zungwi vlei. While others argued that the visited vleis were idle (not cultivated)

and were not in favour of development of Zungwi vlei because it would disturb benefiting families and cut other important uses.

Responses suggest that selection of Zungwi vlei was mainly political. People from Virimayi selected heifer and piggery projects, since vegetation in Zungwi vlei was recommended as good fodder for pigs and dairy cattle. Villagers from Zeruvi selected the Broad-Ridge and Broad-Furrow tillage system as their priority development project. These proposals were submitted to SDAMP. SDAMP indicated to the leaders that it had a bias in implementation of Broad-Ridge and Broad-Furrow tillage system. Displaced farmers assert that the political leaders 'stole' the scheme away from Ziruvi villagers to draw the scheme closer to their homesteads. The displaced farmers were not involved in the decision of neglecting Ziruvi vlei and develop Zungwi vlei where they were cultivating. They were informed when the plans were at an advanced stage. The councillor is alleged to have persuaded people in his area to endorse the papers that required community consent on displaced farmers' behalf. The surveyors and AREX officials identified three suitable vleis namely Zungwi vlei, Zeruvi vlei and November vlei. Furthermore Zungwi vlei had hydrological and geologically advantages over the other two.

54 members joined the vlei scheme and paid $20 as joining fee. The members were asked to assist in the construction of the Broad-Ridge and Broad-Furrows. Zungwi vlei currently has 42 members of whom 28 are males and 14 are females. Thirty-five of the members are married, 6 are widows and one is a widower. Man and women are equal e.g. they have equal rights such as right to vote, speak one's views. Out of the 42 members only 17 were from headman Musibandi and the rest were from headman

Mwedzi's area. The vlei scheme since it started has had 2 committees and three leaders. A 7member committee manages the scheme. Currently the chair is a woman. The cooperative does not have a written constitution but use a verbal one.

The two committees had different achievements (table 5.1). Out of 51 respondents 41% indicated good harvest as the achievement of the first committee (table 5.1). Other achievements included capability to make people work, rapport with vlei scheme members, conserved vlei resources, secured inputs, kept vlei members united, good liasing with external organisations and running a bank account. Interviews highlight that the leader was a hard worker and he compelled people to work. He is reported to have spent a lot of his time monitoring the field and repairing minor damages by himself. He was commended for using his family implements for the benefit of the cooperative.

The second committee has achieved very little as compared to the first. 68% of the respondents said the committee has not achieved anything (Table 4.4). The remaining respondents highlighted numerous achievements such as securing sweet potatoes cuttings, encouraged people to work hard, fenced the vlei, good rapport with scheme members and sharing of the vlei fields (Table 5.1).

Questionnaire respondents highlight problems, which confronted the two communities (Table 5.2). Eighteen percent of the 33 respondents indicated that there were no problems during the reign of the first committee. 82% raised numerous problems, which confronted the committee. Disagreements between the committee

and the vlei scheme members were indicated as the biggest problem that faced the committee.

Table 5.1 Achievements of the first and second leadership according to vlei members

Identified achievement	**Achievements of the first committee frequencies (%)**	**Achievements of the second committee frequencies (%)**
Made people work hard	19	4
Good harvest	45	
Good relations with vlei members	8	7
Preserved the vlei resources	14	
Secured inputs	4	10
United vlei members	6	
Good leasing skills	2	
Good financial management	2	
Division of the vlei		7
Fenced the vlei		4
No achievement		68

Interviews indicated that the disagreements led to the passing of the vote of no confidence. Only 5% out of 37 respondents indicated that there were no problems during the second committee, while 95% said there were problems. The two prominent problems raised against the committee are low yields and lack of leadership qualities. Interviews highlighted that the second committee spent a lot of its time holding meetings. The chairwomen has been criticised for trusting rumours and base decisions on them.

Table 5.2 Problems that confronted the first and second committees

Identified Problems	Problems of the first committee frequencies (%)	Problems of the second committee frequencies (%)
No problems	18	5
Lack of transparency	3	
Embezzlement	6	
Laziness	12	8
Destruction of crops	9	
Soil degradation	9	
Violating the constitution	6	
Dictatorial rule	12	
Conflicts amongst members	25	
Low harvest		22
Absenteeism		3
Non functional constitution		14
Farmers without equipment		3
Lack of leadership qualities		32

5.3 Outcome and Reaction to the imposition of the Technology

5.3.1 Nature and Forms of Internal Struggles

One of the outcomes of Broad-Ridge and Broad-Furrow technology was to introduce internal conflicts amongst the vlei scheme members. Eighty-nine percent of the questionnaire respondents acknowledged the existence of conflicts during the first committee, while 11% said there were no conflicts. Respondents identified different times when the conflicts started such as harvest time (55%), when scheme started

(30%) and other responses (15%). It was felt by vlei-scheme members that conflicts at harvesting time brought latent conflicts out and serious contradictions amongst scheme members started. 85% of the questionnaire respondents acknowledged the existence of conflicts during the second committee, while 15% said there were no conflicts. 10% of the responses said conflicts that existed during the second committee started during the reign of the first committee, while 90% said the conflicts started during the reign of the second committee.

Numerous issues were raised in the questionnaire survey as being causes to the conflicts under the two leaderships (Tables 5.3 and 5.4). Respondents (38%) identified the leadership style as the cause of conflicts under the first committee. 42% of the questionnaire respondents indicated that the first leader had no weakness. More of the respondents (22%) who indicated weaknesses of the first leader accused him of impatience. While other indicated such weakness as using force to make people work (15%), embezzlement, more of foreman than a leader and a dictator had 7% of the responses each. The leader was blamed for being dictatorial. He made decisions without consultation and expected everyone to do as he said. Scheme members blamed the leader for not working when others were working but moved around monitoring and instructing people on the tasks they would be carrying out.

Interviews with committee members showed that the leader prescribed things to the committee. It was also highlighted that he did not take criticism or ideas that were contrary to his lightly. One respondent said people who served in the colonial government are a problem, they are full of “I know”. The leader would withdraw from

a meeting when his ideas were resisted, so at the end of the day to avoid him withdrawing people tended to toll his line of thought.

The leadership problem remains a topical issue even under the second committee (Table 6.4). The second committee had two leaders who succeeded each other. The first leader of the second committee had 15% of the respondents saying he did not have any weakness, while no one said the second leader did not have weaknesses. Highlighted weaknesses of the former included not being knowledgeable in agriculture, not bold to make decisions, trusted gossip, low harvests, did not have ideas of his own, division of the vlei, did not attend work days every time, did not monitor the vlei, dictatorial traits and favouritism. The latter leader has been said to have the following weaknesses; lack of agricultural knowledge, can not make major decisions, concentrates on her plot ignoring all other farmers, poor communication, does not come for work always and being rude.

Another issue (with 19% of the total respondents) to the endogenous conflicts is the clash over harvest (Table 6.3). Majority of the scheme members wanted to share and use all the yields from the scheme for domestic consumption. Their argument was that they would get a donor who would give or loan seed for the next season. Further, they argued that SDAMP, AREX and Local leadership said 'the scheme was suppose to help eradicate hunger', at the launch of the project.

On the other hand, the chairman supported by minority scheme members wanted to sell all the produce and buy inputs for the next season. In an interview with the first chairman, he had learnt this approach of self-sustenance from the exchange visit to

Shurugwi. Those who wanted selling of all produce argued that they would derive their food needs from their upland fields. One of them said *kuno kubasa, munhu angada kudya basa* meaning this is like you are employed so you should expect to carry home a salary in the form of money not food.

Table 5. 3 Causes of internal conflicts under the first and second leadership

Causes of Conflicts	**Under first leadership**	**Under second leadership**
Disliked leadership Style	38	19
Clash over harvest	19	
Absenteeism	16	13
Suspected Embezzlement	13	
Laziness	10	23
Favouritism on fine payments	4	
Unequal sharing of ridges		29
Crop failure		7
Nepotism		3
AREX push for division of vlei field		3
Election fixing		3

The secretary did not come for the harvesting, yet according to the constitution the produce were to be stored at his house. The chairman volunteered to keep the produce in his household grain store. The chairman ridiculed the secretary and commanded the grain to be taken to his homestead. All accounts indicated that part of the produce was stolen from the chairman's grain store. There were a lot of accusations as to who

was responsible. The chairman's son was suspected of stealing the grain since he was seen selling maize and wheat at a local business centre. The fact that the matter was not reported to the police was used as reason to think that the leadership was covering up something. The stolen grain had not been recovered and the thieves were at large.

Both committees had to face the issues of absenteeism, favouritism and laziness, which were causes of problems (Table 5.3). The first committee would leave portions for those who did not come for work and would ensure that they do the work. The vlei members disagreed with this arrangement and opted for paying fines. Some of the people who did not come for work absconded from paying the fines. Friends and kinsmen started supporting each other to make false justifications to cover for absenteeism.

Respondents indicated the unequal sharing of ridges and furrows as the cause of conflict by (Table 5.3). Sharing of the ridges was done as a way to resolve the problems of laziness and absenteeism, the second committee shared the ridges and furrows amongst members. Two or three members were given one ridge and furrow (see Table 5.4). A number of the scheme members were disgruntled since they got infertile and dry fields, while others got fertile and wet fields. The vlei is characterized by three soil types which are sandy-loam on the west wing, sand-clay at the bottom, loam-sand cover much of the vlei especially the eastern wing. Sandy-clay soils being the most fertile and productive are limited.

The farmers think that the lower ridges hold water for longer periods of time than all other furrows. In 2005, the scheme members were given rice seed to plough but the

crop did not do that well in other ridges than in others. The farmers attributed this to late planting and unsuitable conditions for planting. Some furrows were too dry while others were too wet. Other farmers have reacted by neglecting their fields. An AREX officer was present and presided over the sharing exercise. Hence, she has also been blamed for causing the conflicts in the vlei (Table 5.3). AREX officer and vlei committee has been said to be causing the crop failure in the vlei by adopting and advising tillage practices that do not work.

The sharing of the ridges poses threats over loan repayments. FGD accounts reviewed that the scheme is given loans to procure seed and fertilizer yearly. They repay the loans when they harvest. This has never been a problem when they were still working as a cooperative. The committee has expressed fears over continuing to get loans because some members are uncooperative and grumbling. Some farmers are diverting seed meant for the vlei to their upland fields. Farmers indicated in interviews that they were expected to repay equal amount with those with fertile and good ridges who harvest more. This would mean people have to use resources accrued from their upland farms to cover for costs incurred in the vlei field. Table 5.4 shows different farmers who planted rice and its status in different ridges. The rice seed was given for free to every member and they were educated on its production.

FGDs with vlei scheme members have indicted a recent problem of grazing livestock in the vlei. The committee member responsible for security is alleged to have been bringing his livestock during the night to graze inside the scheme fence. This is against the constitution because livestock destroys ridges and the fence. Cattle left unattended were observed in the vlei scheme (Figure 5.6).

Table 5. 4 Showing ridges and the performance of rice and maize crop

Ridge number	Crop
1	Good maize
	Did not plant rice
2	Rice (did not germinate)
	Good maize
3	Good maize
	Rice (did not germinate)
4	Fair maize
	Rice (not germinating well)
5	Good maize
	Rice (did not germinate well)
6	Did not plant rice or maize
7	Rice (did not germinate well)
	Fair maize
8	Rice (did not germinate well)
	Fair maize
9	Fair maize
	Rice (did not germinate well)
10	Poor maize
	Rice (fair rice crop)
11	Poor maize
	Did not plant rice
12	Poor maize
	Did not plant rice
13	Fair Maize
	Rice (did not germinate well)
14	Did not plant rice or maize
15	Poor maize
16	Poor maize
	Did not plant rice
17	Did not plant rice or maize
18	Poor maize
	Did not plant rice
19	Poor maize
	Did not plant rice

Figure 5. 6 Observed cattle grazing in the vlei

The other scheme members were complaining about this practice. The practice was thought of as being unfair for other members who repair the ridges and furrows, while someone's livestock benefited and damaged the ridges. The members heading their cattle in the vlei said they could not watch their livestock die from hunger when there was grass enclosed in the vlei. They also claim that not all the cattle that graze in the vlei belong to vlei members. No one in the vicinity of the vlei knows the owners of the cattle. Scheme members claim that some non-scheme members brought their livestock and destroy a section of the fence for their cattle to gain access to the scheme.

5.3.2 Waging conflicts

Out of the 39 responses 41% indicated that the conflicts were waged as verbal attacks. Willing violation of orders and rules was indicated by 18% of the respondents as a way used of waging conflicts, while 12% said the lazy ones were deprived of their share of the harvest. Absenting oneself, division of the vlei, discussing problems at meetings, fine payment and resigning had 5% of the respondents each who identified them as ways of waging conflicts.

Table 5. 5 Cross tabulation of individual responses and individual positions in the conflict

Individual Response	**Individual Position in the Conflict**					
	Defaulters pay fines	**Resolve Problems**	**Opposed leader**	**Supported committee**	**Supported division of vlei**	**Total**
Did nothing	2		1	4		**7**
Wanted leader to stay		1		4		**5**
Withdrew from conflict			1			**1**
Approached leader to resign			1			**1**
Expel leader			2		2	**4**
Total	**2**	**1**	**5**	**8**	**2**	**18**

More respondents highlighted that they supported the first committee (Table 5.5). Most of the vlei-members were not for the division of the vlei into small plots. Interviews indicated that *vakuru ndivo vakataura saka panga pasina zvokuita* (respectable people like the traditional leadership, councillor and government

representatives were present so you could not oppose them). Cross tabulation of individual position and response shows that a significant number that wanted the leader removed also opposed him (Table 5.5). More of those who did nothing had their various personal positions. Majority of the respondents supported the leader because they supported the committee. Others begged him to resign, as they heard a lot of bad things and some people threatening his life.

5.3.3 Attempts to resolve conflicts

The traditional leadership and council were invited to resolve the conflicts. The councillor and the local traditional leaders held a meeting with vlei members. It was resolved that half of the produce be sold while the other half is shared amongst scheme members. Traditional leadership, AREX, the councillor and other stakeholders were also invited to resolve other conflicts affecting the vlei scheme. The causes of conflicts identified in the meeting included laziness, absenteeism and uncommitted people. There emerged two schools of thought one, which favoured division of the vlei fields and others who supported working as a cooperative. The traditional leadership assigned the AREX officer to peg small plots in the vlei, which would be enough for everyone. The division of the vlei became another source of conflict in itself and the conflicts sought to be resolved were not resolved. Scheme members indicated that the conflicts have declined with the division of the vlei but productivity has also declined.

5.4.1 Inter-group Resistance and Struggles

Different groups of people were affected by the imposition of the Broad-Ridge and Broad-Furrow technology differently. The impacts of these effects frequently manifested as resistance to the scheme and conflicts. 50% of the 79 respondents highlighted the existence of conflicts. A number of issues were identified as the issues to the conflicts, which are dispossession of fields (31.3%), lost vlei benefits (31.1%) disruption of crops by animals (18.8%), general disagreements between scheme members and displaced farmers (9.4%) and disagreements with authorities (9.4%). A traditional leader in charge of the area said, his court attended to 4 cases, which pertained to the vlei from January to September 2005. In the same interview he indicated that on average he attends to 2 cases per month. Interviews, FGDs and trend analysis indicated the presents of what the community describes as 'serious conflicts'. A number of the accounts use strong language such as *kurwisana* and *makakatanwa* (fighting and strong disagreements respectively).

Implementation of the broad-ridges and broad furrows saw a number of farmers with fields loosing their fields to scheme members. The displaced farmers (those who lost their fields) had invested a lot on their fields. Some of them had carried clay from anthills and applied it in their fields, to improve soil fertility. Another example is of a displaced farmer who dug fishponds and was rearing fish. The ponds were approximately 10 meters x10 meters x 5 meters in size and situated on the west wing of the vlei (Figure 4.4). Some farmers had orchards with various types of fruit trees. During construction of ridges and furrows cotton, maize, sugar cane and other crops

belonging to displaced farmers were mowed down by earthmovers. The displaced farmers were not compensated for their loss.

Displaced farmers did not have upland fields. Yet scheme members who had upland fields were displacing them. Their livelihoods were dependent on the vlei fields as they did not have upland farms. To them they took this as a way of getting back at the Virimayi villagers for restricting people from Mwedzi areas access to benefit from the vlei. Displaced farmers called the scheme members nicknames to show their hatred. Vlei scheme members from Virimayi village were excluded from being members of the committee. They complained about a lot of issues, which relate to unfair treatment in the vlei scheme.

A number of the scheme members sympathised with displaced farmers for not being given compensation. The District Administrator (D.A.) and local leaders promised upland fields as compensation for the loss of their vlei fields. The displaced farmers had demanded compensation first before construction started. Their demand for compensation before construction, led to open confrontation, which was suppressed by the leadership. Council argued that traditional leadership were the ones tasked to give fields as compensation. The traditional leadership expected council and the extension workers to give them fields as compensation. The headman indicated that they had awarded a field as compensation to one of the displaced farmers. The other two are using backyards of their homesteads as fields. Others are cultivating on rented field. The dispossessed are now seeking alternative sources of livelihood since they have lost their fields in the vlei. The displaced farmers said they now go for gold

panning and fishing in Runde to raise money for family up keep. This was something they never did when they still had their fields as they produced enough.

The community and displaced farmers claimed that Zungwi vlei had become less productive since it was transformed into the Broad-Ridge and Broad-Furrow tillage system. According to the displaced farmers they utilized the vlei very well and it pained and angered them to see it being under-utilised. 72% of 64 responses highlighted that the vlei was properly utilized before the scheme than now under the technology. While some think the vlei is currently better utilized than before because it is currently possible to have 2 or 3 crops per year in the vlei. In an interview one displaced farmer said, “I have never gone to buy anything from the vlei but they come to buy from me.” Displaced farmers said they just see vlei scheme members carrying their produce on their heads because it is too small. This is to prove that productivity is so low in the vlei and the scheme members do not produce surplus produce. One displaced farmer claimed to have harvested 20 bags of wheat and 3,5 tonnes of maize in his last harvest in the vlei compared to the 1.235 of tonnes maize and 0.279 tonne of wheat harvested in the scheme in the 2003/4 seasons.

Displaced farmers expressed their bitterness over the issue of putting up orchards, fishpond and gardens in the vlei. The extension workers and leaders condemned their orchards, gardens and fishpond because these activities were said to degrade the vlei resources and anger the gods. The activities that the leadership and technocrats condemned are the same activities practiced by scheme members and everyone is quiet. According to displaced farmers this is a clear sign that they did not want us to

get rich. The displaced farmers have vowed that they will not eat the harvest alone or else no one will eat anything.

Displaced farmers and prospective scheme members are at conflict with the scheme members for denying them admittance as members of the scheme. Most of the respondents (98%) showed that vlei members refused entry of new members into the scheme. Half of the 62 respondents highlighted exorbitant joining fees as the major method used to keep prospective new comers out. In 2002, scheme members demanded a joining fees of ZW$80 (US$12). 36% of the respondents (n= 62) said that the vlei scheme was full while 14% highlighted that the scheme members did not want new members. Scheme members openly indicated that they did not want any new members because they had done too much work to be compensated by a joining fee of any amount. Scheme members also pointed out that they had given prospective members enough time to join and that grace period had expired. The exorbitant joining fee demanded from her angered one displaced farmer who wanted her daughter to join. She said “they (vlei members) did not compensate us for the improvements we made on the vlei. They took our fields by force but now they want people to compensate the energy they used to develop the ridges.” Community members have cited such demands by scheme members as reasons for the observed conflicts.

There was a general dissatisfaction by the general community against the scheme due to their loss of access to Zungwi vlei. As demonstrated in chapter 4 the community around the vlei derived numerous benefits from resources provided by Zungwi vlei, but they have lost access after the Broad-Ridge and Broad-Furrow tillage system. Out

of all the benefiting households only 42 households are currently benefiting. The Broad-Ridge and Broad-Furrow system can only accommodate a limited number of users and uses. Non –members showed that farmers with cattle cried fowl over implementation of the scheme. SDAMP and AREX did not inform the community that they were going to fence the whole area surrounding the vlei. SDAMP and AREX only told the community that they were going to take the vlei (to the local people this meant the water way only). Livestock grazing has always been a competing use of the vlei but currently it is no longer possible. A kraal head who was against the scheme said, "The scheme is supported by those without cattle," to discredit the scheme. Interviews confirmed that some of the vlei members do not have cattle and hence it was felt that they are insensitive to cattle needs. It was observed that some farmers graze their herds in the vlei or on the edges of the scheme's fence (Figure 5.7). There have been reports of cattle destroying the fence and people willingly destroying the fence to let their cattle graze on the good grass enclosed in the fence (Figure 5.1). Vlei scheme members blamed this on non-vlei scheme members.

Community members were not happy at the sight of under-utilised grass enclosed in the scheme fence while their cattle starve (Figure 5.6 and 5.7). During the 2004/5 dry period livestock did not have enough fodder and some of the animals died. Other farmers with large heads sold some of their animals' in order to minimize loss to death. A number of community members petitioned the traditional leadership for vlei members to allow them harvesting the grass for fodder. Scheme members refused to admit community members to harvesting grass for fodder. Vlei members who grazed their animals in the vlei fuelled the conflicts.

Three-quarters of the scheme is fenced with wire and the rest is fenced using thorny bushes and poles. Small animals like goats and sheep find their way into the vlei. These animals destroy crops in the vlei field. Interviews indicate that treatment of such cases depends on who is the owner of the animals. If it were a displaced farmer or any of their supporters they would be harsh and labelled as being a reaction to the conflicts. The same issue would be treated differently if it were a scheme member or any one who is not aligned to displaced farmers.

Figure 5. 7 livestock grazing close to the vlei scheme fence

During the 2004/5 drought the vlei scheme members dug a well at the edge of the scheme. The Chikamhe well which was used by the communities in times of drought

had dried, and the small dug well became prime water source in the area. The gate to access the well was closed throughout the day unless the vlei members were working in the vlei. It was difficult for outsiders to come and ask for keys to the scheme, as they are not allowed inside the scheme. Externals ended up damaging the wire to gain access to the well. It was observed that some of the people who came to fetch water came from distant villages at times 5 kilometres away.

It was claimed that there were disagreements between the custodians of tradition and the scheme members when the vlei was established. They claimed that the vlei is sacred and should not be fenced. Furthermore it was alleged that the ridges disturbed the road of *mhondoro* (guardian of the lion spirits) to the Zungwi Mountain, which is the burial place of Chief Mazhihwa's family. Responses in interviews and FGDs did not agree on whether the vlei is sacred or it is not. The elderly members of the community said the vlei was sacred especially the well-named *Tsime ravachikamhi*, after the nickname of Mafenya's wife whose field bordered the well (Figure 5.8).

Traditionalists and other community members expressed fears that the water in the sacred well would be affected by disobedience to customary rules, application of fertilizers and the blocking of free water movement by the ridges and dam wall constructed. In 2005 the sacred well dried up (Figure 5.8). Vlei scheme members and Christian converts believed that it was as a result of the drought spell. The descendent of Chikamhe have been converted to Christianity and hence shared the view that the drying up of the well was caused by the prolonged dry spell. The traditionalists and displaced farmers believed that ridges and the wire caused the well to dry. They

argued that the well never dried up during the 1981/2, 1991/2 droughts which were more severe that the 2004/5 dry period.

Figure 5. 8 Dried sacred well

Not all fields in the vlei area were taken and incorporated into the scheme. The vlei members complained that the fields up stream captured water that the scheme was supposed to benefit from. At the same time people down stream of the vlei scheme claimed that the dam blocked water meant for their use. All respondents agreed that the water way had been reduced down stream. The community held the scheme responsible for this. According to vlei scheme members, farmers down stream used the issue of the sacred well as an excuse for accessing the water for their fields and

gardens. Down stream farmers claimed that the dam affected both water level and quality of the communal well.

Recently a farmer closed a road leading to the vlei and this resulted in conflicts with scheme members. The farmer claimed that the vlei people carried away manure from his field through which the road passes. The road was meant for use by livestock drawing farming equipment to and from the vlei. This made it difficult for people from Mwedzi to access the vlei. They then had to go round a stretch of fields to access the vlei. The vlei members had reported the issue to the traditional leadership. The vlei scheme members claimed that traditional leadership designated the road to them, since time of the construction of the ridges and furrows.

The AREX officer advised scheme members on cultivation practices, which did not work and resulted in low yields. They were advised to use a short season variety, which everyone in the area was supposed to use, yet the vlei had excess moisture in the soil that made the crop not to do well. The extension worker blamed the vlei scheme members for the crop failure as they did not weed their crop in time and did not apply correct quantities of fertilizer. The extension worker said, [3]"*Vanonetsa kushanda navo vanozviti vanoziva vakawandisa. Dai vakatora vanhu vane mamaster farmer certificate chete dai project irikubudirira."* Scheme members have also complained that the extension officers do not source for seed for them and does not include scheme members in training programs. The scheme members would have wanted to be incorporated into the training and growing of maize and beans for seed.

[3] They are full of I know so it is a problem working with them. If they had recruited people with master farmer certificates the scheme would be successful.

Some scheme members have raised concerns over involvement of the AREX officer in the schemes affairs. The AREX officers had made an indication that they were not very knowledgeable in cultivation using the Broad-Furrow and Broad-Ridge tillage system. The extension officers have demanded for a small portion of the field so that they can run experiments and be able to advice appropriately. According to the vlei minutes the members refused and some said they did not want to see the senior AREX officer in the vlei again.

There are potential conflicts between traditional leadership and council. The vlei scheme members indicated that the vlei resources belonged to the chief and the project came with council. Traditional leadership expressed dissatisfaction over the referring of problems to the council rather than to them. Whenever vlei scheme members have problems amongst themselves they refer their issues to council to intervene and solve their problems. Traditional leadership applauded the councillor as he involves them in solving issues in the vlei. Fears were expressed if a new councillor comes into office and attempts to solve these problems on their own. One of the traditional leaders said councillor [4]*muuyi, anouya kuzobata basa chete. Muridzi wemba ndini ndosaka ndisingavhoterwi*.

The traditional leadership has raised concerns over low productivity and degradation of the vlei. According to headman Musibandi if the scheme is not producing anything tangible the members should be removed and new people put in. Headman Mwedzi indicated that the scheme would have to be demolished because it has disturbed people's lives yet it is not helpful to the community. Interviews indicated that

[4] Is an external person who only comes to work only, but the owner of the 'house' is the traditional leadership this is why there are not voted into office.

traditional leadership and other stakeholders are concerned over the soil erosion-taking place in the vlei (Figure 5.11). Fears have been expressed of the well and the river down steam silting and drying up.

5.4.2 Waging the conflicts and Attempts to resolve Conflicts

After pegging of the scheme boundaries, displaced farmers guarded their fields to stop anyone coming near them. They were armed with axes, stones, and catapults. FGDs with vlei scheme members indicated that some people were hit by catapult propelled missiles. The machinery (tractors, graders and other machinery) intending to be used in the construction of the ridges and furrows were also attacked and vandalised. The personnel manning the machines fled from the area on foot and they later returned to take some of their machinery and left.

Councillor approached the traditional leadership to intervene. A meeting was called and in attendance was everyone from near by villages, Traditional leadership and the District Administrator. The District Administrator, Chief and councillor are reported to have promised compensation to the displaced farmers and asked them to move out of the way for the construction. Traditional leadership and the D. A. reacted in different ways to the conflicts (Figure 5.9 and 5.10). The then kraal head Virimayi defended his subjects (displaced farmers) from being dispossessed without clearing the compensation terms. Figure 5.5 indicates that the chief was empowered to deal with the displaced farmers as he saw fit if they were again a problem.

Displaced farmers attempted to stop the starting of work before compensation was given, once again. The chief was called to settle the issue once and for all. The Chief did not try the case, he only delivered a verdict that the displaced farmers should stop disturbing work. One displaced farmer and kraal head that attempted to explain and oppose the verdict as not fair were fined. The displaced farmer had to pay 3 cattle to the chief, while the kraal head had to pay 3. The displaced farmer fled the area but he has since returned without the knowledge of the chief. The kraal head passed away. According to the displaced farmer he does not attend meetings were the chief is in attendants.

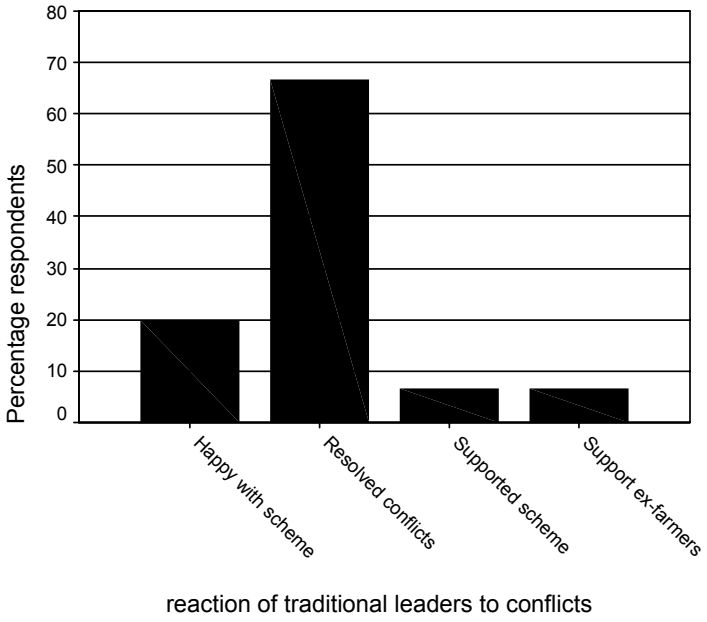


Figure 5. 9 Reactions of traditional leaders to the conflicts over Zungwi vlei

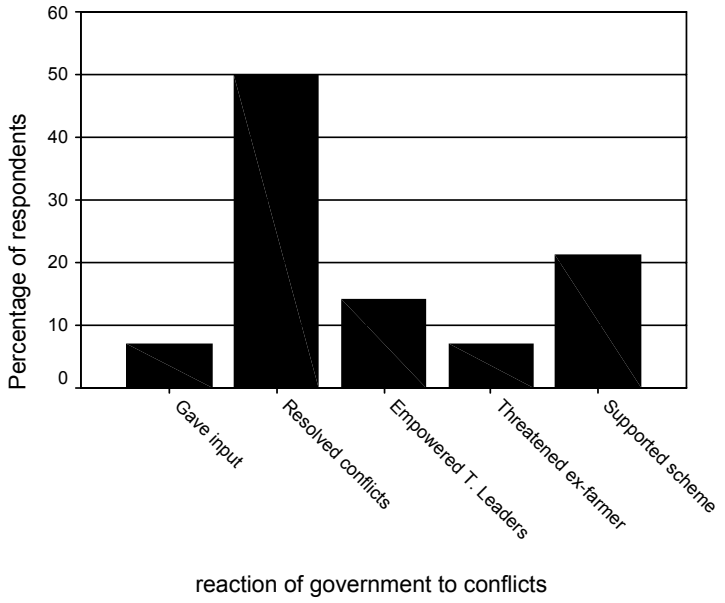


Figure 5. 10 Reactions of government officials who attended the conflict resolution meeting

According to interviews with vlei members' two deaths that have happened in the vlei are linked to the conflicts. One of the deceased was poisoned at a beer-drinking gathering. His wife indicated that his assistance to the SIMA/IDRC research team in finding a control vlei for the agricultural component was misunderstood (Box 5.2).

Box 5. 1 The story alleged to have been linked to the death of a vlei beneficiary

During the SIMA/IRDC research team's reconnaissance visit to communities around Zungwi Mountain they encountered displaced farmers. The team came into the area in the company of the local AREX officer. They were trying to identify a control vlei for the malaria and agricultural components of the program. They asked a vlei scheme beneficiary to assist them identify field owners. A group of middle-aged men approached them and stopped them. They accused them of coming to develop another vlei in the area using the Broad-Ridge and Broad- Furrow technology. The men

harassed them and threatened with death destroying the car and beating them up. While all this was happening the owner of the field was quiet. The local man tried to calm the situation but was also threatened and he just kept quiet. The owner finally said "go away I do not want with my field". the men escorted the researcher and AREX officer to the car and demanded them to go away. The man is reported to have experienced death threats and destruction of his property. He was then poisoned after sometime at a beer-drinking gathering.

Source: compiled with information from narratives and interviews

Vlei members who were close to the deceased chairman suspect that he was bewitched. They suspect that they were connection with a vlei member and non-vlei members. They declined to bring out the issue saying it would directly point at the people. Vlei scheme members pointed out that a lot of them had heard or experienced death and witchcraft threats on vlei members. One man said [5]*tinorwa nezvakawanda kuhope*. One of the vlei members said one has to be brave and protect oneself and your family if you are to survive, which is how I do it. Some non-scheme members indicated that some displaced farmers wished if they had witchcraft then they could use it against the scheme members.

All accounts indicated verbal attacks and blowing small issues out of proportion as other ways used to wage conflicts. Problem-affecting children could easily end up with parents scolding each other. Small disagreements at beer drinking gatherings can easily be made big, scolding and fighting would result.

[5] We are in a spiritual warfare during the night

5.5 Impacts of the technology on social capital, agriculture and conservation

5.5.1 Social Harmony

Social harmony is one of the parameters used in this study to measure community development. High levels of social cohesion would mean social development and the opposite is equally true. All the 38 respondents highlighted changes in relationship between community members, relatives, sub-community groups and communities as a result of implementation of the Broad-ridge and Broad-furrow technology in Zungwi vlei. Table 5.7 summarises the impacts of the broad-ridge and broad-furrow technology on aspects of social capital.

Table 5.7 Dynamics in relations amongst different groups of people

	Status of relations after the implementation of the technology amongst the following groups:					
	Beneficiaries and non-beneficiaries	**Relatives**	**Different villages**	**Sharing arrangements**	**Community works**	**People within same village**
Hatred	57	27	33			27
No idea	7	7	7	7	13	7
No change	22	27	47	50	60	53
Divisions	7	32	13			13
Threats	7					
Scolding		7				
Cut sharing arrangements				43		
Stopped attending community work					27	
Total	**100**	**100**	**100**	**100**	**100**	**100**

Out of the respondents 57% indicated that hatred had developed between members and non-members. Sour relations between vlei-members and non-vlei members have been said to be the worst relations the community has ever witnessed. The following

statements show bitter relations between members and non-members; *hationani nevanhu vemuvlei* (meaning we do not see eye to eye with non-vlei members) interview, 10-2004, *tinongofamba hedu mwanangu asitapera kutaurwa nekushoropodzwa nevasiri muchirongwa* (meaning the non-vlei members are always saying bad things about us, behind our backs) interview, 03-2005*, kumusangano wenyu isu hatiuyi kana vanhu vekuvlei varipo, pangangomuka zvimwe, asi matouya nemapurisa* (we are not coming for the meeting you have invited us if vlei members are present, there might be need for police to instill order) FGD, 02-2006.

The bitter relations that existed were visible at communal gatherings such as meetings, beer drinking sprees and funerals. In cases were people had to share a plate or beer mug, non-vlei members and vlei member's seat on separate sides. Further, if there is an argument or issue to be debated and decided upon they support their fellows on the same side in relation to the vlei. For example vlei members would support an idea from a vlei member even if it not the best available. It has been reviewed that at times physical fights result. All accounts indicated verbal attacks and blowing small issues out of proportion as other ways used to wage conflicts. Problem-affecting children could easily end up with parents scolding each other. Small disagreements at beer drinking gatherings could easily be made big, scolding and fighting would result.

They were fears of poisoning and witchcraft across the conflicting groups. Verbal threats of inflicting harm whether by witchcraft or physical attack were common. According to interviews with vlei members' two deaths that have happened in the vlei were linked to the resistance against the scheme within the community. One of the

deceased was poisoned at a beer-drinking gathering. It was believed that his offering assistance to a research team to find a control vlei for an agricultural research was misunderstood. The community that had been disadvantaged in the development of Zungwi thought that the team was there to develop another vlei using the technology.

Vlei members who were close to the deceased chairman suspect that he was bewitched. They suspect that a vlei member conspired with non-vlei members in bewitching the chairman. The community declined to bring out details on the issue saying it would directly point at the people. Vlei members said [6]*tinorwa nezvakawanda kuhope*. One of the vlei members said one has to be brave and protect oneself and family using herbs if you are to survive, which is what he does. Some non-scheme members indicated that some displaced farmers wished if they had witchcraft then they could use it against the scheme members in order to repossess their land.

Implementation of the technology has been said to negatively affect relations amongst relatives by 66% of the 38 respondents, while 27% said these relations were not affected and 7% had no idea. Respondents who said conflicts over implementation of the technology-affected relations amongst relatives' identified the following changes: hatred (27%), scolding (7%) and division amongst relatives on vlei opinion (33%) (Table 5.7). A lady narrated a story of a quarrel that developed between a brother and sister over joining the vlei. The sister wanted to join the vlei and the brother learnt of this and confronted her over the issue. After quarrelling for sometime the brother slapped her. Children were strictly monitored on who could become their friends and

[6] We are in a spiritual warfare during the night

which relative they could visit or eat from their home. A vlei member interviewed said, *chigarire chese handisati ndamboona ruvengo rwakadaro. Tai pesana tisingamhorosane zvichapisa pisa, mazuva ano vamwe vacho tavakungo mhoresana navo asi unoona kuti kumanikidzira sezvo tirivana baba navanamukoma vavo* (Since I was born I have never seen such magnitude of hate, to the extent of not greeting one another).

The technology did not only have negative impacts at the individual level but also at the community level. Fifty-three percent of the 38 interviewed people said there were no changes in the way community members related at village level, 40% identified distortion of relations and 7% had no idea. There were sour relations between people from different villages and the most affected were Headman Mwedzi's area and Headman Musibandi's area. 46% of the respondents highlighted negative relations between contesting villages (table 5.7). Those against the vlei stopped attending *maricho* (cooperative work) of a vlei member. The hatred that developed derailed community work such as repairing roads, dip tanks and water points. Vlei members preferred to get assistance or borrow anything from a fellow vlei member at a distance than from a non-vlei member nearby.

On the other hand the scheme had positive contributions to social capital. The larger community isolated the scheme members but they developed reliance amongst themselves. The scheme members assisted each other in times of problems like funerals or illness. The scheme members paid *Chema* (condolences) as a group in the case of a funeral. Sharing and borrowing arrangements developed amongst the members. Some of the members did not have farming implements so they got them

from those members with. People from different villages established new networks, which were either weak or non-exiting.

On the other side, members of the scheme developed stronger networks than before. The scheme members developed sharing and borrowing arrangements and friendship amongst themselves. Some of the scheme members did not have farming implements or draught power. Sharing with non-scheme members was limited.

6.5.2 Conservation

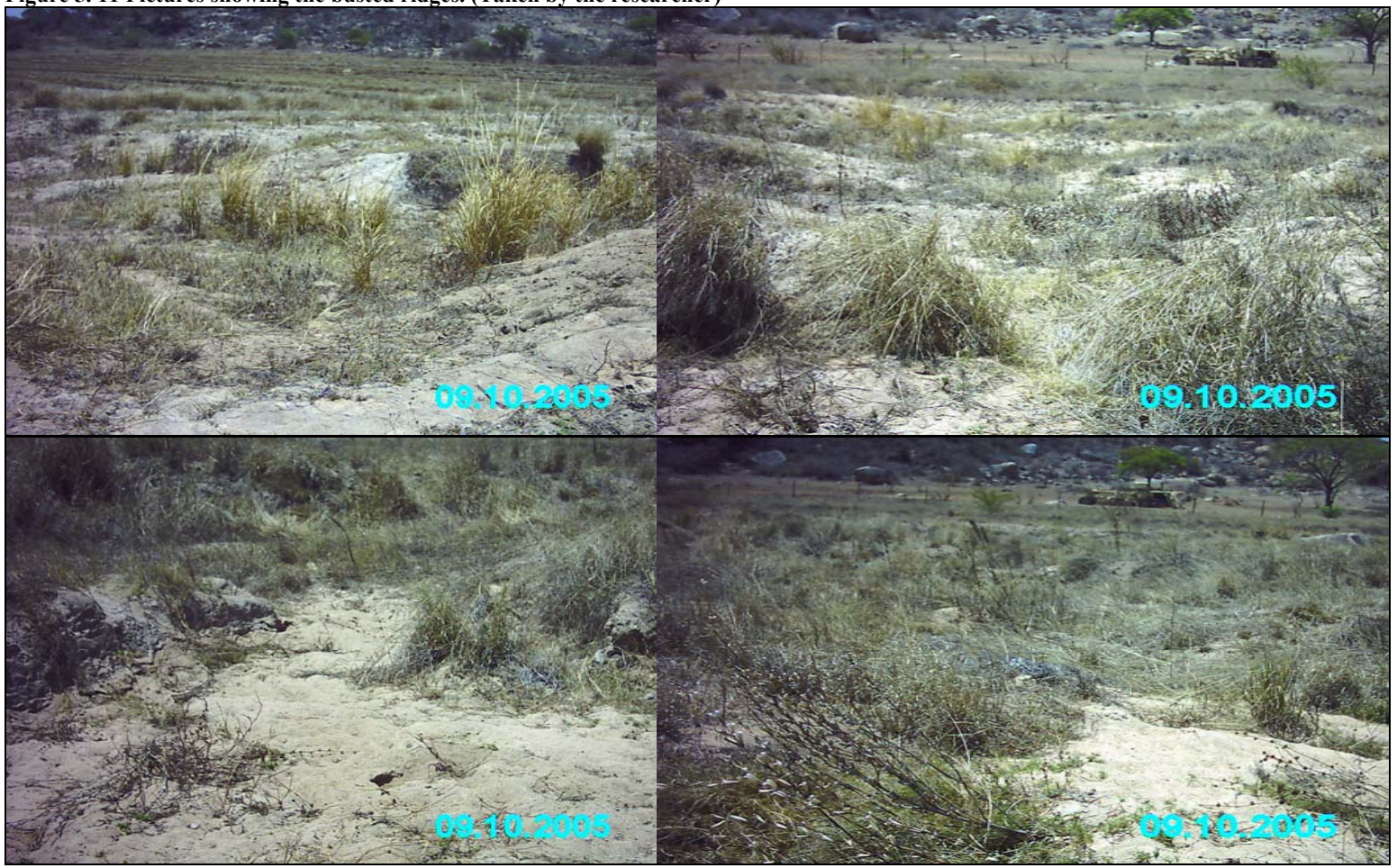
It was established by the study that conflicts over Zungwi vlei had a bearing on conservation efforts. Out of 38 respondents 60% said conflicts had a negative impact on conservation of natural resources, while 40 % said they did not. Fifty-three percent of the 38 respondents said the vlei resources are being degraded as a result of conflicts, while 47% do not think the vlei is not being degraded as a result of conflicts. Scheme members and non-scheme members have highlighted that there are threats to vlei conservation being experienced and others looming. Erosion has since started in the vlei and has potential to accelerate unless members are cooperating to curb it. Erosion has been increased due to conflicts especially after the sharing of ridges. After the sharing of ridges others neglected their ridges and have been broken by runoff.

Members have refused to unite and repair the ridges as a group, leaving it to the individual farmer. Figure 5.11 shows section of the vlei where erosion has developed and busted a number of the ridges. The ridges mostly affected are those located on

sand soils that are less fertile. One of the interviewed members said, *ridge randikawana harikudzi, kubva ndaripiwa handisati ndamboenda kumunda kwacho.* Such frustration has resulted in a number of people not maintaining their ridges. People who neglect their ridges are seen as being lazy and should not be assisted.

The impacts of conflicts on resources were explored; respondents highlighted the changes in the resources as a result of conflicts. Seventeen percent of the 34 respondents highlighted that the ridges and furrow did not change because there are well maintained (Table 5.6), while majority think the vlei ridges have been depleted. The Broad-Ridge and broad furrow technology has been said by 50% of the respondents as reducing erosion, conserving soil fertility by 14% and 20% said there is no change in the land resource (Table 5.6). On the other hand only14% think the land resource have been degraded. Implementation of the scheme has been said by 69% of the respondents to increase the availability of water (Table 5.6). The furrows and ridges hold moisture for a long period. In a good rain year, moisture in the furrows dries around July. The ridges and furrows retain enough moisture to allow off rain season cropping.

Figure 5. 11 Pictures showing the busted ridges. (Taken by the researcher)



The most identified change to plants by respondents is the increasing abundance of exotic trees. These trees were mainly orchard species (Table 5.4). Some members of the community frowned at this change. Some of the exotic trees were blamed for drawing a lot of water, hence drying the vlei. Cutting of traditional tree species was equally frowned at, and indigenous tree species were believed to give out water in dry years. Trees found in wetlands were believed to preserve and protect the moisture in the vlei. Grass was thought of as being well conserved under the scheme than before by 46% respondents. Scheme members highlighted that the vlei preserved grass for use as fodder in dry periods.

Table 5.6 Respondents perspectives of the changes in the resource base

Responses	**Changes as a result of conflicts in;**			
	Ridges and furrows (n=38) (Responses %)	**Land resources (n=38) (Responses %)**	**Water resources (n=38) (Responses %)**	**Plants (n=38) (Responses %)**
Conserved and Well maintained	17	14		46
Degraded	75			
Not maintained	8			
No change		22	31	
Reduced erosion		50		
Ridges need to be redone		14		
Increase in the resource			69	8
Grass used in times of drought				7
Dominated by orchard trees				85
Other				15

5.5.3 Agriculture

Different agricultural activities within the vlei were being affected by conflicts, which existed over the vlei resources. 73% of 38 respondents said conflicts over Zungwi vlei were affecting agriculture while 27% said they were not. Conflicts were said by 73% to have been responsible for the delay in preparation of the scheme. 20% of the respondents said conflicts did not affect scheme preparation, while 7% said the traditional leadership did delay the preparation. Commencing of work was delayed and people's responses were: 50% said exogenous conflicts delayed work, 21% said internal conflicts delayed work and 20% said conflicts had no impact in the delay. Scheme members showed that every season, field preparation in the scheme is delayed as people will be arguing and disagreeing. The chairlady said, *kunevamwe vasingadi hutungamiri nepfungwa dzavanotaura.* Those who dislike her leadership and ideas are always opposing the committee. Conflicts have also affected even looking after crops in the fields. The scheme members give each other turns to come and guard the fields against human theft or animals destroying crops. Some members do not do their duty of guarding the field. Animals destroy crops and this affects their yields. Members claimed that the livestock belong to ex-vlei members, who some regarded as enemies.

5.6 Summary of Key findings

The chapter has established and analysed causes, forms and impacts of conflicts over Zungwi vlei. The results present that development of Zungwi vlei using the Broad-Ridge and Broad-Furrow technology-exacerbated conflicts. Both endogenous and exogenous conflicts existed. Changing rights to access, use, and control of the vlei mainly caused the

external conflicts. Those who lost rights to the vlei, which was regarded as a communal resource, were not compensated. The exogenous conflicts took diverse forms from passive resistance to active resistance. The endogenous conflicts had numerous causes that depended to a large extent with the leadership. The conflicts had impacts on social harmony, agricultural productivity and conservation efforts.

Chapter 6

Discussion and conclusion

6.1 Introduction

The chapter aims to tie the methodology, literature review, theoretical framework and the results together. The objectives presented in the first chapter will be matched to the results. The study sought to understand the results of implementing the Broad-Ridge and Broad-Furrow tillage system on a key resource in the Communal Areas. The study has shown conflicts over access, use and management as the most important outcome of imposing the technology on communities. The study results were derived from one vlei under Broad-Ridge and broad furrow tillage system. Some central themes run through the course of the study and can be directly linked to various objectives: historical factors that gave rise to present situation, context of the conflicts, primary parties, additional parties, issues, power dynamics, stages and type of conflicts.

6.2.1 Evolving use and access rights and resource base

Results from this thesis support scholars who argue that in practice, natural resources in communal areas are rarely managed solely within one property regime (Murphree, 1994 and Berkes, 1989). Literature generally refers to resources in Communal Areas as common property, yet access and use to Zungwi vlei was heterogeneous and complex.

With water held more or less under open access, fields and gardens under somewhat private property and the rest of resources under common property. The boundaries of resources keep on shifting depending on socio-political dynamics, weather patterns (droughts) and time of the year. Resources said to be communally owned in theory have managers within the communities that govern their utilisation. In understanding resource use and access dynamics social institutions are important.

Access and use to Zungwi vlei by gender cannot be easily generalised. According to Matose (2002) it is pertinent to analyse how household members gain access to resources. Family members are allocated different roles in resources mobilisation for the household. Men are active in negotiating for access to resources at a community level what one can call "access politics". Women mainly do the productive work assisted by young females within the household. These duties are informed by custom, that bestows' these roles through marriage institution and societal norms. To perform these roles is only but to be whole and attain a degree of self-actualisation. Scarcity of water resources has caused changes in gender roles in the family. Chapter 4 has shown that increased distance from the vlei or in cases where access is curbed, males took up the role of fetching water using scotch carts. In a family where there are no males, females also took up grazing of animals.

Beyond household-level arrangements, political economy and authority systems of the community mediated resource access for different users. Access to Zungwi vlei was mainly controlled by customary regulations. Everyone from Mazvihwa area could access

the vlei resources except for those resources on people's fields. Resource scarcity changed these customary access rights as the vlei farmers' limited access to the larger Mazvihwa community and this resulted in conflicts.

Distribution of access rights was based on socio-political system and on family relationships so that social networks govern access rights (Berry, 1993). Members of the chieftaincy lineage had more power than others in bargaining for resources. Kraal head that were not of the chieftaincy lineage could not resist their demands. An earlier study by Scoones and Cousins (1991) in Mazvihwa found that powerful patriarchs had control over vleis. The colonial government transferred vlei control to a family of the Shumba totem. These were considered as immigrants and it did not go well with the chieftaincy lineage, hence implementation of the technology was viewed with suspicion. Access to the vlei resource units was determined also by the good will of the ones in control. They could prohibit or admit any one easily, with the exception of those from the ruling family. This is not to assume that the vlei farmers were all powerful, the traditional leadership checked their power.

6.2.2 Typologies of Conflicts Over Zungwi vlei

Competition for legitimacy between traditional leaders and extension workers resulted in conflicts over management. The two separate institutions had different terms of reference and were competing to be heard and legitimated by the same community. This is a typical

interface of modernity and customary practice. Conflict always ends up with the traditional leaders winning because they appeal to the people.

The resources have been undergoing changes and some of these have been attributed to climate change. The data presented in trend analysis charts demonstrate decline in rainfall, trees and other natural resources. The co-relation between people's perceptions of changes in the natural world varies directly with conflicts. Environmental scarcity alone is responsible for certain conflicts that were present before development of the Broad-Ridge and broad furrow. Research work in the Sahel showed that in the complex web of causes leading to social and political conflicts, bloodshed and war, environmental degradation is playing an increasingly important role (Rahim *et al* 1991). Studies by Homer-Dixon, (1991); Kelly and Homer-Dixon, (1991); Howard and Homer-Dixon, (1991); Gizewski and Homer-Dixon, (1991); Percival and Homer-Dixon, (1991) and Homer-Dixon and Blitt, (1998) have shown that environmental degradation causes conflicts.

The implementation of the Broad ridges and furrows technology marked the crisis stage of resources access and use conflicts over Zungwi vlei. The technology changed customary rights and empowered one group of society while disempowering others. Marxism argues that for as long as they are social inequalities conflicts are unavoidable and inevitable. Data presented shows 35% increase in the people who acknowledge existence of conflicts before and after the scheme. The trend analyses also show a sudden

rise in conflicts at the time of constructing the Broad-Ridge and Broad-Furrow tillage system.

The needs of different parties to the conflicts are important to understand. The struggle for control over resources is often centred on those that are the most valuable for local production (Scoones and Cousins, 1991). The issue cutting across conflicts presented here is the question of access to benefit from the vlei resources. Control of Zungwi vlei was a key issue even before the development of the vlei using the Broad-Ridge and Broad-Furrow technology. Control also meant the power to exclude other competing users and uses.

For households, the vlei was particularly attractive because it enabled large numbers of people to make a decent livelihood. Food production could be done on the rich alluvial soils on the sides on fields and gardens. As the data shows the one with fields in the vlei would automatically control the vlei. High yields were realised by those cultivating Zungwi vlei, which meant guaranteed sustainable livelihoods and wealth. People go to extend of willingly breaking laws if the activities are essential livelihood strategy. Before the Broad-Ridge and Broad-Furrow technology people envied the vlei fields but were strongly restricted by customary rules and practices. Further, customary use of the vlei allowed multiple uses by different users. Thus, awarding different rights to different people and resources, which meant minimal conflicts.

There is need to look closely at ways in which different groups establish power relations through their control over resources. The parties involved in conflicts appealed to different institutions for power. For example, the boundary conflicts presented in chapter 6 show headmen appealing to colonial government and black mailing the rival. Another example is that of the scheme members who gained support from the D.A and Council against displaced vlei farmers. For a group to gain support it has to satisfy interests of the powerful institutions. The parties in crafting their position and interests will not only act in their interest but in the interests of others. The problem with this is the tendencies to involve many parties in the conflicts complicating the conflict situation. At the beginning there are two parties, but with time numerous other institutions join on the sides of the initial parties.

Conflicts demonstrate that rural populations can resist innovations that they do not agree with. Data presented in the previous chapter shows resistance towards the Broad-Ridge and Broad-Furrow technology. The implementation of the scheme affected traditional practices and beliefs. Community members ignore customary rules at will. The technology results in sudden change of the status quo creating inequality and threatened people's livelihoods. Scott (1985) has demonstrated the various ways used by the weak to frustrate policies and innovations they do not want. The thesis has documented the active resistance to the establishment of the scheme. Men with axes, catapults and other small weapons tried to stop the earthmovers constructing the ridges. Scott (1985) argues that circumstances, which favour large-scale peasant uprisings are rare and when the revolts occur they are crushed.

The conflicts were transformed from being open to latent methods of waging conflicts. Some of the methods were emotional such as; hatred, anger and frustration. Visible actions which excluded violence, were used in waging conflicts such as; lack of respect, scolding, back biting, selective association, cutting borrowing ties, provocative actions, blocking of the road to the vlei and damaging of property. Care needs to be taken when one is collecting data in an environment of latent conflict.

Although the central issue to these conflicts is establishment of the Broad-Ridge and Broad-Furrow tillage system, there were other fuelling factors. Data presented show the conflicts being thought of as between people of Msimbandi and Mwedzi areas. Data also shows social division according to relationship to the vlei. Vlei-members associate with those who support the idea of the scheme. Those who oppose the scheme associate as a group. This is clear even at beer drinking parties and funerals. This divide is maintained even in other issues that have nothing to do with Zungwi vlei. Scheme members think that conflicts are declining. Yet displaced farmers are still angered and fully conscious of the conflicts. The conflict in Zungwi shows signs of moving from specific to general. The conflicts in Zungwi vlei over the scheme's effects have existed for 7 years now. They do not show encouraging signs of decreasing instead they are going latent and general. The major institutions propping the conflicts are council, traditional leadership, scheme members, displaced farmers, researchers and prospective members (in order of strength of institution).

6.2.3 Development versus Modernisation

WCED (1987) sees scientific technologies and social organisation as key in meeting present and future needs. Implementation of the Broad-Ridge and Broad-Furrow technology in Zungwi vlei is a typical modernisation approach. The question is did it result in development of benefiting households and community? The data presented in chapter 5 showed that conflicts that resulted from implementation of the technology affected social capital in Mutambi and Murowa wards. Social capital of a community is composed of the following elements; social relations, networks, social norms and values, trust and resources (Mignone and O'Neil, 2005).

The Broad-RidgeBroad-Furrow is said to stop soil erosion and increase the wetland area (Mharapara, 1997; Chimbari *et al*, in press). Photos presented in chapter 5-show land degradation. That is even with the technology erosion is still possible if the ridges are neglected. Communities have identified conflicts over unequal sharing of ridges as the major reason for neglecting the ridges. Further, the destroyed ridges require heavy earthmovers to maintain and repair damaged ridges. Thus, this technology is above the capacity of simple peasants to maintain. On a positive note, the vlei was said to preserve surface water and ground moisture longer than vleis under traditional management.

Accounts from community members indicate that yields are decreasing in the vlei. Conflicts over the vlei play a significant role amongst other factors like droughts and lack

of capital. The area has suffered a drought period since Zungwi vlei scheme started. Internal conflicts resulted in delays in ploughing and planting times. This is actually worse after the division of the vlei into small portions. Those who were allocated infertile portions neglect their fields. Grass provides hiding places for birds and insects that destroy crops. Given that some members have already resisted contributions of equal amounts for loan repayment with those with fertile fields, loan repayments will be a problem in the near future. The scheme might even be black listed and more loans extended to it. Further, animal conflicts have also resulted in the destruction of the ridges and crops.

Makumbe, (2000) argues that the success of programmes in rural areas hinges on actor participation. Actor participation makes the peasants to identify with the technology and even input to the final design. This process of interaction will allow for merging of modernisation and the rural people's knowledge system to come up with a product held as novel by all parties involved. The thesis has shown in chapter 5 that no one account was given as to who came up with the idea of the scheme in the area. This already shows people distancing themselves from the scheme. The scientists came and SDAMP interacted with the council and political structures. This resulted in some members even joining without adequate information about the scheme and its management. The exchange visit was a good initiative towards local people participation, although those who participated were not true representatives of different interests around the vlei. The selection was based on subjective criteria that are left to an individual's discretion.

Implementation of the technology can be blamed for ignoring numerous participatory toolboxes, which could have been used. The process of establishing the scheme omitted the participation of the now displaced farmers. None of the community representatives had a field or was to be affected in a significant way. Development programmes should prioritise the views and opinions of those who will be directly affected by their projects. The displaced farmers of Zungwi vlei were not compensated for the loss of their fields. Thus, they have declined in income and social status. This will widen the gap between the rich and the poor, especially since the elite are the ones who benefit at the expense of ordinary people.

6.2.4 Recommendations and Conflict resolution

There is need to improve how the Broad-Ridge and Broad-Furrow technology is incepted into key resources especially those under communal tenure. Imposition of the technology did not value the areas history, tenure, access, legitimacy, and use and management regimes. Participatory rural appraisal tools could have been used at the time that Zungwi vlei was developed. However, today a much developed and powerful tool called Community Visioning is recommended for use. Community Visioning (CV) also referred to as "scenario planning" can guarantee success of the technology. Scenario planning will allow the scientists to understand community goals and aspirations. The technology will be easily accepted in agrarian Communal Areas, as it would meet community goals. The other advantage is that social institutions will evolve to

incorporate the new technology. This would be ideal where a vlei has to be developed using the technology and what about where the mess has already been done?

In cases where the technology has resulted in conflicts, conflict management is recommended. Conflicts are said to be fully resolved when underlying sources of tension between parties are removed, a state of affairs that may be antithetical to social life (Chevalier and Buckles, 1995). Chapter 2 has argued that conflicts are part of human societies. In view of this, conflict resolution becomes a mammoth task, hence it is realistic to talk of conflict management (tool box, 2003). This is to appreciate the functionality of conflicts at a certain level. That means any level of conflicts above that level is dysfunctional. This thesis has used the impacts of conflicts on social harmony, agricultural production and conservation as a measure of whether conflicts over Zungwi vlei are functional or dysfunctional. Results showed that beyond doubt, the impacts of conflicts over Zungwi are mostly negative than positive.

The thesis has presented attempts to resolve conflicts over Zungwi vlei. Unfortunately, these efforts did not achieve much. The result was making the conflicts hidden as active forms of conflicts were met with forceful suppression. In cases of conflicts in rural areas, the problems are brought before the traditional court system. The traditional leadership tried to resolve the conflict but were caught up in the interface of modernity and custom. Support of the scheme would have meant a radical departure from custom. At the same time supporting the customary system would have brought traditional leadership into open conflict with the district administrator's office and other development agents. No

wonder why the traditional leadership dwelt more on the issue of insubordination and disrespect rather than the question of the scheme. Local traditional leadership politics also affected the way conflicts had to be resolved. The scheme issue comes at a time when the area has an acting chief who also wants to impress senior government official.

Result of the conflict resolving exercise was forcing the displaced farmers to accept the new status quo. Attempts to voice out their demand of compensation before construction were met by force. Displaced farmers who pursued their demand were each fined cattle and instructed not to come to the vlei area again. The attempt to resolve conflicts became a new cause of conflicts that existed in Mutambi ward.

6.3 Conclusion

It should be considered that the conclusions drawn are for the particular case of Zungwi vlei and the Mazvihwa community and are difficult to generalise with accuracy. However, the results of the study bring out important contributions to theory on technocetrism and development. Technologies that might have done very well in other cultural settings might not do so well among other cultural groups as was the case with the Broad-Ridge and Broad-Furrow tillage system. The broad-ridge and broad –furrow tillage system is glorify by scientists who think of it as a novel technology, but the Mazvihwa community do not hold the same view. The technology's impact was to exacerbate conflicts, which undermined its success. Resistance against the Broad-Ridge and Broad-Furrow technology and the scheme members in Mazvihwa community is far

from over as conflicts are now moving from focusing on the vlei to other general issues in the community. Zungwi vlei, a key communal resource presented flexible rights system and resource boundary. This meant that issues of access and use rights were very important. The technology besides being external, it limited access, use and shifted management rights hence, it was not widely supported. Pro-modernisation theories should take note of the fact that for development to take place it takes more than the technology to include; land tenure, community history, implementation strategy, community participation and identification with the innovation and local power dynamics. Scenario planning should seriously be considered before expansion of this technology into communal tenure systems.

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