An assessment of environmental impacts associated with the land reform process in Matobo District: Zimbabwe

by

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DECLARATION

I, LISTER NDLOVU do hereby declare that AN ASSESSMENT OF ENVIRONMENTAL IMPACTS ASSOCIATED WITH THE LAND REFORM PROCESS IN MATOBO DISTRICT: ZIMBABWE is the product of my own investigation except where acknowledged and has never been submitted for any degree or similar award at any university.

Lister Ndlovu November 2015

Signed

Supervisor: Dr B M Petja

Signed
DEDICATION

This work is dedicated to my wife Doreen a student in the same field for her immeasurable moral and academic support throughout the writing of this dissertation.
ACKNOWLEDGEMENT

I wish to acknowledge and thank my supervisor, Dr B.M. Petja for his expertise, patience and guidance throughout the writing of this research. This dissertation was not going to be a success without his academic support towards the rightful direction. Similar gratitude goes to the resettled farmers in Matobo district for their unwavering support during the study. Special thanks also go to the University of South Africa (UNISA) technicians for providing me with the SPSS software which was used in data analysis. My profound gratitude also goes to Matopo Research Station (ICRISAT) personnel for providing me with the map of the study area. Finally I remain indebted to my wife Doreen (a student in Environmental Management) for her academic support through the provision of fruitful ideas during the research. God bless you all.
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ABSTRACT

At independence and in the post-colonial era most countries embarked on a series of land reform, land redistribution and land restitution with some adopting the land tenure system. This study sought to assess the environmental impacts associated with the land reform in resettlement wards of Matobo District in Zimbabwe. The study adopted both social impact assessment approaches and the environmental assessments. The findings revealed far-reaching repercussions resulting from activities associated with land reform in Matobo District which altered the physical landscape. The program is accompanied by inter alia excessive poaching, unsustainable agricultural practises, reduced farm production and ecosystem degradation. Therefore, urgent sustainable measures are recommended to be implemented from this study in order to avoid further environmental damage.

Key Words: Land reform, land tenure, land restitution, land redistribution, environmental impacts, resettlement
**LIST OF ABBREVIATIONS AND ACRONYMS**

ANOVA – Analysis of Variance

ASAL – Arid and semi-arid lands

CAMPFIRE – Communal Areas Management Program For Indigenous Resources

CBAHW – Community-Based Animal Health Workers

CBNRM – Community-Based National Resource Management

C.I – Conservation International

CRB – Community Resource Board

DNPWM – Department of National Parks and Wildlife Management

EIA – Environmental Impact Assessment

EMA – Environmental Management Agency

GIS – Geographic Information Systems

GR – Game Reserve

ha – hectare

ICRISAT – International Crop Research Institute for the Semi-Arid Tropics

MMET – Ministry of Mines, Environment and Tourism

NGO – Non-Governmental Organisation

NP – National Park

SPSS – Statistical Package for the Social Sciences

VHW - Village Health Workers

US$ - United States Dollar

Z$ - Zimbabwe Dollar
CHAPTER ONE: INTRODUCTION

1.1 Introduction

The land issue in Zimbabwe dates back to the colonial era which introduced social imbalances especially, the Land Apportionment Act of 1930 which contributed to the outbreak of the war of liberation (Rukuni et al., 2006). A wave of radical land reforms has been taking place throughout the world and Southern Africa and Zimbabwe are not exceptions. Improperly co-ordinated resettlement programmes have led to the introduction of many people in small pieces of land coupled with high number of domesticated animals to a limited pasture land. Since 2000 Matobo District has been undergoing extensive land reform under the auspices of the Fast Track Land Reform Programme (Moyo, 2006). This programme is meant to resettle the formerly disadvantaged African majority. It consists of parcelling out formerly white-owned land into 3 categories of settlements to correct the former colonial land distribution imbalances caused by the Land Apportionment Act of 1930. These categories of land redistribution comprise the A1, A2 and A3 models respectively. The A1 settlement is the small-sized commercial farms; the A2 settlement is the medium size commercial farms measuring between 50 hectares to 600 hectares and the A3 Model, the large scale commercial farm measuring in excess of 1000 hectares. The A3 settlement houses 10 farmers to a 300 hectare piece of land. Zikhali (2010) asserts that model A1 is meant to decongest communal areas, assist land-constrained subsistence farmers and is based on the existing communal organisation where peasants produce mainly for subsistence. Model A2 is a commercial resettlement scheme for small, medium and large-scale farming based on the concept of full-cost recovery from the beneficiary (i.e the beneficiary has to have the resources to pay for the land acquired and/or the developments on the land), and is intended to create a cadre of black commercial farmers (Zikhali, 2010). By mid-2003 4.2 million ha (33 ha/household) had been allocated to 127 192 households under the A1 scheme and 162 farms totalling 2.1 million ha (276 ha/applicant) had been allocated to 7620 applicants under the A2 scheme (Degeorges and Reilly, 2007). It is further argued that by 2007, the government estimated that it had redistributed land to over 150 000 A1 farmers and to 14 000 A2 farmers. However, Degeorges and Reilly (2007) states that a rapidly expanding black population, induced by need, tradition and government to practise rain-fed agriculture and with little or no training in modern intensive agricultural practices, has quickly depleted the soils of these marginal areas. This has led to the reduction of agricultural production coupled with food decline in
Matobo district.

The situation was further aggravated by the uncertainty of tenure, as the government still owned the land through exercising a form of title, and the resettled farmers have no property rights over their newly acquired land (Degeorges and Reilly, 2007). In Malawi, Ethiopia and Nigeria, an executive authority, usually the State President, on behalf of the people, owns the land and may only extend leasehold rights evidenced by a certificate of occupancy. A slight variant of this trend is found in those countries where large proportions of their land mass are state owned with prohibition on sale even to nationals. In Israel, which typifies the later stance, private ownership of land is available for only about 7% of the country’s land, since approximately 93% of the land is owned by the state by virtue of Basic Law (Stephen et al., (1999). Moyo (2006) asserts that in Zimbabwe all rural/communal land belongs to the President and Rural District Councils hold it in trust. It is argued that this made it very difficult for farmers to access credit from financial institutions hence by the end of 2002 Zimbabwe’s farming output was down by about 75% from the previous year (Degeorges and Reilly 2007). The land usage arrangements are that beneficiaries of model A1 will be awarded permits while those in model A2 will attain a 99-year lease period. Bruce (1993) argues that the government accepts the de facto prevalence of customary tenure whilst they simultaneously maintain the de jure state ownership. Currently the beneficiaries of the Fast Track Land Resettlement Programme are using different temporary licenses and offer letters. Zikhali (2010) argues that the duration of contract under the lease is relative despite it stating that the lease is for 99 years and the conditions for subletting are not clear. Under normal circumstances tenure is determined by set of rights enjoyed by the holder as well as the duration for which the rights are valid. It is the individual’s perception of his/her rights to be allocated piece of land on a continual basis without any imposition or interference with the rights vested on him/her to reap the benefits of any investment made on the given land. Using data based on the study from Mashonaland Central Province in Zimbabwe by Zikhali (2010) on tenure security, the results provide evidence that the programme has created some tenure insecurity among its beneficiaries, which has impacted investments in soil conservation adversely. Similarly, the beneficiaries of land did not get fully fledged tenure security in Matobo District.

This study investigated the environmental effects associated with the land reform. The main concern is that the Zimbabwe’s land reform programme may have resulted in
unsustainable natural resource management in newly resettled areas (Vudzijena, 1998). The resettled black majority rely entirely on agriculture for their livelihood. Chenje (2000) maintains that agriculture is the main habitat displacing activity in the region through its expansion, for example by resettlement or simply through extension. Zikhali (2010) asserts that rapid decline in agricultural production is partly due to low levels of land-related investments conditioned by the land reform process. Agricultural production declined alarmingly under the Fast Track Land Reform Programme because some of the land is severely degraded hence it needs a lot of investments. This augurs well with Mutema’s (2012) observation of Svosve resettlement where lack of investment in agriculture, inadequate credit facilities and lack of draft power became major hindrances. Zikhali (2010) further states that in a survey carried out in 2003 it was concluded that about one-quarter of all land in Zimbabwe is severely degraded, therefore comparatively large productivity benefits could be derived from land related investments.

1.2 Statement of the problem

In Matobo District the land reform programme has brought a lot of remarkable changes which are likely to be accompanied by a series of environmental effects. The land reform programme resettled too many families in commercial farms that, originally, belonged to single isolated farmsteads. This means that nucleated homesteads in the form of villages now exist in these farms. The dimensions of the needs of the ever increasing population remain the major threat to environmental sustainability because of the climatic and ecological fragility of these areas. This district is dominated by high population concentrations that depend entirely on crop farming and livestock keeping. Depending on rain-fed subsistence farming may lead to abject poverty and malnutrition thereby impacting negatively on the resettled farmers. Climate variability in Southern Africa, evidenced by year to year rainfall variability ranging between 30% and 35%, mean that livelihoods in dry land or semi-arid areas of the region are not only precarious but often unsustainable (Chibisa et al., 2010). Basic needs such as drinkable water, sanitation facilities, shops, schools and medical facilities were not introduced in this area to cater for such a large number of people. Sources of energy such as electricity were also not catered for; hence the need for the evaluation of the consequences connected to the land reform programme.
The resettled farmers have converted the farms that were originally used for commercial farming into subsistence farming. A case in point is Verifaighet Sott South Farm in ward 24 which was originally used for wildlife conservation but domesticated animals such as cattle, donkeys, goats and sheep have been introduced. Domesticated animals now co-exist with the wild animals such as kudus, impalas, zebras, giraffes, antelopes and wild pigs among others. Some of the farmers brought too many domesticated animals in areas with limited pastureland. Most effects associated with the land reform process were mainly engineered by the fact that in the study area commercial farmers were replaced by less experienced subsistence farmers who even lack modern day knowledge and technology of agriculture. Stephen et al., (1999) observed that sustainable development of the land in these areas must be on a commercial scale but they still recognise the communal character, as opposed to individual landholdings. Brada (1996) argue that privatisation of property can create an effective system of property rights thereby establishing a middle class and a market economy which would allow the private sector to flourish. In farms where crop growing was on a commercial scale the resettled occupants are now doing it on a smaller scale for family consumption. The method of farming has even changed from mechanisation to the use of traditional farming methods. The majority of the land reform recipients do not have technical training in agriculture other than the peasantry farming they have been practising. Such traditional farming techniques are the only option due to financial constraints. Degeorges and Reilly (2007) argues that an estimated 90% of the 300 000 Zimbabweans who were given land by the government under the current land reform program still lacked farm inputs and some 94% did not have seeds for the approaching season. In addition, some of these farmers are the so-called cell phone farmers as they do not reside in their resettled areas. This and other related aspects necessitated an evaluation of the environmental effects associated with the land reform programme in Matobo District.

1.3 Justification
Massive and politically - motivated fast-track land reform programmes are associated with a high degree of environmental degradation if not properly coordinated. Therefore, the evaluation of environmental effects associated with the fast-track land reform can help in the identification of level of such impacts and the vulnerable components of the ecosystem in the study area. The land reform process in Matobo District introduced small scale farmers into farms that were originally occupied by one commercial farmer. The affected
farms have been converted to subsistence farms using traditional farming techniques hence the process has a lot of accompanying consequences. This research sought to investigate the environmental effects inherent in the land reform process and outline the projected outcomes. The fast track land reform process did not provide equal matching basic needs for the recipients prior to their occupation. Similarly it did not consider the size of the pasture land and the presence of wild animals when introducing domesticated animals. The occupants were not taught how to deal with such a process before being resettled hence the need to evaluate the environmental effects associated with the programme. The purpose of the research was to assess the environmental impacts associated with the massive fast track resettlement programme. Recipients of the land in Matobo District lack modern day technology hence the need for assessing their impacts on the environment and the effects of the land reform process on them. The research intends to provide the much needed information which can be used in future wherever the government undertakes similar land reform processes. The information derived from this project may also assist the recipients (small holder farmers) in dealing with environmental issues under the land reform process.

1.4 Research aim
The aim of the study is to assess the environmental impacts of the land reform in Matobo District of Zimbabwe.

1.5 Research objectives
1. To determine environmental impacts caused by the land reform in a Zimbabwean context particularly in Matobo District.
2. To assess the causal effects of the associated environmental problems.
3. To recommend strategies to remedy identified environmental impacts.

1.6 Research questions
1. What are the main environmental impacts caused by the land reform in Matobo District?
2. To what extent does the associated environmental problems cause environmental impacts in Matobo District?
3. Which strategies may mitigate the environmental impacts in the study area?
1.7 Research hypotheses

1. Improperly coordinated land reform programmes have adverse effects on the environment in Matobo District.

2. Massive-fast track resettlement programmes leads to environmental degradation.
CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

This chapter provides a discussion of the literature related to the study. It gives an overview on how land reform and other post-colonial land acquisition processes were conducted in other areas and countries. The discussion is divided into sub-topics such as land reform, land restitution, land redistribution, land tenure, biodiversity and the impact of agriculture on the ecosystem. A detailed account of each component is discussed in relation to similar studies done on land reform.

2.2 Approaches for Post-Colonial Land Redress

2.2.1 Land reform

Land reform is a government policy process aiming to redress the land imbalance across the racial divide (Borras, 2006). The land imbalances were created by the colonial rule. The land ownership and utilisation provided a significant difference between the dominant and the dominated based on racial lines during the colonial era. Zikhali (2010) argues that Zimbabwe inherited a racially skewed agricultural land-ownership pattern at independence in 1980. White commercial farmers comprising less than 1% occupied 45% of all agricultural land and 75% of this was found in the most agriculturally viable areas. Land reform usually refers to the redistribution of land from the rich to the poor and more broadly, includes regulation of ownership, operation, leasing, sales and inheritance of the land (Besley and Burgess, 2000). Land reform involves the changing of laws of ownership, regulations or customs pertaining to land use. Such changes regarding custodianship and utilisation of land are usually associated with a series of environmental impacts hence the need to evaluate such effects. In most cases it is often government-initiated, receiving a lot of government support during the transference from the wealthy minority to the landless majority. Land reform refers to the transfer of ownership from the more powerful to the less powerful such as from a relatively small number of wealthy (or noble) owners with extensive land holdings (e.g. plantations, large ranches, or agribusiness plots) to individual ownership by those who work on the land (Borras, 2006). The process may even transfer land from individual ownership in small-holdings to state-owned collective farms or from government owned farms to small holdings. The common characteristic of all land reforms, however, is the change in existing institutional arrangements governing possession and use of land and this process is often associated with a myriad of
environmental consequences. Besley and Burgess (2000) using all-data exploit interstate variations found out that the number of identifiable land reform laws across states is positively related to the extent of poverty reduction but not agricultural productivity.

Land reform has been occurring in the world since the Industrial Revolution. However, the land reform dynamics in Zimbabwe since 1980 have to be understood within the framework of colonial land policies and legislation between 1889 and 1980 (Vudzijena, 1995). Land reform has been especially popular as part of decolonisation struggles in Africa and the Arab world, where it was part of the program for African socialism and Arab nationalism. Cuba has seen one of the most complete agrarian reforms in Latin America whereby land was being transferred from the dominant to the dominated masses of the society. In India land reform led to limited access to economic resources and translated into limited political power giving rise to vicious and self-perpetuating circle of high inequality, bad institutions and low economic growth (Acemoglu et al., 2004). Also, a tendency towards segregation may affect communities’ ability to supply local public goods and, to the extent that these are essential inputs into the private production, trap the poor in an undesirable equilibrium (Durlauf, 1996). This can be pronounced in cases where what is produced are public “bads” such as violence, social unrest and strife, which are associated with significant economic as well as social costs (Cardernas, 2003). However, the task which the original reforms set out to accomplish remains in many respects unfinished (Lipton, 1993).

In Tajikistan the land reform began in 1998 and was associated with notable economic effects. The process was responsible for agricultural growth by expanding the stock of land at the disposal of household plots and ‘dehkan’ farms (Lerman and Sedik, 2008). The other notable economic effect associated with land reform in Tajikistan involved important structural changes in agriculture, in cropping patterns and in the sectorial structure of agriculture. It further resulted in the near total transfer of livestock inventories into household plots and such changes in land ownership were coupled with a lot of environmental effects. The other consequence of the land reform process was the lower productivity observed in the agricultural enterprises and ‘dehkan’ farms. A similar associated impact is that agricultural enterprises and collective ‘dehkan’ farms face a debt crisis caused by a lack of profits and continued bank lending regardless of credit worthiness (Lerman and Sedik, 2008). The land reform in Tajikistan failed because the
government could not attend to its long term needs of agriculture, rural development and natural resource management. Well-known land reforms in Japan, Korea and Taiwan at the end of World War II redistributed between 30% and 40% of the cultivated area, affecting about two thirds of rural households (Klaus et al., 2008). Although they were drawn out over longer time periods, reforms in Bolivia, Nicaragua, Peru and Mexico, affected sizeable portions of their countries’ arable land endowment and benefited only a third of the rural population (Klaus et al., 2008). In Latin America reforms distributed comparatively large amounts of land (Jarvis 1989) but often failed to improve productivity and were insufficient to help overcome deep-rooted structural inequalities (de Janvry and Sadoulet, 1989).

However, in Zimbabwe the announcement of nationalisation of farms sent the economy into a tailspin from which it has not yet recovered (Degeorges and Reilly, 2007). Land reform in Zimbabwe led to a decline in farm production which also caused widespread food scarcity and insecurity thereby leading to inflation. Widespread food insecurity, massive unemployment due to farm retrenchments and economic decline fuelled the country’s instability and inflation reached a record high of 135% in the summer of 2002. Three quarters of Zimbabweans were living in abject poverty and up to half of the population was reported to be in need of emergency food aid in 2002/03 (Degeorges and Reilly, 2007). Similarly (USAID, 2007) states that in the dry season of December 2006 and January 2007, maize, sorghum and millet stocks for many rural household had run out, while the availability of maize meal in the market became erratic or beyond the purchasing power of the average family due to inflation (in May 2007, 2200% - highest in the world). It is further stated that continuing into 2007, it became the sixth year in a row of failed crops in Zimbabwe in which three million people, 25% of Zimbabwe’s population depended on UN food aid (Degeorges and Reilly, 2007). Tobacco production nosedived alarmingly and paradoxically the previous years had seen Zimbabwe as one of the leading producers of the golden leaf but by 2006 it was one of the lowest producers of this cash crop due to land reform. This negativity in the production of the golden leaf grossly discredited Zimbabwe’s agricultural sector in the world market because it had previously dominated and competed strongly against similar producers. Degeorges and Reilly (2007) asserts that Zimbabwe produced only 50 million kilograms of tobacco in 2006, whereas six years ago it produced nearly five times that amount, earning 40% of the total foreign exchange, at that time the second largest tobacco producer after Brazil. Indeed the land
reform in Zimbabwe was associated with reduced farm production as evidenced by a remarkable reduction in international tobacco sales.

Similarly the production of coffee and tea outputs also declined. By 2010, tea output levels were well above the 1990s averages, but this level was lower the peak reached prior to 2007. Under such circumstances resettled farmers were compelled to diversify their farming activities. USAID (2010) states that remaining tea estates were now diversifying production towards macadamia nuts, pineapples and passion fruits, due to labour shortages and lower prices, while out-growers in tea and sugar growing areas were also producing some foods due to input shortages.

This reduced the former Southern Africa food basket into a destitute country. Degeorges and Reilly (2007) observe that because of the land reform, food production collapsed and the once vibrant economy was destroyed. Social ills such as hunger, destitution and poverty became part of the Zimbabwean society due to the ill-planned and improperly coordinated land reform. When the high inflation conditions reigned, estate labour wages deteriorated further as plantation commodity prices fell. As a result, labour shortages increased and labour emigration ensued (Chambati and Moyo, 2009). It is further argued that hyperinflation made agricultural credits less competitive than trading (Matshe, 2004).

Land reform programme in Matobo District also led to the cross-border migrations into neighbouring Botswana and South Africa. This introduced more strain into the regional economies of receiving countries. These immigrants introduced more social ills especially in South Africa and this was counteracted through xenophobic attacks. Degeorges and Reilly (2007) assert that even Zimbabwean professionals such as teachers were employed for as little as US$90 per month below the stipulated minimum of US$300 per month. This eroded and lowered the professional status that was exhibited by such individuals. It is further argued that many professionals who did not find jobs begged or worked as unskilled labourers such as waiters or security guards. This put a lot of pressure on South Africa’s 27% (official) to 40% (outside analysts) unemployment, adding to the xenophobia that accuses migrants of increasing crimes, stealing local jobs, houses, women and children’s places in schools and placing further strain on South Africa’s overburdened physical and social infrastructure (Degeorges and Reilly, 2007).
Improperly coordinated land reform in Zimbabwe became an eye-opener for the South African land reform. In a study carried out in South Africa by Degeorges and Reilly (2007) evidence was provided that education became the core in the land reform, unlike in Zimbabwe. Realising that the key to moving black South Africans into commercial agriculture is education, the goals have to be set by government to achieve that, including the mentoring programs. These imply the establishment of a relationship between the commercial farmers as mentors to small-scale black would-be farmers (Degeorges and Reilly, 2007).

Degeorges and Reilly (2007) observe that what happened in Zimbabwe should be a wake-up call to Southern Africans, especially South Africa. Furthermore they argue that if the land reform in Namibia and South Africa take similar paths, not only could it mean an ecological catastrophe, but destruction of the agro-industrial complex critical to fuelling the subcontinent’s economic engine, South Africa. Taking the wrong path could have seen commercially viable land being taken by incapable people, as was the case in Zimbabwe, and this could have led to the collapse of the once viable agro-industrial complex. This could have turned South Africa into another dependent state depending on hand-outs from the western world (Degeorges and Reilly, 2007).

The South African land reform did not take a radical stance because the process of land acquisition which involved negotiations between the government and owners for smooth transition. The land reform process involves compensation in the form of another land (land swap) or cash payment (Logan et al., 2012). Furthermore, some countries received financial assistance from the international financial bodies to fund their land reform processes (Moyo, 2000). International organisations, such as the World Bank and the International Monetary Fund, have played a significant role in shaping the land reform processes in many countries. The World Bank has been at the centre of activities aimed at promoting market land reforms in Brazil, Colombia and the Philippines according to (Moyo, 1995). However, in an effort to further promote enforceable land rights, the World Bank has supported agricultural infrastructural development and projects in Nicaragua and Thailand. In Brazil and Colombia land reforms received massive financial back-ups from external forces even in cases where such acquisitions were reactions to land occupations that had already taken place (Moyo, 2000). The land reform processes in Brazil and
Colombia were accompanied by some financial assistance from abroad. This created a smooth transition of land from the former owners to the beneficiaries.

Rashid (1985) argues that Pakistan’s land reform took a radical stance as the original owners were not given any compensation. Similarly, such discrepancies also accompanied the Zimbabwe land reform process.

2.2.2 Land restitution

Land restitution is a component of land reform program aiming at redressing the land imbalances created by the colonial masters who owned large portions of productive land compared to the majority whom they dispossessed of their land and forced them to live in barren unproductive areas. Philander and Rogerson (2001) argues that in South Africa the programme is both an anti-poverty initiative that is targeted at the poor as well as an attempt at racial restructuring of land ownership. Land restitution entails giving back the masses the land that was taken from them by their colonial masters. Such motives are usually associated with some environmental effects and this warrants the need to evaluate such impacts (McMullum, 2000).

The restitution program aims at facilitating the much-needed transition of productive relations thereby empowering the formerly underprivileged communities. Such transfers of ownership may be with or without compensation, and compensation may vary from token amounts to the full value of the land (Martins and Howell, 2001). Rashid (1985) argues that in the land restitution of 1970s in Pakistan the owners of the confiscated land received no compensation and beneficiaries were not charged for the land distributed. The implications associated with compensation are that the government needs to have special funds to compensate those who are losing their land.

Land restitution in Brazil was associated with the massive resettlement of those who were originally deprived of their land hence the social, economic and environmental impacts accompany the whole process. Resettled families do not only involve isolated families but also extended family groups as 60 per cent of settlers have a relative who lives on another plot on the same settlement. Children also make part of the families on more than 80 per cent of the plots (Hederia et al., 2004). The resettlement of such large population of farms is likely to be associated with a lot of environmental impacts. Land restitution responds to a clear cut case of unjust dispossession and intends to restore, as well as compensate
victims weaned of their birth right by their colonial masters. In Zimbabwe the land reform paradigm hinges on the colonial land policies specifically the 1930 Land Apportionment Act which was designed to deprive the locals of their own birth-right in favour of the white settler farmers. The major cornerstone in the expropriation process was the Land Apportionment Act of 1930 which partitioned all land into European and African Reserves (Rukuni et al., 2006). In Zimbabwe the land reform program emanated in 1980 though land was the major cause of the war of liberation. In the early stages of the resettlement program, 1980-1985, preference was given to returning refugees, thousands of war displaced people and the poorest that had little or no land to support their families within the communal areas (Chibisa et al., 2010). During the first ten years of independence, resettlement land could only be acquired on a willing buyer-willing seller basis with the government paying the full market price for the land and competing for it with other buyers on the open market, even though government had the right of first refusal (Mutepefa et al., 1998) and (Rukuni et al., 2006). This emanated from the government’s national policy of reconciliation and was also heavily influenced by the restrictive Lancaster House Constitution. Moyo (2000) asserts that after the rejection of the Draft Constitution in February 2000, the government amended section 16A of the Zimbabwe Constitution so that it recognises the colonial dispossession of land from Zimbabweans. This enabled the government to gain ownership of land through compulsory acquisition of agricultural land for resettlement, thereby ushering in the fourth phase which came to be commonly known as the ‘fast track land reform program’ (Chibisa et al., 2010). Some people moved onto the farms allegedly as new settlers but with the intention of looting resources from the farms (Rukuni et al., 2006).

Philander and Rogerson (2001) indicated that in South Africa, restitution claims are restricted to compensation (in land or money) for acts of dispossession since the passing of the Native Land Act in 1913. During the early phases of the restitution a lot of the land in conservation and protected areas was given back to its original owners. Under such circumstances a lot of environmental effects were incurred such as commercial farms being turned into subsistence farms. Conservancies being utilised for small scale land tillage. Mutepefa et al., (1998) notes that restitution in South Africa has led to cases where land claims were made on conservation areas such as Makuleke, Dwese, Blyde River Canyon and other protected areas. Such land claims led to a series of habitat fragmentation seeing that it even targeted conservation areas with a variety of delicate and fragile
biodiversity. However, in a study carried out in Schmidtsdrift on land restitution in Northern Cape Province of South Africa, evidence was provided that planning was incorporated and done before the actual occupation of the land. The envisaged problems were assessed and rectified prior to the resettlement to mitigate the environmental effects associated with the land reform process. Key issues that would influence resettlement and local economic development processes were dealt with prior, through a series of planning frameworks which looked upon *inter alia* infrastructure, agriculture, nature conservation and tourism, economic and small medium and micro-enterprises, health and welfare, project funding, education and training, the role of women, the law, local government and policing, mining, sports, recreation, arts and culture (Philander and Rogerson, 2001). In this case their research methodology involved facilitating and participating in several community workshops in Northern Cape which were based on planning the return of people to Schmidtsdrift, and their future economic activities and livelihood. In the final outcome of the community planning process the consultants prepared a master plan detailing the physical and infrastructural development of Schmidtsdrift and the document was circulated in draft form to all the departments of Northern Cape for public input (Philander and Rogerson, 2001). The stakeholder-cum-beneficiary empowerment through excessive planning prior to the actual restitution targeting the human resource base of the community lessened the magnitude of environmental effects. However, Schmidtsdrift is one of the fortunate and isolated rural areas of South Africa that received a detailed experience of pre-settlement planning (Philander and Rogerson, 2001).

Another research on land restitution made in Doornkop near Ventersdorp in South Africa presents a scenario where people who were dispossessed off their land wanted to go back to their *maruping* (the place where one’s umbilicus is buried). However, James (2000) notes that planning and development became prerequisite for resettlement. Owing to this, the Land-Reclamation Committees were established which were later replaced by the Management Committee established to deal with the resettlement related issues. James (2000) argue that not all those who were entitled to return to the farm have done so, being reluctant to go back until the government provided basic services. Evidence is provided that even long after the land restitution the Non-Governmental Organisations (NGOs) continued with some meetings arranging the provision of basic infrastructure such as water, sanitation and schools among others. However, James (2000) further states that other people wanted to subsist as the small-scale cultivators they had been before they
were moved. Land ownership had not provided the basis for successful farming in this case.

2.2.3 Land redistribution

Land distribution is the parcelling out of land to the poor and disadvantaged with government assistance. It is a way of empowering the disadvantaged masses as the program aims at alleviating poverty and uplifting the rural and urban poor. It enhances sustainability through production which aims at maintaining and enhancing production and services (Dumanski and Smyth, 1995). In Tajikistan the distribution of land to household plots and the restructuring of agricultural enterprises have resulted in loss of control by the government over the mix of crop produced. In addition, this has resulted in the near total transfer of livestock inventories to household plots (Lerman and Sedik, 2008). Pakistan is one of the countries that introduced land reforms long ago while most African countries were still engulfed by colonialism. Rashid (1985) reported that in 1972, the Bhutto government announced further land reforms which were effected in 1973. Rashid (1985) further points out that in Pakistan, under Haq-e-shifa, the agricultural land comprising large acres was allocated to the landless agriculture workers and peasant families. This meant that all the agriculture land occupied by or allocated to military forms and government departments was revoked and distributed among the landless peasants under the principle of Haq-e-shifa.

Zambia also introduced a radical land reform programme. In an effort to correct the historical injustices in land distribution, the United National Independence Party (UNIP) passed legislation that aimed at nationalising land held by the absentee landlords – a fast-track process that became locally known as ‘Zambianisation’ (GRZ, 2005, GRZ, 2006). Similarly, the land issue in Namibia was the major cause of the war of liberation hence the aim of the reform program was to redress inequitable land imbalances and discrimination against women with special reference to women with regards to land tenure (Chibisa et al., 2010). In Mozambique the land reform program took a radical stance wherein all land was being nationalised under the Land Bill of 1979. There was a dire need to revisit the land issue after the Renamo War due to failure to achieve the intended objectives. External investors had no confidence in the legal framework of land issues (Mutepfa et al., 1998). This compelled the government of Mozambique to craft another Land Bill which was introduced in 1997 and had its own associated impacts.
The South African land reform took a controversial stance because land laws were influenced by the apartheid policies based on segregation and discrimination amongst races. The blacks were dispossessed of their land and remained landless (Mutepfa et al., 1998). The current land reform program consists of three sub-programmes involving land redistribution, land restitution and tenure reform (Fakir and Mayet, 1998). Land redistribution ensures access to land by the poor and disadvantaged through government assistance.

2.2.4 Land Tenure

Land tenure entails the holistic ownership of land often supported by legal documents such as land titles as well as informal or customary land systems (Rashid, 1985). Another case of land tenure happened in Zambia although is not an isolated incident. The Zambian land reform programme was successful in abolishing freehold title to land and replaced it with leasehold tenure for 99 years (GRZ, 2005, GRZ, 2006). The masses persuaded the parliament to pass a legislation for the protection of the peasants’ rights thereby allowing them to have their trade unions, ensuring social justice and providing the old age benefits to them (Rashid, 1985). In Ivory Coast the land reform aims at recognising and formalising customary land rights through creating title deeds. McCallian (2010) asserts that implementation of the law is likely to raise the entire social, economic, institutional and political challenges inherent in ordinary titling programs related to the conflict and resulting displacement. The formulation of the title deeds meant that Ivorian migrants from other provinces were also legible to land title deeds a move strongly opposed by the original residents. This had a potential of creating discrimination (McCallian, 2010).

Land titling is a component of land tenure and bestows the right of ownership to occupant for a certain agreeable time period. A title is a legal instrument that is worth no more or less than the quality of guarantee that the instrument’s guarantor offers (Smith, 2003). Evidence from different Sub-Saharan African (SSA) countries indicate varying responses based on the production stimulated by the presence of the tenure security system while in other cases the tenure system does not necessarily stimulate production. According to Smith (2003) the tenure security influences greater productivity as land tenure becomes more secure and individualised. Furthermore Smith (2003) states that based on this argument the farmer will be having greater incentive to make long term investments that boost land productivity, reduce necessary labour input and/or conserve the land. It is
further argued that the farmer will be able to obtain credit by offering the land as a collateral as well as land markets transferring the land from the less efficient to the more efficient users through willing transactions. In a study carried out by Smith (2003) in the Kenyan regions to prove the role of tenure security on yields it was observed that lack of any significant relationship between the title and yields may be explained by the limited use of credit. It was further concluded that where agriculture is generally depressed, titling will not have effect and weak or constrained titles will not stimulate investments.

Furthermore, Smith (2003) states that if a farmer wishes to intensify production on a fixed area of land, perhaps through purchasing hybrid seed and fertiliser, then s/he may seek credit to do so, and may have more success obtaining credit if s/he can offer the land as collateral. In this instance the importance of tenure security on land ownership may stimulate production because land can be used in out-sourcing the much needed inputs. The titled sector in Kenya constitute an endpoint in the range of Sub-Saharan Africa tenure security and turns out to lack some attributes that are key in stimulating the credit response and productivity effects (Smith, 2003). Smallholders may fail to apply for loans because they perceive a high risk of losing their land through foreclosure as the experience of Kenya (Platteau, 1996). According to Smith (2003) under unstable economic and political conditions, farmers are reluctant to tie up land, labour and capital in long term projects, such as soil conservation, water control, or fixed capital formation, which may sustain soil fertility instead they are likely to spend most of their time in off-farm employment. Subsistence farming which depends entirely on erratic natural rainfall is an economic risky enterprise for the money lenders. This is related to the fluctuations of market prices of products as well as inflation which eliminate the confidence of financial lenders. Most African rain-fed smallholder agriculture is too risky and markets and prices are too unreliable to allow reliable loan investment and repayment (Smith, 2003).

In a study carried out in Thailand by Feder et al., (1988) evidence is provided that over 50% of the respondent households who were found to be using formal credit, exhibited greater variability: specificity of rights and assurance of transfer rights was generally sufficient to inspire confidence in lenders as titles were preferred by official lenders as collateral. The case of Thailand provides evidence on how land tenure security influences positive production since the land can be used in securing loan. In a similar study on farming decisions being influenced by the land tenure in Rwanda by Blarel (1994) it was
observed that the rate of land improvements escalated significantly between two categories in the range of tenure security, twice as many were observed on land held by the family as on land held under long-term use rights. Platteau (1996) also concurs with the assertion that basic use rights without transfer rights, but with bequeathment rights, seem to be sufficient to stimulate investment. Godwin (2003) saw tenure as a similar issue, believing many of the title deeds to have been retained by commercial farmers and this has resulted in many farmers reverting to subsistence farming.

In a study carried out in South Africa assessing the Land Restitution Programme details were provided that land tenure reform aimed at restructuring the administrative and political frameworks of land adjudication (Logan et al., 2012). The same authors argue that an important objective of this programme is to provide tenure security through registration and titling, both for those obtaining land under redistribution and land restitution and for those operating under communal land tenure patterns. This provided tenure security in the form of land ownership. Therefore, titling is a very crucial component of the land reform process because it empowers the beneficiaries of the land to use it as collateral. This enables the farmers to access financial assistance for the purchasing of various inputs through bank loans (Logan et al., 2012).

2.3 Biodiversity: Its Environmental Role and How it is impacted by Land reform

Biodiversity comprises a mixture of flora and fauna that support the socio-economic activities on different forms of ecological systems. Biological diversity has been defined as the variety of living organisms in terrestrial, marine and aquatic ecosystems, and their supporting ecological complexes (UNEP, 1995). However, genetic diversity refers to variations within and between populations of organisms, where species diversity relates to the total number of organisms in a given area (McCullum, 2000). The presence of woodlands and the entire vegetation means that there is ecological stability and vegetation enhances the hydrological cycle as well as reducing the levels of carbon dioxide in the atmosphere. Forests or woodlands regulate the hydrological cycle and also protect watersheds by stabilising the land surface, thereby reducing soil erosion, runoff and compaction (Masundire and Matowanyika, 1993, Timberlake and Shaw, 1994, Mushove et al., 1996 and McCullum, 2000). Another fundamental function forests perform is nutrient cycling. Besides nutrient cycling, forests and woodlands also provide habitats for a variety of herbivores, carnivores and omnivores. In Zimbabwe, savanna grassland is the major
type of terrestrial ecosystem which supports diverse communities of herbivores, carnivores, birds, insects and arachnids. The grassland ecosystem is a result of climate characterised by low rainfall which falls in one short summer season (Waterhouse, 1994).

Human beings depend on the entire biodiversity for a living and this means greater demand for natural resources such as soil, flora and fauna. The demand for land means more invasions into the fragile wildlife ecosystems. Resettled peasants close to the wildlife conservancies use resources therein in a destructive manner as some are depending entirely on these for their livelihood. This behaviour may lead to the extinction of some animals and vegetation thereby altering the natural biodiversity. It may even lead to the introduction of secondary vegetation and bush encroachment. Thus, there is a strong concern that Zimbabwe’s land reform program may result in unsustainable natural resource management in newly resettled areas (Katerere et al., 1992, Matowanyika and Mandondo, 1994, Rukuni et al., 1994, Moyo, 1995, Vudzijena, 1998 and Rukuni et al., 2006). It must be noted that poaching remains a major threat to biodiversity in Southern Africa. Vegetation is being extracted for different medicinal, cultural and socio-political reasons. Similarly animals also suffer the same fate due to demand for their horns, bones and hides. A typical example is that of a rhinoceros which is nearing extinction and is being endangered in the wild due to excessive poaching. Degeorges and Reilly (2007) argue that because of the radical land reform, food production has collapsed and a once vibrant economy has been destroyed and linked to this, the government appears to have permitted poaching in national parks. This led to Operation Nyama whereby a lot of elephants and other game were being shot in national parks and their borders as well as in conservancies to feed the starving villagers. Furthermore, the current climate created in Zimbabwe has negated the country’s contribution to the global conservation effort with the immediate extinction of wildlife, a likelihood (Degeorges and Reilly, 2007). In addition to habitat destruction from farm invasions, a conservative estimate of 50% loss in wildlife numbers, 65% loss in tourism and a loss of up 90% to safari hunting in commercial farms, from poaching and habitat destruction existed (Herbst, 2002). Heath (2006) estimated that there were over 1000 game ranches prior to the radical land reform, in 2006 these were reduced to about four functional conservancies of 120 properties plus an additional 60 game ranches scattered around the country. This indicates the magnitude of negative impacts of the land reform to the country’s revenue base which was supplied by game ranches.
Species in these conservancies might have been destroyed or migrated to other ecosystems. The land reform brought a lot of associated impacts in these wild life conservancies.

Biodiversity also provides food for the rural people since some of the herbaceous and faunal species can be used for human consumption. This accelerates the increased rate of poaching and collection of wild fruits, such as baobab fruit, vegetable oils and edible tubers as well as insects like caterpillars for sale at the local market. Mutepfa et al., (1998) indicated that 31 per cent of Zimbabwe’s total energy consumption to be fuel wood, where 80 per cent of the energy are not attached to certain local taboos and are used at a faster rate than the sacred ones. In a study carried out in Kenya by Otuoma et al., (2009) on the effects of human-livestock-wildlife interactions on habitat in an eastern rangelands, it was revealed that crop cultivation encroachment in the rangeland led to the reduction in the pastoral grazing land and loss of wildlife dispersal areas. The study further provided evidence that crop production in wildlife bases led to a decline in the wildlife-livestock resource base and an increase in human–wildlife-livestock interactions and associated conflict (Wambwa, 2002). Otuoma et al., (2009) noted that the continued encroachment of land use practices more suited for the humid highlands is likely to cause intense resource competition among wildlife, livestock and agriculturalists and may led to habitat degradation, loss of biodiversity, a decline in the per capita pastoral livestock holding and increase in poverty levels among rangeland communities and this has led to biodiversity degradation. Basing on this, the human-livestock interactions have led to the habitat transformations caused by the land reform. Furthermore, the Kenyan study provided the negative evidence of human-wildlife conflicts. There was a significant decline of wildlife population in conservation areas between 1980 and 2000. Kenya Wildlife Services (2002) indicated a decline in the combined population of elephant, buffalo and giraffe from 7 400 in 1977 to 3 600 (Otuoma et al., 2009). It is further argued that the number of human deaths directly caused by wild animals increased by over 70% and these occurred in Murera and Kinna on the western buffer zone, where agricultural encroachment had taken up wildlife dispersal areas, while human injuries due to wildlife attacks increased to over 120%. There were also numerous incidences of destruction of property by wildlife, majority which went unreported (Utuoma et al., 2009).

Finally, improperly coordinated land reform process has led to biodiversity destruction and habit fragmentation in the resettlement areas.
2.4 Impacts of agriculture on the ecosystem

Human impact on the ecosystem through agricultural activities such as crop cultivation, introduction of drainage facilities, tillage, crop rotation, intercropping, grazing, excessive use of herbicides, insecticides, pesticides and fertilisers have far-reaching effects on the ecosystem. Such agricultural activities alter species capabilities to adapt to such agricultural landscape thereby disturbing the grazing, planting and harvesting regimes. Some land management techniques such as drainage, create such fundamental changes that are significant shifts in species composition (McLaughlin and Mineau, 1995).

Mhlanga (1995) argued that agriculture is the most common land use in Sub-Saharan Africa that alter slopes and this either increase or decrease surface run-off. The vegetation clearance of extensive woodlands for agricultural purposes removes the natural retardance resulting in reduced surface roughness, high roughness, high overland flow and loss of vegetation (Schenck, 2001). Vegetation clearing for agricultural land increases run-off and decreases infiltration rates and this lowers the water table (Heyns, 1994). Subsistence agriculture usually leads to uncontrolled cultivation and this affects the soil structure which automatically alters the infiltration capacity of the top soil. Under such scenarios soils are compacted leading to reduced infiltration and high run-off volumes (Mhlanga, 1995). This results from woodland reduction and loss of vegetation cover. Related consequences include increased salinities and changed hydrological patterns. UNEP (2008) reported that for wildlife and ecosystems, the cumulative impacts of numerous pressures determine the actual effects on the abundance of species including infrastructure development, agricultural practices, nitrogen pollution and climate change.
CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Introduction
This chapter describes the study area, research design and methods of data collection used. It further presents analytical method used in the study area.

3.2 Study area
The study was carried out in Matobo District located in the Matabeleland South Province of Zimbabwe. Matobo District has 25 wards and most of its northern part is occupied by Matobo National Park. Of the 25 wards only 5 of them were allocated for resettlement. The study was carried out in Matobo District at latitude 21° 00′ 00″ S and longitude 28° 30′ 00″ E. The district is about 724 459 square kilometres. It is mainly serviced by Bulawayo-Kezi-road which connects Bulawayo to Maphisa Growth Point. From Bulawayo towards Plumtree it is bounded by Bulawayo-Plumtree road to the north-west. The District Council Offices are located at Maphisa Growth Point. It can also be accessed from Joshua Mqabuko Nkomo International Airport at Bulawayo. Furthermore it can be accessed from Gwanda the provincial capital through different in-roads.

Table 3.1: Matobo District population: Source - ZNSA

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<tr>
<td>Statistics</td>
<td>53 534</td>
<td>89 139</td>
<td>99 836</td>
<td>93 991</td>
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The wards in the district are under the custodianship of Agricultural Extension Officers and the whole district falls under councillors and traditional chiefs. The five wards where land reform took place are ward 21, 22, 23, 24 and 25. Data was gathered from a total of 173 questionnaires in the mentioned wards. Based on its climatic pattern, altitude and soil type, Zimbabwe is classified into five agro-ecological regions with agriculture potential and productivity declining from Region 1 to Region 5. The Matobo District lies in Matabeleland South Province which is found in the Farming Regions 4 and 5, which are highly characterised by variable rainfall and poor soils which often form barren unproductive lands. These farming regions often favour cattle ranching and with highly controlled paddocks. Uncontrolled excessive crop farming leads to low yields due to the erratic nature of rainfall. A significant proportion of the land surface in Southern Africa comprises dry land areas which can be classified into semi-arid and arid areas. Semi-arid areas constitute about 15% while arid areas make approximately 28% of the area (McCullum, 2000).
Figure 3.1 Locality Map of Matobo District in Zimbabwe Source: ICRISAT and Google Earth.
3.3 Topography, climate and soils
Matobo District consists of many plains, valleys, hills and rivers. It is also characterised by the presence of the volcanic Matopo Hills with the famous sacred Njelele Mountain. Major rivers include Tshatshani, Hovi, Mbabule, Malunde, Soluswe, Tuli, Simphathi and Simukwe. The mean average rainfall is 650mm per annum and mean temperatures ranges from 21 degrees Celsius in June to 30 degrees Celcius in October. The rainfall season is between October and March. The average altitude is about 1035m above sea level. Climate variability in this region is increasingly influenced by El Nino/Southern Oscillation (ENSO) climatic events associated with periodic warming of the tropical Pacific Ocean and related shifts in atmospheric circulation systems (Cane et al., 1994 and Hulme, 1996). Rainfall in this region in the early 1990s was lower than that of the 1970s, with significant droughts in the 1980s, early 1990s and in 2002 (Chenje and Johnson, 1996; Hirji et al., 2002). However, rain-fed agriculture in Regions 4 and 5 leads to low crop yields hence such areas are good for livestock production. The Zimbabwe’s land reform also coincided with intense changes in weather patterns thereby fuelling the starvation process amongst the newly resettled farmers. Van Rooyen (2000) asserts that in Southern Africa, large populations, who concentrated mainly in the rural areas, face on-going food insecurity and poverty due to adverse weather conditions such as droughts, which impact negatively on farm-level food production.

3.4 Sampling procedures
3.4.1 Random Sampling
Random sampling was employed when the researcher visited the homesteads of the resettled people to be interviewed. The interviews were semi-structured so as to give the researcher an opportunity to probe further. Out of the 5 wards under study, each ward has an average of 350 homesteads with approximately 4 people living in each homestead. 173 people were interviewed and used for questionnaire (Appendix A) in each ward. This makes about 10% of 1750 households. Three homesteads for every 173 homesteads were chosen randomly for the questionnaire. The sampling procedure targeted the head of the household, the oldest person in the household who is most literate, the wife of the head of the household or the person who has been in the homestead since the time of occupation. The process was the same in all the five wards. In the process 56.6% of the respondents were males and females constituted 43.4%.
3.5 Research design and Data collection methods

3.5.1 Quantitative and qualitative methodologies

This section presents the research design of the study. Both qualitative and quantitative methodologies were used in this study. According to (Bowen, 1996), a combination of both methods strengthens the internal validity of the study. However, quantitative method superseded the qualitative method due to the nature of the research and its associated advantages. However, the research also relied on the quantitative-qualitative continuum which borrows heavily from both techniques. Research participants may also become active in events and activities that are themselves informative.

Different research techniques such as observation, questionnaires, in-depth interviews and focus group discussion were used to collect the data required for this study.

3.5.2 Observation

This technique was utilised in the study of the activities of resettled farmers that might harm the ecosystem. The researcher went to the fields and observed the environmental parameters affected by the land reform in the study area. During the process of observation the researcher recorded the nature and stated all environmental parameters under study and these included vegetation, wild animals, birds, soils, state of rivers, dams, presence of schools, presence of shops, presence of toilets, water sources and services such as the presence of clinics.

3.5.3 Questionnaire

A questionnaire is a set of well-designed questions organised to solicit for certain responses from a group of respondents. It is a tool for collecting and recording information about the aspects under study. Questionnaires were used in this research because large amounts of information were collected from a large number of people in a short period of time and in a relatively cost effective way (Popper, 2004).

For the purposes of this study the researcher largely employed open-ended questions in combination with some few close-ended questions. Structured questionnaire (Appendix A) were used because they are suitable when dealing with quantitative research (Oppenheim, 1992). The questionnaire used consisted of 90 questions. The questionnaire took about 25-30 minutes on each interviewee during the study. These were administered through face-
to-face with the respondents and this enhanced high response rates. Appendix B comprises questionnaire for the focus group discussion.

3.5.4 In-depth interviews
These targeted the key respondents in the five wards which included Agricultural Extension Officers, the Councillor, the Village Head and the Chief. Each ward had one respondent consulted thereby totalling 5 in-depth interviews. These focused on the leadership and renowned people in each ward. The in-depth interviews were used to compliment the questionnaires, so as to unearth more details about the activities of farmers and their effects on the environment among others. This presented the opportunity to understand the activities of resettled farmers on the ecosystem and the challenges they are facing. The in-depth interview sought to find out how resettled farmers impact on the ecosystem.

3.5.5 Focus group discussion
Each ward had one focus group thereby totalling 5 focus group discussions. Each focus group discussion had a session that took an average of one hour. The researcher, in his capacity as a participant observer, was guiding the whole discussion process but not interfering with the process. Participants were given the opportunity to describe their experiences and present their perspectives on the land reform program.

3.5.6 Environmental survey
Checklists (Appendix D) are considered one of the simplest approaches in impact identification. The environmental impact assessment checklists are based on a list of special biophysical, social and economic factors that may be affected by the land reform process. A detailed environmental survey focused on the extent of environmental degradation caused by the impacts of the settled farmers in wards under study. Environmental parameters which fall under study include vegetation which may be affected through excessive deforestation since firewood is the main source of fuel in these wards. The materials used to build their shelter were also recorded. The uncontrolled burning of the veld also destroys vegetation, soil structure, animal habitats, bird nests, young ones of animals and birds as well as their eggs to mention but a few. A checklist and observation compliments each other during environmental survey.
3.6 Data analysis
The SPSS data analysis software was used in analysing captured data. Bar graphs, tables, pie charts and line graphs were used in presenting the results.

3.7 Ethical considerations
The researcher followed all research ethics, norms and values throughout the process of this research as outlined in the Ethics Application (Ref. Nr.: 2014/CAES/031). The research was carried out taking into cognisance that the investigation does not violate the rights of the participants. Plagiarism, academic dishonesty and fabrication were avoided at all cost during the research. The respondents were encouraged to participate on voluntary basis. The researcher informed the participants about the aim of the study and about the confidentiality of their responses. Respondents participated on condition of anonymity.

3.8 Letter of consent
A letter of consent, stating the purpose of the study and requesting the subject voluntary participation, was attached to the front of every questionnaire. By signing the letter of consent, the respondent was agreeing that he/she will be participating in the study at will.
CHAPTER FOUR: RESULTS AND ANALYSIS

4.1 Introduction

This chapter provides results and discussion. A detailed discussion on the assessment of environmental impacts associated with the land reform process in Matobo district in Zimbabwe is presented.

4.2 Socio-Economic Attributes

This section provides a summarized socio-economic profile of the population. There are eight variables that describes the demographic characteristics of the sample namely ward, age, gender, education status, marital status, children, male children and female children (Appendix C). The participants were equally distributed across the wards, each ward having at most 35 respondents (ward 21, 22, 23 and 25) with the exception of ward 24 having 33 research participants. The majority of participants in Matobo district are over 30 years of age, with the modal age range being 60-64 years (17.3%). Male and female respondents accounted for 56.6% and 43.4% respectively of the sample observations. Most respondents have reached secondary education level (68.2%) with a few attaining the tertiary education stage (8.1%).

Participants are mostly married (99.4%) and a minority in the widow or widower status (0.6%). A higher number of respondents have 2 to 5 children, with 71 participants (41.0%) having 2 male children and 68 participants (39.3%) have one female child. A pictorial view of the summary of how the numbers of children are distributed across the wards is provided. Age categories across the sampled wards are shown in Figure 4.1 where n is the sample. Age range 60-64 years is highest in wards 21 and 25, while age 30-34 years is modal in wards 22 and 25. Male participants dominate across all wards accounting for more than 56.6% in Figure 4.2. In Figure 4.3, secondary education dominates in all wards followed by primary education and finally tertiary education. Ward 24 is the only ward without participants with tertiary education. All respondents in all wards are married with ward 24 having few respondents who are widow or widower.
Figure 4.1 Ward and age

Figure 4.2 Ward and gender
The assessment of the education per ward as questions 7, 8 and 9 on the individual questionnaire was to find out their responses and behaviour on the environment. Educated people are often perceived to utilise the available resources in a responsible and sustainable manner. This may reduce their impacts on the environment. However, poverty and lack of employment creation compel them to rely on the environment in an unsustainable manner.

Participants in all the wards indicated that they are married with a few widows/widowers in ward 24. These were responses for question 11 on individual questionnaire. Married couples tend to have children and as their families grow bigger this means more demand on the ecosystem. As the population increases, this imposes a strain on resources and shortage of such resources causes ripple environmental impacts. Similarly, during the market-led ‘agrarian reform’ in Brazil registered lands were reported to be of low fertility, lacking water and suffering from settlement of too many families in small areas (Sauer, 2009).
4.2.1 Reliability of statistics
The Cronbach’s alpha was used to measure the internal consistency of the items in the questionnaire. The questionnaire has 91 usable and analysable items. Table 4.1 displays the Cronbach’s alpha coefficients for 91 items. Generally, the questionnaire has an overall Cronbach’s alpha of 0.731 implying that the research instrument is acceptable and further analysis can be conducted.

Table 4.1: Reliability of statistics

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<th>Cronbach’s Alpha</th>
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<tbody>
<tr>
<td>0.731</td>
<td>91</td>
</tr>
</tbody>
</table>

4.3 Environmental challenges
This section covers an analysis of the environmental challenges experienced in the Matobo district.

4.3.1 Duration of residence in resettled areas
Table 4.2 shows the summary of stay for participants in the sampled wards. The respondents were asked how long they had stayed in resettled area. The minimum and maximum stay is 4 and 11 years respectively. The average stay is 7.83 years while most frequent length of stay in a ward is 10 years. Low propensity to migrate to other areas might be an explanation for such long stay in the Matobo district. Most respondents have stayed for a longer period in Matobo district since the beginning of the resettlement. This implies high magnitude of impacts on the environmental attributes of the ecosystem as they solely depend on their immediate environment for survival.

Table 4.2: Length of stay

<table>
<thead>
<tr>
<th></th>
<th>Minimum</th>
<th>Maximum</th>
<th>Mean</th>
<th>Mode</th>
</tr>
</thead>
<tbody>
<tr>
<td>Length of stay</td>
<td>4</td>
<td>11</td>
<td>7.83</td>
<td>10</td>
</tr>
</tbody>
</table>

4.3.2 Improperly functioning dip tanks
In Figure 4.4, respondents were asked if there were dip tanks in their wards. The majority of respondents in all the five wards have dip tanks as revealed by a high number of “Yes”. Very few respondents in wards 22, 23, 24 and 25 have no dip tanks nearby. The available
dip tanks in the resettled wards do not help farmers as further probing during focus group discussion and observation revealed that these were left by the original white occupants and owners of the farms therefore without the necessary medication. The malfunctioning of old boreholes which were using wind power as well as the lack of diesel which was used in pumping water from underground has also led to abandoning the available dip tanks. Vandalism and lack of proper monitoring has led to the destruction of the available dip tanks. This has left most farmers resorting to spraying their cattle. However, not all farmers are doing this as the chemicals used for dosing are costly. Farmers with financial constraints can skip dosing of their animals hence the prevalence and spread of diseases such as lump skin, quarter evil (*umkhonyana*) and black leg. Reduced number of cattle may mean an increase in beef prices, lack of milk and a decline in farm output as cattle are also used as draft power. This may also mean an increase in prices of farm products.

Figure 4.4 Existence of dip tanks

### 4.3.3 Deforestation

The beneficiaries of the land cleared vegetation on their arrival in the resettled farms for space creation. The reasons for clearing vegetation are indicated in Figure 4.5. Respondents cleared vegetation for various reasons which include agriculture, fencing, firewood, construction, making kraals and homes, herbs for medicine and hunting. In line with clearing vegetation, respondents were asked to give the main causes of deforestation in their areas. All the mentioned purposes for vegetation clearance have some synergetic and concomitant environmental impacts. The results are represented in Figure 4.6 which shows that the main causes of deforestation are fencing, firewood and agriculture, these poses the main threat to the environment. The analysis of results from this question shows
that agriculture, fencing and firewood are the major causes of deforestation and its effects. Therefore these activities cause environmental impacts in the study area.

Figure 4.5 Purposes for clearing vegetation

Figure 4.6 Major causes of deforestation

Figure 4.6a shows the use of trees in building their huts, Figure 4.6b shows the use of vegetation for fencing their fields as another cause for deforestation, Figure 4.6c depicts
the use of vegetation in kraal construction while Figure 4.6d shows how trees are used in constructing structures for grain storage. This over dependency on vegetation among other uses contributes to the high magnitude of deforestation and ultimately biodiversity degradation in Matobo district. Residents argue that without the use of vegetation their lives may come to a standstill.

Figure 4.6a Vegetation used in building of huts

Figure 4.6b Vegetation used for the fencing of fields
Respondents in the five wards were asked to provide the main source of energy they use in their homes. The evidence is provided in Figure 4.7 which reveals that a majority of households in Matobo district use firewood as the main source of energy with a few using gas and electricity. The respondents were also asked to provide information on whether they cut the live trees for firewood or they just collect the dried ones. Figure 4.8 shows a
mixed response in that some wards 21, 22 and 25 collect the dried trees whereas wards 23 and 24 cuts the live trees and also collects the dried ones. Reliance on trees as sources of energy further exacerbate deforestation which causes further environmental impacts such as soil erosion, destruction of grass for their animals, lack of good pasture land for their animals, death of animals and expensive animal products. Deforestation caused by firewood collection may also cause gully erosion and river siltation. Firewood is collected mainly on a daily basis in all wards as revealed in Figure 4.9 others collect on a weekly and monthly basis. High frequency of vegetation collection also implies the higher rate of deforestation which is an environmental impact. Firewood is collected from the surrounding bush which used to be the virgin forest.

Figure 4.7 Sources of energy for home use
Figure 4.8 Cutting trees and collecting dried trees

Figure 4.9 Frequency of firewood collection

Figure 4.10 show that residents of Matobo district do sell firewood by the roadside and some even take the firewood to the city of Bulawayo. Selling of firewood by the roadside or taking it to the nearby city of Bulawayo results in the excessive cutting down of trees which lead to deforestation and its subsequent environmental impacts. There are few people who are selling firewood for a living as evidenced by a higher number of “Nos” during the focus group discussion. In support of that, Figure 4.11 reveals that firewood
selling business is not a viable undertaking. However, Figure 4.12 shows mixed reactions over illegal collection of firewood.

Figure 4.10 Selling of firewood

Figure 4.11 Viability of firewood business

Figure 4.12 Illegal firewood collections
4.3.4 Subsistence agriculture and its effects

According to participants, households in Matobo district practise subsistence farming (see Figure 4.13). The practice of subsistence farming shows a drastic change in the type of farming because these farms were commercially operated. They still rely on their traditional farming techniques they have been practicing before resettlement. This has accelerated the erosion and its consequences of land degradation. Addition of fertilisers and manure is very minimal hence this has seen a decline on outputs on a yearly basis. Residents receive seeds and fertiliser from the government, however, these come very late compelling them to buy or use those from the previous season. Therefore the farms which were previously on a commercial basis based mainly on cattle ranching are now under subsistence agriculture. Subsistence farming implies low output as is done on a smaller scale. Farmers mainly rely on donkeys and oxen, and a few on tractors for their agricultural activities as shown in Figure 4.14. This means fewer acres now fall under cropping. In Zimbabwe, for example, there is currently concern over the underutilisation of newly distributed land (Clover, 2003). In Latin America, the land reforms distributed comparatively large amounts of land but often failed to improve productivity (Barraclough, 1970). The dominating traditional methods and types of resources used for farming in the resettled wards result in low productivity.

Figure 4.13 Farming practise
4.3.5 Spread of animal diseases and their effects

Table 4.3 shows the summary of response on wildlife issues. Respondents believe that contagious diseases and ticks spread from wild animals to domesticated animals. The main contagious disease is black leg though lump skin is also a threat. The respondents believe that the contagious diseases can be lessened by spraying and dosing with spraying as the main preventive method. The relevance and implications to the topic under study may be death of domesticated animals like cattle and goats which may mean an increase in prices of their products due to shortages. Lack of livestock products may also lead to an increase in demand. Therefore, the land reform in Matobo district was accompanied by environmental impacts which may also lead to economic effects. In the Eastern Kenya rangeland human-livestock-wildlife interactions on caused a reduction in pastoral grazing range, increase in livestock density and decline in the population of wildlife (Otuoma et al., 2009).

Results show that there are people who hunt wild animals in Matobo district illegally and these animals are killed for their hides, horns, bones and medicinal purposes. Figure 4.15 reveals that the top three wild animals hunted in Matobo district are kudu, wild pig and impala. The number of these wild animals has dwindled alarmingly since the beginning of resettlement in the district. Figure 4.15a shows a kudu being killed by a group of dogs within the resettlement area. Poaching may lead to the extinction of certain species such as the kudu. The wild animals have decreased ever since respondents settled in the Matobo district. There are no outsiders who come to set snares in order to catch wild animals. The
evidence in Table 4.3 suggests that there are no measures put in place to minimise illegal hunting activities in Matobo district. Furthermore, the respondents are not aware of any Game Rangers patrolling their area. Illegal hunting is intensified by lack of adequate rules and regulation therefore people are not even in compliance with the already existing rules and regulations (mean=1.84). The land reform programme in Matobo district was associated with excessive poaching hence the decrease in the number of the vulnerable animals. The study on land reform in Kenya indicates that there was a significant decline in wildlife population in the conservancy area between 1980 and 2000 specifically for elephants, buffalos and giraffes (Outoma et al., 2009).

Table 4.3: Environment and wildlife

<table>
<thead>
<tr>
<th>WILDLIFE</th>
<th>n (sample)</th>
<th>MEAN*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Are there any wild animals in the area where you are resettled?</td>
<td>170</td>
<td>1</td>
</tr>
<tr>
<td>Could there be any contagious diseases that can spread from wild animals to domesticated animals?</td>
<td>173</td>
<td>1.46</td>
</tr>
<tr>
<td>Is there any possibility for wild animals spreading ticks to domesticated animals?</td>
<td>173</td>
<td>1.18</td>
</tr>
<tr>
<td>Do people hunt such wild animals in your area?</td>
<td>70</td>
<td>1</td>
</tr>
<tr>
<td>Are there any wild animals that are killed for their hides, horns, bones or any other medicinal purposes?</td>
<td>70</td>
<td>1.2</td>
</tr>
<tr>
<td>Do you have the rarest animals such as pangolin in this area?</td>
<td>70</td>
<td>2</td>
</tr>
<tr>
<td>Is there any illegal hunting of wild animals in this resettlement?</td>
<td>171</td>
<td>1.01</td>
</tr>
<tr>
<td>Do people come from other areas and set snares in order to catch wild animals?</td>
<td>171</td>
<td>1.87</td>
</tr>
<tr>
<td>Are there any measures put in place to minimise illegal hunting in this resettlement?</td>
<td>171</td>
<td>1.54</td>
</tr>
<tr>
<td>Do you know of any Game Rangers patrolling in this area in order to lessen illegal hunting?</td>
<td>35</td>
<td>1.91</td>
</tr>
<tr>
<td>Are there any rules and regulations to monitor the illegal hunting of wild animals?</td>
<td>35</td>
<td>1.60</td>
</tr>
<tr>
<td>Do people comply with such rules to lessen illegal hunting of wild animals?</td>
<td>140</td>
<td>1.84</td>
</tr>
</tbody>
</table>

* The following scales are used to measure the level of intensity for response on wildlife.
  * $1 \leq M \leq 1.5$ : Yes
  * $1.5 < M \leq 2$ : No
Figure 4.15 Wild animals hunted

If the beneficiaries of the land reform continue killing them it may cause a decrease in their numbers and this may affect the ecosystem’s stability. The energy and nutrient cycles may be disrupted. Excessive poaching in the resettled wards of Matobo district has led to dynamic changes in the ecosystem therein. The number of wild animals is decreasing in some wards specifically ward 24 which was original referred to as *Enyamazaneni* due to the large number of wild animals. This was an animal conservancy.
Respondents were asked to respond to questions related to conservation and health and the results are provided in Table 4.4. The participants do not have soil conservation methods in their area such as gully reclamation that assist in reducing soil erosion (mean=1.69). However, there are people who teach participants to practise soil conservation (mean=1.42) and the resettled people do not respond positively to such soil conservation (mean=1.94).
Table 4.4: Conservation and health

<table>
<thead>
<tr>
<th>CONSERVATION AND HEALTH</th>
<th>N</th>
<th>MEAN*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Do you have soil conservation methods?</td>
<td>70</td>
<td>1.69</td>
</tr>
<tr>
<td>Are there people teaching you how to practise soil conservation?</td>
<td>140</td>
<td>1.42</td>
</tr>
<tr>
<td>Do the resettled people respond positively to such soil management strategies?</td>
<td>120</td>
<td>1.94</td>
</tr>
<tr>
<td>Is there any observation you have made to the depth of rivers and dams in your locality?</td>
<td>140</td>
<td>1.36</td>
</tr>
<tr>
<td>Do you sometimes use veld fires in this resettlement?</td>
<td>140</td>
<td>1.59</td>
</tr>
<tr>
<td>Are there any rules and regulations that restrict you from using veld fires?</td>
<td>140</td>
<td>1.82</td>
</tr>
<tr>
<td>Are there any awareness programs for the community meant to conserve the trees, animals and birds?</td>
<td>140</td>
<td>1.94</td>
</tr>
<tr>
<td>Are there any educational campaigns for environmental conservation?</td>
<td>35</td>
<td>2</td>
</tr>
<tr>
<td>Do you have any Communal Areas Management Programme For Indigenous Resources?</td>
<td>105</td>
<td>2</td>
</tr>
<tr>
<td>Do you have any toilets in your homesteads?</td>
<td>173</td>
<td>1.59</td>
</tr>
<tr>
<td>Do you think absence of toilets might lead to the outbreak of diseases in this resettlement?</td>
<td>173</td>
<td>1.46</td>
</tr>
<tr>
<td>Do you think lack of toilets can cause any river or dam pollution?</td>
<td>136</td>
<td>1.44</td>
</tr>
<tr>
<td>Are there any sources of drinkable water in your locality besides rivers and dams?</td>
<td>31</td>
<td>1.48</td>
</tr>
<tr>
<td>Do you think its health to use water from rivers and dams for household purposes?</td>
<td>70</td>
<td>1.68</td>
</tr>
<tr>
<td>Do you have any clinics or hospitals in your area?</td>
<td>99</td>
<td>2</td>
</tr>
<tr>
<td>Are they any Village Health Workers where one can obtain tablets during ill health?</td>
<td>171</td>
<td>1.15</td>
</tr>
<tr>
<td>Are there any ambulances that occasional come and collect the sick from the nearest health centre?</td>
<td>171</td>
<td>2</td>
</tr>
<tr>
<td>Do clinics in your locality have enough tablets or one has to proceed to the nearest hospitals?</td>
<td>135</td>
<td>1.69</td>
</tr>
</tbody>
</table>

* The following scales are used to measure the level of intensity for response on conservation and health.
  - \( 1 \leq M \leq 1.5 \) : Yes
  - \( 1.5 < M \leq 2 \) : No

4.3.6 Unsustainable utilisation of soil and vegetation

The respondents have observed notable changes in the depth of rivers and dams as a result of lack of soil conservation method in place. The depth of rivers and dams is now shallow due to siltation. Such effects are associated with the land reform in the resettled wards of Matobo District as a result of unsustainable utilisation of resources. Respondents reported
that the main environmental effects associated with poor utilisation of soil in Matobo district are soil erosion, siltation, degradation and gullies (see Figure 4.16). The use of veld fires, though not common in the district but occurred on the 22nd of August 2014 in ward 24 has some far-reaching environmental effects on the ecosystem. Veld fires destroys a lot of environmental components such as vegetation which is source of food for animals, killings of flora and fauna, loosening of soil particles, altering soil structure and texture and it further leaves a trail of fire scars. An incident of fire was captured through observation in ward 24. There are no rules and regulations in wards to restrict the use of fire. There is lack of awareness and educative programs for environmental conservation in Matobo district. Respondents need to be made aware of the effects of fire on the environment so that they will not attempt burning the veld. The utilisation of fire may have far-reaching effects in the resettled wards because it may kill a lot of floral and faunal species. The implication of this may be the extinction of such species directly attributed to the land reform.

Most households do not have toilets at their homesteads but instead use bush toilets. They believe that the lack of toilets can cause outbreak of diseases such as cholera, dysentery and diarrhoea and water pollution in rivers or dams. Residents in Matobo district have other sources of drinking water besides rivers and dams. The participants were of the opinion that it is not healthy to use water from rivers and dams for household purposes. There is potential for a health hazard which could be accelerated by lack of nearby clinics or hospitals, ambulances and lack of enough tablets in health centres in Matobo district. People in Matobo district use cars, buses, carts and some walk (see Figure 4.17) an average of 15.85 kilometres to the nearest health facilities. It is very expensive and difficult to access the health care centres. This has compromised the health of the resettled farmers when exposed to different diseases.
According to respondents, there are no nearby schools. The only available makeshift primary schools are not adequately equipped, are under enrolled and without libraries at schools and in the community. Such schools practise multi-grading whereby one teacher teaches 2 or more grades combined. Resettled wards do not have electricity hence modern day facilities such as overhead projectors and computers may not be used.
Figure 4.17 Mode of reaching health facilities

4.4 Overview of environmental challenges

Table 4.5 shows the analysis of variance (ANOVA) results of the effect of various environmental challenges. The means of the named environmental challenges were compared across the five wards to gauge the effect. The test was conducted at the 5% level of significance. The result is significant if the probability value \((p\)-value\) is less than 0.05, in this context it implies that the named environment challenge has an effect on the environment. In Table 4.5, all the eight environmental challenges are significant and have an effect on the environment since the \(p\)-values are less than 0.05. The significance of this figure implies greater magnitude of these environmental challenges hence the land reform in Matobo district introduced and accelerated the environmental impacts in the area.
Table 4.5: Environmental challenges

<table>
<thead>
<tr>
<th><strong>ANOVA</strong></th>
<th><strong>p-value</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Deforestation</td>
<td>0.000</td>
</tr>
<tr>
<td>Illegal firewood</td>
<td>0.002</td>
</tr>
<tr>
<td>Use of vegetation in fencing trees</td>
<td>0.000</td>
</tr>
<tr>
<td>Contagious diseases</td>
<td>0.023</td>
</tr>
<tr>
<td>Hunting of wild animals</td>
<td>0.000</td>
</tr>
<tr>
<td>Lack of soil conservation methods</td>
<td>0.000</td>
</tr>
<tr>
<td>Soil erosion</td>
<td>0.000</td>
</tr>
<tr>
<td>Lack of toilets and water pollution</td>
<td>0.000</td>
</tr>
</tbody>
</table>

Responses from the resettled farmers indicate that they rely on vegetation for various but interrelated reasons such as agriculture, fencing, firewood, construction, making kraals and homes, herbs for medicinal purposes and hunting. Trees are used for fencing in all wards with the exception of ward 21 as shown by the results of the study and such fencing is done yearly. The results further show that the number of people who rely on trees for fencing override those who use wire.

Firewood is the main source of energy among gas, electricity and paraffin within the resettled wards in Matobo district. Respondents in wards 21, 22 and 25 revealed that they rely on dried fuel wood whereas wards 23 and 24 collect dried and cut live trees for firewood. The frequency of firewood collection also exacerbates the rate of deforestation as is done mostly daily and weekly with less monthly rates. This happens on a faster rate hence environmental degradation and consequently a marked reduction in biodiversity. High rate of deforestation is also augmented by the fact that firewood is also sold along the main roads. Illegal firewood collection is highly pronounced is wards 23 and 24, ward 24 because it is close to Bulawayo city. Respondents in wards 22 and 25 stated that there are no people who are responsible for the excessive cutting down of trees.

This excessive reliance on vegetation has led to some environmental effects which include soil erosion, gully formation, land and environmental degradation and soil erosion. Similar environmental effects as drawn from the study are also associated with poor utilisation of soil in Matobo district. Despite the availability of Agricultural Extension Officers who teach participants to practice soil conservation methods residents do not respond positively to soil conservation.
Another problem caused by the co-existence of wild animals and human beings is that the wild animals devour the crops of farmers especially at night thereby minimising their output as revealed by the focus group discussion. This makes them vulnerable to poaching so as to eradicate the existing problem.

The study also revealed that most households do not have toilets in the resettled wards therefore a health hazard which might lead to the outbreak of diseases such as diarrhoea, dysentery, cholera and typhoid. Lack of toilets implies the utilisation of the bush and during rainy season this causes a lot of pollution in rivers and dams. Rivers and dams are sources of water for domestic purposes such as drinking, cooking, bathing and washing among others. Depending on such water causes some diseases, a case in point being the outbreak of cholera in 2008. Residents argued that it is not health to rely on water for household use but they do not have alternatives.

The above analysis also shows that Zimbabwe’s land reform programme was not well organised as it did consider the much needed provisions in its implementation. In West Bengal (India), on the other hand, a state that ranks at or near the top for both measures and that counts with a formidable level of grassroots-level organisation, land during the land reform appears to have been transferred in a very pro-poor fashion (Klaus et al., 2008).

4.5 Possible solutions for identified environmental challenges

The main source of energy in Matobo district is firewood. In order to curb the destruction of endangered tree species alternative renewable sources of energy need to be introduced such as biogas which utilises animal waste to generate heating and lighting energy. In addition, workshops can be conducted to raise awareness of the effects of cutting down trees and the legal consequences thereof. The residents in Matobo district are mainly involved in subsistence farming which produce low yields hence there is a need to shift to commercial farming which will enable farmers to produce for commercial purposes and earn a living. The success will depend on government and non-government organisations commitment in supporting the farmers with the requisite resources needed to carry out commercial farming.

Hunting of wild animals seem to be a major challenge in Matobo district, therefore as a remedy, it is proposed that the Zimbabwe National Parks deploy Game Rangers in the area
as a way to monitor and control the poaching of wild animals. Furthermore, there is need to educate the population in Matobo district about the existing rules and regulations governing the poaching of wild animals. The implication of this to the study topic is that it may curb poaching which might lead to extinction of other animals.

Soil erosion, siltation, land degradation and gullies are the main environmental effects associated with poor utilisation of land. As such, it is proposed that soil conservation methods be introduced in the Matobo district this could be done via the Environmental Management Agency in Zimbabwe which enforces environmental laws. Awareness and educative programmes can play a key role in conserving the environment. Residents should be discouraged from farming near rivers as this increases siltation of rivers.

Bush toilets are mostly used in Matobo district; it is recommended that simple toilet structure be built for better sanitation. Residents are at risk of diseases such as cholera which could result in unnecessary loss of life. The water in rivers or dams needs to be boiled before use and use chemicals such as chlorine so as to reduce contamination. The clinics and schools are far away from residents. There is need to introduce mobile clinics which will be equipped with drugs to assist residents in ill health times. The government could built more rural schools as it has done in urban areas or resettling people where they can easily access the essential amenities of life.

There is heavy reliance on trees leading to deforestation and subsequently soil erosion and land degradation. Awareness programs and stringent measures in line with the utilisation of soil are lacking in Matobo district. The study also revealed that most residents are unaware of environmental impacts in the area. Similarly there is also lack of environmental legislation on fire per se and existing regulations are fragmented and difficult to enforce. Moreover, lack of funding, absence of government assistance, vandalism and expensive medication for dosing remain the stumbling block within the district. The study concludes that the poaching of wild animals is manifesting itself in a real way in Matobo district as residents think that they own wild animals but the challenges emanates on how to manage and control them. Game rangers need to be introduced in the resettled wards to monitor and mitigate incidences of poaching.

Resettlement in Matobo district introduced counter development in educational spheres as schools in resettled wards are all makeshift and under equipped. Children are housed in
former stables in the name of school. Furthermore, schools are under enrolled and under staffed which compromises the standard of learning. Such schools do not have electricity hence modern learning and teaching facilities may not be utilised. Proper schools with modern day facilities need to be introduced in the resettlement area.
CHAPTER FIVE: CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

A series of concomitant and synergistic environmental impacts were associated with the land reform process in Matobo District all being a result of poorly coordinated resettlement programme. The study revealed high levels of overreliance on the ecosystem and as such it can be concluded that resettlement in the district gave rise to environmental consequences as illustrated in the results, such as deforestation due to excessive cutting down of trees for different uses such as provision of firewood, fencing, kraal construction, building of huts, and harvesting of caterpillars which is associated with a lot of vegetation destruction. The government did not plan in advance provision of basic services before the resettlement programme resulting in amongst others sanitation issues. Resettlement in the district did not consider the availability of necessary facilities such as schools, toilets, libraries and clinics. This increased the risk to mostly water borne diseases like diarrhoea, dysentery and cholera due to lack of ablution facilities.

The study also revealed uncontrolled levels of poaching. It can therefore be concluded that such practices present a major risk leading to a decrease or extinction of important wildlife. Interactions between domesticated animals and wildlife contributed to a decrease in stock due to transmission of contagious diseases. Such transferrable diseases often resulted in death of domesticated animals since farmers lack proper medication for dipping and dosing thereby affecting livelihoods. Resettled farmers engaged in subsistence farming which is unsustainable in nature and led to a decline in farm production.

In summary, the environmental challenges with significant impacts on the environment in the resettled wards were identified as deforestation, illegal firewood collection, use of vegetation in fencing, contagious diseases, hunting of wild animals, lack of soil conservation methods, soil erosion and lack of sanitation facilities as well as water pollution.

Therefore it can be drawn that the resettlement in Matobo district became associated with environmental effects as was revealed in this study. These impacted negatively to the different components of biodiversity. Some recommendations and strategies have been provided to address the identified environmental impacts associated with the land reform program.
5.2 Recommendations

It is recommended that the government must have a lot of planning, budgeting and availability of resources preceding the resettlement process. Deforestation can be mitigated through the provision of low cost houses as well as the materials for building those structures. This might lessen the entire dependency on vegetation. Some virgin forests need to be set aside as protected areas where the cutting down of trees is strictly prohibited. This can protect watershed and minimise the erosion, land degradation, siltation and biodiversity destruction.

It is also recommended that the government must help revamp the old dysfunctional dip tanks. Such structures must be renewed and dipping of cattle as a way of dosing them must be compulsory so as to eradicate the prevalence of contagious diseases. Residents must pay certain amount in the form of tax and the money be used for procuring medication being subsidised by the government. Dipping of cattle must be done regularly say fortnightly.

The over reliance on fuel wood as the main source of energy is counterproductive as this causes deforestation and biodiversity degradation, it is therefore recommended that farmers use alternative sources of energy. Residents can be encouraged to use biogas and solar energy as this lessens deforestation. However, the Ministry of Energy can train few individuals who will in turn train the villagers on how to process biogas. It can further provide cheap solar panels that can be paid over a long period of time. Security personnel must be introduced with rules, regulations and policies against the uncontrolled cutting down of trees for firewood. Government must also introduce fines and jail sentences for offenders. The Community Policing Forum also needs to be introduced to guard against the wanton cutting down of trees. The neighbourhood watch committees are needed so as to reinforce the implementation of the well laid down rules and regulations. The research further recommends that current government structures be strengthened through giving them authority to resolve disputes in the resettled areas. Residents must adhere to the norms and standards of the Natural Resources Act.

Subsistence farming depends entirely on the unreliable rainfall which is highly influenced by climatic change and global warming. Climatic change has made planning a difficult venture in farming. It is therefore recommended that farmers in Matobo district must shift from subsistence farming to commercial farming in order to increase their output. The government through the District Development Fund (DDF) must provide tractors
accessible for tilling the land. This can enable farmers to embark on commercial farming. Services of the tractors can be paid after selling the produce to the Grain Marketing Board (GMB). Fertilisers and seeds must be provided in time prior to the rainy season. Another recommendation is that farmers can practice cattle ranching as was done by their predecessors and this is a viable farming practice as it is favoured by rainfall amount and temperatures in Farming Region IV. Finally it is recommended that the resettled farmers be given title deeds. These can be used as collateral in soliciting for loans from financial institutions and such loans can improve their inputs for better production. Government loans can assist farmers to shift from subsistence to commercial farming. This can enhance sustainable agriculture management which combines technologies, policies and activities aimed at integrating socio-economic principles with environmental concerns so as to simultaneously maintain or enhance productivity, reduce the level or production risk, protect the quality of natural resources and prevent soil and water degradation, be economically and social acceptable (Dumanski and Symth, 1995). It further recommended that farmers may practise organic farming which is a production system that avoids or largely exclude the use of synthetic fertilisers, pesticides and relies upon cultural crop production methods. This is a cheaper alternative in land tillage.

More so, the government need to set aside loans through Agribank so that the-would be farmers would borrow money for the buying of farm inputs such as wire for fencing as well as fertiliser and seeds.

Wild animals must not co-exist with domesticated animals. This can be done through the creation, maintenance and monitoring of wild animal corridors, game parks, conservancies and game reserves. This can be done in liaison with the Department of National Parks and Wildlife. Game Rangers must be allocated to the protected areas so as to keep a watchful eye and eradicate poaching. The seclusion of domesticated animals from wild animals may minimise the spread of contagious diseases and ticks from wild animals to domesticated animals or vice versa. Systematic and regular dosing schedules must be adhered to as has been alluded to above.

It is recommended that poaching be prohibited by all means and at all cost in Matobo district. Sign posts and billboards need to be erected in resettlement areas discouraging poaching. Rules, regulations, policies and law must be well spelt to insiders and outsiders regarding poaching. Game Rangers in cohorts with Zimbabwe National Police (ZRP) must
enforce the well laid down policies and arrest all perpetrators. The selling of game meat, hides and skins must be prohibited as this will lessen poaching. This need to be in line with the policies of Environmental Management Agency (EMA) and Ministry of Environment and Tourism. Additionally, Zimbabwe must participate and take an active role in global initiatives on biodiversity conservation, for instance, the Convention on International Trade in Endangered (CITES), signed by 100 countries, which controls and in some cases prohibits the trade in threatened species. Management is required because humans have already modified many local environments so much that the remaining species and ecosystems need human monitoring and intervention in order to survive (Primack, 2014). Primack (2014) argues that without human intervention, reserves exist in name only. The world is littered with “paper parks” created by government decree but left to flounder without any management.

Farmers must be taught and encouraged to install contour ridges and contour bands on their fields to minimise soil erosion and these must be compulsory. Soil conservation methods such as ploughing across the slope, addition of lime and letting the land lie fallow must also be practiced. The Ministry of Lands, Agriculture and Resettlement must offer some loans so that farmers can go and attend at colleges like Ehlekwni and Esigodini Agricultural College and learn how to practice sustainable agriculture.

The burning of veld must be prohibited at all cost in Matobo district and residents must be taught about the effects of veld fire. There must be awareness programs and rules and regulations pertaining the utilisation of fire. It is recommended that there must be people policing the area guarding against any incidences of fire outbreak and perpetrators be incarcerated. Sign posts alerting people not to burn the veld must be installed within the wards so as to minimise burning the veld.

To arrest the incidences of water borne diseases it is recommended that the government fund and teach people on how to build the simple blair toilets. The government can train one person per village and offer the materials. A condition of receiving the materials from the government can be digging of a standard pit for the toilet which is to be inspected by the trained person and if conforming to standards then the homestead receives the materials. Participants also need to be advised to boil water from rivers and dams before domestic use. The utilisation of water bodies and the nature of water therein must conform to the auspices of Zimbabwe National Water Authority (ZINWA).
It is recommended that the government must allocate a clinic and an ambulance per ward in the resettlement areas. This can be done during the initial planning phases of resettlement. This can be also done by introducing the mobile clinics and these needs to be well stocked to reduce travelling further afield to access better medication since it is expensive. More so, every village must have a Village Health Worker (VHW).

Various measures need to be taken in order to conserve biodiversity. One of the measures is through increasing community involvement. Conservation areas must work in close partnership with the local communities. This will instil a sense of ownership in communities and encourage them to conserve and protect biodiversity. Community involvement in conservation is empowering them as they may be some economic benefits to the communities. The passing of environmental legislation and policies also goes a long way in conserving biodiversity through the various policies which fall under EMA. The control and management of nature conservation areas must be done by skilled people. There is also a need to extend the network of conservation areas to include unprotected plants. In that way more diversity will be conserved. The country must commit itself to biodiversity expeditions. More conservation areas must be identified and listed under biosphere reserves. The biosphere reserves work at the conservation of the environment holistically and in its totality.
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APPENDICES

APPENDIX A: INDIVIDUAL QUESTIONNAIRE 2014

AN ASSESSMENT OF ENVIRONMENTAL IMPACTS ASSOCIATED WITH THE LAND REFORM PROCESS IN MATOBO DISTRICT: ZIMBABWE

SECTION ONE: DEMOGRAPHIC CHARACTERISTICS

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3. Province of origin .................................................................

4. District of origin ........................................................................

5. Language(s) spoken in the Province ................................................

6. Language spoken in the District ......................................................

7. Educational status ........................................................................

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8. Profession .....................................................................................
9. Occupation.............................................................................................................
10. Religious affiliation ............................................................................................
11. Marital status

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12. If married state tribe of spouse .................................................................
13. Number of children ........................................................................................
14. How many males .................. How many females .................................

SECTION TWO: SEMI-STRUCTURED QUESTIONNAIRE

1. How long have you been in the resettled area?

2. What do you understand by the term ‘environmental impacts’? You are not expected to give the exact definition but possibly the kind of practices that cause environmental impacts.

3. What is the main economic activity that you are practising in this area?

4. Do you think your primary economic activity has any impact on the environment?

5. Do you think the environmental impacts caused by your primary economic activity can be minimised?

6. Are there dip-tanks in your area? If no, how do you dose your cattle?

7. What do you understand by the term deforestation?

8. On your arrival here, did you clear any vegetation to open up space?

9. If so, what were the purposes of clearing up vegetation?
10. What does the cutting down of trees cause in this area? Name any noticeable changes caused by the cutting down of trees in the area.

11. How can the effects of deforestation be minimised in this area?

12. What is the major cause of deforestation in your area?

13. What is the main source of energy that you use in your homes?

14. Do you cut the live trees for firewood or you just collect the dried ones?

15. How often do you collect firewood for domestic use?

16. Where do you get firewood?

17. Are there any people who are selling firewood by the roadside or taking it to Bulawayo?

18. Do you think there are people who are now relying on firewood selling for a living?

19. If so, do you think the business is viable?

20. Is there any illegal firewood collection in your area?

21. Are you practising subsistence or commercial farming in your area?

22. Which resources are used for this type of farming?

23. What do you use for fencing your fields?

24. If you use vegetation, how often do you fence your fields?

25. Do you have people who use trees for medicinal purposes in this area?

26. Which trees are used for medicinal purposes in this area?

27. Do people come from other areas to extract herbs from this area?

28. In your opinion do you think this leads to deforestation or not?

29. Are there any rare tree species in this area which you think are vulnerable because of man’s impact on the ecosystem?
30. Are there any ways of conserving such endangered tree species in your area?

31. Do you know of people who are responsible for monitoring the excessive cutting down of trees in this area?

32. Do you know of any programmes encouraging the planting of trees in this area?

33. Are there any wild animals in the area where you are resettled?

34. Could there be any contagious diseases that can spread from wild animals to domesticated animals? If any, name them.

35. Is there any possibility for wild animals spreading ticks to the domesticated animals? If so, how can this be lessened?

36. Do people hunt such wild animals in this area?

37. Which wild animals are mostly killed in this area?

38. In your opinion do you think the number of wild animals has increased or decreased since you settled here?

39. How often do people kill wild animals in this area?

40. Are there any buffalos, rhinos or cheetahs found in this area?

41. Are there any wild animals that are killed for their hides, horns, bones or any other medicinal purposes in your locality?

42. Do you have the rarest animals such as pangolin in this area?

43. Is there any illegal hunting of wild animals in this resettlement?

44. If any, name the wild animals that are illegally killed.

45. Do people come from other areas and set their snares in order to catch wild animals in this area?

46. Are there any measures put in place to minimise illegal hunting in this resettlement?

47. Do you know of any Game Rangers patrolling in this area in order to lessen illegal hunting in this area?
48. Are there any rules and regulations to monitor the illegal hunting of wild animals?

49. Do people comply with such rules to lessen illegal hunting of wild animals?

50. Do you have any soil conservation methods in this area such as gully reclamation and building contour ridges or contour bands to reduce soil erosion?

51. Are there people teaching you how to practise soil conservation?

52. If so, do the resettled people respond positively to such soil management strategies?

53. Is there any observation you have made to the depth of rivers and dams in your locality?

54. State any environmental effects associated with the poor utilisation of soil in your area.

55. Is there any evidence of soil erosion in this area? If so, is this a new phenomenon or it was there before the resettlement?

56. Do you sometimes use veld fires in this resettlement? If so, please elaborate.

57. How many times do you use veld fires per year in this locality?

58. Are there any rules and regulations that restrict you from using veld fires?

59. Are there any awareness programs for the community meant to conserve the trees, animals and birds?

60. If so, who organises the educational campaigns for environmental conservation?

61. Do you have any Communal Areas Management Programme For Indigenous Resources (CAMPFIRE) programmes in your area?

62. Do you have any toilets in your homesteads? If not, where do you go if you want to relieve yourself?

63. Do you think absence of toilets might lead to the outbreak of diseases in this resettlement? If so, name the diseases which are likely to affect you due to lack of toilets.

64. Name any diseases that have affected you in this area since the time of occupation.
65. Do you think lack of toilets can cause any river or dam pollution? If so, explain how?

66. Are any sources of drinkable water in your locality besides rivers and dams?

67. Do you think it's health to use water from rivers and dams for household purposes?

68. Any there any schools in your locality? If yes, are these permanent schools or the make-shift ones?

69. In your observation, do you think these schools are well equipped for your children?

70. Do such schools have any libraries for your kids to study?

71. Are there any mobile libraries within your community?

72. If there are no schools in your locality where do your children attend for schooling?

73. How close in the nearest school in your locality?

74. Do your children walk to the school or they use a certain arranged form of transport?

75. Do you have any shops in your locality?

76. Do you walk to the shops or you have to use certain mode of transport to reach your destination?

77. Do you get everything you need in the shops or at times you travel to the nearest township?

78. In your opinion, do you think prices in the local shops are fair or they are rather too high?

79. Do you have any clinics or hospitals in your area? If no, where do you get medication during times of illness?

80. Are there any Village Health Workers where one can obtain tablets during ill health?

81. How far is the clinic or hospital from your area of residence?

82. Are there any ambulances that occasional come and collect the sick from the nearest health centre? If no, how do reach such places with health facilities during times of sickness?
83. If there are any clinics in your locality, do they have enough tablets or one has to proceed to the nearest hospitals?

84. If clinics are found in your area, do you pay for any medication or not?

85. Do you sell any produce from your fields to the Grain Marketing Board or you just grow enough for your family consumption?

86. Do you think you are producing more than the previous farmer used to do?

87. Are you using mechanisation or ox-drawn plough and zero tillage?

88. Where do you get seeds during the growing season?

89. Do you add any fertilisers or manure in your fields? If yes, where do you get such resources?

90. Are there Agricultural Extension Officers that assist you with skills and techniques?
APPENDIX B: FOCUS GROUP DISCUSSION INTERVIEWS

AN ASSESSMENT OF ENVIRONMENTAL IMPACTS ASSOCIATED WITH THE LAND REFORM PROCESS IN MATOBO DISTRICT: ZIMBABWE

1. How long have you been resettled in this area?
2. Do you have any documents of ownership for these farms?
3. If you have them, where do you get such documents?
4. What type of farming was practised in this farm before this resettlement?
5. What form of draught power do you use for tilling the land?
6. Do you have any contour bands or contour ridges in your fields?
7. Do you produce only for feeding your families or you also sell the produce?
8. During your stay in this farm is production increasing or decreasing?
9. Do you add any inputs on the soil to improve its quality e.g. fertilisers or manure?
10. If so, where do you get these?
11. Where do you get some seeds?
12. Do you receive any government assistance for farm inputs?
13. Are there any wild animals in this area? If so, do you think they are well protected?
14. Is there any poaching in this area? If so, which animals are highly poached?
15. Do you sometimes come across any snares in the bush?
16. Are there any endangered animals in this area? If so, name them.
17. Did you introduce any domesticated animals in this area?
18. If so, name there. Do these animals co-exist with wild animals?
19. Have you ever noticed any diseases affecting domesticated animals being caused by wild animals? If so, name those diseases.
20. How can these diseases be minimised?

21. Are there insects or flies affecting your domesticated animals being caused by wild animals? If so, how can this be rectified?

22. Do you have any agricultural officers who teach you some farming techniques?

23. What sources of energy do you use?

24. Do you also use wood fuel? If so, what environmental problem does this create?

25. Are there any people selling wood by the road side or to the nearest city Bulawayo?

26. Name trees that are used for medicinal purposes in this area?

27. How often are these trees being extracted?

28. Are there any endangered trees in this area? If so, please name them and state the reasons why you say they are endangered.

29. Do you sometimes use tree branches for fencing your fields? If so, what do you think are the effects of this on the environment?

30. What materials do you use for building your huts or houses?

31. Do you notice any changes in the river and dam depth levels since the onset of the resettlement? If so, what may be the likely causes?

32. Are there any primary or secondary schools in this village? Approximately how long do your kids travel to reach the school?

33. If so, are these permanent or makeshift schools?

34. Do you have any hospitals, clinics or Village Healthcare Workers in this area? How many kilometres approximately do you travel to reach the nearest clinic?

35. Where do you buy your groceries? Do you have any shops within the resettlements? If so, are they well-stocked?

36. Do you have any toilets in your homesteads? If no, where do you relieve yourselves? What do you think might be the effects of this?

37. What types of diseases usual affect you? What might be the causes?
## APPENDIX C: TABLE 4.1 SOCIO-ECONOMIC PROFILE

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## APPENDIX D: A DESCRIPTIVE CHECKLIST

A descriptive checklist (Adapted from MMET, 1997)

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<tbody>
<tr>
<td></td>
<td>Adverse</td>
</tr>
<tr>
<td></td>
<td>ST</td>
</tr>
<tr>
<td>Deforestation</td>
<td>✓</td>
</tr>
<tr>
<td>Illegal firewood</td>
<td>✓</td>
</tr>
<tr>
<td>Use of vegetation in fencing</td>
<td>✓</td>
</tr>
<tr>
<td>Contagious diseases</td>
<td>✓</td>
</tr>
<tr>
<td>Hunting of wild animals</td>
<td>✓</td>
</tr>
<tr>
<td>Lack of soil conservation methods</td>
<td>✓</td>
</tr>
<tr>
<td>Soil erosion</td>
<td>✓</td>
</tr>
<tr>
<td>Lack of toilets and water pollution</td>
<td>✓</td>
</tr>
</tbody>
</table>

**KEY**
- ST – Short Term
- LT – Long Term
- R – Reversible
- IR – Irreversible
- L – local
- W – Wide
- SI – Significant
- N – Normal
- *Negligible
APPENDIX E: LETTER SEEKING PERMISSION TO CARRY OUT STUDY IN MATOBO DISTRICT

9439 Nkulumane
P.O. Nkulumane
BULUWAYO

10 December 2013

The Chief Executive Officer
Matobo Rural District Council
P.O.Box 5730
Maphisa

Dear Sir/Madam

RE: APPLICATION TO UNDERTAKE AN ACADEMIC STUDY IN THE RESETTLED WARDS OF MATOBO DISTRICT

I, the undersigned, Lister Ndlovu, Identification number 39-004212 G39 and Passport number BN 909378, hereby apply for your permission to carry out an academic research/study in the resettled wards 21, 22, 23, 24 and 25 of Matobo District. The study is solely for academic reasons to fulfill the requirements of Msc in Environmental Management which Iam currently studying with UNISA.

The title of my dissertation is: An assessment of environmental impacts associated with the land reform process in Matobo District: Zimbabwe.

I hope my application will reach your maximum consideration.

Yours Faithfully

Lister Ndlovu

Signature ……………………
APPENDIX F: CONSENT LETTER

CONSENT FORM

TITLE OF RESEARCH PROJECT

An assessment of environmental impacts associated with the land reform process in Matobo District: Zimbabwe

Dear Mr/Mrs/Miss/Ms __________________________ Date……./…. / 2014..

NATURE AND PURPOSE OF THE STUDY

Massive and politically-motivated fast-track land reform programmes are likely to be associated with a high degree of environmental degradation. It is, therefore, envisaged that the evaluation of environmental effects associated with the fast-track land reform may lead to the identification of the level of such impacts and environmental vulnerable components of the ecosystem in the study area. This research will focus on the environmental attributes of the ecosystem that may be affected by resettlement in the area and these include vegetation, water, domesticated animals, wild animals, human beings, drainage systems and sources of fuel. Negative effects of these usual lead to environmental degradation. It will further check on the availability of basic needs such as schools, pre-schools, shops, availability of roads and presence of drinkable water among others. These components will outline the effects associated with the land reform programme on the environment. This will highlight the magnitude of the negative impacts of the land reform that need urgent attention. This assessment may contribute towards finding a long term solution that lessens environmental impacts associated with the land reform programme.

RESEARCH PROCESS

1 The study requires your participation as a questionnaire respondent.

2 175 Voluntary respondents will be required and will be recruited from the 5 wards under study in the District.

3 Respondents will be the beneficiaries of the land reform.

4 Basic demographic information will be required from respondents such as gender, age, educational status, profession, occupation, religious affiliation and marital status where applicable. Respondent names and house addresses will not be required.
5 Answer the questions freely as there are no right or wrong answers and your opinion is important to the study.

6 A copy of a written report as feedback about the research project conclusions and recommendations will be shared with participating communities.

7 Focus Group Discussions and In-depth Interviews will be carried in each ward under study on an hourly session.

NOTIFICATION THAT PHOTOGRAPHIC MATERIALS WILL BE REQUIRED

Your attention is drawn to the fact that photographs of your community settings, farms, farming equipment, and house type will be taken for illustration purposes in the study. You will have access to the photographs should you wish to.

CONFIDENTIALITY

The opinions of the respondents are viewed as strictly confidential, and only members of the research team will have access to the information. No data published in dissertations and journals will contain any information through which respondents may be identified. Your anonymity is therefore ensured.

WITHDRAWAL CLAUSE

Research participants/respondents may withdraw from the focus group at any time. Participation in the study is voluntary.

POTENTIAL BENEFITS OF THE STUDY

A series of benefits are to be accrued from the research and these include the following among others; the land reform process must be accompanied by the provision of basic needs such as schools, clinics and drinkable water among others, educating the recipients well in advance before the actual physical occupation of the farms must also be the key component of the land reform and there must be a controlled parcelling out of the land so as to avoid overpopulation and overstocking which adversely impact on the environment. The research will play a significant role in outlining the magnitude of the environmental consequences associated with the land reform. It is further envisaged that the research will provide the much needed information which can be used in future wherever the government undertakes similar land reform processes. It will also highlight the negative aspects of the land reform that need immediate attention. This assessment may also contribute towards finding a long term solution that lessens environmental impacts.
associated with the land reform programme. The need for scholarly research may also lead to knowledge creation in the field of land reform. The research will also provide valuable information on the already existing body of knowledge on environmental effects associated with the land reform programme. The information derived from this project may also assist the recipients (small holder farmers) in dealing with environmental issues under the land reform process. It is further anticipated that the same information will also assist Agricultural Extension Officers in lessening the environmental impacts on flora, fauna, drainage systems, relief and human components of the ecosystem associated with the land reform programme. Finally, it is believed that the outcome of the research will provide an appropriate tool for mitigating the effects associated with the land reform process.

INFORMATION (contact information of your supervisor)

If you have any questions and concerns regarding the study, please note you may contact my research supervisor, Dr BM Petja, at the Limpopo Department of Agriculture, Adaptive Research and Innovation Division. Tel: 015 294 3208, Email: petjamb@agric.limpopo.gov.za

CONSENT

I, the undersigned, ……………………………………………………… (full name) have read the above information relating to the project and have also heard the verbal version, and declare that I understand it. I have been afforded the opportunity to discuss relevant aspects of the project with the project leader, and hereby declare that I agree voluntarily to participate in the project.

I indemnify the university and any employee or student of the university against any liability that I may incur during the course of the project.

I further undertake to make no claim against the university in respect of damages to my person or reputation that may be incurred as a result of the project/trial or through the fault of other participants, unless resulting from negligence on the part of the university, its employees or students.
I have received a signed copy of this consent form.

Signature of participant: ...........................................................................................................

Signed at ................................................................. on ...........................................

WITNESSES

1 ........................................................................................................................................

2 ........................................................................................................................................