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DISSERTATION ON:

AN ASSESSMENT OF THE ROLE OF SMALL SCALE IRRIGATION ON FOOD SECURITY IN DROUGHT PRONE AREAS IN ZIMBABWE: THE CASE OF CHIVI DISTRICT OF ZIMBABWE.

BY

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APPROVAL FORM

The undersigned certify that they have supervised the student Spencer Tagwireyi's dissertation entitled: **An assessment of the role of small scale irrigation on food security in drought prone areas in Zimbabwe: the case of Chivi District of Zimbabwe.** It was submitted in partial fulfilment of the requirements of the Bachelor of Arts Honours degree in Development Studies at the Midlands State University

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DECLARATION

I, the undersigned Tagwireyi Spencer, hereby declare that this dissertation is my own original work and that it has been submitted, and will not be presented at any University for similar or any other degree award.

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Signature Date

DEDICATION

The study is dedicated to my parents for their support and God Almighty for giving me strength and courage to endure in most difficult times during the course of the study.

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ABSTRACT

The study serves to unpack the role of small scale irrigation projects in ensuring food security in ward 11 of Chivi District. The study gave special attention on how the small scale irrigation schemes are implemented in the area, their role in ensuring food security in drought prone areas and the challenges that affect effective irrigation production. Qualitative and quantitative research *methods were used in order to gather the information. The target sample for the qualitative approach was the farmers, community leaders as well as government workers from EMA and AGRITEX whilst the quantitative approach targeting the farmers. Chapter one of the study covers the background of the study. The second chapter discussed related literature on the implementation of irrigation schemes in Zimbabwe, their contribution to food security and the challenges affecting their development. Research methodology is presented in chapter three showing how the data was collected while chapter four present, interpret and analyses the research findings. Chapter five concludes the research and provides recommendations. The main contributions of irrigation projects found includes food production, income which also promote education and health, infrastructure development and peace promotion. However, the major challenges affecting irrigation development includes lack of finance, equipments, knowledge and farming skills, climate related disasters as well as animals and diseases that destroy the crops. From the conclusion and recommendations, the research indicated that small scale irrigation projects play an important role in ensuring food security in drought prone areas despite the existence of many challenges that tries to obstruct progress and irrigation performance.*

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ACRONYMS

AGRITEX	Agricultural Extension
CIC	Community Irrigation Committee
DA	District Administrator
EMA	Environmental Management Agents
HI	Heifer International
Ha	Hectares
MDGs	Millennium Development Goals
NGOs	Non- Governmental Organisations
SSA	Sub-Saharan Africa
SSIs	Small Scale Irrigation
W.H.O	World Health Organisation

CHAPTER ONE: INTRODUCTION

1.0 Introduction

According to Rukuni *et al* (2006) in Nhundu and Mushunje (2010:1), agricultural production has dominated the Zimbabwean economy and it provides income for over 75% of the country's population. Agriculture is the main stem for ensuring food security and better living standards for most rural dwellers in Zimbabwe. About 80% of the rural population lives in agro-ecological regions III, IV and V where rainfall is erratic and unreliable, making rain fed agricultural practices a risky venture (Nhundu and Mushunje, 2010:1). These regions are characterised by recurrent and perennial droughts and thus makes food shortages common. Chivi district is one of the most vulnerable districts to climate change and recurrent droughts. The communities in the area depends mostly on food aid from Non-Governmental Organisations (NGOs) such as CARE International because their crops constantly fails in most cases. High levels of food shortages and poor living standards in the area as a result of the decrease in agricultural production, makes irrigation development a prerequisite. The Government of Zimbabwe (GOZ) has identified irrigation development as a key strategy for drought mitigation. This led to the development of small scale irrigation schemes in dry regions such as Chivi, along water source like perennial rivers and dams.

The major objective of this study is to assess the role of small scale irrigations on ensuring food security in drought prone areas. Nyevedzanai irrigation scheme in ward 11, Chivi district is the case study. The study focuses on how the small scale irrigation projects are implemented in the area, its contributions towards food security in the area and also assessing the challenges which the small scale farmers face in promoting irrigation projects. This chapter outlines the background to the study, problem statement, research aim, research objectives, research questions, and significance of the study, delimitation and limitation of the study.

1.1 Background to the study

Food insecurity is one of the main challenges to Africa's development. The international development community made frantic efforts to reduce the number of hungry and undernourished people in the world by 2015 as enshrined in the Millennium Development Goals (MDGs). However, besides all the efforts by the international community, food insecurity in Africa mostly Sub-Saharan Africa (SSA) still prevails. About 44% of the population in Sub-Saharan Africa estimated to be food insecure in 2011, and according to United States Department of Agriculture (2011), food insecurity is projected to increase by 17 million people by 2021 in southern Africa.

As a result of complex nexus of socio economic, political and environmental factors, Zimbabwe is failing to feed its population of about 13 million people. According to Moyo (2010:30-31) and FAO (2009), points out that climate change related disasters such as droughts and floods, political instability, declining infrastructure, economic challenges, poor government policies and resource prioritization, shortage of agricultural inputs and HIV/AIDS has contributed to poor agricultural production in Zimbabwe since independence. These factors have reduced Zimbabwe from being the bread basket of Africa to a net importer of food and perennial recipient of food aid from international and regional humanitarian organisations. Food shortages in Zimbabwe differs with agro-ecological regions. Nhundu and Mushunje (2008), noted that region IV and V have the highest percentage of the most food insecure households in Zimbabwe. However, the government of Zimbabwe and policy makers have recognized the development of small scale irrigation as a strategy to ensure food security and poverty reduction in drought prone areas, after years of rainfall shortage in the country during the period of 1981-1992. As a result, the Second Five-Year National Development Plan 1991-1995 focused its attention to irrigation development particularly in communal areas and resettlement areas. In 2014, the Department of Irrigation

estimated the area equipped for full control irrigation at 150 000 ha with 26 550 ha under surface irrigation, 112 500 ha sprinkler irrigation and 10 950 ha localized irrigation. Government of Zimbabwe (2013) stated that, in 2012 about 102 000 ha were equipped for irrigation and operational whilst World Bank (2014) argued that 51 000 ha was the actually irrigated area in 2012. The irrigated area in Zimbabwe seems to be more concentrated in Save and Runde catchment and according to the satellite image 40 000 ha out of the total of 51 000 ha are located in Southwest low veld (World Bank, 2014).

Ward 11 lies in Chivi district which is located in Masvingo Province. The irrigation scheme is located 8km north of Chivi growth point along the Tugwi River. The district has a population of about 164 047 people (ZIMSTAT 2012) and ward 11 has about 6 124 and 1166 households. More than 80% of the population depends on subsistence agriculture. The main crops that are produced at subsistence level include rapoko, millet, sorghum, maize, and groundnuts, roundnuts, watermelons, sweet potatoes and pumpkins. Livestock kept at subsistence farming include cattle's, sheep, goats, chicken and donkeys. The district lies in agro-ecological region IV and V, and the area receives annual rainfall of below 600mm (World Vision 1998). Ward 11 is one of the most food insecure among the 14 wards in Chivi district as a result of recurrent droughts and erratic rainfall which consistently hits the area. The communities heavily depends on food aid from international NGOs such as CARE International for food due to consistent failure of agricultural production in the area. This has led to the establishments of small scale irrigation schemes in the area by the communities to address the problem of food insecurity in the area. The ward has four functional irrigation schemes 2 under Tizai community, 1 under Mhiti community and 1 under Nyevedzanai community area.

Particular attention will be paid to Nyevedzanai irrigation scheme in ward 11 Chivi district as a primary case study in assessing the contribution of irrigation schemes towards improving

food security in drought prone areas. The irrigation scheme is under the management of Community Irrigation Committee and encompasses 38 households from the local villages. The scheme initially covers 4.2 hectares of land, with each farmer allocated 4.4m x 180m of land in the irrigation scheme. The farmers mostly produce maize and groundnuts, water melons, pumpkins and round nuts. The scheme has managed to produce and supply the local community and Chivi shopping centre with green maize and the income used to pay school fees and health services for their families.

1.2 Statement of the problem

Small scale irrigations has been discredited by scholars as wastage of resources and ineffective strategy for ensuring food security because of high levels of food insecurity in rural areas despite their existence. This also came as a result of the failure of the previous irrigation projects to recover the cost of establishment and effectively eradicate food insecurity. However, the government of Zimbabwe is now advocating for small scale irrigation development in drought prone areas such as Chivi as a strategy that can improve agricultural production so as to ensure food security in dry areas.

Food insecurity is the major problem in Zimbabwe particularly in rural areas under region 4 and 5 which are characterised by erratic and sporadic rainfall patterns. Climate related disasters such as droughts are the major causes of food shortages in Zimbabwe particularly Chivi District. This has reduced Zimbabwe from being the bread basket of southern Africa to become the most food insecure country in sub-Saharan region.

The development of small scale irrigation has raised conflicting arguments among the scholars about the contribution of small scale irrigations in ensuring food security. Peacock (1995:46) argued that it is far much better to ensure food security through food aid than to invest in irrigation projects. Rukuni (1984:17) also supports the argument by stating that

small-scale irrigations are riddled with many problems that make them fail to bring food security in Zimbabwe and to recover the cost of establishment. However, Mtonga (2014) pointed out that small scale irrigation projects are powerful factors for providing food security, increasing employment opportunities, protection against drought effects and create opportunity for multiple cropping and crop diversification. This necessitates the research to assess the reality about the contribution of small-scale irrigations in ensuring food security in drought prone areas, using Nyevedzanai small-scale irrigation project as the case study.

1.3 Aim

To assess the role of small scale irrigation in ensuring food security in ward 11, Chivi District.

1.4 Objectives

- To assess how the small scale irrigation programme was implemented in ward 11 Chivi District.
- To assess the extent to which small scale irrigation has contributed to food security in Chivi district of Zimbabwe
- To examine challenges faced by the small scale irrigation programme on promoting food security in Chivi District.

1.5 Research questions

- How were small scale irrigation schemes implemented in Chivi district?
- What are the contributions of small scale irrigations on improving food security in ward 11, Chivi district?
- What challenges do small scale irrigation farmers face in promoting irrigation farming in Chivi district?

1.6 Significance of the study

The study is of great importance to different stakeholders interested in the promotion of agricultural production, food security and rural development. The research will help the development practitioners and policy makers to improve their approaches when it comes to poverty alleviation in rural areas through promoting small scale irrigations and to discover new methods of developing the projects.

The district officials will also benefit from the research on whether or not the small scale irrigation projects are effective in addressing food insecurity in the area, and whether or not small scale irrigations should be promoted in order to reduce food shortages in the district. The research findings will also contribute to the body of knowledge which is going to be used by other researchers such as local and international students who are interested in poverty reduction. The study will help the researcher to acquire more skills on how to work and interact with diversity of people such as officials from different organisations and ward 11 residents.

1.7 Delimitation of the study

The research mainly focused on small scale irrigation farmers of Nyevedzanai irrigation scheme in ward 11. Non-small farmers who contributed to the development of the irrigation scheme were included in the research, such as AGRITEX officials, department of irrigations, ward councillor and village heads from which the farmers resides. The research was conducted in ward 11, Chivi district. Chivi district is located in Masvingo Province and it is in agro-ecological region IV and V. Chivi district covers an area of 3534km^2 and total population of 166 049 people and ward 11 have a population of about 6 124 and 1166 households (ZIMSTAT 2012). The district has 14 wards but the researcher focused on one irrigation scheme which is Nyevedzanai Irrigation Scheme in ward 11, Chivi central.

1.8 Limitations of the study

Financial constraints, time and scheduling of meetings with officials are the main challenges that the researcher encountered. The researcher had to employ cheap methods of researching and good time management to overcome the challenges. Access to information is another challenge that the researcher faced because respondents tend to protect information which they regarded as confidential. In order to address this problem, the researcher went to visit the people with approval letter from the District Administrators' Office so as to build trust with respondents. The researcher has protected the information that the respondents provided to make sure that the information is used for study purposes only.

1.9 Definition of key terms

1.9.1 Defining food security

They are about 200 definitions of food security (Smith et al, 1993) and the definition of food security and the concept of food security is difficult to find and being developed and expanded over time. The November 1996, World Food Summit states that "food security exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food that meets their dietary needs and food references for an active and healthy life." This definition became the working definition of United Nations and FAO and it was adopted by 183 countries. World Health Organisation (WHO) goes further to describe food security saying, "food security means that: all people at all times have both physical and economic access to enough food for an active and healthy life; the ways in which the food is produced and distributed are respectful to the natural processes of the earth; the ability to acquire food is ensured; the food is obtained in a manner that upholds human dignity; the food itself is nutritional and personally and culturally acceptable; and both the consumption and production of food are governed by social values that are just and equitable as well as

moral and ethical. Taking from above definitions, food security only refers to the situation when sufficient, safe and nutritious food is available and accessible by all people at all times to maintain a healthy and active life.

1.9.2 Definition of small-scale irrigations

Small scale irrigation refers to an irrigation scheme in which a group of people practice farming and irrigation together, sharing the same source of irrigation water and delivery lines, with joint or individual control of irrigation and farming activities on their plot land(s). Kedir and Alamireuw (2006:17), define small-scale irrigation as an irrigation usually practiced on small plots of land in which farmers have the influence to control and use the level of technology and machinery they can operate. These schemes are in most cases established by farmers and they are managed by the farmers. Small-scale irrigation schemes can be community or individual owned. Smout and Shaw (1994:23), observed that most small scale irrigation schemes serve a group of farmers comprising of between 5 and 50 households. Van't Hof (2001:9), came up with a three dimension definition of small scale irrigations in his irrigation research in the West Africa saying that the command area of the irrigation scheme must be less than 40ha, the average area per farmer is less than 10ha and management of the irrigation scheme is by the whole group of farmers. Seleshi however studied that in India the size of an irrigation scheme can go up to 200ha, but the agreement is on that the irrigation is community owned and small scale irrigations benefits a sizeable number of community members. According to FAO (1997:8) in Zimbabwe, the small scale irrigation schemes usually range from 2ha to 228ha of land but as pointed out by Van't Hof (2001:9) individual plots are usually not more than 10ha.

1.10 Summary

This is an introductory chapter of the study. The chapter introduced the research background and the statement of the problem under study. Research limitations and de-limitation, research aim and objectives, research questions and significance of the study were discussed. Key terms under this study were also defined. The next chapter will focus on the researches carried out by other scholars on the role of small scale irrigation on insuring food security and the challenges which these schemes are facing.

CHAPTER TWO: LITERATURE REVIEW

2.0 Introduction

In this literature review, the researcher's main interest is to acquaint himself with previous findings made by other researchers on the issue of small scale irrigations as a strategy to address the problem of food shortages in drought prone areas. The discussion starts by exploring how small scale irrigations were implemented in Zimbabwe. The contributions of small scale irrigations on food security are also discussed under this chapter and the challenges being faced by irrigation farmers in their quest to promote small scale irrigation production are also discussed. Debates and arguments on the role of small scale irrigations in ensuring food security in drought prone areas are analysed in this chapter. Theoretical and conceptual framework is also discussed. This discussion helps to identify the gaps which the previous scholars left in their previous researches and how the researcher intent to address the gaps. It also helps with the final assessment of the role of small scale irrigation on improving food security.

2.1 Implementation process of small scale irrigation schemes in Zimbabwe

There is a gap in literature on the implementation process of small scale irrigation projects. Many studies by different scholars focused much on contribution of irrigation projects on rural development and challenges which they face. Previous studies also put more effort on assessing the role of government and NGOs on the development of these schemes as a poverty alleviation strategy and little attention was given to the assessment of the implementation of these schemes which is a critical phase on the project life cycle and this phase determines the success or failure of the project.

Project implementation refers to the carrying out, practice, and execution of a plan or any project idea in order for the project idea to take place. It is the third phase of the project cycle

after the initiation and planning phase. This phase is where by the plan is put into action or motion. After the identification and planning of the irrigation projects, the work begins on implementation stage. The duration of the project implementation depends on a variety of factors which includes resources availability and complexity of the processes of implementation.

Successful project implementation requires the participation of the beneficiaries and all stakeholders in the planning and implementation process of the project (FAO, 1996). This helps in creating a sense of project ownership and ensuing commitment to the project. Mushala (1995:141) argued that lack of people's participation in their own projects developments creates a situation whereby the spirit of participation in their project management is undermined. The project planning and implementation phase should allow every member to make decisions and to come up with solutions to the problems that affect or likely to affect them in the future. Underhill (1990) noted that bottom-up irrigation schemes are economically well-organised and efficient and the project can achieve satisfactory production targets and betterment of human welfare unlike the top-down.

Farmers are the most important stakeholders to be involved from the beginning of the irrigation schemes. Stephen (2002) pointed out that the most key stakeholder is the farmer, who, if not properly included in the scheme development, may not feel obliged to play her/his part effectively, thus threatening the sustainability of the scheme. Farmers and other stakeholders should be involved from the planning stage to execution stage which includes clearing of the land, construction of the irrigation infrastructure, and financial contributions for the development of the scheme, labour provision, and selection of the project committee or management members. Allocation or distribution of the land should be done transparently with everyone playing a role during the process. These factors helps to enhance a successful project implementation and thus helps to ensure project sustainability.

Farmer involvement can help to boost resource mobilisation and can enhance cost savings especially if the farmers are expected to contribute to the investment costs. Mekuria (2003) noted that commitment and ownership by the farmers are likely to be attained unless they consider that the irrigation scheme would meet their needs and they have a stake in the equity. Resource availability can determine the success of the project implementation phase. During the implementation of the project the resources are directed into action to meet the objectives of the project plan. The chairperson of the irrigation scheme in most cases direct and manage activities and solve any problem that arise during the course of the implementation phase.

Zimbabwe is good at policy formulation but very poor on implementation which makes most of the country's policies wastages of time and resources. This results in the failure of many project ideas in the country such as irrigation development because of the weaknesses associated with the country's implementation strategies. Lack of budgetary support, politicisation of development projects and activities, corruption and general lack of trust among Zimbabweans are some of the factors which makes poor implementation of development projects in the country.

Most of the available literature about small scale irrigations put much focus on socio-economic benefits of irrigation production on rural development. However, there is need also to look into how these small scale irrigations are implemented in order to identify some of the gaps that hinders the success and full benefit of these projects. The role played by the small scale irrigations in improving household food production has never been more crucial (Magadlela, 1997). The causes of their failure is attributed to unsuccessful implementation of these irrigation projects mainly as a result of lack of farmer participation during the establishment of the projects.

2.2 Small-scale irrigation and food security

IFAD (2001:2) noted that the majority of the poor people worldwide lives in rural areas and still depends on agricultural production for their livelihoods. It is of great importance to raise profitability of the agriculture sector for the benefit of the rural poor by increasing agricultural production or encouraging the farmers to switch to higher valued crops. As a result of food insecurity, in most developing countries especially sub-Saharan Africa small-scale irrigation projects has been brought forward as a strategy to address the problem of food shortages. Nhundu and Mushunje (2008:3) cited Rukuni when he acknowledged that irrigation development represents the important relationship between land resources and water. Small-scale irrigation projects has been hailed as the solution to food shortages in drought prone areas as a result of climatic changes. However, literature from previous scholars give conflicting arguments on the role of small-scale irrigation in ensuring food security with some scholars arguing for and others against the sustainability and viability of small-scale irrigation schemes.

The study on irrigation projects by Ersado (2005) in Ethiopia supports the development of small scale irrigation projects arguing that they have significantly increases food security hence it should be promoted and given institutional support. Besides increasing food security and raw material production, small scale irrigations also promote rural development. Small scale irrigations not only benefit the farmers or meet the targeted objectives of improving food security, but it is also beneficial to the surrounding communities who do not participate in irrigation farming and thus promoting community food security. Rukuni (1984) noted that areas close to the irrigation schemes provide the market for the irrigation products.

In addition, small-scale irrigation promotes crop diversification and multiple cropping, reduce droughts effects, create employment and also address issues of food insecurity and shortages.

Peters (2011) supports the development of irrigation projects arguing that, irrigation farming improves households' physical and economic access to food. Economic access is defined by FAO, (1997) as the ability to purchase food by a household which meets their dietary requirements depending on affordability and need. Crop diversification and economic diversification in general helps in reducing vulnerabilities as a result of external shocks and seasonality of agricultural production in particular.

Small scale irrigation projects create employment opportunities for the rural poor which in return promotes their household food security. Employment promotes food accessibility because it enables the people to purchase food from the income they earned as salaries for the labour in the irrigation schemes. Rukuni (2006), Haddad (2001) and Sithole (1995), in their various studies on the role of small-scale irrigation projects in ensuring food security, all agreed that irrigation projects attract the rural poor from the surrounding dry communities in search of jobs. This shows that irrigation development not only increases food production and availability, but it also creates employment for the local people and generates income which contributes to the growth of the local economy.

Small scale irrigation projects are good sources of income and rural livelihoods for many developing countries' rural dwellers. Carter and May (1997) noted that agricultural production is one of the most important sources of income for rural households in South Africa. This means that small-scale irrigation allows the farmers to increase their income and food production and reduce vulnerability to food shortages and poor living standards caused by the seasonality of agricultural production, external shocks mostly climate change and variability. Sithole (1995) postulate that incomes for irrigation farmers are mostly higher than for non-irrigators. This enables the small-scale irrigation farmers to purchase grains and other food stuff for their families as compared to non-irrigation farmers. Thus shows that irrigation development playsa pivotal role in ensuring food security and economic growth.

Irrigation development helps to bridge dry periods and makes it possible to grow crops with high water demand and also reduce the uncertainties common in rain-fed agriculture. The establishment of small-scale irrigations ensures that cultivation is done all year round and increase food production in an attempt to alleviate poverty. Nhundu and Mushunje (2008) in Zimbabwe, Webb (1991) in Gambia and Christine et al (2003) in Ethiopia in their studies on irrigations agreed that small-scale irrigation have potential for reducing poverty in rural areas and improve rural livelihoods. Irrigations in drought prone areas play a major role in complementing the rains and reduces the impact of climate change and variability.

Sithole (1995) have undertaken a cost benefit analysis in his irrigation study and he noted that small-scale irrigation projects increase household food security in areas characterised with poor rainfalls. However, some scholars criticise the viability of small scale irrigations basing their arguments on cost-benefit analysis. Peacock (1995:46) argued against small-scale irrigations postulating that it is cheaper to ensure food security among the communities through the use of food aid than to develop and invest in irrigation. Rukuni (1984:17) in Mtonga (2014) he questioned the viability and sustainability of small scale irrigations as a strategy that can bring about food security in Zimbabwe as most of the schemes failed to recover the costs or capital for establishment. Mtonga (2014) cited the SADC report (1997:4) when it criticised the role of small scale irrigation on food security because of their failure to recover the development costs and working capital. This makes the irrigation projects economically unviable and not worth to invest in. Webb (1991:31) supports the above criticism in his researches in Zambia by pointing out that to get high incomes from irrigation projects there is need to invest more in construction, trade and production which makes it an expensive project.

2.3 Challenges facing small scale irrigation farmers

The role, development and sustainability of small scale irrigation schemes in Zimbabwe is affected with a number of factors. FAO (1997) have highlighted some of the constraints faced by small scale irrigation farmers in Zimbabwe and these includes technical issues, management and governance of the schemes, financial constraints for capital and operations, environmental and climate related challenges and also policy related issues and they greatly affect the role of small scale irrigations in ensuring and improving food security in the country. SADC (1997) have ruled out the role of small scale irrigation in ensuring food security as economically unviable and of negligible importance on improving national and household food security.

For establishment, operations and maintenance of small scale irrigation schemes, there is need for large amounts of capital for it to be viable and sustainable. FAO (1997b), noted that high cost of irrigation development is hampering the development of small-scale irrigation schemes. Farmers lack proper title deeds and land rights which make it difficult to access credit lines that will help them to make large investments in their farms. This lead to low level of productions and incomes for the farmers. Most of the small-scale irrigation schemes in Zimbabwe are in communal areas where the farmers lacks title to the land hence this affected the confidence of the farmers to invest on the land in terms of high quality infrastructure because the land do not belong to them. Financial constraints in the country have been made worse by the decline in economic growth that has reduced capital accumulation in the last decade. The study aimed at identifying how financial and operations capital affects the performance of irrigation schemes in Chivi District.

Land rights and title deeds is another challenge faced by smallholder irrigation farmers in Zimbabwe. Title deeds can be used as collateral security that can enable farmers to access loans and credits for the development of their irrigation projects. The type of title deeds a farmer holds has an impact on the level of development or investment that can be done by the farmer on the irrigation scheme. FAO (1997b), the lack of land titles among the farmers in Zimbabwe affect their capacity to manage and invest in irrigation projects. As a result, the land under irrigation in Zimbabwe has not been improved. Nhundu and Mushunje (2010) state that about 13% of the irrigation farmers in Zimbabwe had 99-year leases which guaranteed the right to hold the land for a long period of time and enables them to invest much in irrigation production. However, land rights is a serious impediment to the success of small-scale irrigation farming because 65% (leasehold) and 22% (no title deeds or lease) of farmers lacks proper title deeds that can enables them to seriously invest in irrigation farming. Hence the study aimed to see whether land rights are of serious concern for the success of small scale irrigations in Chivi District.

The size of an irrigated or cultivated land in an irrigation scheme per farmers or household is another area of concern in assessing the problems which the farmers face. Farmers must have a piece of land that can enable them to make a reasonable production. A study by the Ministry of Finance and Economic Development (2010) and Tesfay (2008) in the Tigray and Amhara regions of Ethiopia indicated that about 23% of the farm households own piece of land less than 0.5ha and 83% for those who owns less than 1ha. In most of the irrigation schemes in Zimbabwe, farmers have pieces of land which range from 0.2ha to 0.5ha which makes it difficult for farmers to make any meaningful production.

Access to markets is another barrier to the success of small scale irrigation farming in Zimbabwe and many other developing countries. The studies done in East African countries shows that markets are not equipped enough to serve the needs of poor farmers. Long

distance from the markets in most East African countries further worsened the situation, with almost more than half of the population surveyed travel a distance of about five hours to the market centres. Makombe and Symbatha (2003) supported the view that access to markets is of great importance saying that the success of small-scale farmers is dependent upon the marketing of their outputs. Smaling et al (2006) and Ariga et al (2006) in their irrigation studies have looked on the application of fertilisers in Ethiopia (14kg/ha), Kenya (30kg/ha) and Uganda (1kg/ha) and they noted that the average application rate of fertilisers is far much less than that of the world average per year of 100kg/ha. The situation in Africa is further worsened by the dilapidated communication and transport structures in rural areas, thereby making it difficult for farmers to access output and input markets. Therefore, the study examines this literature in order to see whether the farmers under the case study are facing the similar challenges.

Poor infrastructure in rural areas mostly in developing countries is another challenge that undermines the performance of small scale irrigations in ensuring food security. Salami et al (2010) have studied smallholder irrigations in East Africa and their constraints and found out that poor infrastructure continues to slow down agricultural practises in Africa. The major challenges facing small holder farmers in East Africa are inadequate and poor conditions of transport systems and market facilities which includes rail and road. An example given by Salami et al (2010) of Kenya which the smallholder farmers are experiencing was high transport costs for their agricultural products to the market and inputs to their fields and thus reducing the farmers' competiveness. In Zimbabwe, most of the rural areas are characterised with poor road networks and poor access to markets as a result of long distances to the markets. The study seeks to examine if poor road infrastructure affect the performance of small scale irrigation in food production in Chivi District.

Location of the irrigation scheme also determines its success or failure. If the irrigation scheme is located in an area with poor roads it becomes difficult to access. Transporting irrigation products to the market and inputs to the irrigation fields becomes difficult as a result of poor roads. Difficulties in transporting agricultural inputs will affect farming operations and thus leading to poor performance and production of the irrigation projects and this will lead to the questioning of their viability. Poor roads also affect the movement of technicians around the irrigation scheme when doing maintenance work.

Small scale irrigation management issue also affect the performance of the irrigation projects. In most cases, what determines the success or failure of an irrigation projects is the quality of management, instead of the size of the irrigation scheme and who owns it and controls the system. The causes of government owned irrigation schemes' collapse in most cases is attributed to poor management by farmers and the use of top down approach by AGRITEX officers. Lack of communities' participation on the inception of irrigation projects affect sustainability of the irrigation schemes (IFAD, 2005:6). Community participation from the beginning of any project is the baseline survey for the success of the projects to the final implementation. If the community is side-lined, it might persuade politicians or community leaders to block any development.

2.4 Theoretical/Conceptual framework

This research is grounded on Sustainable Rural Livelihoods approach which was propounded by Ian Scoones in 1998. This approach is the centre for rural development, environmental management and poverty reduction debates. According to Chambers and Conway (1992) a livelihood refers to the comprising of capabilities, assets (material and social resources) and activities needed for a means of living. The sustainability of a livelihood depends on its ability to cope with and recover from shocks and stresses, enhance or maintain its capabilities

and assets, while not undermining the natural resource base. The approach pointed out that for poverty reduction and rural development to be achieved people should combine the available livelihood resources (natural, social, economic and human capital) which they have control and access to, and use them in a sustainable manner in order to achieve the outcomes they want. This means that people in drought prone areas should make use of land, water and other natural resources available which they have control over in order to promote food security. The theory can be applied at different levels from individuals, household and national level.

There are three broad types of livelihood strategies within the sustainable livelihood approach which includes agricultural intensification or extensification, migration and livelihood diversification. The study focused on small-scale irrigation practices as a form of agricultural intensification (livelihood strategy). Small scale irrigation refers to an irrigation usually practiced on small plots of land in which farmers have the influence to control and use the level of technology and machinery they can operate (Kedir and Alamireuw, 2006:17). Therefore the approach was used in the study to measure the sustainability of Nyevedzanai small-scale irrigation project as a livelihood strategy created by the community in order to promote food security and also to identify the link between sustainable livelihoods and poverty reduction and rural development.

2.5 Chapter summary

The literature reviewed above looked at the implementation process of small scale irrigation schemes in Zimbabwe. The implementation process of irrigation schemes in Zimbabwe has been discussed. The contributions of small-scale irrigation projects on food security have been explored and the challenges that undermine the performance of irrigation farming identified. Arguments and debates for and against promoting small-scale irrigations among

the scholars have been discussed, with some scholars advocating for the schemes because of their benefits whilst others arguing against the schemes postulating that it is wastage of resources as the schemes failed to recover the cost of establishment. The next chapter discusses the research methodology.

CHAPTER THREE: RESEARCH METHODOLOGY

3.0 Introduction

Irny and Rose (2005) defined research methodology as a path to systematically address the research problem. This chapter gives a description of how the research was conducted and the approaches that the researcher employed in doing the research. The data collection methods which the researcher used are explained below and this includes sampling and the sampling techniques which the researcher used to select the respondents. Ethical considerations, research design, and administration of the data gathering and an analysis plan of information will be outlined. The researcher used the mixed methods approach in collecting the data on the assessment of the role of small scale irrigation on ensuring food security in drought prone areas. Interviews, observations, focus group discussions were used for collecting information from different sources of information concerning small scale irrigations in ward 11, Chivi District.

3.1 Research design

According to Carriger (2000), research design can be defined as the strategy, plan, and the structure of conducting a research project. The researcher have made use of the qualitative approach as the main paradigm and triangulated it with the quantitative approach so that these methods can support each other to overcome the weaknesses associated with using a single method. The advantage of qualitative method is that it seeks to understand the perspectives of the local people under a given research topic or problem. The researcher have used the three common qualitative methods of data collection, in-depth interviews, focus group discussions and participant observation. Quantitative research method was also used because it helps to gather data that are projectable to a larger population and it easily translate data into quantifiable charts and graphs.

3.2 Data sources

The researcher has made use of primary and secondary data. Community leaders, the farmers and officials from the ministry of agriculture and AGRITEX officers were the primary data sources and they provided data through interviews and focus group discussions. The textbooks in the library and internet sources were the main secondary data sources. Some of the secondary data were gathered from the minutes, reports and records from the ward councillor, the irrigation scheme secretary and AGRITEX offices.

3.3 Targeted population

Parahoo (1997) defined target population as the total number of respondents from which the data can be gathered. The participants involved in this study includes farmers from Nyevedzanai Irrigation Scheme, government ministries and departments involved in the development of small scale irrigations and food security in Zimbabwe, particularly Chivi District. AGRITEX and EMA are some of the organisations from which the information was collected. The research mainly targeted the farmers who are involved in irrigation farming as the main plays in finding out whether the small scale irrigation played a major on addressing the problem of food shortages in the area.

3.4 Sampling

Sampling is the process of choosing a few representatives from a larger group and thus gives rise to the sample population (Marimba and Moyo: 1995). Cooper and Schindler (2006) argue that the basic idea of sampling is that, through the selection of members of the population, the researcher may draw conclusions regarding the entire population, where sampling refers to the process of selecting elements to observe. The study involves thirty seven participants which includes small scale farmers who practice irrigation production in Ward 11 Chivi district, AGRITEX officers, EMA officers and community leaders. The respondents were

purposively and randomly chosen for interviews and questionnaire respondents. The researcher have also included the headman and village heads of the area because there are the owners of the land and they play a pivotal role in monitoring the environment which makes the projects sustainable.

3.5 Sampling Technique

3.5.1 Purposive sampling

In this study, purposive sampling was used so as to easily identify small-scale irrigation committee members who have and are still working in the irrigation scheme. This sampling technique is based on key informants. The respondents include the irrigation chairperson and vice chairperson, secretary and treasurer who take part in the irrigation project and were consent and willing to participate in this study. The research also used purposive sampling for one official from ARGRITEX, EMA and community leaders which includes four village heads who are close to the irrigation scheme and the councillor. This sampling technique was used by the researcher because it saves time and thus the research will not be prolonged.

3.5.2 Simple random sampling

Simple random sampling was used for selecting questionnaire respondents. Cooper and Schindler (2003) defined simple random sampling as a design in which the cases that will make up the sample are chosen in a single process of selection from the sampling frame that covers the entire target population. The respondents were listed on a sheet of paper with their names numbered and their numbers were put in a closed box. The research then handpicked the numbers representing the names of the farmers and 30 farmers were randomly picked from a total of 38 farmers. The researcher made use of this technique because each sample population have an equal opportunity to be selected and it is the only method that is without

bias. This sampling technique was used for selecting small scale irrigation farmers in ward 11 for questionnaire administration.

3.6 Data collection: Methods and Instruments

3.6.1 Interviews

Interviews were used in the study in order to gather information from key informants such as the irrigation chairperson and committee members, the ward Agricultural Extension Officer, the ward councillor and the village heads close to the irrigation scheme. Semi-structured questionnaires were employed to guide the interviews. This data collection method has helped the researcher to gather in-depth information from the interviewees on their understanding, perceptions, definitions and meanings of situations under study. It also helps the researcher to measure the attitudes of respondents on the role of small scale irrigations in ward 11 in ensuring food security. The researcher interviewed each member from the selected households and key informants such as local village heads and headman who take part in the establishment and implementation of the irrigation scheme and how it contributed to food security in the area.

3.6.2 Observation

In this research, the researcher also used observation. This is the process whereby the researcher will go around seeing what is really happening on the ground for example watering the plants. This method of data collection helped the researcher to adapt to events as they occur and to identify some of the challenges which these farmers are facing. The researcher managed to use a checklist that guides him on his observations.

3.6.3 Document review

Document review is another data collection method which the researcher used in gathering secondary data. The researcher have reviewed the minutes of previous meetings, reports and project proposals so as to gather first-hand information from the irrigation committee, relevant ministries and organisations.

3.6.4 Focus Group Discussions

Two focus group discussions were conducted on different days with different respondents of 5 farmers per group. A focus group discussion is a carefully planned discussion intended to obtain awareness on a defined area of interest. Sihwa (2014), states that the number of respondents in a focus group discussion should not exceed 10 people. During the discussions, the researcher monitors, facilitates, records the responses and less act as an interviewer. These discussions took place between the groups of selected individual and the researcher. Teddlie (2009) noted that focus group discussions allow the researcher to study how the respondents react to each other. The researcher used this method because it allows more people to participate in a friendly atmosphere and to express their feelings as a group towards the research problem and it allow a cross conception of ideas from different social groups.

3.7 Ethical consideration

Research ethics as a concept refers to a complex set of standards, values and institutional schemes that help constitute and regulate scientific activity. The permission to undertake the study was granted by the District Administrator, the ward councillor and the Headman to carry out the research. Confidentiality and protection of individual dignity was made for each participants and respondents. Confidentiality of respondents was promoted through anonymity such as not writing names on the questionnaire and thus protecting the privacy of the participants. The researcher informed the participants that the information they provide

was going to be used for the research purpose only and the respondents are protected by the Nuremberg code of 1948.

3.8 Chapter Summary

The chapter discussed the research methods and design used in the study and methods of data collection. The study has employed qualitative methodology. The chapter also looked into sampling, sampling techniques and methods used in collecting data. The interviews using open and closed ended questionnaires were also discussed. Other data collection methods such as observations and focus group discussions which were used by the researcher were also discussed in detail. The next chapter is going to discuss data presentation and analysis of major research findings.

CHAPTER 4: DATA PRESENTATION, ANALYSIS AND INTERPRETATION

4.0 Introduction

This chapter presents the research findings of this study. The main headings of the findings in this chapter include the implementation process of small scale irrigation schemes, followed the contribution of small scale irrigation projects towards food security and lastly the challenges which the small scale farmers are facing in a bid to promote irrigation farming in Chivi District. The research findings are presented in a manner that helps to address the research questions.

4.1 Implementation process of small scale irrigation project in Chivi District

Nyevedzanai irrigation scheme was re-established in 2014 according to the ward councillor after it was officially opened in 1990 and collapsed. He also indicated that it is community owned because the farmers are the ones who have established it. One of the irrigation scheme committee member stated that the scheme was a brainstorm of 4 community members who decided to make their own irrigation scheme and later other peoples started to join them. One of the re-founders of the irrigation scheme have indicated that they were four when they started the project and other members joined later after seeing the progress and their seriousness and he pointed out that the idea came when they were drinking beer with his friends. Thus marks the beginning of project implementation which is the most vital aspect within a project cycle. This phase determines the success or the failure of a project.

The table below shows all the stakeholders and beneficiaries who were part and parcel of the small scale irrigation project when it was implemented. During one on one interviews and focus group discussions, 90% of the farmers and 50% of the village heads have indicated that they participated during the implementation of the Nyevedzanai irrigation scheme. The farmers also indicated that the councillor and officials from the government departments also

participated on the establishment of the irrigation scheme and their contribution plays a very important role for the success of the irrigation scheme. The councillor has said that participation of farmers on the establishment process of the irrigation scheme creates a sense of ownership and this was supported by the farmers during the group discussions saying that because they have put their hands on the establishment of the irrigation scheme, they own it.

Table 1 participation of the farmers and stakeholders during the implementation process of the irrigation scheme

Names	***Total***	***participated***	***Not participated***	***Percentage (%) of participated***
Small scale farmers	30	27	3	90
Councillor	1	1		100
Village heads	4	2	2	50
EMA officer	1	1		100
AGRITEX officer	1	1		100

The above table indicates that 10% of the farmers did not participate during the implementation phase of the irrigation scheme. These farmers rent the pieces of land from the original owners of the land because the owners are failing to utilise the land. One of the respondents said that the farmers are allowed to lend their land in order to avoid paying the penalty fee for failing to use the land. Among the interviewed village heads, 50% of them are not part of the irrigation scheme that is why they did not participate during the establishment of the irrigation scheme.

All the respondents believe that everyone have played an important role during the implementation of the irrigation scheme. The farmers also believe that every member of the irrigation scheme has done something important for the success of the project implementation. The councillor has indicated that he put tremendous efforts for the success of the project through sourcing resources materially and financially. He pointed out that he managed to talk to the Heifer International and they have provided fuel pump, fencing materials and water pipes and this was supported by 43% of the farmers whilst 57% believes that he did not done enough because they have already bought their pump although it was small. However, the farmers and traditional leaders were in agreement that every member have participated equally according to his/her ability and capability through monthly subscriptions, clearing of land and duties for protecting their plants from monkeys. Their involvement during the implementation phase gives them confidence that they own the scheme and thus insures project sustainability.

4.2 Small scale irrigation projects and their contribution to food security in Chivi District

4.2.1 Contributions of small scale irrigation projects to people's lives in Chivi District

Fig 1 below shows the main contributions of small scale irrigation projects to the people's lives in Chivi District according to the respondents. All the respondents indicated that irrigation projects are contributing to their lives through improving food security in the area. They believe that irrigation projects act as a panacea to climate related disasters mainly droughts and rainfall shortages which make the area suffer from food shortages. One of the farmers indicated that:

"Irrigation project is the only solution to droughts and rainfall shortages in this district. It enable us to grow even in dry seasons and we are lucky that our community is close to the

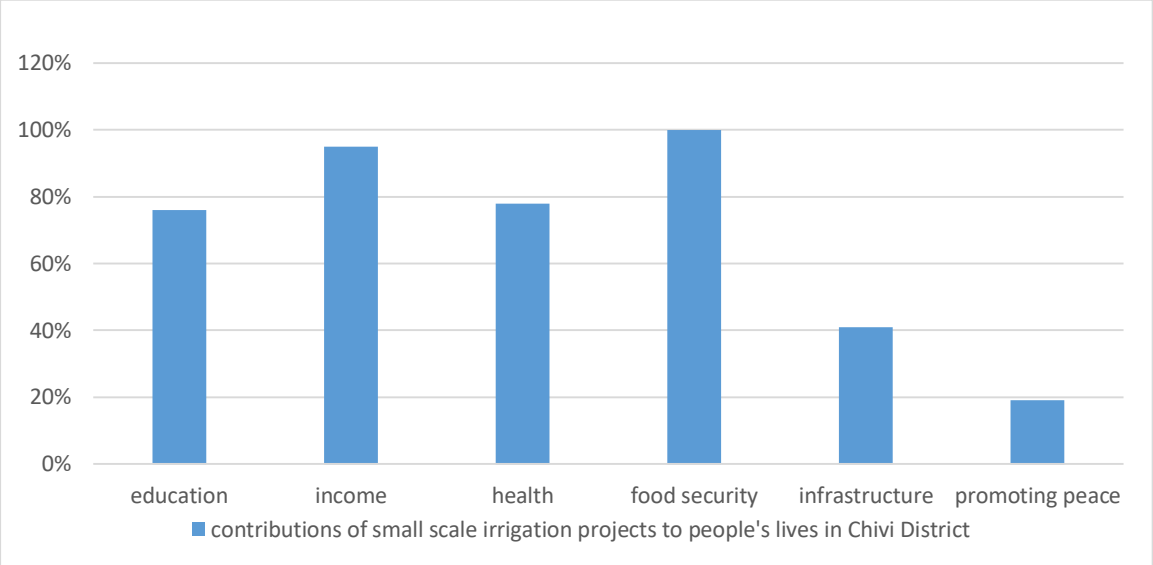
water source. Since the establishment of the scheme, I'm sure that every member have enough food to eat with their families and to some extent surplus food".

Also 76% and 78% of the farmers said irrigation projects have improved their education and health status in their communities whilst 95% acknowledged that irrigations act as a source of income with an average income of $50 per farmer at their first harvest of 2017 from the selling of green maize and it helps them generate money for paying social services such as health and education and also as a source of capital to start other projects such as poultry. The irrigation chair has pointed out that:

"Every farmer got an average of $50 from this year's first green maize harvest. This irrigation project is boosting farmer income beyond their expectations and some of them are advocating for the expansion of the scheme so that they can increase their production".

From the income generated, 41% of the respondents indicated that small scale irrigation helps to promote infrastructural development and thus improving their lives. However, 19% of the respondents indicated that irrigation projects have also promoted peace among families and even in their communities.

Fig 1 contributions of small scale irrigation projects to people's lives in Chivi District



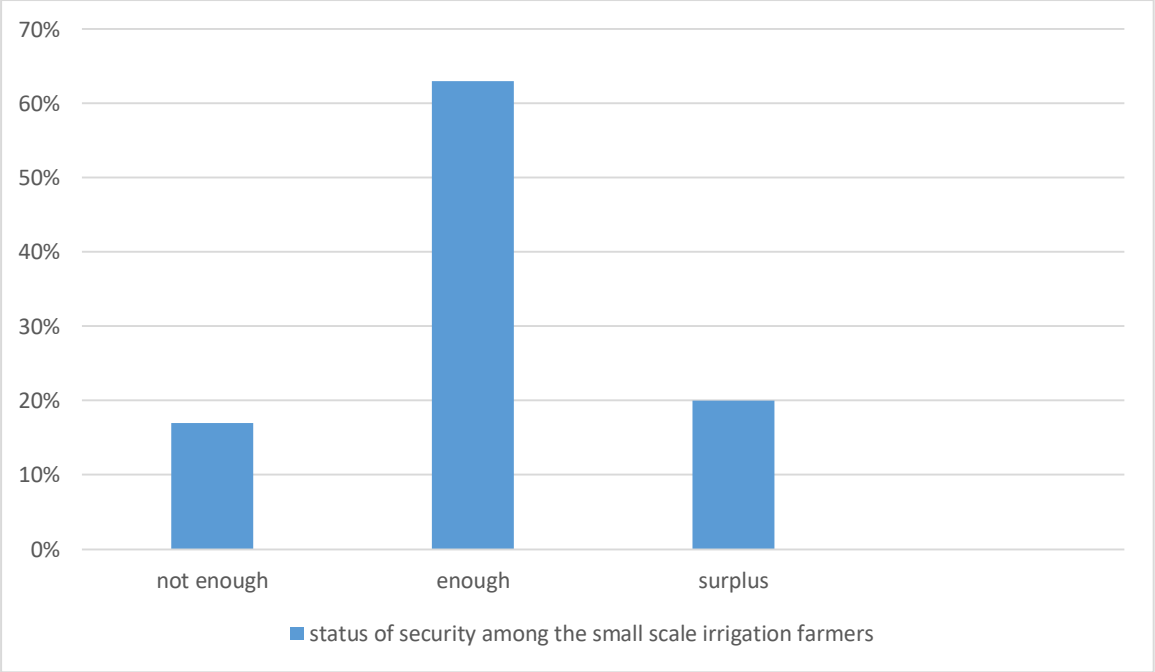
4.2.2 Food security status among the small scale irrigation farmers

When the farmers asked about the status of food security in their households and communities, 63% of the small scale irrigation farmers appreciated that they have enough food to sustain their families and 20% with surplus food. However, 17% of the respondents has pointed out that small scale irrigation projects are failing to ensure food security by indicating that they do not have enough food to sustain their families to the next harvest. One of the reasons why the irrigation scheme is failing to produce enough food for other members' families is because their portions of land are too small to produce enough food for their households. However, the findings shows that 83% of the respondents said they have enough food to sustain their families and this shows that small scale irrigation projects in Chivi are helping the farmers to meet their food needs. The ward has indicated that:

"…irrigation farmers have better food security status that non-irrigation farmers because they produce food all year round and non-irrigation farmers only wait for the rain season to grow their crops which in most cases fails due to the occurrence of recurrent droughts in the area. Some of them can even sale their produce because they have more than enough for their household consumption…"

Fig 2 below shows the above findings on the status of food security in Chivi District as a result of small scale irrigation projects.

Fig 2 status of food security among the small scale irrigation farmers

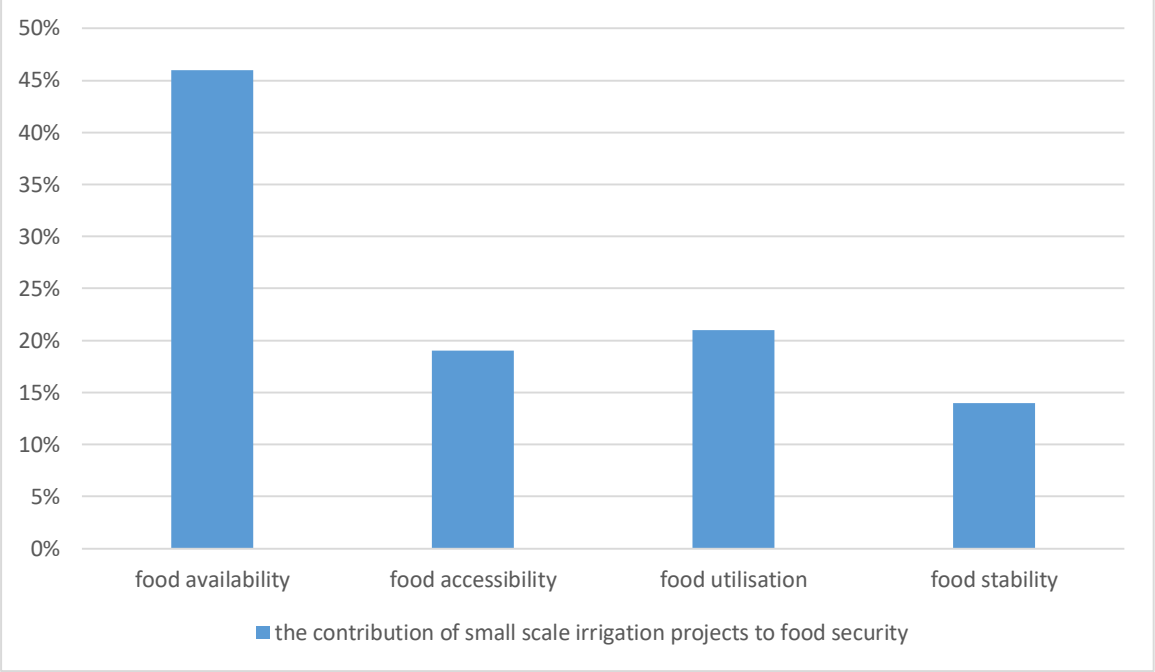


4.2.3 The contribution of small scale irrigation projects to food security

Fig 3 below shows the response of the farmers when asked how the small scale irrigation projects contributes to food security, 46% believes that small scale irrigations ensures food security in the community through making food available. WFP (2009) noted that food security deals with the amount of food that is present in a particular community through all forms of domestic production, food aid, imports and food stocks. About 19% supports the aspect of food availability but put more emphasis on food accessibility. The communal leaders with the AGRITEX officer agreed that food can be available in sufficient quantities in a certain area but the people will fail to access it. Small scale irrigations make households to produce their own food and that's easing food access problems. Also 21% and 14% of the farmers said that small scale irrigations promote food security through food utilisation and stability. They indicated that irrigation enable the farmers to grow variety of crops which

include maize, ground nuts, round nuts, traditional and modern vegetables, pumpkins and watermelons. On the stability side, the respondents said that small scale irrigations help to reduce the impact of factors that affect food stability directly and indirectly. These factors include climate change political instability and instability of market price.

Fig 3 shows the contribution of small scale irrigation projects to food security



Farmers' reaction towards the role of small scale irrigation projects in insuring food security in the area shows that they positively support the efforts of irrigation projects on food security. One of the farmers has pointed out that:

''We are now eating four meals per day as compared to one or two per day before this irrigation scheme was established''.

This shows that the farmers acknowledged the role being played by the irrigation project in order for them to meet their dietary needs and enough meals expected for a human being to eat per day under normal circumstances.

4.3 The challenges facing irrigation farmers of ward 11 in Chivi District

Small scale irrigation farmers and the communal leaders were asked about the challenges which they are facing, all (100%) of the farmers indicated diseases and animals destroying the crops, dangerous predators in the water source, lack of equipments and adequate infrastructure, limited government support and lack of fertilisers and seeds as the major challenges. This shows that all the respondents believe that these are the major challenges hindering the performance of irrigation projects and all the development efforts of agriculture sector in the area.

4.3.1 Lack of finance and infrastructural development

Qualitative findings indicated that lack of finance and infrastructural development are the main challenges affecting irrigation projects. The councillor of ward 11 said that:

''...lack of finance is the major stumbling block and the main challenge hindering the success of irrigation projects. Lack of finance also affects the development of infrastructure such as tanks and canals which are vital for irrigation production...''

4.3.2 Animals destroying the crops and predators in the water sources

About the animals destroying the crops and dangerous predators in the water sources all farmers have said that these challenges are part and parcel of the main challenges affecting the development of irrigation project. The farmers have indicated that monkeys eat the maize cobs when they start to develop up to harvesting stage. The irrigation chairperson has pointed out that:

''...monkeys are the biggest challenge especially when the maize start to develop the maize cobs and it also eat the harvested maize even at your house...groundnuts, roundnuts and

vegetables are also at risk of being destroyed by the monkeys, but we are doing duties of 2 members per day in order to protect our plants from the animals…''

4.3.3 Small size of land allocated to the farmers

About 92% of the farmers indicated that small portions of land allocated to the farmers is another barrier that block the quest to promote small scale irrigation development in order to ensuring food security in the area. These farmers believes that the irrigation scheme is too small for a meaningful production with each member allocated 4.4m by 180m of land. They also said that they have large families and they want a large amount of land that can enable them to produce enough food to carter for their families. One of the farmers said that:

''…the land which we were allocated is too small for producing food that is needed by my family because we depend on agriculture as our main source of livelihood. I spend much time and energy in this irrigation scheme but the produce is very little than I get from my fields. This is because the land is too small but the irrigation is very good as a strategy to reduce the impacts of climate change…''

4.3.4 Lack of government support, fertilisers and seeds

Another challenge indicated by the farmers was lack of government support and also lack of fertilisers and seeds. All (100%) of the farmers said that the government is failing to support its citizens to develop project that can improve their lives. They also said that they are facing the challenge of accessing fertilisers and seeds due to financial constraints and this draws back their progress. One of the committee members has pointed out that:

''…in 2015 our production was poor because the farmers did not have access to fertilisers and seeds. We have planted maize seeds from the maize which we have received from CARE for consumption. The government was supposed to support us through providing seeds but it

failed and I say because they were not willing to help us. They only come when the time of votes is close…''

4.3.5 Limited knowledge and farming skills

The findings also show that 88% of the farmers indicated lack or limited knowledge and farming skills as another impediment to the success of irrigation projects in the area. About 44% pointed conflicts within the committee as another problem which is caused by lack of education and management skills among the committee members. Some of the members do not want to cooperate or to be told instructions by a women and that is affecting progress. The extension officer indicated that: ''*…successful irrigation production requires good application of farming skills and this can be acquired through education and good management of the irrigation scheme…''*

4.3.6 Lack of access to markets and theft

Another 75% said that access to markets is also a challenge which the farmers are facing whilst 25% indicated theft as another challenge to the success of irrigation projects in the area. Most of the farmers lack farming knowhow. The farmers have pointed out that there is much competition in the markets and there is however need for the farmers to commit themselves to their work so that they can produce competitive goods on the market.

4.3.7 Climate change and climate related disasters

Climate change and climate related disasters are some of the challenges affecting the performance of irrigation projects in the area as indicated by 45% of the farmers. Floods caused by heavy rains have resulted in the destruction of crops and irrigation infrastructure. One of the irrigation committee members pointed out that:

''...heavy rains this year 2017 which resulted in massive destruction of the environment and infrastructure *has also affected us by destroying our fence, water pipes and washing away of our pumpkins and watermelons. Thank God our pump was not there because other people's pumps have been swept with the waters...''*

Table 2 challenges affecting the performance of small scale irrigations

Challenge	**%**
Diseases and animals destroying crops	100
Dangerous predator in the water source	100
Limited knowledge and lack of farming education	88
Theft	25
Small portions of land	92
Lack of equipments and adequate infrastructure	100
Leadership conflicts	44
Lack of access to markets	75
Limited government support	100
Lack of fertilisers and seeds	100
Climate change and natural disasters	45

4.4 Conclusion

The chapter presented and analysed the findings collected from the farmers and relevant key informants using the mixed methodology approach. The data was collected from the small scale irrigation farmers using structured questionnaires. In presenting the data, the researcher have made use of tables, graphs and figures and explanations. The next chapter discusses the summary and conclusions of the study and finally provides the recommendations.

CHAPTER 5: CONCLUSION

5.0 Introduction

This chapter summarise the whole research. The research problem, literature and research methodology is also summarised under this chapter. It also revisits the research objectives and provide a summary of the data analysis and research findings. The chapter also outlined the conclusions and recommendations deduced from the research findings.

5.1 Summary of the study

The study titled the role of small scale irrigation in ensuring food security has been an evaluative research using the case study of Nyevedzanai irrigation scheme in ward 11 of Chivi District, in Zimbabwe. The objectives of the study are: to assess how the small scale irrigation was implemented in Chivi District, to evaluate the extent to which the small scale irrigation is ensuring food security and lastly to assess the challenges affecting the development and performance of the small scale irrigation scheme in Chivi District.

The first chapter is an introductory chapter. It looked on the background to the study, problem statement, the research aim and objectives and the overall layout of the study. Chapter two discussed the literature of previous studies on food security and small scale irrigations. The literature reviewed how small scale irrigation projects are implemented, the role of irrigation projects in food production and the factors affecting irrigation production in drought prone areas are explored using various examples in Zimbabwe and abroad. The third chapter has presented the research design and data collection methods. The research have used the mixed method approach which is a combination of qualitative and quantitative approaches. The sampling techniques and primary and secondary data sources were discussed. Interviews, focus group discussions and observations as data collection methods and semi-structured questionnaires and interview guides as instruments were analysed.

Chapter four finally presented the research finds derived from analysis of data collected from the farmers, community leaders and other various documents. Chapter five concluded the research by summarising the research findings and give the conclusions and recommendations for future researches.

5.2 Conclusions

The research findings revealed that project implementation is the most important phase during the project life cycle. The findings shows that about all (100% of the respondents) the farmers and the community leaders agreed that during project implementation it is important for the community to be involved from the beginning of the project. The respondents believed that their participation is the most important thing in order for the project to be successfully implemented. They should be involved in choosing the irrigation committee members. District authorities and traditional leaders should participate because their involvement make the work easy, upholding equality is important in buying inputs, decision making, planting and watering of crops is important for success and conflict prevention among the members.

The findings also shows that the community is now food secure as a result of the establishment of the irrigation scheme. The results indicated that 83% of the respondents have enough food for their households with 20% among them having surplus as a result of the irrigation production as of 2016. However, the farmers pointed out that their plots are too small for them to produce enough food because they have large households and for them produce surplus, they need more land so that they can produce more for selling and get income.

It is believed among the farmers that small scale irrigation projects play a very important role in people's lives through the production of food, income, promoting health and education,

infrastructural development and promoting peace among the families and the community as well. The findings indicated that food security is the major contribution of small scale irrigation projects (100%) and income with 95% which they use to finance social services such as education and health. Qualitative data have pointed out that small scale irrigation projects is the solution to climate related disasters which are causing high levels of suffering due to food shortages in rural areas such as Chivi District.

Small scale irrigation ensures food security in dry areas through making the food available, accessible, utilised and stable. Food can be available through various means such food aid, imports but it does not mean it is accessible or utilised or stable. The research findings have indicated that irrigation production enables the people to produce food they want and thus makes it easily accessible and available. Also irrigation production promotes food stability as a result of reduction in effects of climate change to crops.

The findings also indicated that there are a number of challenges which are drawing back progress. These challenges include animals and diseases destroying the crops, lack of finance, equipments, knowledge and farming skills, limited government support and lack of fertilisers and seeds, climate change and climate related disasters and also the land allocated to them is too small for meaningful production. Animals and diseases destroying the crops, lack of equipment, limited government support and lack of fertilisers and seeds are major challenges facing the farmers and these problems are affecting irrigation production. Sometimes farmers grow their plants late due to lack of seeds and this affects progress.

Lack of knowledge and farming skills also affect irrigation production. The farmers lack the skills needed for good farming practices. Climate change and climate related disasters such as floods and heavy rains also affect production. Heavy rains and floods are destroying

infrastructure and equipments such as water pipes. Crops have swept away with the heavy rains floods of 2016/2017 season and thus causing a loss for the farmers.

Also the plots size are too small for a meaningful production. Some farmers have large families and what they produce from the irrigation scheme is for consumption only and nothing to sell. The farmers requires enough land that they may produce in surplus.

5.3 Recommendations

Government should work with the communities in addressing the problem of food insecurity through establishing irrigation schemes and support them with agricultural inputs, equipment and farming skills. The government should also be part and parcel of every development activities in the rural areas and this can help it to identify the challenges facing the people and help them to address them.

The peoples should be encouraged to venture into other livelihood activities such as small businesses and poultry projects that can promote food security as well as income generation. Projects diversification is important for boosting the local economy, supplementing household income and food security. A project can generate start-up capital for another and in turn the other project can also help finance operations of the first. This means that projects can help each other for them to survive.

There is need to expand the plots of farmers so that they can produce at a large scale. Expanding the plots can bring more income and help to improve household food status. This can also help the government to ensure community and national food security through increasing farmers' capacity to produce more and thus ensures more sales.

Monitoring and evaluation of the irrigation schemes should be done every year by the local authorities and after every three years from the head office in order to monitor project sustainability and long term results of the project.

The government and non-governmental organisations should provide inputs such as seeds and fertilisers and chemicals needed for farming in sufficient quantities. It is good for the government to make sure that farming materials are available in time so that the farmers will not face difficulties in accessing the agricultural inputs.

Government and financial institutions should create lines of credit for the farmers so that they can easily get farming loans. They is no way agricultural production might improve or survive without financial help or access to finance for the farmers. For the Nyevedzanai irrigation project to progress, there is need for farming loans.

The irrigation committee should get some training on leadership and management skills so that they can have the knowledge and ability to deal with arising problems and conflicts among the members as they will be working with different peoples.

5.4 Chapter summary

In summation, this chapter has indicated the contributions of small scale irrigation project in ensuring food security in Chivi and challenges which are affecting the farmers in their quest to alleviate the problem of food shortages in the area. Recommendations are also provided so that they can help to promote and make the project sustainable. The results of this research can be used to other areas with similar characteristics with those of ward 11 of Chivi District. This findings from this study shows that small scale irrigation project is one of the strategies that can promote food security in drought prone areas despite the existence of many challenges.

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APPENDICES

Appendix 1: Interview guide for farmers

Semi-structured interview schedule for farmers in ward 11 Chivi District on the research topic: An assessment of the role of small scale irrigation on food security in drought prone areas in Zimbabwe: the case of Chivi district of Zimbabwe.

I am Spencer Tagwireyi, a fourth year student at Midlands State University studying Development Studies Honours Degree. I am kindly asking for your contribution through providing relevant information to the questions below. **The purpose of this study is to assess the role of small scale irrigation on food security in drought prone areas: the case of Chivi district, in Zimbabwe.** The information that you are going to provide will be used only for academic purposes.

Interview date…… (Interviews done after respondents' consent)

Age……years

1. What is your understanding with the term project implementation?
2. What do you know about the process of irrigation project implementation?
3. What are the main aspects to be done during project implementation?
4. Did you participate during the implementation stage of the irrigation scheme?
5. In your view what would you define food security?
6. What are the main contributions of small scale irrigation projects in Chivi district?
7. What is your household food security status after the establishment of the irrigation scheme?
8. How does the small scale irrigation project contributes to your household food security?

9. How does the small scale irrigation project contributes to community food security in your area?
10. What are the main challenges you are facing as small scale irrigation farmers?
11. What can be done to improve food security status in your community?
12. What can be done to improve small scale irrigation production?

Appendix 2: Interview guide for key informants

Semi-structured interview schedule for key informants in ward 11 Chivi District on the research topic: An assessment of the role of small scale irrigation on food security in drought prone areas in Zimbabwe: the case of Chivi district of Zimbabwe.

1. What can you comment about the implementation process of the Nyevedzanai irrigation scheme?
2. Has the small scale irrigation project helped to improve thefarmers' household food security and community food security?
3. In your view, what are the main challenges affecting small scale irrigation production in Chivi district?
4. What can be done to improve food security in the area?
5. What can be done to improve small scale irrigation production?

Appendix 3: Focus Group Discussion guide

Semi-structured Focus Group Discussion (FGD) schedule for farmers in ward 11 Chivi District on the research topic: An assessment of the role of small scale irrigation on food security in drought prone areas in Zimbabwe: the case of Chivi district of Zimbabwe.

FGD date…… (FGD done after the consent by the respondents)

1. What is your understanding with the term project implementation?
2. What do you know about the process of irrigation project implementation?
3. What are the main aspects to be done during project implementation?
4. Did you participate during the implementation stage of the irrigation scheme?
5. What are the main contributions of irrigation projects in Chivi district?
6. How does the small scale irrigation project contributes to your household food security?
7. How does the small scale irrigation project contributes to community food security in your area?
8. What are the main challenges you are facing as small scale irrigation farmers?
9. What can be done to improve food security status in your community?
10. What can be done to improve small scale irrigation production?