CERTIFICATION OF DISSERTATION

The undersigned certify that they have read and recommended for submission to the department of Agricultural Economics and Development, in partial fulfilment of the requirements for the Bachelor of Science Honours Degree in Agricultural Economics and Development, a project by Chinyoka Unanda entitled:

ANALYSIS OF SOCIO-ECONOMIC FACTORS AFFECTING WHEAT PRODUCTION IN ZIMBABWE. A CASE OF NYABIRA, ZVIMBA DISTRICT.

Supervisor

Mr. J. Mukarati

Signed.....

Date……../……../…….

DEDICATION

To my late parents, Jane, Allen and Takuranashe

ACKNOWLEDGEMENTS

Firstly my gratitude goes to the Lord Almighty who enabled me to undertake and finish this dissertation. It is my desire to express my genuine appreciation to every person who contributed towards the success of this dissertation. It would not have been achievable without your love, input, time and support; am really thankful for your help. I wish to especially thank my supervisor Mr J. Mukarati for his effort and guidance all the way through the phases of writing this dissertation. You really helped me put my opinion in order; it would have been difficult without your help.

I would like to also extend my gratitude to my Mr N. Mupaso, Mr N. Chipunza and fellow colleges Christina, Kudakwashe, Tatenda, Tinashe and Hillary. Their effort and moral support helped me to pull through. Heartfelt gratitude to my family and friends; you are wonderful.

ABSTRACT

After land reform program in Zimbabwe, wheat production has been on a declining trend, with several constraints being identified hindering wheat production. These include the land policy, wheat pricing policy, high irrigation costs and government protection policies on consumers. As a result farmers have been dropping out of wheat production as it's no longer a profitable crop to grow. This study is aimed at identifying and quantifying the socio-economic factors affecting wheat production in Nyabira, Zvimba district. The study used primary data collected from a sample of 40 randomly selected household from Nyabira. Descriptive and the Cobb-Douglas production function were used to analyse the socio-economic factors affecting wheat production in Nyabira. The results showed that 85% of the household head attained secondary education level; therefore most of the household head were literate. The majority of the household head were males (75.5%). The regression results showed that fertiliser, area under wheat, distance to the market, price and level of education were positively related to output whilst experience in wheat production was negatively related to output. The farmers also faced so many constraints with power shortages being the highly ranked challenge. The Government, Non-Governmental Organisations and private companies should emphasise on fertiliser, area under wheat, distance to the market, price and level of education so as to increase wheat production in Zimbabwe. The study recommends the government to work in hand with the private sector to introduce inputs for wheat farmers so as to help reduce their costs.

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ACRONYMS

A1	Small Scale Farmers
A2	Large Scale Farmers
CIMMYT	International Maize and Wheat Improvement Centre
DDF	District Development Fund
ECA	East Central Africa
EU	European Union
FAO	Food and Agriculture Organisation
FAOSTAT	Food and Agricultural Organisation Statistics
GDP	Gross Domestic Product
GMB	Grain Marketing Board
GNP	Gross National Product
NGOs	Non-Governmental Organisation
RBZ	Reserve Bank of Zimbabwe
SADC	Southern Africa Development Countries
UDI	Unilateral Declaration of Independence
US$	United States Dollar
USAID	United States Aid International Development
ZETDC	Zimbabwe Electricity Transmission and Distribution Company
ZFC	Zimbabwe Farmers Communal

CHAPTER ONE

INTRODUCTION

1.1 Introduction

Agriculture has been and remains the backbone of the Zimbabwean economy. The sector contributes 20.3% to the country's Gross Domestic Product (GDP), provides jobs to 23% of the formally employed people in the country and generates 28.8% of the country's foreign currency earnings (Ncube, 2012). This shows that high proportion of Zimbabwean population depends on agriculture, for their livelihood. Agriculture and agriculture related sector provides employment to 70 percent of the population, about 60 percent of raw materials for the industry and about 45 percent of the country's exports are of agricultural origin (Ncube, 2012). Agricultural sector contribute about a fifth of the total export income derived mainly from tobacco, sugar, tea, coffee, and fruit and vegetable exports, among others.

Agriculture in Zimbabwe is broadly diversified with over 20 types of food and cash crops and livestock consisting of dairy, poultry, piggery and beef production (Kapuya, Davison, Admire, Tolbert, Kingstone & Lulama, 2010). Zimbabwe's most crucial commodities produced are categorised into four, the first category including food grains (maize, wheat, edible dry beans and small grains). The second category includes oil seeds (soya bean, groundnuts and sunflower), the third comprises of export crops (tobacco and cotton) and lastly the fourth encompasses high value plantation crops (sugar cane, coffee, citrus and tea), horticultural products and non-traditional export crops like paprika. The food grain production in Zimbabwe is decreasing and some of the causes are change of season and it's no longer profitable to grow these crops (Kapuya et al., 2010). Thus most people are now switching from the production of wheat as an alternative to production of other cash crop

1.2 Background of the study ` `

Ngobese (1987) indicated that Zimbabwe started growing wheat after 1965 due to restriction in wheat import from other countries. Wheat in Zimbabwe is produced in the dry winter months, mainly planted between April and May mostly under irrigation, there are now also few wheat varieties grown in summer using rain fed for example Sahai a Seed Co summer wheat variety. Wheat is the most second important food security crop after maize and bread is its by-product which is highly demanded especially by the urban population (Mutambara,

Zvinavashe & Mwakiwa, 2013). Bread is now a key staple food in Zimbabwe as a result making wheat the second important crop after maize (Kapuya et al., 2010). The wheat sector contributed about 4% of to the total agricultural contribution to GDP (Reserve Bank of Zimbabwe, 2009). Wheat is specifically used to make flour and bran. Flour is for baking and other confectionaries being consumed almost daily by urban Zimbabweans. Bran is mostly used in manufacturing of stock feeds. As wheat production is a winter crop it offers opportunities for farmers to crop twice in a year hence raising their annual incomes.

Before 1980 the Zimbabwean farming system used to consist of the communal and the large scale commercial sector and as wheat is a high production costs crop, it was mostly produced by medium to large scale commercial farmers (Anseeuw, 2011). After independence the government started prioritising on the development of agriculture through policies like the land reform and the large scale farms are now divided into small scale and large scale. As a result of these changes some of the small scale farmers in smallholder irrigation schemes and wet-lands are also now involved in wheat production.

In the past decade, there has been a decline in wheat production in Zimbabwe and many constraints to the production were pointed out which included lack of credit facilities, power shortages and other factors (Moyo, 2004). Rapidly increasing demand in Zimbabwe for wheat products, particularly bread has generated interest in wheat production and consumption policies and its leaving a gap between local production and demand of wheat. The national wheat requirement is estimated at 348,000 metric tonnes per annum whilst wheat production for 2012/13 season is expected to be about 25,000tonns (Esterhuizen, 2012).Therefore Zimbabwe will continue to rely on wheat imports to meet national requirement due to ongoing low production levels.

It is in view of the above mentioned scenarios in wheat production sector that this study was carried out to investigate the socio-economic factors that affect wheat production in Nyabira. The extents to which the acknowledged factors affect wheat production are investigated. The study is expected to shed more light into strategies to implement in order to reduce the over-dependency on import supply of wheat in the country from different countries.

1.3 Statement of the problem

Zimbabwean economy has been facing low agricultural production levels since independence and several constraints have been identified as hindering agricultural growth which includes the land policy, the agricultural pricing policy, the trade policies, technology and the government protection policies on farmers. Wheat production plays an important role in Zimbabwean economy as it is the second staple crop after maize and it improves the income of farmers and their livelihoods. Its role in the economy can be furthered if strategies are pursued to increase its production and earnings to farmers. Therefore the country needs to assure the sustainable of wheat production systems so as to revert the declining productivity levels. The declining of wheat production is still there to date therefore there is need to conduct an assessment of the socio-economic factors influencing production of wheat so as to find the mitigating measures to reverse the trend. Many studies on production have been conducted and are almost similar, others are applicable in the countries where the studies have been done, but there is need to fit the information provided in Nyabira case.

1.4 Research Objectives

The main objective of the study was to investigate the socio-economic factors that affect wheat production in Nyabira, Zvimba district in Zimbabwe. The specific objectives are:

i. To determine the socioeconomic factors that affect wheat production in Nyabira.
ii. To ascertain other wheat production constraints in Nyabira.

1.5 Research Questions

i. What are the socio-economic factors affecting wheat production in Nyabira?

ii. What are the constraints wheat producers in Nyabira are facing?

1.6 Justification of the study

There is a decline in wheat production in Zimbabwe and the major supply of wheat in Zimbabwe is now imports. Therefore there is need to have knowledge and an understanding on the key variables, that affect production of wheat, and it's of great importance for scheming sound agro-economic policies, therefore their implementation in Zimbabwe will improves the country's welfare and that of farmers'. The reasons of differences in wheat production between years might include production inefficiency, input quantities decline and

weather variability. Determining reasons for the changes in wheat production in Zimbabwe will be useful in evaluating the effects of existing and new policies to be formed. Zimbabwe has been changing its policies for agriculture its major objective being to improve farmers' livelihoods, productivity and remove state interference in agricultural markets and to develop the functioning of the market system. The policies' results were found not productive as nothing changed and poverty worsened for those reallocated farmers. Mahofa (2007), in his study showed that government after realizing the failure of the policies, it regress back to controlling the market, hence policies were going in cycles and without any success in promoting market efficiency. As the agricultural sector is the main key to development in Zimbabwe, and a chief factor in poverty reduction, given the prevailing situation of food insecurity the country is facing, therefore there is need to carry out a study that will investigate, the various relevant socio-economic factors affecting wheat production. There are few empirical studies in these areas on the Zimbabwean case and they have not been satisfactorily recognized and articulated by researchers. As a result therefore there is need to carry out a study exploring these issues. However policy makers, producers and consumers are expected to benefit from the study.

1.7 Organisation of the study

The thesis consists of five chapters and the first chapter introduced the study and its objectives. Its main objective was to give a background of agriculture and wheat production in Zimbabwe. Chapter two gives the theoretical and empirical literature from other researchers on wheat production. Chapter presented the research methodology used in the study. Chapter four's main focus was on the discussion of results from the findings. Chapter five concluded the study and gave policy recommendations

1.8 Summary

This chapter laid the foundation for the study. It motivated the study, presented the problem, objectives, hypotheses, research question and the key research issues to be explored during the study. In addition, it presented a justification for the study by articulating the expected contribution and benefits from the project. Finally, the road map on the organisation of the chapters or the overall structure of the study was provided.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter reviewed the existing literature on wheat production which guides the study plan. This chapter looked at definition of key terms, global wheat production and marketing, wheat production and marketing trends in Africa and Zimbabwe in particular, models commonly used to study agricultural production and review empirical studies

2.2 Definition of terms

Frank (1993) explained labour as labour that is provided by the family member of a household. Mpawenimana (2005) defined labour as a primary instrument for increasing production in agriculture. Panda (2007) in his book also defined labour as any work whether mental or manual done to acquire income. He furthered indicating labour as an active factor of production which is not separable from labourers. This study is going to differ from both of the above and labour is defined as hired and labour provided by the family members. It is defined as hours spend in the field on a normal day.

Hayami and Vernon (1971) explained capital as human capital broadly including education, skill, knowledge and capacity embodied in the population. Panda (2007) defined capital as output which has accumulated which is used to increase effectiveness of current production activity. He explained further that it can be immovable assets, inputs, savings and borrowing. Capital is human made and is used to make consumer good and varies with people (Pardey, 2011). Ronald, William and Patricia (2012) defined capital as collection of financial and physical assets that have a market value. In general capital (C) is the stock of durable goods (machines, equipment and personal savings) used to produce other goods. In the study capital is defined as per value placed on assets owned by farmers' plus their personal savings. Unit of measure is dollar-value and it's difficult to measure directly, so it is defined indirectly.

Production process is a technique that combines inputs to produce output Dixit (1976). Panda (2007) described production as a process whereby certain services or goods are used to make goods and services of different nature. The researcher defined production as the methods and processes which are used to change tangible inputs such as raw materials and intangible

inputs which includes ideas, information, knowledge into a particular good which is called the output.

Frank (1993) defined production function as the physical relationship that is between inputs and outputs. Ronald, William and Patricia (2012) explained production function as a biological or physical relation that shows the quantity of output that result from using certain quantities. In the study production function was explained as a physical relationship that is between inputs and outputs.

Ben (2007) defined smallholder as large populations of households that are engaging in agricultural production on a relative small scale. Panda (2007) defined smallholder as small scale farming which is done on a small size of holding and other factors of production are small in quantity and scale of production is said to be small as well. The study is going to define smallholder farmer as a farmer that practise agriculture on a small scale. They are further classified as A1.

Commercial farming is defined as large scale when farming is done on large size holding with large amount of capital, labour force, large and risk (Panda, 2007). The study defines commercial farming as large scale production of crops for sale, intended for widespread distribution to wholesale outlets.

Michael and Amir (2006) described socioeconomic factors as joint economic and social factors. They went on pointing out farming patterns, equity, gender and traditional ownership as social factors. Also production systems and input output economic analyse were also mentioned as economic factors. This study is defining socio-economic factors as factors that include social and economic factors. They deals with day to day human facets that promote human survival and is measured using demographic data, level of education and other indicators.

2.3 Overview of global wheat production and marketing

Wheat is one of the earliest cereal crop and most important in the world. Its genetic heart is in the Black Sea basin and Western Asia; though it can adapt in many environments as a result it can as well be grown in the tropical regions to nearly the poles (Rajaram & Braunet H,

2006). Land under wheat production is more than any other commercial crops. It has also a world trade which is greater than other crops combined and its global average productivity is around 2.7 tonnes per hectare with highly variability among countries and regions' (Rajaram et al., 2006).

Wheat production is done by many countries in the world, but countries in the Northern Hemisphere accounted for larger world output. The top ten list of wheat producing countries in ascending order are as follows European Union-27 (EU-27), China, India, United States, Russian federation, Canada, Australia, Pakistan, Ukraine and Turkey (Rajaram & Braunet H, 2006).

By 1980 there was an increase production area and reached up to 240,000 million hectares. There after many intensive varieties were developed and as a result of this agro techniques dropped. As a result the average wheat yield started to increase all over the world. At the same time the outcome of these new technologies of producing under smaller production area and having high wheat yields has tripled in 40 years. During the time Hungary was one of the most producers but in the 90s European increased yields and Hungary reduced due to input decrease caused by economic difficulties it was facing (Hornok, 2009).

Global wheat production grew by an average of 2.18% per year from 222,400 tonnes in 1961 to 607,000,000 tonnes in 2007. In observance with other staple crops wheat production is spatially determined. China and India are accounted for more than 30% of the world wheat crop 2007. Pace of growth of global wheat production have slowed in recent years. From 1961-1990, the total quantity of wheat worldwide increased by an average of 3.38% per year. There after (specifically 1961-2007), global wheat grew by 0, 67% per year (Pardey, 2010). This reflects the combined effect of a contraction in wheat area and a slowdown in the growth of average yields. The effect of these broad trends is that an increase in wheat production has failed to maintain pace with the growth in world population (Pardely, 2010).

In summarising the existing proof on narrow-minded and multi-factor production trends in agriculture worldwide, Alston et al (2010a) conclude that though there are many reasons for being cautious in this area (wheat), it is difficult to reach any conclusion other than that there is an evidence of a slowdown in global productivity growth especial in the world's richest countries. In addition he argued that other countries too would have been affected by unusual favourable or unfavourable seasons and he also indicated that it's hard also to tell the difference between sustained changes in growth and multiyear effects of a change that's

really episodic in nature (for example massive institutional reforms in China and Former Sovereign Union) (Alston et al., 2010a).

Countries were classified in terms of their consumption as developing countries which would have consumed at least 1,000,000 tonnes of wheat per year whilst high income producing a minimum level of production consumption of 1,000,000 tons and this was done basing on the criteria used by World Bank in its World Development Indicators (1999). Developing countries had per capita gross national product (GNP) which was lower than US$9,655 in 1997, whereas high-income countries had a per capita GNP exceeding US$9,656 (Pingali, 1998/9). In their analysis (Pingali, 1998/9) in connection with CIMMYT on this study of wheat consumption used a 3 year average of the latest data which was available.

The Table 1 show the wheat consumption statistics, regional means appropriately biased because the mean may not be presenting the actual values. Developing countries included Eastern and Southern Africa, Western and Central Africa, South Asia and the Pacific and East Asia. The Eastern Europe also included Czech Republic, Hungary, Ukraine and other countries, whilst the Western Europe and other high income included Australia, Italy, United Kingdom United States and other countries.

Table 1: World wheat usage and consumption

Regional	Average net wheat imports, 1995-97		Wheat consumption		Average percent wheat use	
	Total (000t)	Per capita (kg/yr)	Average per capital 1994-96 (kg/yr)	Growth rate per capita 1987-96 (%/yr)	Human consumption 1994-6 (%)	Animal feed 1994-6 (%)
Developing countries	56953	13	74	0.3	85	4
Eastern Europe & forever Soviet Union	1164	3	262	-4.0	51	29
Western Europe, Japan & other high income counties	-58005	-68	155	1.3	53	35

Source FAOSTAT (1999)

The world aggregates are not exactly equal to the food aid organisation (FAO) estimates because the method of aggregation may have differed (Pingali, 1998/9). The table shows that human consumption was high in developing countries leading with 85percent whilst the high income countries had a leading percentage as well but in animal consumption.

2.3.1 Wheat production in Africa

Wheat has been always a commodity crop in North Africa and it was the grain basket for the Roman Empire. The wheat production and domestication started in North Africa, Turkey, Iraq and for traditional reasons wheat was always there (Braun, 2012). African wheat producing countries are Nigeria, South Africa, Sudan, Tanzania, Tunisia, Zimbabwe, Lesotho, Algeria, Egypt, Eritrea, Ethiopia, Kenya, Libya, Morocco and other small countries. Wheat is grown on a wide scale in South Africa and Maghreb countries and mostly done in large private or community fields. In East Africa and North Africa wheat is grown under rain

fed conditions expect in countries like Zimbabwe, Zambia, lowlands of Somalia and Egypt, where they produce wheat under irrigation (Braun, 2012).

Countries, South Africa, Ethiopia, Sudan, Kenya, Zimbabwe, Tanzania and Zambia produce nearly 99 percent of all the wheat grown in the region and 97 percent of all wheat grown in Sub Saharan Africa (Paul et al., 1966-97). Paul et al.(1966-97) went on indicating that countries in the Sub Saharan Africa region produces less than 2 percent of all the wheat being produced in the developing world which is no less than 2.5 million metric tonnes. Eastern and Southern Africa countries also produce wheat but on a small scale but there are diversities on wheat growing environments as a result this favours wheat production.

Major wheat producing countries in the ECA region are Tanzania, Kenya, Sudan and Ethiopia. Average wheat production for ECA countries from 1986-2003 was 18, 000,000 million on 12,000,000 hectares having an average yield of 1.2 tonnes/hectare (CIMMYT, 2004). From the CIMMYT (2004) paper, area under wheat has been progressively growing from 1987- 1997 until 2000 when it stagnated. As from 2000 to 2001 there was arise ad there after there was a decline up to 2003.

Wheat marketing in Africa is done domestically and regionally. The average share of marketed output within and outside ECA region from 1986-2000 was about 1 percent for wheat (CIYMMT, 2004). ECA region faces problems of stiff competition when it comes to international marketing and the other factor being heavy subsidization in developed countries. CIYMMT 2004's statistics showed that ECA region is a net wheat importer as imports has been increasing since 1986 from 675,000 tonnes to over 3 million tonnes in 2002. This shows that there is an increase in demand of wheat within ECA countries.

African continents accounts for 15% of global wheat market, and farmers producing only 44% of wheat locally consumed leaving Africa's demand for the crop mainly in the hands of the global traders. Nigeria and Zimbabwe a long time ago encompass sound wheat production in the 1970's and 80's and then there was an overproduction and the Europeans and North Americans dumped their wheat on world market at extremely low prices and that destroyed wheat industry in many countries which also included Zimbabwe and Nigeria. For that reason there is a massive gap between what Africa is producing and what it needs. CIMMYT (2004) in their work believe that there is high carbon dioxide in Africa which might favour an increase in wheat yields therefore there is a call for an increase in wheat production.

The researchers noted that downfall in wheat production was posed by lack of access to markets, lack of support and lack for infrastructure which resulted in high input and travelling costs. Studies are indicating that there is need for addressing economic, social and environmental impact of boosting wheat production in rich agricultural lands of Eastern and Southern Africa. These studies also indicated that fertiliser use at rightful levels could have a significant impact on yield and profitable in many nations. As there is a call for increase Ethiopia and Madagascar are already producing new wheat varieties which might increase wheat yields.

2.3.2 Wheat production in Zimbabwe

The country started growing wheat after Unilateral Declaration of Independence (UDI) in 1965 when the Ian Smith regime was hit by sanctions (Figure 1). By then the country had become one of the most important producers in Africa. Wheat marketing was initially the sole responsibility of Grain Marketing Board (GMB).

In Zimbabwe wheat is planted between April and mid-May and more than 90 percent is grown under irrigation by the commercial sector and the crop is harvested in October/ November. Wheat can be successfully produced in winter under irrigation; this shows that the crop needs more capital to produce as it requires irrigation equipment, dam construction and high usage of electricity. Wheat has high production costs as a result it is mostly produced by a large to medium scale commercial farmers (Anseeuw, 2011).The trends in national wheat production are shown in Figure 1 below.

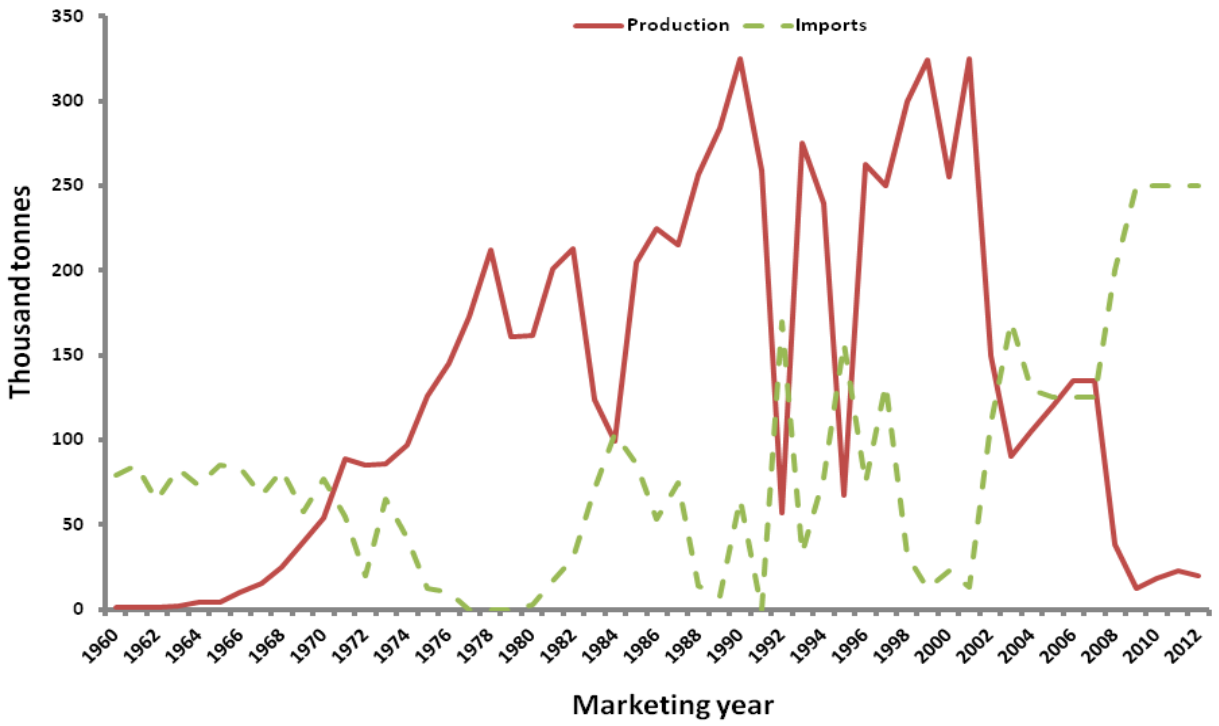

Figure 1: Wheat production and imports in Zimbabwe from 1960 to 2012 (Mutambara e t al; 2013)

Wheat production has been on a down ward trend since 2000 to date and as a result of this imports have been increasing in response to resulting shortfall in the domestic market. The figure 1 above shows wheat production and imports from 1960 to 2012. There was an upward trend in wheat production from 1964 to 1990 even though some evident depressions were showed in 1979, 1980 and 1984 (Figure 1). The years 1992 and 1995 recorded the lowest wheat production with an average of 55 thousand tonnes.

From 1996 wheat production was on an increasing trend however, since 2000 wheat production has been on the decline (Figure 1). Before in 1980, Zimbabwe faced international sanctions but it adopted an internal looking food-self sufficiency strategy and protection of domestic wheat production for this reason it managed to uphold an increase in wheat production during the 1960 to 1980 era. The country adopted the approach that emphasized heavy subsidized investment in irrigation projects, subsidized operating loans throughout the

commercial farming areas, accompanied with research, development and extensive extension (The Herald, 02/10/12).

In 1978 the country excessively produce its wheat leading to wheat export as a result of foreign currency rationalization and this supported by Figure 1 as it shows no imports in that particular year. Regardless of the earlier achievements, the arrival of independence in 1980 saw these investments in the subsector declining, the government budgetary constraints increasing, and wheat production trends in the country declining over the years (Figure 1). And from this time, that's when Zimbabwe transformed from being a net exporter of wheat with the last recorded exports of 70,000mt in 1995 to net importer of wheat (Figure 1). At present the country is heavily depending on imports averaging 250,000 tonnes per year (Figure 1). The country's production levels fell from a record high of 340,000 tonnes in 2000 to a record low of about 40,000 metric tonnes in 2011 against a consumption level of about 450,0 00 metric tonnes per year (Mutambara et al., (2013).

The decline in wheat production in Zimbabwe is credited to several factors which led to reduced areas planted and flagging productivity of wheat over the years. Due to a vividly increase in urban population and changing of tastes there is a widely gap between production and consumption and this is widening the import demand. The problem became particularly severe since 2000 as a result of the fast-track land reform program. The situation was made worse off by the 2008 situation when there was company disinvestment; lose of agricultural expertise, loss of agricultural NGOs and general decline in economic activities.

From the year 2000 when the land Track Land Reform Programme was undertaken, four main commercial field crops, which include tobacco, wheat, sunflower and soya beans, have reduced area plantings and its output levels due to low use of land, inexperience of the relocated farmers and lack of resources on the part of new farmers (Moyo, 2004). Most of the wheat farming was done in large scale farms but due to the land program reform the white farmers were forced out of the farms and they were divided. As a result of land-redistribution program many farmers found it difficult to plant wheat.

A number of constraints, such as unreliable power supplies for irrigating the crop, weak irrigation infrastructure, and late payments by the GMB, have contributed to the declining trend in wheat production. The GMB still owes money to the majority of growers for unpaid wheat deliveries made in October 2011. In addition the financial sector is only able to offer short-term credit of up to 90 days for purchasing inputs which is too short for wheat production.

Furthermore, the Zimbabwean government's policy requiring foreign owned companies to have at least 51 percent native shareholding has negatively affected foreign direct investment and contributed to the unavailability of long term and affordable financing facilities from banks. Without huge investment in maintenance and upgrading of irrigation systems wheat production will remain low in future. Thus this shows Zimbabwe is relying on imports in order to meet its needs.

2.3.3 Constraints wheat production in Zimbabwe

The wheat sector has been facing many challenges since 2000 up to date. Zimbabwe faced countless macroeconomic difficulties, which incorporate galloping inflation, misrepresentation of the authorized exchange rate and shortages of most important commodities such as fuel (Mlambo & Poulton, 2003). The wheat world prices have been on an unstable price trend and they are below the country's producer price due to the high production costs in the country and this is negatively affecting the sector. Below are some of the factors which are affecting the wheat production sector in Zimbabwe.

High costs, limited availability of inputs were some of the main constraints to wheat production. In the importation of these imports there are many foreign exchange irregularities which will make the inputs more expensive and hence this will lead to high prices of wheat in the country (Rukuni. Tawonezvi. Eicher. Munyuki-Hungwe, & Matondi, 2006). The economic chaos at the time of production has resulted in low input use and poor producer prices have resulted in low production over the years (Mudhara, 2002).

The fertilizer industry in the country has experienced difficulties. ZFC, one of the country's main producers (along with Windmill, another producer, and Omnia, an importer and blender) has the capacity to produce 16,000 tonnes of fertilizer per month. As a result shortages of foreign currency to import expensive raw materials in the production of fertiliser

has resulted in low production and high import bill being transmitted to farmers by paying higher prices for fertiliser.

The Department of Agricultural Mechanization estimates that only about 2 percent of Zimbabwe's arable land is prepared using tractors, down from an estimated 5 percent in 2004/05. In 2000 there were some 20,000 operational privately owned tractors in the country and a further 2,000 with DDF. There has been a lot of destruction as a result of the land reform program leading reduced irrigation equipment on the farms.

In previous years, diesel for tractors was heavily subsidized in an attempt to stimulate tractor-powered land preparation. However, the diesel was often sold on by farmers, at subsidized prices, for non-agricultural uses such as general transport and the operation of private vehicles. The growing cost of fuel has predictable impact on the agricultural, because the country depends solely on fuel imports. The country incurs external costs as a result of oil imports that are directly or indirectly factored into all economic activities that use fuel as an input. In particular, this has a significant impact on the price of transported wheat (Muchopa, 2006).

Herbicides were not readily available and expensive and thus its use was consequently very low throughout the country and largely confined to the larger farms, although under-utilization was often very evident there too. Of which because of land reform most of the farmers are now small holder farmers who cannot afford the herbicides.

The unreliability of ZETDC's electricity supply remains a strong disincentive to wheat growers who depend on irrigation during the dry winter months for the success of their crop. This, as well as the high cost of inputs and therefore small marginal return, were key contributors to the decline of Zimbabwean wheat production from approximately a quarter of a million tonnes per annum at the end of the 1990s to a forecast of 12,000 tonnes in 2009. ZETDC is unable to maintain a regular power supply to the farmers (IRIN, 2007).

The main problem farmers are facing is that of lack of access to credit facilities due to the considerations needed for one to be able to borrow money. Kanyenze (2011)'s theoretical and empirical review on the financial growth records it concludes that well developed financial sector plays a vital role in the development of all sectors be it agricultural or non-agricultural. The current uncertainty on landownership rights in Zimbabwe has compromised the financial sector's ability to mobilize financial resources from savings for lending to the

productive sector at reasonable interest rate (Mutambara et al., 2013). As a result of this the credit institutions do not feel secure in lending the farmers money and this has greatly affected the operational, infrastructural and investments in Zimbabwe's agriculture. Financial products available in the market are limited and short term, typically not appropriate for agriculture, and offered at high interest rates (USAID, 2012).

As a part of helping the new resettled farmers, the government buy inputs from GMB and other input companies using credit so as to supply it to the farmers. Then the government will take long to pay back the money to the GMB and other input companies like fertiliser companies. Considering the time value of money concept, its overdue debts is also costing farmers and companies and its creating severe liquidity challenges as money received today is worth more than the money received in the future. As a result, this affected the GMB's finances up to the extent of failing to pay the farmers' products in time and also there were no interests or charges on late payments. Whilst the Grain Marketing Act being implemented by the government announces the floor prices for grains that are high which will be attractive to the farmers whilst they are deceptive and they will fail to meet their promises in time.

Due to the land reform farms are now occupied by new farmers the new large scale commercial, A1 and A2, which most of them lack enough skills and knowledge to operate at most efficiency. As a result these new farmers are not fully utilising their arable land due to many challenges they are facing such as lack of finance and labour.

2.3.4 Regulations and domestic policies affecting wheat production in Africa

Zimbabwean agricultural policies are providing disincentives for commercial farmers through government taxing a large portion of social profits and this is resulting in encouraging farmers to plant those crops where they have comparative advantage (Michael, 2002). GMB has been the main statutory dominated in trading of wheat with the power it was given from the government up to 2009. The deregulation of grain trade in 2009 has brought participation of private players in the industry. There are also new millers which were introduced, and formal private grain intermediaries which includes Denote Enterprises, Crop Link, Paperhole Investments and Staywell.

The producer prices for wheat are above import parity prices and this is discouraging production of local wheat and encouraging importation of wheat and its products. Mutambara, Zvinavashe and Mwakiwa (2013), indicated that wheat flour is coming in at prices that are much lower than the normal price at supply; and this is one and the same with dumping and is in violation of Article 4 of the World trade Organization Anti-dumping Agreement and Article 18 of the SADC Trade Protocol. An example, that of wheat flour from Turkey which is costing US$493 per tonne in Zimbabwe, whilst in Istanbul the source supply costs US$580 per tonne (Mutambara, Zvinavashe & Mwakiwa, 2013).

A number of countries are subsidising its exports, and this will allow the countries to trade at a lower or below cost as a result this affects the Zimbabwean local wheat producers. The SADC Trade Protocol provides protection of infant industries; therefore it has to implement sanitary and phyto-sanitary measures as a way of reducing dumping.

Domestic policies which affect wheat production are producer price, labour policies and other government policies. Producer price policy mainly tax commercial farmers as a result wheat farmers are affected as most wheat production is done under commercial farming. Import tariff and sales taxes puts pressure on the prices of the imported machinery by farmers. Due to the minimum wage legislation workers' income has increased, as a result of this the cost of production has as well increased.

2.4 Production function model

The relationship between various factors and the output in agriculture is commonly determined by a production model. Mpawenimana (2005) indicated that in agriculture the production input consists of land, labour and capital as the basic factors of production. Malassis (1975) outlined that as more land is brought under production output increases.

Simple form of production is as follows

$$Q = f(L_d, K, L) \quad (1)$$

Where:

Q= production output

K = capital

L = labour

L_d = land

2.4.1 Cobb-Douglas function

Cobb Douglas Production Function is regarded as a distinctive case of a production function and is homogeneous of the degree one (Henderson & Rchard, 1980). This means is that if we change the inputs by some amount, the output will change by the same amount as the input. Most production functions are believed to be curvilinear (Mafoso, 1999). The Cobb-Douglas production function is given by:

$$Q = AL^{\alpha}K^{\beta} \quad (2)$$

Where

Q = output

A = technology used to produce the output

L = Labour

K = Capital

α and β are elasticity. The functional relationship has to be specified so as to find the impact of factors on wheat production. The study used Cobb-Douglas production function because of its simplistic.

2.4.2 Specifications of the study model

$$Q = f(A, K, P, S, F, L, G, M, E, Ed) \quad (3)$$

2 .5 Review on empirical studies

There are several studies that have been done on agriculture using the production function. The review is going to be on the grain studies by Hassan (2010) Punjab in Pakistan, Mujere et

al, (2011) Chinyatumwa, Bikita district in Zimbabwe, Richard et al, (2009) Maitoba in Canada and Peter & Falcon (1975) Southeast Asia.

Hassan (2010) has shown that wheat yield in the mixed cropping zone of Punjab in Pakistan is affected by factors like sowing time, seed rate, education, fertilisation application, irrigation and so on. A Cobb Douglas production function was used to assess the effect of sowing time, seed rate, education, fertilizers application, irrigation, and so on, on wheat yield. Most of their factors were found positively contributing toward higher wheat yields and the effects of all these were highly significant. They also included weather as one of the factors that affects wheat production. Favourable weather conditions also increase wheat production as witnessed in Punjab 2006-7 season where there was an increase in production without the use of new technologies or new variety seasons. He also concluded that poor management is more prominent. The problem that may arise from this study is that it did consider labour as a factor, which is a crucial factor in Cobb-Douglas production function.

Mujere et al (2011) they looked at five factors affecting wheat yield variations in Chinyamatumwa irrigation scheme in Zimbabwe which are plot size, sowing rates, farmers experience, fertiliser supply and distance of plots from main water. Their results indicated that plot size and use of fertiliser were significant and positively related to yield. The issue of plot size can be supported by literature that as more land is brought under cultivation more output will be a result. They also indicated that crops far away from the canal yields low and that use of fertiliser increases wheat production. The problem which may arise from their conclusion is that they didn't include labour in their study just like Hassan (2012) study. Their study can be concluded that shortage of water to other crops or fields was due to shortage of labour and supervision or good management practises.

Richard et al. (2009) used a Just-Pope production function to examine the relationship between fertiliser inputs, soil quality, biodiversity indicator, cultivars and climatic conditions on the mean and variance of spring wheat yield. The study concluded that spatial and temporal diversity has a negative effect on mean yield. Nitrogen is the most important fertiliser nutrient for wheat yield and grain concentration (Grant, 2006). Their study also concluded that the use of nitrogen increases wheat yields though high quality soils are found to have less yield variability while nitrogen fertiliser increase yield variability. This was

different from other study as it went further to analyse the soil quality as this might have an effect on the nutrients supplied to the crop and costs of fertiliser.

Falcon and Peter (1975) used a Cobb-Douglas production function in their estimation model of the Southeast Asian rice economy for period from 1962 to 1970. The Cobb-Douglas production function was containing rice area harvested and total fertilizer nutrients applied, with separate intercepts for each country, satisfactorily explain the broadly different levels of rice production in the nine countries examined (Japan, Burma, Thailand, Indonesia, Philippines, Malaysia, Taiwan, Ceylon, and South Korea). Area under rice in any country is a long run policy variable mainly in terms of irrigation investments and is partially flexible in the short run. Therefore for a given area, there should be prominence on the factors affecting output in the short-run, like fertilizers. Ceteris paribus, the level of fertilizer application has a significant effect that determines yields. The criticism on this study is against the data used because there was no attempt made to determine amounts of fertilizer actually used on rice.

Kapuya et al. (2009) on their study on grain industry value chain in Zimbabwe generalised that the constraints are firmly rooted from farm level. The study blamed the land reform as the main cause of the decline in grain production. Conclusion of this manner leaves out some of the factors like unavailability of inputs and funds because production area might be reduced but still producing high yields.

Mohammed et al. (2013) in their study examined the socioeconomic characteristics of maize farmers, resource use efficiency, problems as well as profits of maize production in Ogori state in Nigeria. The production function was used in the determination of the nature of inputs-output relationship in maize production. And the regression results showed that farm land, fertiliser and seed were positively significant to output. And the research went on indicating that over time utilisation of labour can result in high costs of hired labour. The study revealed that many farmers faced problems of inadequate capital to finance maize production and he went on concluding that it has a negatively effect on maize production and yield. The problem with this study is that it only looked at the characteristics of the farmers but did not look at their effects in maize production. For example in descriptive they included age, level of education and gender but they did involve these in their regression model.

The researcher identified that the studies on socioeconomic factors affecting wheat production has been done in other countries but not Zimbabwe. And the researcher has wished to look at a certain district (Nyabira) as Mahagayu et al (2001) did on his study on wheat productivity, constraints associated in the eastern parts of Kenya (Nakuru District). But my research is going to look differ from him because his main concern was on budgetary analysis of farmers and concluded that many of the farmers were affected by the costs and it was cheaper to grow maize instead of wheat. As asserted by Kapuya et al. (2009) in his research that the constraints on wheat production are firmly rooted from farm level in his study of grain value chain in Zimbabwe therefore this study seeks to find out socioeconomic factors affecting wheat production in Nyabira. This research is going to differ because it's going to encounter many researches starting from the farm level and the problem might be the social life of farmers.

2.6 Conclusion and insights from the literature

The chapter summarized both theoretical and empirical literature related to the socio-economic factors affecting agricultural production. From the literature, land, labour, inputs and capital are the basic factors of production and different production models have been used and recommendations have been suggested. Many of these studies has been done in developed country so the study is trying to fit into the Nyabira case and will make use of production function model to analyze the relationship between the output and the different socio-economic factors affecting wheat production in Nyabira, Zvimba district in Zimbabwe.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

The purpose of this chapter is to give general description of techniques and methodologies used in the research. This begins by laying down the conceptual framework on socioeconomic factors influencing production of wheat, followed by study area, the data collection and management. Advantages and disadvantages of data collection methods and the research techniques used in this research are also closely discussed.

3.2 Conceptual Framework: Factors Influencing Production of Wheat in Zimbabwe.

Byerlee (1986) indicated that wheat has a special significance in the analysis of food policy and food imports in developing nations, because cereals constitute the bulk of food imports, and among cereals wheat is by far the dominant food grain import. Most developing countries lay within the tropical belt in which the climate is unsuitable for wheat production, hence the basic inconsistency between the traditional food staple and the importation of wheat a non-traditional staple with little immediate prospects for local production.

The study focuses on households as a decision-making unit. This focus then, specifies that the households have access to a limited amount of resources that they can use in their production activities (Wyckoffand & Rukuni, 1992). Conventional economic model of the household theorizes postulates that a household has to allocate its resources in a manner that will meet its aspirations within the limits imposed by production technology, institutional and market factors (Mutamba, 1999).

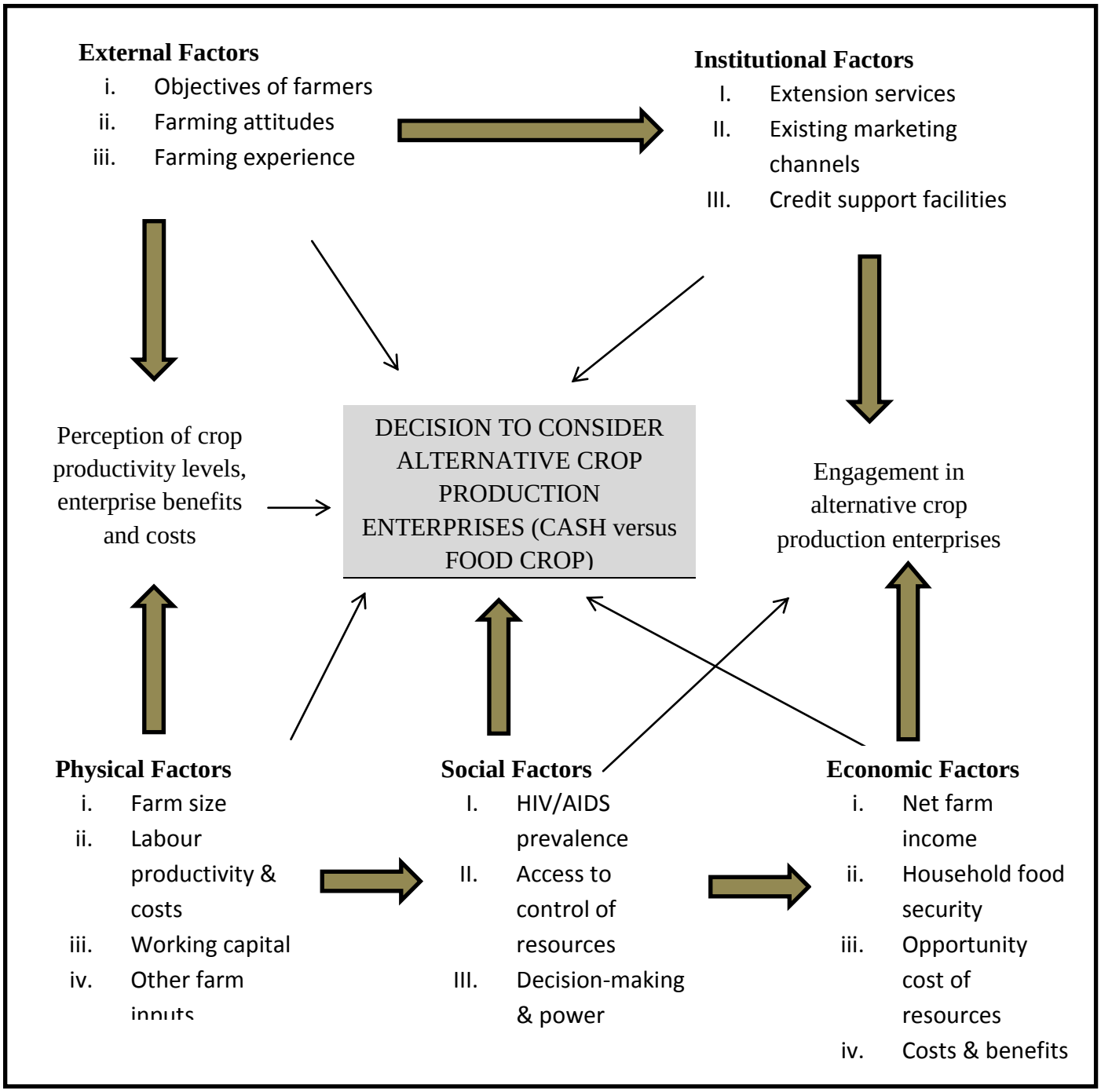

Figure 2: Conceptual Framework of Famers' Choice Decisions: Modified from Macharia et al, (2002)

Figure 2 is a schematic representation showing factors that affect or influence the farmers' decision to engage in one enterprise over the other. There are various factors that influence the farmers' decision on which type of crops to produce (cash or food crop) and these include physical, institutional, economic, social and external factors (Macharia & Tolbert,2002). Pricing policy interventions affects household behaviour in resource allocation and decision-

making of the level of production represent, the institutional factors also have impact on smallholder farmers' production levels (Arora & Alamgir, 1991). All these factors affect farmers' profits and the level production of wheat of the whole economy.

In addition, to the above factors, literature has developed on the determinants of wheat production and likely effects of such production on national governments and individual households involved in the production process. These determinants are decomposed as; institutional arrangements (legal framework, organizational and marketing arrangements); macroeconomic and policy environment; private and public factors (access to credit, provision of research and extension, development of irrigation infrastructure) (Byerlee, 1986).

3.3 Study area

Nyabira is found in Zvimba East constituency which is allocated in Mashonaland West Province of Zimbabwe in agro-ecological region two. It receives an average annual rainfall of 750 to 1000 mm per year and it is a region where farmers produce most of the country's maize output. Mashonaland West province is a major cropping and livestock production area. Mapfumo. Mtambanengwe. Giller. and Mpepereki. (2005) indicated that within farming systems there is a high degree of interdependence and interaction among crop and livestock activities. The interaction is that livestock depends on crop residual for survival during winter mainly from maize stoves. Many people besides farming also derive their livelihoods from fishing at Darwendale dam.

3.4 Sampling methods and sampling size

The unit of analysis was a household, and simple random sampling was used to select households. The study intended on having to interview 60 farmers but due to time and costs the researcher had to sample only 40 farmers and of statistic reasons which regards sample size >30 large. Therefore a sample size of 40 farmers was selected from a population of wheat farmers in Nyabira with the assistance of Seed Co sales agronomist of the area.

3.5 Data Collection and sources of data

For the primary data the researcher used a questionnaire (see appendix) as a tool for data collection. It was designed in a way that it will capture information on an array of potential indicators related to household production of wheat. Quantitative and qualitative data was

also incorporated in the questionnaire. Households were interviewed and in the absence of the household head, any family member or person who is involved in the farming activities and management was interviewed. Shona (local language of people) was also used during interviews in order to minimize misunderstandings and gain farmer confidence. Data collected was for the 2012/2013 season. Pilot testing was done before the questionnaire was taken to the field and corrections were made. As a result the questionnaire provided adequate information for the study and it was considered the best tool.

Secondary data was also obtained on the internet and as follows are some of the sources of the data. Wheat production and imports for the period 1965-2012 was used for the analysis. Major sources of data were Index mundi website and FAOSTAT website.

3.6 Relationship between Objectives, Hypothesis and the Method of Analysis

Table 2 shows the quantitative and qualitative data used for the study and the method of analysis for each objective and hypothesis. The following section will discuss the sources of data and describe the analytical tools used for the study.

Table 2: Relationship between objectives and methods of analysis

Objective	Hypothesis	Data Required	Method of Analysis
To determine the socioeconomic factors affecting wheat production in Nyabira.	The household characteristics and price have positive effect on the wheat output.	Primary and secondary data	Descriptive statistics Correlation Regression analysis
To ascertain other wheat production constraints in Nyabira.	Wheat farmers in Nyabira are facing many constraints in their production.	Primary data	Descriptive statistics

3.7 Analytical Framework

Data was coded and processed using the Microsoft Excel 2010 and analysis was done using STATA. Descriptive statistics were used together with the log linear regression model to analyze the relevant data. The main descriptive indicators that were employed are measures of central tendency values for all the variables. These are useful in analyzing household characteristics as well as analyzing the relationship between variables. The analytical techniques used in the study include, descriptive statistics, correlation analysis and regression analysis. These tools will be discussed below with their limitations.

3.7.1 Descriptive Statistics

They are measures of central tendency and measures of variability or dispersion. And these measures include standard deviation, median, mean, the maximum and minimum. The mean is a measure of the central location and it is calculated by adding all the variable values and then you divide by the total number of variables or items. Percentages were also used and they are the most useful way to transmit statistic information and it locates values in the data that are not necessarily in the middle. Standard deviation is the square root of variance, and it was also used in the data analysis. Descriptive statistics were used together with the regression model to analyze the relevant data. These are useful in analyzing household characteristics as well as analyzing the relationship between variables. The advantages of descriptive statistics is that it is a straightforward process and it easily translate the results overall averages, percents and frequency. The other advantage is the establishment of the standard deviation. Its limitations are that it does not associate data and does not account for randomness. The other disadvantage is that mean is not always a best measure of central tendency for example if the data is skewed.

3.7.2 Correlation Analysis

A pair wise correlation analysis was done to analyse the association between dependent and independent variables. The correlation analysis can as well be used to verify the strength of the relationship between two variables. The output of a correlation study is a number referred to as the correlation coefficient. Values of the correlation coefficient are always between -1 and +1. A value of +1 indicates that the two variables being considered are perfectly related in a positive linear sense. A value of -1 indicates that the two variables are perfectly related in a negative linear sense. Larger coefficients for example 0.8 suggest there is a stronger

relationship and 0.3 weaker relationships between variables. Values of the correlation coefficient close to zero indicate that the two variables are not linearly related.

3.7.3 Expected signs of explanatory variables

Table 3: Expected signs

Explanatory variables	Expected signs	Explanation of the relationship
Area	+	Output is positively related to area under wheat. Which means that as more land is brought under wheat production, output is increased
Capital	+	Output is positively related to capital. The more farmers have more capital, efficiency increases as well output
Price	+	Output is positively related to price. If there are increase prices farmers will be motivated to increase output.
Seed	+	Output is positively related to seed. As more seed is grown more output is also expected
Fertiliser	+	Output is positively related to fertilizer. The more farmers apply fertilizer the soil get enriched with nutrients, hence an increase in the output
Labour	+	Output is positively related to labour. The more hours spend in the field with more labour, the more the output is increased
Gender	+/-	It is believed that man are more powerful than women as a result man will produce more output than women
Distance to the market	-	Output is negatively related to distance to the market. As there will be a long distance to the market, it might discourage farmer due to transport costs hence reducing output.
Experience	+	As a farmer gains more experience efficiency will be improved as well hence increase in output
Level of education	+	Output is related to education. This means that the more the farmers are educated, the more output increase

3.7.4 Regression analysis

Factors affecting wheat production were analysed using a log linear regression model. The following regression model was assumed

$$LogQ = \alpha + \alpha_1 lnA + \alpha_2 lnK + \alpha_3 lnP + \alpha_4 lnS + \alpha_5 lnF + \alpha_6 lnL + \alpha_7 lnG + \alpha_8 lnM + \alpha_9 lnE + \alpha_{10} Ed + U \quad (4)$$

Where:

i. Q= total output of wheat produced in kilograms,
ii. A = area planted under wheat in hectares,
iii. K = capital in US$
iv. P = wheat price in US$,
v. S = seed quantity needed to produce wheat in kilograms
vi. F = fertiliser quantity needed to produce wheat in kilograms
vii. L = labour in terms of man-hours spent on the farm,
viii. G = gender (where 0- female and 1- male)
ix. M = distance to the market in kilometres
x. E = experience in wheat production in years
xi. Ed =level of education attained by the respondent
xii. α= constant
xiii. α_{1-10} =is the coefficient to estimate the relationship between the output and the different variables,
xiv. U= random error term.

The above estimated equation is a log linear production function signifying the relations among the collection of economic variables used in this analysis. Log linear production function was used to minimise the disparities between dependent and explanatory variables. The relations are particular based on the economic theory of the firm and in this case the household is the one referred to as the firm. The production function in this analysis is a multivariable function which seeks to find out the effect of changes in the amounts of more than one input (Blume & Simon, 1994). The merits of using regression model includes that it efficiently uses data and it obtains optimal estimation of the unknown parameters. The disadvantages of regression model are that it fails to verify the difference between correlations and causal relationships and it is very sensitive to the outliers.

3.8 Limitations of the study

Time and funds were a limitation to the study, the whole Nyabira village could not be studied therefore a sample of 40 farmers was randomly selected so as to give information on socioeconomic factors influencing wheat production. As it was soon after election some of the farmers were not willing to give information so to overcome this we had to ensure them that the information was strictly for academic purposes.

3.9 Conclusion

The chapter explains the research methods used in the study and their limitation. The next chapter will then present results and analyse them.

CHAPTER FOUR

RESULTS AND DISCUSSION

4.1 Introduction

This chapter presents research results emanating from the field survey that was carried out. Findings of the research regarding factors that affect wheat production are highlighted. The chapter explains the demographic characteristics of the sampled households. The results of the log linear regression model are then later explained in trying to identify significant socioeconomic factors affecting wheat production in Nyabira. Significant variables are explained, constraints faced by wheat producers in Nyabira and lastly conclusion of the chapter. These results were presented in form of tables and graphs.

4.2 To determine the socioeconomic factors that affect wheat production in Nyabira

This section is going to discuss household head's aspects such as gender, age and educational levels. Makhura (2001) indicated that these aspects are important as the household head is the one that coordinates main household activities and his or her decision affects the production output. Demographic characteristics of households are vital on analyzing socio-economic data as they manipulate the households' economic behaviour (Randela, 2005). Therefore it is important to consider household demographic characteristics in analyzing the socio-economic factors affecting wheat production in Nyabira.

The study sample was 40 household. From the household population under survey it was observed that 51% were females and 49% were males (own source) and this is supported with the study in Zvimba East Constituency (Parliament Research Department, 2011). Below is some of the summary of the descriptive analysis of the farmers' socio-economic characteristics.

4.2.1 Gender of household head

The Table 4 below summarizes the gender distribution of all sampled wheat farmers in Nyabira.

Table 4: Sex of household head

Gender of the household head	Frequency	Percentage
Females	9	22.5
Males	31	77.5
Total	**40**	**100**

Out of 40 households that were interviewed 77.5% were male headed and 22.5% were female headed. From the results it shows that males were dominating as household heads.

4.2.2 Age of household head

Age of a household head in aspect of agricultural productivity determines farming experience and the household's knowledge of the social and physical environments (Hofferth, (2003). Table 5 summarises the age distribution of the households head.

Table 5: Age distribution of household heads

Age range	Frequency	Percentage
25 to 35years	9	22.50
36 to 45years	10	25.00
46 to 55years	10	25
56 to 65	11	27.50
Total	**40**	**100.00**

Overall, the dominant age range of the interviewed farmers was between 56 to 65 years with 27.5% and the least number of respondents was between 25 to 35 years with 22.5%. This affirms the belief that farming is usually done by older people as a result of younger people migrating to town in search for other sources of income which are not laborious as compared to farming.

4.2.3 Education level of the household head

Figure 3 below shows that 40% of the households heads attained formal education and this is supported, as some of the farmers indicated off farm work as a source of income. 30% attained advanced education, 25% secondary education and lastly 5% primary education.

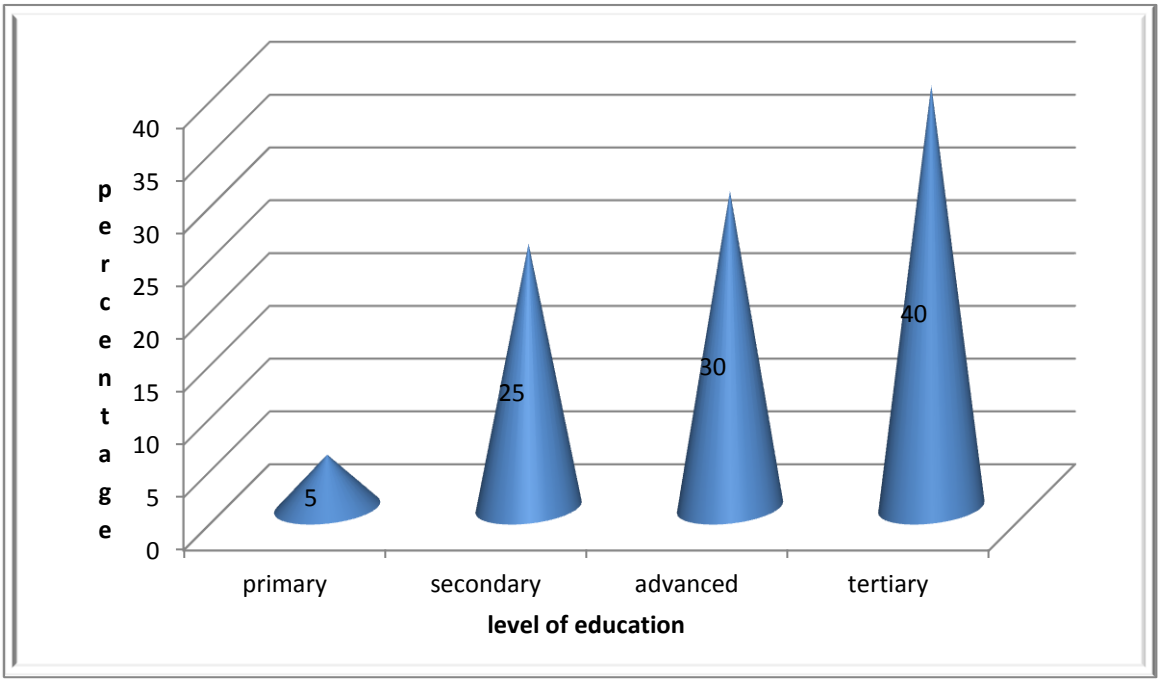

Figure 3: Education level of the household head

Therefore, it can be concluded that most farmers had some basic literacy especially in *Shona* their local language and also English concerning their farming activities.

4.2.4 Source of income

Many farmers recorded cultivation of crops as the best source of income with 51%, secondly livestock with 34% and thirdly employment with 15%. The farmers were involved in the cultivation of crops like wheat, maize, barley and potatoes. Livestock included animals like cattles, ducks, sheep, pigs and goats. The distribution is shown below in figure 4.

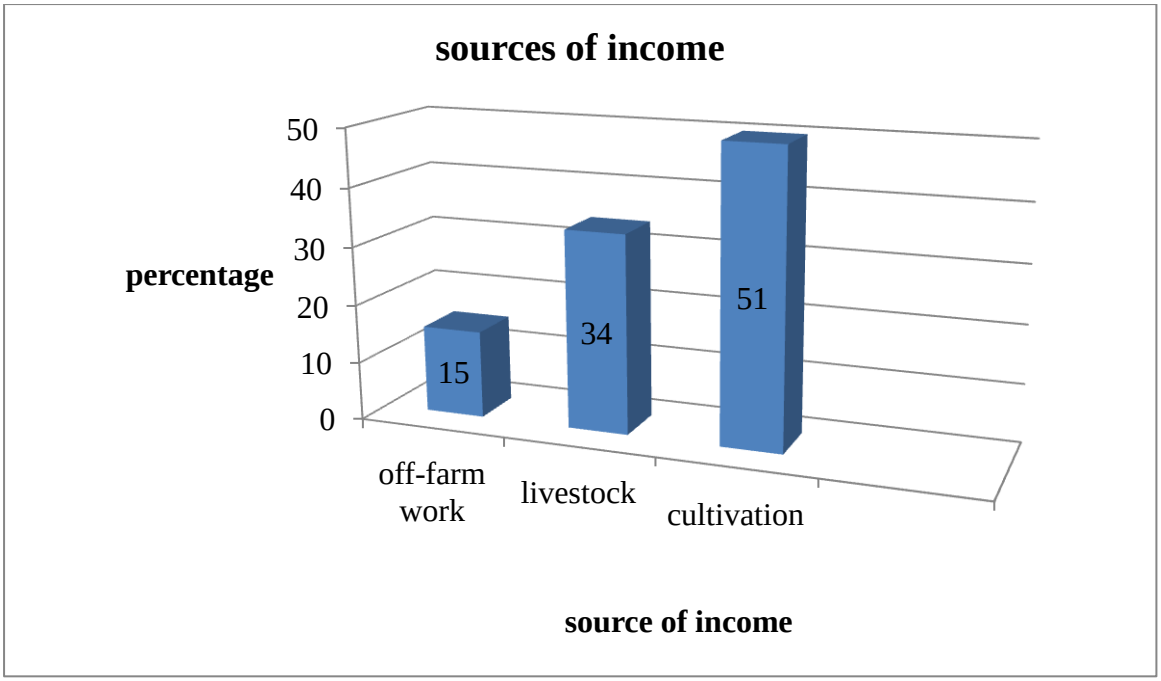

Figure 4: Source of income

4.2.5 Area under wheat, fertiliser quantity used, seed quantity used, labour used, market distance, experience, capital, and household size

Table 6 shows that the average land size under wheat was 38.38 hectares with minimum area under wheat being 5 hectares and the maximum 250 hectares. This shows wheat production in Nyabira is constituted of both the A1 and the A2 wheat farmers. The variation in area under wheat production can be explained by the availability of inputs and physical equipments as the crop is produced under irrigation.

The seed and fertiliser quantity recorded were per farmer and depending with the farmer's area under wheat, that's why the data is showing large quantities. Further analysis indicated that their average seed per hectare was 120kg and fertiliser per hectare was 450kg for basal dressing and 350kg per hectare for top dressing. The same applied for output and the average output was 4.5 tonnes per hectare. Labour as specified in chapter 3 it was measured in hours spend in the field per day. The average hours spent in the field was 7.51 whilst the minimum hours spend was 3 and maximum 10 hours per day.

Table 6: Area under wheat, fertiliser quantity used, seed quantity used, labour used, market distance, experience, capital, and household size

Variable	Mean	Standard deviation	Min	Max
Area under wheat	38.375	44.17546	5	250
Seed used	211.875	217.7793	25	1250
Fertiliser used	687.775	710.6947	75	4050
Labour	7.5125	1.715269	3	10
Output	150.5575	180.0431	8.8	875
Market distance	56.425	43.62009	5	200
Experience	2003.95	7.085377	2	33
Capital	114899.9	117190.3	14334.7	673497
Household size	4.3	1.636131	3	10

The respondents' average distance to the market was 56.4km and the minimum distance being 5km and maximum 200km (Table 6). This means that farmers who are located near the markets are likelier to market their produce than those who are far away. Therefore those farmers that are far way will face high transport costs (Dorward et al., 2003) and this might affect the return of the produce.

The average year for starting growing wheat for farmers was between 2003 and 2004 which implies that they have 10 to 11 years of experience (Table 6). Farmers started growing wheat in 1980 and those with least experience started growing wheat in 2011. With more experience it implies that there will be more insight on much land to allocate for wheat production.

Table 6 presents wheat farmers capital which was defined in terms of the US$ used in the wheat production for year was US$114,899.90 whilst the lowest amount was US$414,334.70 and the highest was US$673,497.00. The farmers indicated that they also source capital from personal investments and in this study it included cash, physical equipments and as well personal savings

Table 6 summarizes the household sizes in the study area. The average household size of Nyabira was 4 and they were in the range of 3 to 10 as shown by the table above. The household size represents the permanently total number of household's residents. The Nyabire wheat farmers though they have large families they still hire labour and this might be

because of large hectares recorded. Paddy (2003) indicated that as family size tends to increase it provides households with the required labour for agricultural production.

4.3 Correlation

The correlation results (see appendix) showed that the variables are not highly correlated therefore there is reduced possibility of multicollinearity. The correlation matrix (see apendix) showed that wheat output is highly and positively correlated with capital, fertiliser, seed and area. And this means that an increase in capital, fertiliser, seed and area will induce an increase in wheat output. A weak positive linear correlation between wheat output and price, market and education was confirmed. Experience, gender and labour are negatively correlated with wheat output

4.4 Model test

The model was tested for heteroskedasticity using Breusch-Pagan test which is designed in way that it identifies any linear form of heteroskedasticity (Berry & Feldman. 1994) and it was found not to be a problem. The model was again tested for normality using the Shapiro-Wilk test and p value indicated (0.63) which means that r is normally distributed.

4.5 Estimated parameters of socioeconomic factors affecting wheat production

A log linear regression model with ten predictor variables was regressed against a dependent variable wheat output. This was done as to identify significant socioeconomic factors probable to influence wheat production in Nyabira.

Table 7: Estimated parameters of socioeconomic factors affecting wheat production

Variable	Coefficient	T-statistics	Significance
Constant	94.38208	3.02	0.005**
Capital	0.0025897	0.50	0.621
Total fertiliser	0.0163391	3.28	0.003***
Total seed	-1.452298	-0.52	0.607
Wheat price	0.3688848	1.78	0.086*
Education	0.1115549	1.83	0.077*
Experience	-.0466522	-3.10	0.004***
Area under wheat	0.0411451	5.75	0.000***
Sex of household head	0.1000475	0.47	0.640
Labour	0.0020788	1.12	0.271
Market distance	-0.1912248	-2.03	0.052 *
Number of observations N	40		
f-statistics	17.33***		
Prob > F	0.0000		
R squared	0.8566		

*Note *= significant at 10%, **= significant at 5%, ***= significant at 1%*

As shown above (Table 7) out of the ten predictor variables, six were statistically significant ($p < 0.1$) and these are market distance, area under wheat, education, fertiliser quantity, wheat price and experience in wheat production. Some of the signs of the estimated coefficients were consistent with the *a priori* expectations while in some they were contrary to the expectations.

The variables are going to be explained in detail below. Ordinary Least squares (OLS) were used to estimate the variables. The results show that R-squared = 0.8566 imply that 85.67% of the variation in wheat output is explained by the explanatory variables. There is zero probability of rejecting the model since the f-probability is zero and it means it is significant at 1%. This implies that the model was correctly specified.

The regression equation model:

$$Q = 94.38208 + 0.0025897\ capital + 0.0163391\ total\ fertiliser$$

(31.2286) (0.0051853) (0.0049859)

$$-1.452298\ total\ seed + 0.3688848\ wheat\ price + 0.1115549 education$$

(2.790206) (0.2076701) (0.0942188)

$$-0.466522\ experience + 0.0411451\ area\ under\ wheat$$

(0.0150569) (0.0071594)

$$+0.1000475\ sex\ of\ household\ head + 0.0020788\ labour$$

(0.2116067) (0.0018527)

$$-0.1912248\ market\ distance$$

(0.0609157)

$R^2 = 0.8566$

Fertiliser is significant at 1%. This implies that a unit increase in fertiliser application led to about 1.63% increase in wheat production. This can be because general agriculture indicates that as you apply more fertiliser more nutrients are added to the soil hence to crop and as a result there will be an increase in output.

The results show that output from wheat production is positively related to area under wheat as shown by the coefficient of 0.041. This is significant at 1% level. This means that as households expand acreage under wheat production by 1%, the output will increase by 4.1%. And this supports what Malassis, (1975) said in the literature, that as more land is brought under production, output is also increased.

The results showed that output from wheat production is positively related to the price of wheat output as indicated by the coefficient 0.369. This explains that an increase in price by 1%, the output will also increase by 36.9% and its' significant at 10%. This can be because increase in price will motivate farmers to grow more wheat as there will be profits to be accrued hence more output and it will also attract new farmers into the sector.

A negative coefficient (0.047) experience indicates it's negatively influence on wheat production. This means that as household heads gain more experience in wheat production by 1%, the output decreases by 4.7%. From the results from questionnaires those farmers with more experience in wheat production, due to constraints facing wheat production sector they has been reducing area under wheat production and some were moving out of wheat sector.

And as the relationship indicated by Malassis, (1975) between land and output which pointed out that as less land is brought under production output also decreases. A positive sign was expected from the findings, but the results illustrate a 4.7% decrease.

Output from wheat production is negatively related to the distance to the market as it is shown by the coefficient (0.191) and is significant at 10%. This implies that an increase by 1% distance will decrease output by 19.1%. This might be because farmers who are located far away from the market might face marketing problems, and they also incur high transport cost (Dorward et al., 2003). Lack of transport connectivity can as well delay produce transportation which might result to quantitative and qualitative loss in the wheat produce. Due to these problems, some farmers might find it unattractive to grow wheat hence the will be a decrease in wheat output production.

From the results it shows that wheat output is positively related to education as shown by the coefficient 0.12 and is significant at 10%. This means that an increase in the level of education of household heads by 1% will result in an increase in wheat output by 12%. As indicated in the descriptive statistics most of the farmers had attained secondary level this explains the results. This is so because as a person tends to get more educated he or she will be gaining more experience, and will be able to learn quickly from the extension officers.

Seed, labour, capital and gender of the household head, their t-statistics were not significant. And this means that these variables in the study do not have a significant effect on the output of wheat in Nyabira.

4.6 Constraints faced by wheat farmers in Nyabira

The farmers were asked to rank problems that they faced during wheat production on a scale of 1 to 6, regarding 1 as the least important and 6 as the most important. The following Table shows the most frequent problems mentioned by farmers and the percent of farmers being affected with it.

Table 8: Constraints faced by farmers in wheat production

Constraint	Percent of farmers
Power shortages	90
Unavailability of loans	70
Low yield	55
Quelea birds	40
Shortage of fertiliser	30
Limited Extension	25

As shown above on Table 8 the most crucial challenge faced by most farmers was power shortages recording 90%. Many farmers were complaining that power outages are affecting their irrigation, as some of them did not have big generators to sustain irrigation. The next problem in the ranking was unavailability of loans with a 70%. Most of the farmers indicated that they did not get loans due to different causes such as high interest rates and lack of collateral. Low yields also followed in the rankings and this was affecting farmers resulting them in reducing area under wheat. These results also supported by Sukume et al (2000) who indicated that low yields on small grains have acted as a major obstacle for farmers not to uptake production of these crops on a large scale.

Quelea birds were also a problem during the sprouting stage and this is shown by a 40%, though some farmers did not face this problem. From my observation it showed that these birds were concentrated on some areas whilst in some areas they were not there. The presence of these birds also offered labour constraints to farmers as they had to hire more labour to scare away the birds. The other problem resulting from these birds is that they reduced yields. Shortage of fertiliser also ranked next with a 30%, this is because few of the farmers received inputs from the presidential scheme. As a result farmers were now forced to buy for their selves by then unavailability of loans was another problem, so they could not afford buying fertiliser hence this affected their output. Limited extension was another problem indicated by wheat farmers with a 25%, this might be because of lack of resources from extension officers as some of the farmers were far away from the main roads.

4.7 Conclusion

Study population and farm characteristics were discussed in the chapter. The results from the survey showed that most of the households were male headed and they were the highest producers of wheat. Most of the farmers' attained tertiary education and as a result of this illiteracy was not a problem among these farmers. Some of the farmers' capital was from personal savings and it was defined in US dollars.

Correlation analysis was undertaken using pair wise correlation to determine the relationship between the dependent variable (output) and various independent variables. Based on the results it can be concluded that capital, fertiliser, seed, area, education and price are positively related to wheat output. It can be concluded that there was no multicoliniarity as variables were not highly correlated. Results from the logistic regression model showed that factors such as level of education, market distance, experience, area, wheat price and fertiliser quantity significantly affect wheat production at household level in the area under study. This implies that, the results have a tendency that an adjustment in one of the significant variables can lead to increased or decreased wheat production. The results also indicated constraints faced by wheat farmers which included power shortages, unavailability of loans, low yield, quelea birds, shortage of fertiliser and limited extension. These problems made wheat production unattractive to farmers as it is reducing their yields.

CHAPTER FIVE

CONCLUSION AND POLICY RECOMENDATIONS

5.1 Introduction

This chapter will give a summary of the findings from the study. The chapter will then provides promising policy recommendations based on the findings from the analyzed data. In the end, the chapter will conclude by exploring areas of further study.

5.2 Main findings from the study

The main objective of this study was to investigate the socio-economic factors influencing the production of wheat in Nyabira, Zvimba district in Zimbabwe. Wheat production trend has been showing an increase during the period 1960 to 1990 and it was due to policies adopted during the pre- and post-independence eras. However literature on wheat production is showing a decline on the trend from 2000 up to date. From the questionnaires small scale farmers are also participating in wheat production though large scale farms are still the largest producers of wheat. An estimation of the relationship between the output of wheat and various socio-economic factors was done. The study aimed to fulfil the following specific objectives.

5.2.1 To determine the socioeconomic factors that affect wheat production in Nyabira.

The first objective was looking at demographic characteristics of Nyabira wheat farmers. It was found out that the out of the 40 household that were interviewed 77.5% were male headed and 22.5% were female. From the results it can be concluded that households in Nyabira are male dominated. The dominant age range was between 56 to 65 years and this shows that wheat production in Nyabira is done by old people. Average household size was four. 40% of the sampled population attained formal education, 30% attained advanced education and 30% attained secondary level and below therefore it can be concluded that most of the farmers were literate. Most of the farmers' income was reported from cultivation of crops though some indicated off farm work and livestock production as their sources. The average land size under wheat cultivation was 33.38 hectares. The smallest owners had 5 hectares and largest had 250 hectares, therefore it can be concluded small holder farmers were also involved in wheat production. Most of the farmers started growing wheat between

2003 and 2004 and those who had more experience were now dropping out of wheat production.

Log linear regression was run to estimate the relationship between output and variable socio-economic factors. Based on the results fertiliser, area, price and level of education have positive relationship with the wheat output and experience has a negative relationship with output. As a result of the findings these significant socio-economic factors have to be reviewed in order to improve the production of wheat in the country. Experience in wheat production and distance to the market in this study showed a negative significance to wheat output. One of the reasons to this is that wheat sector has been hindered by so many factors which are discouraging farmers to continue growing wheat. Therefore it can be concluded that wheat is no longer a profitable crop to grow.

Capital, sex of the household head, labour and seed quantity showed a positive coefficient but was not significant to wheat output. This implies that these factors have no effect on wheat production. Basing on the results from the study it can be concluded that fertiliser quantity, area, level of education and labour are the main socio-economic factors affecting wheat production in Nyabira. The government should give an emphasis on these factors of production so as to increase the production of wheat.

5.2.2 To ascertain other wheat production constraints in Nyabira.

There are many constraints which farmers were facing and these includes power shortages, unavailability of loans, low yield, quelea birds, shortage of fertiliser and limited extension. From the results the most challenge faced by farmers was a power shortage which was recorded 90% by the population. The least challenge faced was limited agricultural extension therefore it can be concluded that most of the farmers were getting information from the extension officers.

5.3 Recommendations

The recommendations are for the direct stakeholders involved in wheat production. They are presented for each research objective. The overall recommendation first for the main objective is that the government has to introduce inputs for wheat farmers so as to help reduce their costs.

5.3.1 To determine the socioeconomic factors that affect wheat production in Nyabira

The government should promote the use of fertiliser by introducing reliable input schemes which promises and deliver as promised. It can also provide incentives to fertilizer shops so that wheat farmers will buy it at affordable price therefore this will increase the level of wheat production. There should be workshops that encourage women to participate in wheat production. As a result this will increase the level production of wheat.

The government should introduce new land program which will reallocate land to farmers. Those farmers with high productivity should be given more preference and land should be taken away from those who are not using it. Motivational speakers should be introduced in the agricultural sector so as to sweet talk those experienced farmers to come back into wheat production. Promising promises should be made, or some incentives should be offered to them (sort of rewarding) as they have been in the sector for a long time. The seed houses should introduce wheat summer varieties as this will reduce costs of production like irrigation costs.

5.3.2 To ascertain other wheat production constraints in Nyabira.

Farming information is the key to high production therefore the government should advance in its gathering methods and dissemination of information. This requires the government to provide adequate resources to the extension officers so as to enable reach to remote areas. There is also need for remittances to extension officers and awards so as to motivate them. With the current circumstances surrounding low wheat production in Zimbabwe, the government has to provide credit facilities to farmers. Loans must also be made accessible to farmers with low interest rates and this would help in improving wheat productivity and profitability as it was difficult for other farmers to obtain loans.

Efforts must be made to provide capital to wheat farmers so as to improve wheat production because lack of capital was making farmers reduce their acreage under wheat. Therefore, government should persuade non-governmental organisational (NGOs), banks and private sectors to extend to help farmers with capital. The study is also recommending that wheat farming households should form cooperative groups so as to help them financially as this will allow them to obtain loans at low interest rate and if they bargain they buy farm inputs in

bulk and get discounts. To reduce transport costs they can as well sell their produce at once and in bulk

5.4 Area of further study

The study aimed on investigating the socio-economic factors affecting wheat production in Nyabira, Zvimba district. The study was conducted in Nyabira and only 40 respondents were interviewed. However further research can cover the whole district of Zvimba so as to capture socio-economic factors that was not available due to small sample in this study model. The study can also cover all other wheat producing agro-ecological regions as to pick the differences in challenges affecting farmers. Also ZETDC rates, type of irrigation and water rates should be incorporated in furthers research. There should be studies on summer wheat varieties.

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APPENDIX

Annex 1: Questionnaire

Enumerator's name……. Date……

Case number……..

This survey is being carried out for academic purposes in order to obtain information on the socioeconomic factors influencing wheat production by Chinyoka Unanda a student at Midlands State University. This will assist researchers and farmers in identifying options and the factor affecting wheat production amongst the smallholder farmers in improving their productivity and welfare. The project would be grateful if you could spare an hour of your time to answer the following questions. The information you give will be used in the strictest confidence and mainly for academic purposes and will not be used for any other purposes. (There are no wrong or right answers)

Household details

Q1. Are you the head of the household (tick the appropriate)? Yes ☐ No ☐

Q2. What sex is the head of the household? Female ☐ Male ☐

Q3. What age is the head of the household?

Less than25 years ☐ 25-35years☐ 36-45 years☐ 46-55years ☐ 56-65 years ☐

Over 65years☐

Q4. What is the highest level of education of the head of the household?

Advanced☐ tertiary ☐ none ☐ secondary ☐ Primary ☐

Q5. How many are in your family?

Q6. A-7-Indicate your income-generating activities (list by order of importance):

(1- Best, 2-second, 3-third)

livestock	
Off farm employment	
cultivation	

Other (to specify).....

Q7. How do you come up with your capital for wheat production?

Q8. How much capital did you have for the last season wheat production?

Q9. For the household members who reside here please indicate their numbers as required in the following table

Age group/Gender	Number of individuals	Age group/Gender	Number of individuals
Males over 60 years old		Males under 15 years old	
Females over 60 years old		Females under 15 years old	
Males 16-60 years old		Males under 5 years old	
Females 16-60 years old		Females under 5 years old	

Q10. Does your household hire labour? Yes ☐ No ☐

Q11. State what is this labour for? Permanent Labour ☐ Ploughing ☐ Weeding ☐

Other (specify)

……

Q12. How do you pay labour? Cash ☐ Ploughing their land☐ Fo☐

Other (specify)

……
……

Q13. Where do you normally get your agricultural information? Enumerator please indicates the main sources by ticking the boxes.

AREX ☐ TV☐ Radio ▭ Pamphlets☐ other farmers ☐ produce buyers ☐Farmer organization / co-op ☐

Assets-Land

Q14. When did you start growing wheat?

Q15. Total area under wheat production in the last cropping season (Ha or acres)

Total area……

Q16. How much fertilizer and seed do you use per hectare?

Fertilizer (Compound D--------& AN------) other specify---------- &seed----------

Assets-Cattle and Implements

Q17. Indicate the assets and animals owned by the household.

	Responses	Notes
Assets owned		If no assets owned write none
Animals owned		

Labor Availability

Q18. How much time do you usually take per day in your field?

Q19. How often do you experience labor shortages during your farming operations? Tick applicable

[1] Not at all ☐ [2] Moderate ☐ [3] Severely ☐

Access to Land and Agricultural Inputs

Q20. For the past ten years did you have access to credit, if not explain why? ----------

---

Q21. If you did not obtain credit, what were the reasons? _ 1 = did not seek 2 = unavailability of credit 3 = no collateral 4 =high interest rate

5 = unfavorable repayment terms 6 = did not need 7 = other (specify)

Q22. Are you currently a member of any farmers' associations/cooperatives? _____[1] = Yes [2] = No

Q23. What association (group) do you belong to? (Circle all that apply)

1=Extension group 2=NGO group (indicate name of NGO) 3=women groups 4=savings club 5=farmer field school 6= co-operative 7=other (specify)

Q24. Do you receive any subsidised inputs from any other source if yes specify. ----------
---

Rural Services and Credit

Q25	Have you ever received any type of formal training if yes which organization	YES ☐ NO ☐	
Q26	From whom did you receive this training?	Source 1:_____ Sex:_____ Source 2_____ Sex:_____	List source and sex

Q27. What is the distance in kilometers (km) to the nearest market? ----------

Q28. What other constraints do you face in production of wheat? (Key rank. 1 least important and 6 most important)

Constraint	Rank

Q29. Thank you that is all. Is there anything that you would like to add?

_____

_____

The End

&

Thank you for your time and effort

Annex 2: Model test

Test 1: Breusch-Pagan / Cook-Weisberg test for heteroskedasticity

Ho: Constant variance

Variables: fitted values of log output

chi2 (1) = 0.00

Prob > chi2 = 0.9939

Test 2: Test for normal data

Table 9: Shapiro-Wilk W

Variable	Observation	W	V	z	Prob > z
r	40	0.97848	0.851	-0.340	0.63314

Annex 3: Correlation

Table 10: Correlation matrix of the dependent and independent variables

	output	capital	fertiliser	Seed	price	market	Area	experience	Gender	education	labour
Output	1.0000										
Capital	0.8976	1.0000									
fertiliser	0.8941	0.9997	1.0000								
Seed	0.8975	1.0000	0.9997	1.0000							
Price	0.4358	0.2964	0.2920	0.2965	1.0000						
Market	0.3259	0.2026	0.1959	0.2026	0.5315	1.0000					
Area	0.9563	0.9401	0.9357	0.9401	0.4173	0.3287	1.0000				
experience	-0.3711	-0.4041	-0.4042	-0.4041	-0.0202	0.1952	-0.2586	1.0000			
Gender	-0.0599	-0.1303	-0.1368	-0.1303	-0.0188	0.1807	-0.0956	-0.2007	1.0000		
education	0.0605	0.0662	0.0677	0.0661	0.0171	-0.0718	-0.0020	-0.2876	0.1008	1.0000	
Labour	-0.0573	-0.0842	-0.0840	-0.0842	-0.0877	0.0952	-0.1407	-0.0273	0.1096	0.1329	1.0000