



CHAPTER ONE.

INTRODUCTION

1.1 Background

Zimbabwe is a landlocked country with a total surface area of 39,09 million hectares of which a small proportion is covered by water bodies. Land use is divided into categories which comprise agricultural land, wildlife and strategic areas, urban, and mining areas. Agricultural land constitute the largest category and accounts for about 33 million hectares of which about 12 million hectares are in the large scale commercial sector and the remainder in the smallholder sector, resettlement sector and stateland.

For agricultural purposes the country is divided into five regions in accordance with the agricultural potential of the area. Region 1 has the highest potential in terms of agricultural diversity and ideal climate while Region 5 has the least potential. Consequently most of the agricultural activities in Region 1 are rainfed whilst the affinity for irrigated agriculture increases from Region 1 to 5.

Zimbabwe has an estimated population of 11.5 million of which more than half dwell in rural areas. The majority of the rural population depend on agriculture for their livelihood. Current estimates put the number of rural households to 800 000. It is further estimated that 75 per cent of this number live in Regions 4 and 5. In line with the thrust of promoting growth in the smallholder sector which was adopted by Government in 1980 it has been realised that irrigation development features prominently in

developing a sustainable agriculture in these areas. Government has therefore made a deliberate effort to construct dams and irrigation schemes in these areas.

Within the formal sector 350 000 people are employed in agriculture. The informal or smallholder sector provides a livelihood to well over 800 000 households. With increasing unemployment within the formal sector it is envisaged that the agricultural sector will continue to play a dominant role in providing food to both the rural and urban population, employment to the rural population and curbing rural-urban migration.

Within the macro context agriculture plays a central role by way of generating foreign currency, providing food to the urban sector, providing raw materials to the industrial sector, capital formation and creation of employment. The sector accounts for about 14 per cent of the GDP and over 40 per cent of foreign currency earnings. A wide range of crops which include maize, tobacco, wheat, soyabeans, horticulture, sugar cane, tea and coffee are grown under irrigation and/or dryland farming. Currently maize is the main staple.

1.2 The Concept of Food Security

Food security is generally taken to mean access by people at all times to a sufficient supply of quality food for a healthy and productive life (Centre for International Economics, 1996). The main elements of this definition include access, sufficient supply, quality, all times, and healthy and productive life. It follows therefore that in terms of access; supply, affordability and proximity are important parameters in the food security equation. Abundant supplies which are not available to households owing to a

weak demand or logistical problems do not enhance food security. Similarly the nutritional balance and adequate quantities are important facets of food security. In that respect a balanced diet should primarily comprise adequate quantities of minerals, vitamins, proteins, energy and other essential ingredients.

The European Union defines food security as " a combination of circumstances of supply and demand (involving both availability of food and ability to obtain access to it) which represents a threshold above which households can start to accumulate reserves (in the form of stocks, livestock or savings), develop more powerful means of production or ways of increasing income and organise their social relations to provide more reliable solidarity networks; all of these actions make them less vulnerable in the case of a food crisis." It will be realised that this definition highlights all the elements given in the first definition. However, it goes further to bring in other dimensions such as poverty, coping strategies in the event of a crisis and the hierarchy of needs. It considers food security as a threshold for breaking out of poverty and developing more powerful means of production or increasing income. In other words it is seen as a basis of moving from physiological needs to higher needs. Thus, above this threshold people are seen as part of the development process or as it were actively participate in the development process.

The Bundesministerium fur wirtschaftliche Zusammenarbeit und Entwicklung define food security as "All people have access at all times to sufficient food to enable them to lead an active and healthy life." From a glance one would realise that this definition is very much in line with the first definition. Furthermore, it also nicely fits into the second definition.

Following an overview of the definition of food security it is now pertinent to review the mechanics of achieving food security. At a regional or global level food security can be achieved through promoting trade (Centre for International Economics, 1996). Through the theory of comparative advantage it is believed that promotion of trade results in welfare gains. In this context trade enables access to higher quality and cheaper food owing to competition and relative comparative advantages. Alternatively countries can pursue policies of food self-sufficiency through promoting national production.

At the household level food security can be achieved through own production, production of cash crops, wage employment and barter. Own production or subsistence production as it is popularly known involves production of various crops for household consumption. The extent to which this achieves food security depends on the quantities produced and the nutritional balance. Through the production of cash crops one is able to raise cash, part of which can be used for the procurement of food. In this way one can therefore achieve food security. Similarly through wage employment one is able to raise cash for food procurement. Barter trade involves trading certain goods and services for food. The most popular transactions involve the exchange of small livestock for cereals.

1.3 The Food Security Problem (Problem Statement)

In order to put Zimbabwe's food security problem into perspective it would be more ideal to give a global picture then proceed to present the national picture. About 840 million people suffer from malnutrition and poverty (FAO, 1996) worldwide. Furthermore, projections of food demand made by IFPRI (1992) show that

developing countries will experience an increasing production shortfall between 1992 and 2000. Detailed results of this projection are shown in the table below.

Table 1.1: Food Consumption/Demand Projections for 1992 - 2000

Region	Population %	Incomes %	Income Elasticity %	Food Demand %	Domestic Use %	Food Production %
Developing Countries	1.9	2.9	0.4	3.1	2.7	2.9
Sub-Saharan Africa	3.2	0.3	0.6	3.4	3.6	2.1
East Asia	1.5	5.7	0.2	2.6	-	-
South Asia	1.9	3.1	0.4	3.1	2.3	2.9
Latin America	1.8	2.2	0.3	2.5	-	-
MENA	2.0	1.6	0.3	2.5	3.2	3.0
High Income Countries	0.6	2.1	0.1	0.8	3.8	2.9

Source: IFPRI, 1992

Despite the decline in food production in LDCs the importance of livestock will be expected to increase over the next decade (Cees de Haan, *et al*, 1997). Demand for livestock products is expected to rise from the current level of 206 million metric tonnes to 275 - 310 million tons or more per year by 2020. Furthermore, current levels of meat and milk consumption are estimated to be one-fifth of consumption levels in developed countries (Cees de Haan, *et al*, 1997). Table 1.2 below shows the gap in consumption of livestock between developing and developed countries.

Table 1.2: Regional Consumption Levels of Meat and milk (kg capita/year, 1990)

REGION	PER CAPITA CONSUMPTION/YEAR (1990) KGS	
	MEAT	MILK
Global	30	70
Developed Countries	80	200
Developing Countries	12	30
Africa	10	25
Latin America	40	90
Middle East	20	68
Rest of Asia	10	23

Source: Haan, 1997 (adapted)

Future changes in food consumption within Developing Countries will greatly hinge on population growth, income growth, food prices and changes in preferences driven by changing lifestyles (IFPRI, 1992). Furthermore, demand for livestock products will accelerate in developing countries with high rates of per capita income. Population growth and urbanisation will be the major driving force in Africa. Table 1.3 below shows the relationship between income growth and growth in consumption of livestock products and feeds.

Table 1.3: The Relationship Between Income Growth and Consumption of Livestock Products and Feeds

GROWTH RATE OF PER CAPITA INCOME FOR THE 1961-80 PERIOD	GROWTH RATE (PER CAPITA)	
	Livestock Products	Feeds
Less than 1%	1.72	2.73
1.0 - 2.9%	3.02	4.02
3.0 - 4.9%	3.42	4.56
5.0% or more	4.91	6.02

Source: IFPRI (1992)

There are two global challenges arising from Table 1.3. The first challenge is to produce enough meat to meet the increasing consumption. The second challenge is to produce that meat in a cost effective fashion so as to address the food insecurity problem.

The food security situation in Zimbabwe is no better than the global perspective portrayed above. A greater proportion (70 per cent) of the Zimbabwean population live in rural areas and 31 per cent of the rural population is said to be in absolute poverty (FAO, 1997). Furthermore, the average daily energy consumption has declined from 2233kc per capita in 1980 to 2000kc per capita in 1993 and the situation is expected to deteriorate up to 2010 (FAO, 1997).

On the same score the 1998 publication on "Poverty in Zimbabwe" by the Central Statistical Office (Government of Zimbabwe) estimates the percentage of population below the poverty line at 63,3 per

cent. In addition 76,2 per cent of the poor and 89,5 per cent of the very poor are in rural areas. It further highlights that the main determinants of poverty in Zimbabwe are residential status as it implies to urban or rural, access to land and its quality, and the level of rainfall received in a particular area. Within the study area or in Mashonaland Central and West respectively 80,4 and 66,7 per cent of the population is below the poverty line.

The general observation to be made is that FAO and Central Statistical Office data have several implications to food security. From the definitions given in section 1.3 it is apparent that food security and poverty are one in the same thing. Secondly, they are serious problems in Zimbabwe.

Similarly Web and Moyo (1992) report wide spread poverty and food insecurity in Zimbabwe especially in the rural areas. In their study the problem of malnutrition is underlined. Their average national figures for chronic and acute malnutrition, and low birth weights for 1988/89 and 1989/90 are summarised in the Table 1.4 below.

Table 1.4 Manifestations of chronic and acute malnutrition in Zimbabwe

Weight for Age (%)	Weight for Age (%)	Weight for Height (%)	Low Birth Weight (%)
1988/89	1989/90		
11.44	15.89	28.89	6.89

Source: Web and Moyo, 1992 (adapted)

The data in the Table 1.4 shows that the malnutrition problem is critical in Zimbabwe. The worst hit provinces are Matabeleland North, Matabeleland South and Manicaland.

The main factors which influence food security in Zimbabwe are income and droughts. The link between food security and income has been adequately covered above. It now suffices to analyse the influence of drought on food security. Maize is the main staple of Zimbabwe and the average maize consumption is estimated at 1,8 million metric tonnes per annum (Ministry of Lands and Agriculture, Zimbabwe). Since 1990 Zimbabwe has only, on 4 occasions produced maize in excess of 1,8 million metric tonnes. The domestic production and imports over the last 9 years is given in Table 1.5 below.

Table 1.5 Domestic production and imports of maize

Year	Total Domestic Production (mt)	Imports (mt)
1990/91	1,585,800	nil
1991/92	361,000	83,171
1992/93	2,011,850	1,845,000
1993/94	2,326,200	204,970
1994/95	839,600	nil
1995/96	2,609,000	133,000
1996/97	2,192,170	101,237
1997/98	1,418,030	390,719
1998/99	1,519,560	500,000

Source: Ministry of Lands and Agriculture (1999)

The country experienced food shortages in the 1991/92, 1994/95 and

1997/98 and 1998/99 seasons. The shortages of the first 3 seasons were drought related whilst that of 1998/99 was caused by excessive rains which depressed production. The situation was particularly bad in 1991/92 where the country only produced 360 000mt of maize, imported over 1,8 million mt of maize and enrolled 5,6 million or about half of the entire population on the food relief register (SADC, 1992). The problem was compounded by chronic and severe malnutrition, low food supplies, lack of purchasing power at the household level and, disease epidemics and pandemics (SADC ,1992).

Web and Moyo(1992) portray a similar picture in the eighties. Their data on food relief indicates that in 1988 more than 9 million people received food relief. The number declined to 1,8 million in 1990 only to rise again to 5,6 million in 1992. Their data highlights the degree of instability in the food security situation in Zimbabwe.

The food security problem as it is related to drought is also interlinked to low productivity, geographic location and access to means of production (Web and Moyo, 1992). Communities who live in high potential areas tend to have higher incomes and yields hence are relatively more food secure compared to those who live in marginal areas where incomes and yields are much lower. In marginal areas food shortages and malnutrition are rampant.

With regards to access to means of production it is reported that the success story of smallholder farmers in Zimbabwe is only attributed to 30 per cent of the farmers who account for 75 per cent of production in the smallholder farming sector (Web and Moyo, 1992). The other 75 per cent is languishing in poverty. Furthermore, the wide disparities in welfare are attributed to access to means of production.

The food security situation at the global and national level is not so bright. In Zimbabwe the situation is equally bad. The rural areas are particularly hard hit with more than three quarters of the population being below the poverty line. The correlation between poverty and food insecurity implies that the majority of the rural population is food insecure. This problem needs urgent attention. Furthermore, it is also apparent that agriculture plays a pivotal role in poverty eradication in Zimbabwe.

1.4 Overview of World Cassava Production

Cassava is popularly known as mandioca in Portuguese and manioc in French. Local production is still insignificant and estimated at 18,000 metric tonnes per annum. However, within the global context cassava is a very important crop as a staple food, in livestock production and industrial use.

World cassava production is in excess of 150 million tonnes wet mass. The major producers by continent are South America, Asia and Africa. In terms of area under production, Africa is in the lead with over 5,5 million hectares under cassava. However, it should be noted that yields for cassava in Africa are still very low hence production in Asia and America which have significantly lower hectarages are very high. It is also noteworthy that whilst cassava is of little commercial significance in Africa it is a major commercial crop in Asia and Brazil. The major producers include Thailand, Nigeria, Brazil, Indonesia, Malaysia, India, Central America, Democratic Republic of Congo, Angola, Malawi, Mozambique and Tanzania. Table 1.4 below gives a summary of the global production of cassava.

Table 1.6: The Global Production of Cassava

Region	Production (MT) x 1000	Area (Ha) x 1000	Yield in MT/Ha
World	164,400	10,532	9
Africa	85,000	5,567	7
South America	31,700	2,413	13
Asia	47,600	2,378	9
Other Countries	32,000	104	6
Brazil	23,900	2,004	14
Indonesia	15,100	1,466	7
D. Rep. of Congo	16,800	843	12
Nigeria	32,100	928	10
India	6,000	328	15
Thailand	18,100	206	15

Sources:FAO (1998)and Onwueme(1989)

As indicated in the table the largest producers of cassava are Brazil, Thailand, Indonesia, Nigeria and the Democratic Republic of Congo. Each of these countries produce in excess of 10 million tonnes per annum. Despite being still a minor crop in Zimbabwe cassava is undoubtedly one of the major crops produced for human and animal consumption world wide.

1.5 The Current Food Security Options for Zimbabwe

Food security options are underpinned by three main pillars which include trade in food, promotion of production and promotion of consumption (Lipton, 1988). The strategy to enhance food security through the promotion of trade has been debated widely in the Southern Africa Development Community (SADC). Rukuni and Bernstein (1988) in their analysis of food security options underscore the

role of trade in food security. It has several weaknesses most of which relate to reliability of supply (Nziramasa, et al, 1989). Its main weakness is that it does not guarantee effective demand or access at the household level. The general criticism levelled against it is that owing to the bulkiness of food and poor infrastructure which result in high transport costs imported food often ends up being unfordable (Lipton, 1988).

Production options seek to empower the household to produce enough food for own consumption or sale. This is very popular in Zimbabwe. The main strategies have been used include provision of research and extension services, development of production such as irrigation systems, development of marketing infrastructure, adoption of appropriate technologies, development of input supply systems and resettlement of farmers (Rukuni and Bernstein, 1988). The main problem associated with most of these strategies is high cost. These high costs are factored in food prices thereby making it unaffordable. Secondly, high production costs discourage technological adoption hence perpetuate poverty or food insecurity. In order to put the former into perspective the price of inputs (irrigation water, agro-chemicals, electricity, fertiliser, fuel, transport, etc) have risen by over 300 per cent over the past 3 years, roller meal (mealie meal) prices have risen by more than 250 per cent over the same period and minimum wages have risen by about 75 per cent (Commercial Farmers Union, 1999). Consequently the food security situation has deteriorated significantly. To add fuel to a burning fire, population pressures are pushing rural folk into marginal areas. The challenge on the production option on food security is therefore to identify cost effective production strategies and crop varieties that grow well in marginal areas. In the face of recurrent droughts irrigation development provides an ideal production strategy. However, the inhibitive costs of

developing such infrastructure renders it no longer attractive.

Consumption strategies involve putting in place programmes which enhance access to food at the household level. These include food relief, food aid, food subsidies, price controls, strategic grain reserves, food for work programmes and minimum wage policies. Provision of food relief has been a common practice in Zimbabwe and this is well documented in Section 1.3 above. The Food-for-Work programme was introduced in 1993 following the devastating drought of 1992. This strategy entails employing rural people to participate in community development programmes and paying them in cash or kind. Payment in cash enables the households to buy food and payment in kind (food) directly provides food to the household. This option is well documented by Web and Moyo (1992). The programme has since been abandoned mainly because the Government does not have adequate financial resources to sustain it.

Tagwireyi, *et al*, (1989) propose the provision of a decent minimum wage as a strategy for enhancing food security at the household level. Their argument is that the provision of a decent wage stimulates effective demand for food hence improve household food security. In the eighties Government was actively involved in determining wages. However, this function was relegated to Labour Unions following the introduction of the Economic Structural Adjustment Programme. It was deemed that economic controls were not sustainable (Government of Zimbabwe, 1991). This strategy and price controls compliment each other. Price controls on food have been in place since 1980. They were temporarily lifted in 1994 only to be imposed again in 1998. Price controls are under heavy criticism from Rukuni, *et al*, whose views are that they are a tax to production.

Zimbabwe's Strategic Grain Reserve was established in 1995. The Reserve is two faceted and comprises a financial and physical stocks component (Government of Zimbabwe, 1996). At its inception Z\$842,4 million was set aside for the programme and this would convert to 936 000mt of maize at prices of that time. The producer price of maize at the inception of the programme was Z\$900/mt and now has more than quadrupled to Z\$4200/mt in 1999. Part of the fund has been used to subsidise maize meal. Consequently, the fund has dwindled. Thus, the main problem with this option is once again that of sustainability.

Strategies which promote production are very effective in improving food security at the national level although such improvements do not trickle down to the household owing to price related lack of effective demand. Similarly production strategies greatly enhance national food security and to a certain extent household food security. This notwithstanding, the rapidly increasing cost of production is compromising potential gains to be made at the household level. Consumption strategies are very effective in improving access to food. However, they are not sustainable.

1.6 Rationale for the Production of Cassava in Zimbabwe

Cassava is of major economic importance. The main uses of cassava include human consumption, manufacturing of stockfeeds and flour for industrial use, beer brewing, fuel production (butanol) and forage for animals. In terms of its importance with regards to food security Onwueme(1989) makes this observation:

"...Ease of production. A factor which has promoted the rapid spread of cassava to various parts of the world is the ease

with which it can be produced. Reasonably good yields can be obtained even if the crop suffers considerable neglect by the farmer. Even in modern cassava production, the crop requires very little care beyond the stage of canopy closure. Because of this ease of production, cassava is used in many traditional communities as a famine reserve. It is planted and left relatively untended, while most of the attention is devoted to the preferred crop such as yams, sweet potatoes, maize or guinea corn. If the main crop is good, the cassava may be left unharvested: but if the main crop should fail, the farmer is rest assured that he can supplement his diet from what the neglected cassava has produced."

Similarly the African Farming Magazine makes the following observations on the importance of cassava in food security:

"..Traditionally thought of as a food of the poor, cassava is an important staple for around 200 million African people"

"...It can grow in poor soil and survive erratic rains and drought conditions when other crops fail." and,

"..Cassava tubers can be stored in the ground as a food reserve for up to a year, hence the saying "where there is cassava, there is no hunger." "

Hahn(1989) and Jones(1991) also highlight the importance of cassava as a food crop and its role in food security.

From these observations it can be concluded that cassava plays a significant role in food security although downplayed. This role is dualistic in nature. It involves direct and indirect consumption.

In direct consumption it is a major source of energy. The chemical composition of its tuber as given below vouches for this observation.

Table 1.7: The chemical composition of cassava.

Nutrient	Content
Water	62%
Carbohydrate	35%
Protein	<2%
Fat	0.3%
Fibre	<2%
Minerals	1%

Source: Onwueme (1989)

It is rich in vitamin C, phosphorous and iron. Its main weakness in terms of food security is the low calcium and protein content. It therefore needs protein supplements. Table 1.6 below gives a comparison of various sources of energy under a subsistence production system. From the table it is very apparent that cassava supersedes most popular crops such as maize, rice, wheat, sorghum and Irish potato.

Table 1.8: The energy yield of various crops at a subsistence level of production.

Crop	Yield in MT/Ha	Million Calories/Ha
Cassava	9	12
Yam	8	7
Sweet Potato	7	7
Taro	6	6
Rice	2	5
Maize	2	8
Sorghum	1	3
Irish Potato	10	6
Wheat	1	4

Source: Onwueme (1989)

The main foods derived from cassava include fresh tubers which are normally eaten raw, meal which is used for preparation of porridge and roasts, chips, cassava flakes, flour for blending with wheat, and noodles. In Brazil cassava is mainly produced for human consumption and fuel production. In Philippines its use is restricted to production of noodles and livestock feeds. In addition it is produced as a secondary crop. In Africa the production of meal for porridge is a common practice.

Secondly, it is a cheaper stockfeed ingredient. Fresh cassava tuber finds considerable use as a feed for livestock. Sheep, goats, cattle and particularly pigs are often fed on fresh cassava tubers which they find palatable (Onwueme, 1989). In this regard cassava exports are estimated at 14,5 million tonnes of which Thailand accounts for over 13 million tonnes. The main export destination is the European Union which accounts for more than 12 million tonnes. Cassava exports are mainly used in livestock production. The implications to food security are that with increasing competition in meat production cassava offers cost cutting opportunities which

in turn provide scope for making the price of meat affordable. This in turn increases access to meat (protein) from the demand perspective.

It has been amply demonstrated in this section that cassava is of strategic importance. It is drought tolerant, easy to produce, it can adapt to wide range of environmental conditions, it can store easily for long periods and it has a multiplicity of uses. It therefore offers great scope for addressing the food security problem especially in the rural and marginal areas where the majority of the poor or the food insecure reside.

1.7 Objectives

In Zimbabwe the improvement of food security is given high priority. Traditionally research and extension has put more emphasis on food crops. Of late this emphasis has been extended by incorporating the crop diversification aspect. In this respect cassava has been identified as a promising crop.

The purpose of this study is to appraise the feasibility of producing cassava primarily for food security purposes. The specific objectives are to:

1. Assess the suitability of cassava as a strategic crop for the enhancement of food security;
2. Assess the compatibility of cassava production with sectoral and macro-policy;
3. Carry out a technical, social, financial and economic analysis of cassava production in Zimbabwe;
4. Identify appropriate strategies for cassava production in Zimbabwe; and,

5. Assess the suitability of the study area for cassava production.

This study therefore seeks to introduce the production of cassava in Zimbabwe as cheaper complement of maize for food and livestock feeds. Primarily it seeks to enhance food security through:

- directly providing a cheaper and drought tolerant food crop;
- indirectly through providing a cheaper stockfeed thereby reducing meat production costs and hence reduce meat prices; and,
- raising the incomes of communal farmers

1.8 Methodology

The viability of cassava production in Zimbabwe is underpinned by four hypotheses. The success of cassava production like the success of any other project greatly depends on the availability of a sound technical base, its financial and economic soundness, and comparative advantage over enterprises which compete for the same resources. In order to make the feasibility study more meaningful and practical a project proposal to pilot the production of cassava in two selected provinces is used as a case for technical, financial and economic analysis.

The main technical elements which come into the viability assessment of cassava production include agronomic and botanic aspects, human and physical resources, commercial aspects and

appropriate technology. The financial analysis determines the attractiveness of the production of cassava in terms of cost-benefit analysis. The economic analysis assesses the overall impact of the project to the nation. It determines whether it is worthwhile to commit the nations scarce resources to the project. The comparative advantage analysis evaluates the attractiveness of the proposed investment vis-a-vis other projects which could compete with this project for resources such as land and finance.

The main analytical tool to be used in the study to test the viability of cassava production in Zimbabwe is the cost-benefit analysis. The analysis also looks at technical and socio-economic aspects. The study is based on both primary and secondary data. However, it is heavily biased on secondary data which was collected through desk research. The data on the production and utilisation of cassava was collected from various texts, publications and workshop proceedings.

Primary data collection was based on purposive sampling techniques. Data was collected through interviews with key informants, stakeholder workshops and meetings. Cassava enthusiasts were identified within the Department of Research and Specialist Services; University of Zimbabwe; Agricultural and Rural Development Authority; Farming Community; and, the Agricultural, Technical and Extension Services Department. These were interviewed through open discussions. Such discussions were meant to probe into issues associated with cassava production, utilisation and processing. The workshops were used to identify and follow up on issues raised in key informant discussions.

Most of the information on production and utilisation of cassava in Africa was gathered through meetings of the Steering Committee on

Cassava Production in Zimbabwe and the Southern Africa Root Crops Research Network (SARRNET) organised workshop which was held in Harare in January 1999. A course on Trade Policy which was organised by the Centre for International Economics and held in Australia in February gave the author an opportunity to interview participants from Asia (Thailand, Indonesia, Sri Lanka and Philippines) where there is large scale commercial production of cassava. A trip to Uganda in mid February 1999, to a meeting on bio-fertilisers provided further insight into the production and utilisation of cassava. A few field trips to assess the situation on the ground capped up the information gathering process.

The mathematical analysis hinges on the financial and economic analysis of the viability of producing cassava in Zimbabwe. Through the "with and without" project scenario the issue of comparative advantage was naturally taken on board. The main appraisal parameters are return per dollar(Z\$) variable cost, net present value (NPV), the internal rate of return(IRR) and economic rate of return(ERR). The return per dollar(Z\$) variable cost is the ratio of the gross income to total variable costs. The internal rate of return is the discount rate which causes the present value of net future cash flows to equal the cost of the investment (Correia, 1993). Similarly the economic rate of return is the social discount rate which causes the present value of net future cashflows to equal the cost of investment. The net present value is the sum of the discounted net cashflow minus the initial capital outlay.

The decision criteria is based on a selected threshold of the return per dollar variable cost, the required rate of return and the selected threshold of the net present value. The threshold for return per dollar variable costs is 150 per cent. Any value equal to or above this level is accepted. With regards to the internal

rate of return the opportunity cost of capital which is based on lending rates is normally used as the selection criteria. This is commonly called the required rate of return or the investor's required return on investment. In this context 43 per cent is the minimum return for financial analysis and 8 per cent is the minimum return for economic analysis adopted in this study.

1.9 Outline

This report comprises 6 Chapters. The first Chapter presents the food security concept, problem, current options and methodology. The Second Chapter gives an overview of the macro and sectoral policies and evaluates the fit between policy and the project. The Third Chapter gives an overview of the study area. The Fourth Chapter describes the proposed project. The Fifth Chapter provides a descriptive and mathematical analysis of the feasibility of the project. Finally the Chapter Six draws conclusions on the analysis of the option to produce cassava in Zimbabwe for purposes of improving food security.