CHAPTER FIVE

THE FEASIBILITY ANALYSIS OF THE PROPOSED CASSAVA PROJECT IN ZIMBABWE

5.1 Introduction

This Chapter focuses on the feasibility analysis of the proposed project. Technical, social, commercial, financial and marketing aspects are the main elements addressed in the analysis. The chapter comprises eight sections. The first section focuses on technical elements on cassava culture. The second section looks into the marketing environment for cassava and this is followed by the financial analysis of cassava, sensitivity analysis and, then the economic, SWOT analysis, and benefits respectively.

5.2 Technical analysis

5.2.1 Botany

Cassava is a perennial shrub which comes in two broad varieties based on taste, viz, sweet and bitter varieties. Sweet cassava has a low concentration of cyanogenic glucosides which in this case are usually concentrated in the peels. Bitter cassava has a higher concentration of cyanogenic glucosides which are distributed within the whole tuber. The classification of cassava according to cyanogenic glucosides content can be misleading given that the cyanogenic glucosides concentration depends among other things on environmental factors. Soils with high nitrogen content usually produce cassava with a high cyanogenic glucoside concentration (Onwueme, 1982).

Cassava grows well in both fertile and infertile soils (Onwueme and Hahn, 1989). However, it is a heavy feeder so if grown in fertile soils it quickly exhausts the soils. Secondly, high soil fertility generally promotes vigorous vegetative growth which delays tuber formation. The crop is susceptible to waterlogging.

Although the crop grows well in both heavy and light soils, heavy soils present problems in harvesting as it is normally difficult to uproot the crop. Onwueme (1982) indicates that manually one can harvest about 1000kg per day in light soils and only 500kgs in heavy soils. From an economic point of view it would therefore appear that the most ideal soils for this crop are light soils. Silvestre (1989) recommends an NPK fertiliser application of 10-10-20 for such soils. The application rate is about 10 kilograms per 10 metric tonne projected yield. This recommendation will be adopted in this project.

Cassava is a sub-tropical crop and as such tends to thrive very well in regions with rainfalls of 1000-1500mm per annum. Nevertheless cassava is drought tolerant and can therefore grow well in regions with a total rainfall of over 500mm. The most ideal growing temperatures range between 25 and 29^0C. It does not grow well at temperatures below 10^0C. Furthermore, it is susceptible to frost. When subjected to water and temperature stress the crop sheds off its leaves as a coping strategy. The climatic conditions of the study area given in Chapter 3 are compatible with the crop requirements.

Cassava is planted from seed, tissue culture and cut stems. The most common practice involves the use of stems and tissue culture. Tissue culturing is a high technological process under which stems are produced by multiplying selected genetic material. The main advantage with this process is that important genetic characteristics can be selected and developed. Secondly, the planting material arising thereof is normally disease free or clean. With respect to use of stems the common procedure is to select cuttings on harvest. In this case thicker parts of the stems from the middle part are selected. The thicker parts are used because they produce higher yields. The selection of middle parts of the stem is deliberate and aims at selecting against diseases which are usually concentrated in the lower parts of the stem. It should be highlighted that the establishment of nurseries for cassava multiplication is the standard practice of producing planting materials. This involves multiplying clean planting material from which cuttings for planting are drawn.

As has already been highlighted above planting material is usually selected during harvesting. In this process either the planting material is replanted from holes where the cassava will have been uprooted or bundled and kept in shade or moist conditions until the planting season. In selecting cuttings it is very important to make sure that the planting material has at least three nodes. Stems are re-planted vertically, horizontally or slanted. Planting vertically entails that the holes have to be deeper so more labour is involved. The tubers arising thereof are normally compact but deep into the soil. This also involves greater labour in harvesting. With horizontal planting the tubers are normally spread and close to the surface. Harvesting is easier. In addition yields are higher. Slanted or tilted planting lie between vertical and horizontal planting in terms of yields, depth and drudgery (labour involving).

After planting, shoots normally emerge in the first three weeks. Planting can be done on ploughed land, ridges or unploughed land.

Weeding is critical in the first three months after planting within which period a canopy would not have developed. After three months a canopy would have developed and by then weeds cannot effectively compete with the crop.

Tuber formation starts in the eighth week and continues until the 6 - 9 month period at which time it usually ceases. No significant tuber formation takes place after 9 months. The period of maturity depends on the variety. Sweet varieties have a shorter gestation period and usually mature between 6 and 9 moths with an average gestation period of 7 months. Bitter varieties mature in a period of between 15 - 19 months and the gestation period can even be as long as 24 months. If left for a long period unharvested after maturation the tubers develop fibrous tissues (Onwueme, 1989).

From the foregoing the emerging technical issues related to the production of cassava in Zimbabwe include climatic aspects, diseases, varietal selection, environmental factors, planting orientation and selection of planting material. The following sections will analyse each of these issues in detail.

5.2.2 Climatic Aspects

Cassava will be grown in the north western parts of the country. The climate of this area has been given in section 4.5. In line with the botany of the crop the most appropriate varieties are those with water requirements of about 500mm, and temperature conditions of 18 - 32°c. The majority of cassava varieties tend to fit in these climatic conditions. The climatic aspect is therefore not a problem, if anything the crop provides the appropriate choice in terms of suitability to the drought conditions prevalent in the area.

5.2.3 Soil Factors

The soils in the project area range from sandy loams in Hurungwe to heavy soils in the Zambezi Valley. The heavy soils of the Zambezi present harvesting problems in that their plasticity makes tuber harvesting difficult. In addition they tend to depress yields by promoting excessive vegetative growth. In this light it would be more ideal to go full scale production in Hurungwe and pilot the Zambezi Valley.

5.2.4 Diseases

Undoubtably this is one of the greatest challenge the project will face. The main disease threats and pests are the cassava mosaic virus (CMV), mites, termites and bacterial blight. At a workshop organised by the Southern Africa Root Crops Research Network (SARNNET) held in January 1999 CMV was identified as one of the major challenges in the success of cassava production. To that end more work on the control of these diseases should be carried out. However, initially the following steps will be carried out in order to control the problem. Firstly, clean planting materials will be used. This will minimise the transmission of diseases to and from other areas. The mealybug or CMV vector tend to be very problematic in large cassava plantations. This problem will therefore be counteracted by inter-planting 2-3 rows of cassava between two acres of maize or other crops so as to avoid large continuous cassava tracts.

5.2.5 Varietal Selection

From the socio-economic analysis the most ideal varieties for

Zimbabwe are those with a shorter gestation period. In other words the crop should fit in a production season of about 6 - 7 months. Sweet varieties would therefore appear to fit very well into the socio-economic environment of the smallholder farming sector. This project should therefore concentrate on the production of sweet varieties. A lot of research has been conducted on those varieties and there is adequate planting material to sustain the project.

5.2.6 Planting Orientation

With regards to planting orientation the guiding principles include the need to maximise yield whilst minimising drudgery. In that regard the horizontal planting orientation is more in line with the project objectives hence this will be adopted. This is in consistency with the orientation/yield research findings discussed in Section 5.2.1 .

5.3 Analysis of the Marketing Environment under the Purview of Stockfeed Production and Human Consumption

The main environmental elements associated with cassava production are consumer, marketing, processing and procurement or supply analysis. The following sections will take an in depth analysis of each of these elements.

5.3.1 Consumer Analysis

The consumption of cassava comes at two levels, viz, primary and secondary. The primary level involves direct consumption. On the other hand secondary consumption entails using cassava as a stockfeed. Consumer analysis will therefore take cognisance of these two levels of consumption.

The question of the availability of effective demand has repeatedly come under the spotlight in fora where cassava production is discussed. It would be difficult to assert with confidence that there is an effective demand for cassava in Zimbabwe at the moment. However, one can talk of potential demand. It is within the context of this potential that one gathers confidence to pilot cassava production. Cassava has several advantages over other crops. These have already been highlighted in various chapters of this document. However, as a recap they include drought tolerance, multiplicity of uses, low input requirements, affordability, ease to store and ease to produce. These advantages are of major significance in terms of enhancing food security. The current lack of consumer test for the crop should therefore not be viewed as a deterrent but a challenge.

Within the context of food security and/or direct human consumption of cassava, demand potential exists in the baking industry, cassava meal production and direct consumption. In Tanzania baking flour blends comprising 20-30 per cent cassava meal with the rest being wheat and other ingredients has successfully been used for baking biscuits. There appears to be no noticeable taste differences between these biscuits and those baked wholly from wheat. Similarly tastes carried in Malawi indicate that there are no noticeable taste differences on "sadza" cooked from mealie meal blends comprising 30 per cent or less cassava. There is therefore a very great potential for blending cassava with maize meal or wheat flour.

Under stress conditions especially during droughts cassava appears to be a viable source of food. This has been amply demonstrated in Section 1.4. Cassava can also be used indirectly to provide cheap protein through using it as a stockfeed. In Zimbabwe the prices of stockfeeds has increased by over 200 per cent over the past 3 years. Given that feeds are a major cost item in dairy and livestock production the rise in stockfeed prices has triggered a wave of price increments on meat and livestock products. Farmers are looking for cost reduction options in order to remain commpetitive. There is, therefore, a lot of potential in this area. This potential has been discussed in various chapters in this document.

5.3.2 Marketing Analysis

The main elements of this analysis include price, distribution, product aspects and promotion. The price of raw materials is key to the success of the stockfeed manufacturing process. This and cost of finished products will determine the degree of competitiveness of the crop in relation to other crops which compete for the same resources. The project price of dry cassava is Z$2000 per tonne dry weight. This will compete very well with the main competitor, maize, whose average price is projected to be around Z$4800 per metric tonne this year.

The bulkiness of both the wet and dry raw material is a major distribution constraint. The short shelf life of fresh cassava further compounds the problem. In terms of logistics it would therefore be ideal to bring processing facilities closer to production units. A further dimension to this is that either a central processing system is put in place or small scale intermediate processing facilities are provided at the farm level. A dual approach is more consistent with the goal in that it encourages direct consumption at the household level whilst channeling surplus into animal feed production. The chemical composition of the product offers opportunities for a wide range of uses which include baking, human and animal consumption, and industrial use. Currently the use of cassava for all these purposes in Zimbabwe is still minimal. However, it should be underscored that this commodity is relatively new to Zimbabwe and as such needs to be developed.

5.3.3 Procurement Analysis

This is more pertinent to the stockfeed manufacturing factories. The critical issues include a regular supply of wet or dry cassava, oilseed cake, vitamins and minerals. The production of sunflower and soya bean oil in Zimbabwe has reached maturity. Thus, these ingredients will be sourced from large and small scale processors. Currently there is little competition in the procurement of these raw materials so no procurement problems are envisaged. The supply of vitamins and minerals is abundant. The fundamental issues regarding processing are the availability of adequate volumes. In this instance there will be excess processing capacity at the inception of the project. However, the supply of cassava is expected to be build up over time to meet the demand for human consumption and stockfeed manufacture.

5.4 Financial analysis

Financial analysis is a tool used to measure the project worth or attractiveness of an investment. This tool uses a number of criteria which, inter alia, include the net present value, internal rate of return, payback period and net benefit cost ratio and return per dollar variable cost. The payback period is the period over which a project's total discounted or undiscounted net cashflows cover the total cash outlay. The decision to accept or reject a project is based on investors required payback period. The net benefit cost ratio is the ratio of the total discounted net cashflows of a project as realised under the project life and the total initial capital outlay. Under this scenario an investor selects a subjective required net benefit cost ratio which normally covers inflation and risk plus a premium/profit. These measures of project worth weigh the risk versus its return. The most popular and powerful evaluation criteria are the net present value and internal rate of return.

The financial analysis has three main components which include cassava enterprise, stockfeed manufacturing factories sub-project and the Government perspective of the financial analysis or the composite analysis. The criteria used in measuring the project worth are return per dollar variable cost, net present value and internal rate of return. Several assumptions are used in this analysis and these include:

1. Prior to this project the land which will be used was idle and as such the without the project net cashflows or opportunity cost of land is assumed to be zero. The net cashflow of the project therefore constitute the incremental cashflow;

2. All costs in the cashflow budgets are quoted at the project site;

3. It is assumed that inputs and other stockfeed ingredients are readily available. This arises from the fact that the market is liberalised and supply is now heavily dependent on business lucrativeness. Thus if the project offers lucrative prices for these inputs then they will be readily available;and,

4. Assumed prices are as quoted in the cashflows.

A detailed analysis of each of the enterprises comprising the project are given in Section 5.4.1 below.

5.4.1 Cassava Enterprises - Farm Investment Analysis

The analysis of the viability of cassava production or farm investment analysis as it is popularly known basically assesses the profitability of producing cassava. It measures the attractiveness of the enterprise to the farmer. This analysis is the foundation or basis of the overall project success. A viable cassava enterprise makes it worthwhile for the farmer to venture into cassava. It also makes it worthwhile to invest in stockfeed production. Thus, the processes are interlinked. This analysis uses simple enterprise budgets to assess the attractiveness of cassava production. In this context the parameters used are the gross margin and return per dollar variable costs. The gross margin is used to measure profitability of the enterprise. The return per dollar variable cost is used to assess the extend to which the gross margin covers overheads. A minimum of 150 per cent is generally used as a guide on enterprise attractiveness in Zimbabwe. It should be highlighted that the weakness of this criteria is that it is based on average performance. Different farms have different cost structures and perform differently such that for some the threshold is higher than this figure whilst it is lower for others.

The viability analysis of cassava enterprises is based on the farm plan and assumptions given in Annex 2. This plan entails producing cassava on alleys or contour ridges. Each ridge or row will have two rows with a spacing of 80 centimetres and plant spacing of 80 centimetres. This gives a plant population of 100 per ridge or 300 per two acres. If planted continuously this spacing would give a population of about 9000 per hectare. The projected yield is about 12MT per hectare and this is based on the sigmoid curve(Cobb Douglas Curve) or input/output curve. The curve used assumes a normal distribution and as such is approximated by the following formula:

Y = 1/@*1/(2*2.71)*e $^{-1/2((T - Tav)/@)**2}$ (Adapted from Lucey 1994)

Y = weight at time T, @=standard deviation, T = time after planting, T_{av} = mean, * = multiply and ** = to the power, and e = exponential.

Fertiliser application rate is 10 kilograms per tonne yield. Being an extensive production process chemical application is assumed to be minimal or nil. The detailed analysis or cash budget which gives assumed rates, quantities and project costs, gross income and gross margin per household are given is Annex 6a. From the analysis the gross margin is Z$569 on a production of 420kgs wet mass. This gross margin is based on production on 3 alleys or six rows of cassava. As highlighted in Annex 3 these three alleys divide one hectare of maize into two halves. The return per dollar variable cost is 210 per cent. These results make cassava currently one of the most viable crops. However, it should be highlighted that the high viability is partly explained by the extensive mode of production under which input application is minimised. Secondly, it should be noted that it was assumed that the opportunity cost of land on which cassava is being produced is zero. This gives cassava an edge with respect to competitive utilisation of resources.

5.4.2 Stockfeed Factories

This enterprise is meant to absorb all surplus cassava(surplus to human consumption) and process them into stockfeeds. Thus, it is assumed that 70 per cent of total production will be for direct human consumption and the remainder will be channeled into stockfeed production. Therefore at the beginning of the project stockfeed production will not be of major significance in terms of absorbing surplus cassava since there will be little surplus as most of it will be consumed directly. However, it will play an instrumental role in catalysing the adoption of cassava production as a commercial window of the project.

The financial analysis of mills is given in Annex 6b. The total capital costs of the two mills, office and accommodation and vehicles is Z$11,2 million. The main running costs are fuel, maintenance and power. The overheads items are salaries, wages, telephones and consumables. The raw materials are dry cassava, soyabean cake, minerals, vitamins and minor ingredients. Soyabeans cake will be sourced from oil expressors. The throughput to the factories is assumed to be half of total production. Growth in throughput is based on the household adoption of cassava production i.e it is based on the adoption curve. The prices assumed in the calculations are as given in Annex 6b. Raw materials and stockfeeds are priced on a per tonne basis and other items are priced in bulk.

From the financial analysis the internal rate of return and net present value of the factories are 50,4 per cent and Z$2 875 334 respectively. The IRR is above the required rate of return of 43 per cent (Commercial Bank Interest Rate) and the NPV is well above zero. This signifies that this is a worthwhile project to invest in.

5.4.3 Financial Analysis - Government Perspective

As highlighted in section 4.7 most of the resources for this project will be channeled in by Government through donors. In this regard it is important on the part of Government to ascertain whether its investment is financially sound. The reasons being that at some point Government would expect revenue from some of the enterprises in the form of taxes. The purpose of this section is therefore to assess the overall financial viability of the investment. Details of the Government perspective of the financial analysis are given in Annex 6C.

This analysis aggregates the farm enterprises and stockfeed mills sub-project to constitute the whole project. Additional costs such as Study Tours and, Travel and Subsistence allowances which will be borne by Government are also incorporated. A cost of capital of 43 per cent being interest charged on treasury bills is used.

The total cost of the project is Z$19,24 million. Net cashflows rise from Z$(435 136) in the first year to Z$64,2 million at maturity. The gross margin for the cassava enterprise is $569,08 per 3 alleys. The internal rate of return and net present value for the stockfeed factories are 50 per cent and Z$28,7 million respectively. The internal rate of return and net present value for the whole project is 14,6 per cent and Z$3,3 million respectively. On appraising viability using the net present value criteria the whole project is acceptable. However, when using the internal rate of return criteria the cassava and factory enterprises are acceptable whilst the whole project is not acceptable i.e. the IRR of 14 per cent is below the required rate of return of 43 per cent.

The fundamental aspects associated with this phenomenon are the very high costs of capital of 43 per cent and high cost of support services such as travel and subsistence allowances, and study tours. The downsizing of these activities will improve viability. However, these expenditure subheads fall under social services. The decision to downsize these activities should therefore be weighed against its impact in terms of compromising project success. It can therefore be concluded that the economic analysis should be used to evaluate the viability of the whole project. In other words the financial analysis of the whole project does not give conclusive results.

5.5 Sensitivity Analysis

A sensitivity analysis is a rigorous test meant to assess the resilience of a project to factors which impact adversely on its success. The approach adopted in this analysis involves identifying key success elements/factors which are bound to have a significant influence on project viability under adverse conditions. These critical factors are decline in yield of cassava and decline in the producer price of cassava. The main input is fertiliser and project viability is not very sensitive to the cost of this input so it is not a critical factor. The projected changes of these parameters under worst scenarios were estimated and subjective probabilities of these changes occurring were also estimated. The expected value of the parameter under distress conditions was then obtained by using the following formula:

> $(1-m)V*P$, where m is the percentage decline under distress, V is the parameter value under normal market conditions and P is the subjective probability of the occurrence of distress.

The values of these probabilities are summarised in the Table 5.1 below. The details of the calculations of the sensitivity analysis are given in Annex 7 and 8. However, a summary of the impacts is given in Table 5.1 below. Details are provided in Annex 7c and 8c.

Table 5.1: Summary of Sensitivity Analysis

Parameter	Normal Value	Probability of Occurrence	NPV	IRR
1. 40 % Decline in Yield	420kg/Ha	0,3	3 391 266	14,6%
2. 50% Price fall	Z$2000/MT	0,5	7 852 074	21,3%

A 40 per cent decline in the yield of cassava reduces the gross margin from Z$569 to Z$254. The factory viability is not affected much as the NPV and IRR almost remain static on Z$28 753 347 and 50 per cent. However, the overall project is severely affected. The NPV and IRR decline from Z$28 753 347,00 and 50 per cent to Z$3 391 266,00 and 14 per cent respectively. This underscores the significance of yields to the overall success of cassava production in Zimbabwe.

A 50 per cent decline in the price of cassava has a similar effect as yield reduction in terms of impact on gross margin. It reduces the gross margin from Z$569 to Z$254. The factory profitability improves significantly as indicated by the rise in NPV and IRR from Z$28 753 347 and 50 per cent to Z$33 214 155 and 55 per cent respectively. This situation normally arise from surplus production in which case the factories will tend to benefit relative to farmers owing to enhanced bargaining power on price determination. However, the overall project is severely affected. The NPV and IRR decline from Z$28 753 347 and 50 per cent to Z$7 852 074 and 21 per cent respectively.

It can therefore be concluded that farmers are the most exposed party in this project. Pricing and yields will play a pivotal role in the success of the project in terms of motivating adoption and sustaining production. In addition the viability evaluations give conflicting results with the whole project being acceptable under NPV but not acceptable under the IRR criteria. The guiding principles in terms of decision making in this context were discussed in Section 5.4.3.

5.6 Economic analysis

5.6.1 Approach

The purpose of the economic analysis is to assess the impact of the project on the welfare of the society. In other words the rationale of the exercise is to assess whether resources are being put to best use or used efficiently. The analysis first catagorises all inputs and outputs into tradables, non tradables and non traded goods. These categories are given in the Table 6.2 below.

Table 6.2: Classification of inputs/outputs into tradables, non tradables and non traded items.

Tradables	Non Tradables	Non Traded
1.Factory Equipment 2.Trucks 3.Vitamins and minerals 4.Skilled labour 5.Fuel	1.Power 2.Fertiliser, Phosphates 3.Unskilled labour 4.Accommodation and Offices 5.Unskilled labour	1.Cassava 2.Soyabean Cake 3.Telephone Services

Most of the tradables are sourced from some of the most competitive markets in the World. For example, vehicles will come from Japan, a very competitive market; muriate of potash from Jordan, a very competitive market as well; the same applies to vitamins, factory equipment and fuel. Thus the fob prices of these items are a good estimation of efficient prices.

The calculation of economic prices involves decomposing project costs and incomes into local and foreign content. This assumes that values of tradables quoted in the financial analysis are costs at the project site. Further adjustments were made to obtain border or economic prices for tradables. These adjustments include removal of transfer payments (taxes, duties and subsidies). This results in import parity prices. Finally economic values of the local component were then calculated.

Telephones services present a challenge in the economic analysis. Within the World Trade Organisation they are regarded as a tradable services. However, by the nature of the service each of the supplier countries charges its own prices and collects almost the whole amount charged. This makes it difficult to come up with an international competitive price or price in alternative use. Consequently, it was assumed that this service is non traded in which case the domestic price was used.

Although cassava and soyabean cake are traded internationally they were considered as non traded goods owing to that fact that they are largely exported into the European Union and this market is highly distorted hence it is felt that quoting European Union prices would distort the analysis. However, given that these goods are intermediate opportunity costs were used in determining their economic values as recommended by Gittinger(1982). A similar (evaluation based on opportunity cost) approach was adopted for power, locally manufactured fertiliser components and unskilled labour. In addition the opportunity cost of unskilled labour was based on the wage for seasonal peaks. The calculations are detailed in Annex 9a. Economic prices of skilled and semi skilled labour were based on opportunity costs (international prices). This follows from a general assumption that there is shortage of such manpower.

With respect to tradables the general approach was to disaggregate the prices into local and foreign component then calculate the import parity prices. The exchange rate premium was accounted for by multiplying all non tradables by a conversion factor of 0,833 which was provided by the National Economic Planning Commission. The calculations and conversions are given in Annex 9A.

The economic values of buildings were based on the opportunity cost of these assets. In this respect the market prices of similar structures in the project area were used as estimates of opportunity cost.

5.6.2 Results

The parameter used to assess the economic viability of a project is the economic rate of return (ERR). The utility of this parameter depends on the methodology and accuracy of the calculations. Thus, it is important to scrutinise the calculation of the economic rate of return given in Annex 9a-d. The economic rate of return of the project is 31,5 per cent. When this is compared with the Government borrowing rate of 8 per cent (the required rate of return) it can be concluded that the project is very viable. The net social gain at the present value as per this calculations is Z$18,2 million. This is a measure of the net contribution of the project to national income.

5.7 Strengths, Weaknesses, Opportunities and Threats

This section puts the first five chapters in perspective by linking up all the critical elements which influence the success of this project. It is a prelude to project justification. The major strengths, weaknesses, opportunities and threats as they relate to cassava production in the study area given below. This Section summarises the study findings into a framework for strategic analysis.

5.7.1. Strengths

The major strengths of this project are as follows:

1. Human and physical factors of production are available;
2. There are ideal soils and climate for the production of the crop;
3. Government policy favours the production of the crop;
4. Zimbabwe has the technology for the production and processing of the crop;
5. There are sound implementation structures which guarantee its success;
6. It enjoys Donor support;
7. The crop has a wide use of ranges at both the domestic and industrial use; and,
8. Cassava production in Zimbabwe is financially viable.

5.7.2 Weaknesses

The major weaknesses of the project are as follows:

1. Cassava will be produced as a secondary crop and this compromises farmers commitment to the crop;
2. It competes for labour and other resources with other crops;
3. Most of the available varieties are vulnerable to diseases, have high gestation periods and low yields and therefore not very suitable for Zimbabwe;
4. It is regarded as an orphan crop by both researchers, farmers and extension; and,
5. A shorter growing season will be adopted and this results in lower yields.
6. Cassava has a low protein and calcium content hence cassava based diets need protein and calcium suppliments.

5.7.3. Opportunities

The opportunities for the production and processing of cassava are as follows:

1. High and rising prices of grain make cassava a cheaper substitute;
2. The current policy of diversification offers it opportunities for growth; and,
3. Its wide range of uses offers opportunities for growth.

5.7.4. Threats

The project is threatened by the following:

1. Zimbabweans do not currently have a taste for the crop and this threatens its adoption. This should be viewed in the context of the consumer analysis given in section 5.3.1.
2. Diseases are a major threat to viable production of the crop.
3. Cassava contains poisonous cyanogenic glucosides which if consumed above certain levels may be lethal.

In conclusion it can be inferred that in weighing the threats, opportunities. strengths and weaknesses the strengths and opportunities seem to outweigh the threats and weaknesses thereby offering scope for success.

5.8 Benefits

5.8.1 Higher standard of living

Higher employment levels and incomes, improved food security (nutrition) and enhanced economic activities will lead to a higher standard of living in the project areas. Details of projected increases in these parameters are given in the log-frame, annex 4.

5.8.2 Employment

Production of cassava in Zimbabwe is expected to create a substantial number of new jobs. It is estimated that more than 50 new jobs will be created per province in the formal sector. In addition a substantial number of jobs will be created downstream through the multiplier effect. Within the smallholder farming community a significant reduction in underemployment is expected. Furthermore, it will create income generating activities for the communal farming sector.

5.8.3 Nutrition and Food Security

The production of cassava will improve the nutrition of communal populations. This will be through increased consumption of meat and meat products arising from higher production, and increased consumption of cassava arising from increased overall production of food crops. Furthermore, higher incomes arising thereof will stimulate diversification in consumption.

5.8.4 Revenue

The economic analysis indicates that cassava production in Zimbabwe will increase national income by over Z$18 million at the present value. Within this context the revenue base will also increase. Thus, government is expected to benefit from the collection of additional tax revenues through company and sales tax from new investments.

5.8.5 Soil Conservation

Cassava has a large foliage which serves as a wind shield. Thus, owing to its large foliage cassava will drastically reduce wind erosion in the communal areas.

5.8.6 Higher Overall Crop Production

Cassava will be produced in contour ridges/alleys as a secondary crop. This integration of cassava with other crops which does not entail displacement of one crop will increase overall crop production in the communal areas.

5.8.7 Provision of Forage

Cassava leaves are highly palatable to livestock and human beings. Thus, in addition to the use of the cassava tuber as a stockfeed, its stover will provide forage for livestock.

5.8.8 Increased Export Earnings

The substitution of maize with cassava will pave way for a higher maize surplus. This will provide scope for increasing maize exports.

5.9 Conclusion

In this Chapter the study carries out a thorough feasibility analysis of the proposed cassava project. Technical aspects which influence the success of cassava production such as botany, climate, soils, diseases, varietal selection and planting orientation are analysed. The analysis shows that although these factors are critical to the success of cassava production they as such do not severely constrain the success of the project. Secondly, a marketing analysis is presented. This analysis attempts to assess the impact of critical marketing aspects on the success of the project. Lack of consumer taste and preferences is identified as one of the major constraints on the adoption of cassava.

The main appraisal analysis presented is the financial and economic analyses. A budget for cassava production is presented in analysing the cost-benefit for cassava production. The test parameters used are net profit, return per dollar (Z$) variable cost and gross margins. These budgets are used to build up cashflows for the stockfeed factories and whole project or Government perspective. In the analysis it is demonstrated that cassava production and stockfeed processing are very viable enterprises. Similarly the economic analysis shows that the project is very viable. However, the Government perspective of the analysis indicates that the project is not very viable mainly because of high expenditures on study tours, travel and subsistence, field days and trucks.

In addition a SWOT analysis is presented in order to provide a qualitative summary of the results of interviews with various stakeholders and guide on strategic options. It highlights problems and opportunities which is crucial in strategic policy formulation. From this analysis the issue of consumer taste and preferences for cassava remains nagging. Nevertheless, the proposed project's benefits which are likely to counter that problem include improvement of standard of living, employment ceration, enhanced nutrition and food security, revenue generation, soil conservation, higher overall crop production and increased export earnings.