THE PREDICTIVE VALIDITY OF FEASIBILITY STUDIES OF HORTICULTURAL PROJECTS IN EASTERN AFRICA

By

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A management research project in partial fulfillment of the requirements for the degree of masters of business administration (MBA) of the University of Nairobi.

FEBRUARY, 2002

DECLARATION

This management project is my original work and has not been presented for a degree in any other University.

Signed..... Date 24/09/2002

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This management report has been submitted for examination with my approval as the University supervisor.

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FEBRUARY, 2002

DEDICATION

To the Almighty, God.

FEBRUARY 2002

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The study has also shown that the other important factors that lead to the success of horticultural projects include good previous start-up and professional experience, a good team, commitment of the project sponsor, good labour and financial management.

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ABSTRACT

Whereas the use of feasibility studies in forecasting the performance of horticultural projects has been widely used in the Eastern Africa region, the resulting performance has least matched the expectations. The study looks at ten years of the period 1990 to 1999.

The main objectives of this study therefore, are to determine the predictive validity of feasibility studies in horticultural projects, that is, the relationships between forecast performance, as per feasibility studies, and actual results of horticultural projects in the Eastern Africa region. The study will also determine factors of feasibility studies that have a significant influence on the performance of horticultural projects while at the same time identifying key fundamentals that generally cause project failure despite the use of feasibility studies to provide guiding principles for engaging in such projects.

From the results of the regression and correlation analyses, the research study has found out that crop yields, total sales and operational costs had a strong relationship between what was forecast and the actual performance of the projects; while selling prices, project capital costs, logistics costs and profits had relatively low correlation values. Further, competitive action, project sizes, crop management practices and employment levels differed significantly from projections, leading to a number of project failures. There was a high correlation level between feasibility studies and actual project performance for project size, crop varieties and their duration to maturity. This meant that forecast values

gave a good indication of the actual values that would result. Conversely, water consumption, disease incidence, product wastage and employment levels had low correlation values, implying that feasibility studies could not accurately predict the events that followed.

The study has also shown that the other important factors that lead to the success of horticultural projects include good previous start-up and professional experience, a good team, commitment of the project sponsor, good labour and financial management.

TABLE OF CONTENTS

CHAPTER ONE

CHAPTER TWO

LITERATURE REVIEW

CHAPTER THREE

CHAPTER FIVE

CHAPTER ONE

1.0 Introduction

Horticulture is that branch of agriculture that deals with garden crops as opposed to field crops. Thus maize and millet are field crops, that is, grown on a large scale, whereas all fruits and vegetables, flowers, potted plants and herbs are grown on a relatively small scale. Besides its importance in diversification, the horticulture industry has a far reaching multiplier effect as it feeds into the downstream industry with each crop having differing uses, compared to traditional commodities like coffee and tea that have limited end uses in local economies. Many vegetable projects need small amounts of start-up capital and take a relatively short time to grow to maturity, thus providing quick returns to the farmer, both key ingredients in the poverty eradication endeavours. The horticulture sector has become increasingly important as it provides jobs and earns a lot of foreign exchange.

Entrepreneurs and project managers in the horticultural industry are, however, now faced with an increasing demand for good quality projects delivered on time, on budget and to specification in order to survive both in the local and international markets as consumer preferences and tastes become stricter and competition stiffer. There is the need to contain project implementation timing and costs; the requirement to achieve forecast production and sales volumes; achieve or surpass quality demands and expectations; the need to live within or lower than projected operating costs, and the necessity to service the planned markets reliably and develop additional outlets; have become increasingly critical for the success of any horticulture project.

In Eastern Africa the horticultural sector deals in the production and selling of crops such as vegetables, fruits and flowers. Vegetables can be sold pre-packed in raw or processed form depending on the needs of the target market and flowers are generally sold dressed in pre-packed form.

An informed supplier, on the one hand, demands higher prices for the products sold, while an informed competitor striving for the top position in the industry exercises creativity and innovativeness, on the other hand. In view of this, prospective investors need to adequately develop a horticulture project, properly implement it and subsequently manage it effectively in order to derive any benefits from it.

It is envisaged that increased use of well developed feasibility studies and attempts to work within the parameters stipulated in a good feasibility study will assure entrepreneurs' success in the current high competitive environment.

Although a number of entrepreneurs in Eastern Africa carry out feasibility studies, as evidenced by information made available by financial institutions and receivership companies, actual project performance differs significantly from predictions given in feasibility studies. In most cases, actual performance is found to be lower than outcomes predicted in feasibility studies, resulting in a number of projects finding it increasingly difficult to operate profitably on a sustained basis.

All projects including horticultural projects should use the results of feasibility studies to make informed investment choices. However, the horticultural projects appear to register a high failure rate, contrary to the results of feasibility study analyses. In view of this it is necessary to establish the usefulness of feasibility studies in future projects.

This study covered farms established during the period 1990 to 2000 (10 years) to demonstrate the veracity of feasibility studies as a means of predicting the actual performance of horticulture projects in general.

According to Mbeche (2000), the key issues in feasibility analyses are considered to include:

Market analysis, which indicates the demand potential of the output of the project. It is important to establish the level of competition for similar products and the existing gap that will determine market share.

Technical analysis examines levels of production (i.e. capacity), quality of machinery and equipment, project location and layout, appropriateness of technology and maintenance provisions. Organizational analysis deals with logistics in terms of transportation of plant and equipment, construction of structures, maintenance and project commissioning.

Financial analysis analyses the viability of a project based on its returns compared to both the initial and operating costs of the project.

Economic analysis identifies the effects of the project on the society.

Environmental analysis highlights the adverse effects the project may have on people and the general environment and identifies mitigating factors for incorporation in project implementation.

Horticultural projects are some of the projects which require feasibility analyses in order to establish their investment potential and sustained success.

1.1 Project feasibility analyses

Mbeche I. (2000) looks at feasibility studies, in the general sense, as part of the process of project identification, preparation and selection. He states that the process involves the appraising of projects or groups of projects and then choosing to implement some of them based on some

criteria. This process is very important for ranking a portfolio of projects that need implementation, and the process is also important for entrepreneurs who are going into projects/business for the first time.

A feasibility study for new investments in the horticulture sector is considered necessary in order to establish whether or not the project is feasible based on various factors, for example, the climatic and soil conditions of the area under consideration, the variety and number of crops to be grown, logistical remoteness or otherwise of the area to be cropped. Horticultural projects call for careful consideration of the available and potential markets and capabilities of competitors, as most of these products are exported into international markets which are highly sensitive to quality requirements, delivery commitments and price.

Belli P. (2000) emphasizes the need to conduct robust feasibility studies that identify weak links of a project and how to address them before embarking on the implementing of the project that is likely to respond to cyclical patterns of the industry and fierce competition from global players. Burke R. (1997) describes a feasibility study as a preliminary estimate or comparative estimate. Preliminary in the sense that the feasibility study would be performed without detailed data, but when estimates are based on previous projects having a similar scope of work and capacity, the accuracy can be improved to +/- 10%. The feasibility study would use a number of other techniques to improve the quality of information available. These would include, but not be limited to: cost-benefit analysis, which may establish the financial feasibility of the project and a needs analysis using a structured questionnaire targeted on the project scope to quantify the status of present position, the planned target and what the project must do.

A definitive estimate, also called a detailed project estimate is based on a considerable amount of data incorporating a developed scope of work, detailed drawings, specifications, vendor quotes and surveys to give an improved accuracy of +/- 5%. For horticultural projects the estimates would include value of the land, quotes for greenhouses, parent stock, irrigation equipment, fertigation (fertilizer application) equipment, piping, water pumping systems, cold-rooms, transport vehicles, tools and equipment, labour requirements, management levels and skills, etc.

Chandra P. (1995) states that the key facets of project analysis are: market analysis, which examines the potential market and possible market share, technical analysis which looks at the technical viability and sensible choices of the technical plant and equipment, financial analyses that looks at the risks and returns inherent in the project, economic analysis which examines benefits and costs in shadow prices and other economic impacts, and ecological analysis which embraces environmental damage and restoration measures. Chandra, like Mbeche, looks at feasibility studies in the general sense of ranking investment decisions before implementing a project from a pool of prospective investment projects.

Davis D. (1998) looks at feasibility studies as strategic audits critical to making valid investment decisions. The studies examine and identify key areas of success/failure and requirements for the investment. Horticultural projects are no exception and demand a great deal of attention to detail in their feasibility stage.

However, it is still unclear as to why many horticulture projects fail despite the detail of feasibility studies.

According to Price (1982) a feasibility study is the process of determining whether the project as defined and with the available resources can be implemented successfully. The study sets out to examine if the resources outlined in the design will be available in the required quantity and quality and on time in the context of the actual project environment. Price (1982) makes little attempt to expound on other aspects of a feasibility study leaving to question the validity of feasibility studies, especially as relates to horticulture projects.

Little Mirlees (1974) explains that it is at this stage that measurement tools which will be used to evaluate the project are developed and refined, although McNeil (1986) argues that the development of measurement tools is dependent upon a number of factors which include the sophistication of the project promoter, the size, complexity and urgency of the project; and the functioning of the Financial and/or government agencies. Nathaniel (1988) defines a feasibility study as an act and interface between project planning and implementation. It questions all the assumptions in the preceding stages, hence underpinning the importance of accuracy. However, the organic nature of horticulture presents itself quite differently after project implementation, hence the need to understand the factors that have greater influence on the performance of horticultural projects.

Kibiku (1998) referred to a feasibility study as defined by Little Mirlees (1974), McNeil (1986) and Nathaniel (1988) as being an act and interface between project planning and implementation.

1.2 Validity

Validity is concerned with the question "Am I measuring what I intend to measure?" According to

Frankfort-Nichiamas C. et al (1996) we can distinguish three basic kinds of validity, each of which is concerned with a different aspect of the measurement situation: content validity, empirical validity and construct validity. Each includes several kinds of evidence and has a special value under certain conditions.

Content validity: The relevance of an instrument to the characteristics of the variable it is meant to measure is assessed by *face validity* – the researcher's subjective assessment of the instrument's appropriateness; and *sampling validity* – the degree to which the statements, questions, or indicators constituting the instrument adequately represent the qualities measured.

Empirical validity: If a measuring instrument is valid, there should be a strong relationship between the results it predicts and the results it obtains when measuring the same variables. Empirical validity can be supported by comparisons with measurements made by other instruments. ***Predictive validity*** is estimated by predicting the results expected to be obtained in reference to an external measure, referred to as a criterion, and by checking the measuring instrument against outcomes obtained by other measuring instruments. In other words, ***predictive validity*** is the degree of correlation, known as the correlation coefficient, between the results of a given measurement and an external criterion. The higher the correlation coefficient, the greater the predictive validity.

Construct validity: This kind of validity is established by relating the measuring instrument to a general theoretical framework.

In the context of this study, validity is concerned with soundness, that is, what feasibility studies measure, and how well they predict the various performance factors of a horticultural project. Predictive validity will indicate whether the feasibility study did, indeed, make a difference in the project's actual performance, and how generalizable feasibility studies are, that is, to what measurement variables can the effects, as observed in feasibility studies, be generalized. The generalizability of the appropriate variables will, therefore, enable the operationalisation of the validity of feasibility studies in horticulture.

This study attempts to highlight areas that are covered under feasibility studies, and the aim of choosing to analyze the predictive validity of feasibility studies in horticultural projects is to be able to relate the predictions of feasibility studies with the actual outcomes of such projects so as to identify performance aspects that have a major influence in horticultural businesses.

To the best knowledge of the researcher, no such research has been done in Eastern Africa. A fairly related research undertaken so far is by the Bank of Uganda that looked at the interventions by financial and support institutions and policy level intervention by the government of Uganda in terms of promoting the horticultural industry in that country. The horticultural society of Kenya has also looked at the government support systems necessary to encourage the growth of the horticultural industry in this country but has not addressed issues impacting the performance of horticulture projects relative to feasibility studies.

Evidently, the validity of feasibility studies in the horticultural industry has not been addressed, hence the need for this study.

1.3 The importance of feasibility studies

Campbell M. (2001) states that a project feasibility study examines the important *technical*, *management*, *commercial* and *financial* aspects in order to determine, as accurately as possible, the values and timing of the capital costs outlay and income generation. An analysis of these four principal factors will provide an assessment of the profitability and hence viability of the project.

In order to derive a statement of the capital costs of a project, it is essential to, first, carefully define the marketing objectives in terms of what products will be produced, in what volumes, where they will be sold and at what prices. For horticultural products, risks and issues related to the climatic and soil conditions, skills and management, logistical remoteness of the project, markets and the competition must, in addition, be adequately addressed and justification for the project demonstrated.

A statement of type, quantities and prices of crops to be cultivated is provided. A production plan is developed and the technological and equipment requirements defined. Thus, for the selected product mix the land, buildings such as greenhouses, utilities (power, water), materials (including mother plants), machinery, equipment and accessories are determined and the capital requirements carefully defined.

A clear statement of production costs including those of all inputs and their sources and method of derivation are provided. A feasibility study, therefore, acts as a pointer towards a go or no go decision for implementing a project.

1.4 Statement of the problem

The value of feasibility studies has gained increasing prominence in Africa due to the need to implement projects appropriately so as to become competitive both in the home and overseas markets. However, *the predictive validity of feasibility studies of horticultural projects has not matched actual performance, which has led to some firms closing down prematurely. Despite attempts made to conduct feasibility studies for such projects, as indicated by most financial institutions who lend money to such projects, the predictions made in the feasibility study have not matched the resulting actual performance of such projects as measured by production levels, sales volumes, prices, costs and subsequently profitability.*

In the project management literature, it is usually taken that feasibility studies provide the basis of ex-ante evaluation of a project and the results of a feasibility analysis should show areas of improvement and if adjustments are done accordingly, the project will have higher chances of implementation success. It is, however, not clearly understood why horticultural projects in the Eastern Africa environment do not conform to this commonly held view. It will be of great interest to understand what factors or aspects of feasibility analysis are significant in the prediction of future performance of these projects and also establish reasons why some aspects are easily predictable and how in future these aspects should be handled when carrying out feasibility studies, particularly for horticultural projects.

1.5 Objectives of this study

The objectives of this study are to determine, in respect of the Eastern Africa region:

a. The relationship between forecast performance, as per feasibility studies, and actual results.

b. To determine factors of feasibility studies which have a significant influence on the performance of horticultural projects.

c. The study will highlight aspects that generally cause project failure despite the use of feasibility studies to provide a forecast of project performance.

Attitudinal aspects, which include professional experience, commitment, labour and financial management, will be analyzed to provide some understanding of how these impact on the performance of horticultural projects.

1.6 Hypotheses

The following hypotheses will be used to guide data collection and analysis:

a. *There is no relationship between feasibility studies and actual project performance in respect of the following:*

- Production yields
- Sales volumes
- Selling prices
- Revenues
- Profits
- Operating costs

- Logistics costs
- Project capital costs

b. *There is no relationship between the following factors in feasibility studies and actual project performance:*

- Project implementation timing
- Project size
- Market availability
- Competitive action
- Water requirements
- Disease incidence
- Crop varieties
- Number of days to crop maturity
- Wastage of harvest
- Management skills and experience
- Employment levels
- Commitment of the project sponsor

1.7 Study rationale

a. The study will provide information that would be useful generally to entrepreneurs interested in going into horticultural projects.

b. The study will be useful, especially, to the lending institutions who now demand strict adherence to good practices in project implementation and management when entrepreneurs seek funds from these institutions. This should engender discipline in society and encourage the implementation and management of horticultural projects on a profitable basis.

c. The study will enlighten the general public on the need to be cautious when making decisions about investing in horticultural projects.

d. This study will encourage people who own some land, in the right ecological zones and have access to markets, to consider investing into horticultural projects, hence create wealth for themselves and their countries.

e. The study would give added advantage to scholars interested in pursuing further study in the area of horticultural project planning, implementation and management in this region.

f. The study will highlight key business drivers, that is, factors that can lead to business failures in the horticultural sector.

g. The study will also assist academics who wish to carry out further research in this area.

CHAPTER TWO

Literature review

2.0 Interpretation of a feasibility study in a horticultural project

Over the past ten years horticultural projects have become a fast growing investment opportunity due to the rising demand for fresh vegetables and flowers, especially in Europe. This has resulted in a growing number of individuals being attracted to invest in this industry.

While a number of writers have provided various definitions of feasibility studies, in the general sense, a few of these authors have given specific guidelines on the factors to look for when undertaking a feasibility study of a horticulture project. This study will highlight elements contained in a feasibility study of a horticulture project.

Belli P. (2000) emphasizes the need to conduct robust feasibility studies that identify weak links of the project and how to address them before embarking onto implementing a project that is likely to respond to cyclical patterns of the industry and fierce competition from global players. Despite this need Belli cautions that the performance of horticulture projects does not generally tally with the predictions of their feasibility studies.

Burke R. (1997) describes a feasibility study as a preliminary estimate or comparative estimate. Preliminary in the sense that the feasibility study would be performed without detailed data, but when estimates are based on previous projects having a similar scope of work and capacity the accuracy can be improved to +/- 10%. The feasibility study would use a number of other techniques to improve the quality of information available. These would include, but not be limited to: cost-benefit analysis, which may establish the financial feasibility of the project and a

needs analysis using a structured questionnaire targeted on the project scope to quantify the status of present position, the planned target and what the project must do.

A definitive estimate, also called a detailed project estimate is based on a considerable amount of data incorporating a developed scope of work, detailed drawings, specifications, vendor quotes and surveys to give an improved accuracy of +/- 5%. For horticultural projects the estimates would include value of the land, quotes for greenhouses, parent stock, irrigation equipment, fertigation (fertilizer application) equipment, piping, water pumping systems, cold-rooms, transport vehicles, tools and equipment, labour requirements, management levels and skills, etc. However, despite this detail the final outcome tends to vary significantly from projections of feasibility studies.

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Price (1982) defines a feasibility study as the process of determining whether the project, as defined and with the available resources, can be implemented successfully. The study sets out to examine if the resources outlined in the design will be available in the required quantity and quality and on time in the context of the actual project environment. Little Mirlees (1974) explains that it is at this stage that measurement tools which will be used to evaluate the project are developed and refined, although McNeil (1986) argues that the development of measurement tools is dependent upon a number of factors which include the sophistication of the project promoter, the size, complexity and urgency of the project; and the functioning of the Financial and/or government agencies. McNeil's view, however, begs the question of the validity of feasibility studies and how effectively these are performed.

Nathaniel (1988) defines a feasibility study as an act and interface between project planning and implementation. It questions all the assumptions in the preceding stages.
Kibiku (1998) referred to a feasibility study as defined by Little Mirlees (1974), McNeil (1986) and Nathaniel (1988) as explained above.

Hinchy (2001) states that project assessment cannot proceed without a clear understanding of the project's underlying concept or rationale. He emphasises the need for the project promoter to clearly identify the project concept in the *business plan* or *feasibility study*; whether such a study is prepared by the promoter or a consultant, it should be well understood by, and reflect the views

of the promoter who should own the risks and issues associated with the project. Hinchy underscores the fact that a feasibility study reflects the promoter's capacity to implement and operate the project as planned. Hinchy emphasises that the key considerations in a feasibility study must include *product, customers, competition, distribution systems, contractual arrangements, price flexibility, and capital intensity*. For horticultural products, Hinchy mentions growing conditions and management as also being key to the success of the project. However, the validity of such a feasibility study is not indicated.

Mbeche (2000) describes a feasibility study as part of the process of project identification, preparation and selection. He explains that the process involves the appraising of projects or groups of projects and then choosing to implement some of them. He views a proper feasibility study as a crucial tool in making proper investment choices in projects for the long-run development of a country. He ascribes the long run survival of a firm to a properly conducted feasibility study. Nevertheless, it is not clear as to the validity of feasibility studies in horticulture projects in view of the organic characteristics of crops.

In many developing countries, including Africa, horticulture projects are being sufficiently evaluated before investments are made, mainly due to the high level of financing needs for such projects under greenhouse conditions. However, despite the high level of due diligence done, a number of these projects do not succeed, especially in Eastern Africa.

Kosura (2000) describes ten planning steps which include establishing the project objective; choosing the basic strategy for achieving the objective; breaking the project down into sub-units or steps; determining performance standards for each sub-unit; determining the proper sequence for

completing each sub-unit; aggregating this information into a schedule for the total project; determining the cost of each sub-unit and aggregating costs into the budget; designing the necessary staff organization, number and positions, duties and responsibilities of each; determining what training, if any, is required for the project team members; and developing the necessary policies and procedures. This plan clearly details steps of implementing a project and therefore defines the requirements of a feasibility study.

Feasibility studies in horticultural projects are seen to address various aspects of the business plan. The factors examined include availability of land and its economical size, location of the project, an assessment of the microclimatic and soil conditions, an assessment of the availability of water and storage needs for irrigation and other purposes, sources and cost of capital equipment plus its supply and construction contracts, cost of buildings for cropping, packing and administration purposes, implementation schedule, completion and start-up, provision of infrastructural requirements, that is, power supply, roads and telecommunications, an assessment of logistics to the market, reliability of source of mother plants, expected yields and quality of plants, examining guarantees provided by suppliers of parent plants and determining recourse procedures, assessing fertilizers/pesticides suppliers and their reliability, an assessment of the markets and distribution channels/transport and terms of sale, prices and expected profit margins, determining realistic forecasts and looking at industry cycles and scheduling supply timing, an assessment of the competition and their prices, determining operating costs and their flexibility, examining management and its experience, overall accounting/control and information systems, assessing exchange risk impact for export products, looking at the capital structure and debt servicing plan, checking on key insurance requirements of the project, examining technical assistance support

requirements, checking on the level of contingencies provided for the project, an assessment of working capital requirements and provisions for escalation in project costs and operating costs.

These aspects, among others, are considered crucial in conducting feasibility study. However, in Eastern Africa, unfortunately, while such analyses are done for horticultural projects the tendency for failure is high. The Contiflower project in Arusha, Tanzania for example, suffered from a severe quality problem of its flowers when, in 1998, a gale of wind ripped off the plastic sheeting from its greenhouses, the debt provider, in 1999, reported that the project sponsor had misappropriated 50% of loan funds which did not go into the project.

Redhill flowers in Limuru, Kenya, suffered from lack of economies of scale as it was on a two hectare piece of land whose expansion is restricted by lack of internally generated funds to service debt. ABN Amro, lenders for a vegetable growing firm (to remain un-named) reported, on 30/5/2000, at the UNCTAD workshop on the horticultural sector in Africa that a sponsor (who was a lawyer by profession) was discovered to have used 65% of the loan funds to buy himself a Mercedes Benz car. The project was subsequently liquidated by the bank.

In the three cases sited above, the lending banks admit that the feasibility studies provided to them by reputable consultants appeared credible.

2.1 Elements considered in a feasibility study for a horticultural project

As highlighted above and based on the definitions of feasibility studies given by various authors and some of the text of the actual feasibility studies conducted by horticultural consultants, a feasibility study for a horticultural project examines, assesses and reports upon the *technical*, *management*, *commercial* and *financial* aspects and provides explanations and justifications for

investment in the proposed project. It also enables a prospective investor who wants to borrow funds to present the study to lending institutions as a bankable document for project financing:

2.1.1 Technical assessment

Company background

Kaufmann (1991) and Ahmed (1999) state that for an operating business that might be planning to expand, the following information is included in the feasibility study: an introduction of the company including year of formation, a brief description of its development, its financial history, current types and quantities of products produced, their markets and competitors, and the company's major subsidiaries; type and structure of present and projected ownership and background of major shareholders, and current/projected management structure and their skills; type and structure of holdings and investments, including joint ventures; number of operational sites and personnel numbers per site; brief description of production operations at each site and the inter-linkages between sites; a general identification of the new project elements; age profile of the existing equipment park (if any, e.g. tractors, boom sprayers, irrigation equipment, etc); an outline of the technical, commercial and financial nature of, and reasons for the proposed project and how it would integrate with existing operations and activities; management - qualifications and capabilities of top managers, technical, marketing or management agreements, international relationships and local linkages with main producers; logistics arrangements and availability of cargo space for air freighting final products; main Management Information systems used. In addition, a feasibility study examines the following aspects for a Greenfield horticulture project, adds Applegate (1998):

The project

Beohlje et al (1998) and Campbell (2000) in their journals explain that virtually every project functions or will function in a competitive environment. Success depends to a large part on whether the project has a comparative advantage over alternative suppliers to the target market. It is therefore considered essential to examine the project's underlying strategy and its characteristics. A feasibility study examines and defines a strategy for the project.

Location

Manne (1972) explains that the location of a project can have a major influence on the ability to get to the market. A remotely located project will experience greater difficulty and higher cost in transporting its products to the markets, while on the other hand projects located in close proximity of their markets or those projects that are able to move their products to the airport easily and faster will be in a stronger position to get the products to the markets in much better condition and at lower costs.

However, while a feasibility study would identify this factor as important, it is likely that some projects remotely located may have lower supplied costs than those in close proximity of the airport or market, possibly due to lower production costs. This study seeks to verify if this aspect is indeed crucial in the success of a firm as highlighted by some feasibility studies.

Land

In a feasibility study for Greenfield projects, there are a number of points considered in assessing whether the project site is suitable or not, asserts Marsden (2001) in his journal on African entrepreneurs. Access to labour, access to services and infrastructure, access to water sources and

possible environmental concerns. Would any of the physical features of the site – soil structure, load-bearing capacity, water run-off, seismic risk – be unsuitable for the project or have an adverse impact on the project cost? All these concerns make it essential to undertake a thorough soil sampling and topographical analysis on the site, Burke (1997).

Burke (1997) highlights that the costs of civil works often pose the greatest problem, because detailed drawings and layouts of the site are normally not yet available at an early stage. This has led to huge project overruns in a number of cases. Although there is no certain way to eliminate these risks, the feasibility study attempts to highlight the basis of cost estimates.

Project size

Feasibility studies attempt to establish the optimal size of a horticultural project in order to assure profitability on a sustained basis. Work by Schiffer et al (2001) has shown that firm size matters. In the worldwide survey they found that smaller firms generally report significantly more problems than larger firms with financing, taxes and regulations, inflation, exchange rate, corruption, crime and anti-competitive practices. Economies of scale and entry costs are business obstacles that may be particularly severe because they represent fixed costs that a large firm can absorb easily. However, Schiffer et al (2001) explains that there are no significant differences in how much infrastructure, policy instability and the judiciary affect firms of different sizes. The level to which feasibility studies are able to predict this is still unknown.

Design and Engineering

Cleland (1988) in his project management handbook and Clay (1989) in his project appraisal and planning release, explain that the cost of the service providers and the basis of the estimated costs for the design and engineering services by the service providers must be made available.

Site layout

Van Roozendaal (1994) includes the following information in a feasibility study for horticultural projects: Process flow diagram and layout plan of the new items, showing the relationship between the new and existing equipment (if any). He adds that this is necessary for future planning for expansions to gain economies of scale.

Physical infrastructure

The type and standard of the physical infrastructure determines the project's longevity and minimizes maintenance costs, Squire (1989) in his handbook on project evaluation in theory and practice.

In horticultural projects some project promoters may choose to build wooden greenhouses and others use steel structures. Obviously, greenhouses built in steel, albeit more expensive, will last longer than those erected in wooden material. The need to replace wooden structures from time to time may mean that production will cease for some time during the time the structures are being refurbished. The size, description and costs of any buildings or modifications to existing structures and technical installations are assessed to determine the likely expenditure on these items.

Plant & Equipment

Estimates are based on previous experience or wild guesses based on hearsay, according to Belli (2000). However, in most feasibility studies in horticulture, equipment prices are based on recent quotations or validated estimates. Detailed lists of new machinery and ancillary equipment to be installed by number, capacity, unit price, make and country of origin are prepared. Reasons for selecting the particular technologies and proposed suppliers are indicated. Plant and equipment costs can be estimated from signed contracts or suppliers' quotes.

Production program

Under this heading, the following information is covered by feasibility studies:

A brief description of the process, need for special "know-how" or technical skills; complete details of the proposed new production plan, including quantities per day, and year for each crop type/variety together with exact data about what will be produced using the proposed new facilities and expected conversion ratios and yields of output, Sarah (1996).

Material inputs & outputs

According to Sapru (1998) the following points are covered in feasibility studies:

Adequacy, future availability, costs and sources of raw materials and other material resources required; availability, reliability and costs of utility inputs, namely: electricity, water, fuels for transport vehicles, etc and infrastructural constraints (i.e. transport, communications, etc) which may inhibit the success of the project.

Environment and sustainability

Zollinger (2001) explains that the feasibility study also provides information on the potential of the new project to create environmental concerns in terms of liquid effluents, gaseous emissions, dust and noise from machinery and equipment, and how these issues will be addressed. Key social issues are also brought to light, for example, worker health and safety problems. Zollinger (2001) continues to state that good environmental control leads to sustainable profitability.

Research & Development

In deciding what needs to be grown, soil tests are performed to establish suitability of the soils for the project crops, common crop diseases are checked out and their treatment procedures outlined, pruning needs are established and post-harvest handling procedures and storage mechanisms are outlined. Successful implementation of horticultural projects also entails creating experimental plots for new crops and testing whether or not the new crops can produce the desired results before introducing and establishing them on a commercial scale. Nonetheless, while feasibility studies make attempts at providing these guidelines, entrepreneurs often switch to new crops sooner than later for various reasons including price attractiveness, disease resistance, etc.

2.1.2 Management assessment

Ownership

The determination of project ownership is crucial in establishing whether or not the people behind it are sufficiently committed and have the capability and resources to implement the project successfully. Feasibility studies allude to the fact that one has to be totally committed to making one's start-up a success, even if it means putting family, social and personal needs aside.

However, Edwards S. & P.(1996) assert that as an entrepreneur, "one's well-being is vital to ones success." Using a descriptive statistic, this study will endeavour to examine how important the commitment of the sponsor is to project success as stated in feasibility studies.

Management

A feasibility study establishes the level of management required and the desired skills to ensure the success of a horticultural project. It also identifies the number of employees and their roles, Thieme A. (1995). The gap that exists in this assessment is the devotion of management and workers to ensuring project success.

Implementation arrangements

An integral part of assessing the estimated capital costs is the assessment of the arrangements for the implementation of the project. For most sizeable projects, the promoter creates a dedicated team that has the necessary technical experience to carry out the project, including control of suppliers and contractors Belli (2000) and Kosura (2000).

Operations management

Feasibility studies also identify the organizational structure and whether it is appropriate for the size and complexity of the business, who makes the decisions and whether the arrangement has a good or bad effect on operations, Shirley et al (2000) and Schoudhary (1998).

The track record, skills and experience of key managers are examined closely to verify the managers' will and ability to do the job (Belli, 2000).

Personnel

In feasibility studies, personnel information includes proposed personnel required for the project, a tabulation of the number of personnel per department and people per shift for each major section and proposed training programs, length of time proposed and costs involved (local and foreign, especially for professionals). This assessment establishes the level of cost in the manpower employed, Thieme (1995) in "needs assessment of staff with regard to investment project evaluation". However, the validity of this assessment still fails to tally with actual performance.

2.1.3 *Commercial assessment*

Market and Marketing

According to Ramsey (1997), it is easy to produce products and services customers should want; to find out what they actually do want requires some tedious legwork; you can produce the best products or services, but if there are no customers for them,…you will soon be out of business. The feasibility study justifies the basis of the project in marketing terms and addresses, but is not limited to the following points and it also identifies any areas where there may be competitive trend risks: what and where the target market segments are; what the demand trends in these segments have been; actual and forecast domestic and export demand; current product mix by major product categories; volume or yield of output and proposed marketing strategy and possible risks; proposed product types, volume, value, price ranges, price trends and projections; current customer base and potential new customers; current and potential future competition; tariff and/or quantitative restrictions in export markets, i.e. trends of quotas and tariffs imposed by main export destinations by product category and trends in import tariffs and other protection prevailing in

domestic market and product category; critical factors that determine market potential; definition of the type, prices and quantities of products to be produced by the project; sales, trade terms, commissions paid to agents or distributors, etc for domestic and export sales; main competitors and competitive advantages; present aging of trade receivables; main suppliers of raw materials, prices and reliability of supply; yields compared to world class standards; main suppliers of other raw materials and accessories; customary payment terms to suppliers.

However, despite this detailed review the results of feasibility studies do not generally tally with actual project performance.

It is considered important to be sensitive to market conditions. Mistakes in market assessments, especially those that overestimate the market or underestimate the competition, are often irreversible and fatal. Unfortunately, there are no infallible guidelines to help the analyst avoid these potentially fatal errors. Even with the most thorough and complete market analysis, the conclusions may still be wrong. One study reports that 60% of IFC's (International Finance Corporation) forecasts, despite their wealth of detail, were off by more than 20% compared with actual sales, Ahmed P.(1999).

Prices

In his journal "Managing projects", Roman (2001) explains that in price setting, a feasibility study considers the following: analysis of CIF (cost insurance & freight) prices for equivalent products; any tariff or non-tariff barriers (including price controls) that distort the price in the target markets; checking whether the target markets are dominated by one or a few large producers who may be making monopolistic profits owing to the lack of competition; whether the industry is cyclical; a check on the key determinants of product prices in the markets is done.

Selling prices of corresponding lower quality products on a cash basis and on credit are established.

Distribution channels

In a feasibility study every market assessment reviews the distribution channels through which the producer will deliver the product to the ultimate consumer. The review covers transport on which the distribution system will depend, the normal terms of sale, and the typical profit margins to intermediaries (if any), Belli (2000).

Competition

A feasibility study will highlight the level of competition in the markets to be served and the necessary strengths to enable one to compete effectively. In the journal, www.AfricaIntelligence (2002) on "trouble in the horticulture sector" it is stated that in analyzing the relative strength of the competition in the target market, the following are considered: principal suppliers to the market, domestic and foreign; location of their production capacity; competitors' relative size; cost structures of principal competitors, and their comparative advantages or disadvantages; the relative financial strength of competitors, and their ability to sustain protracted price wars. The degree of cauterization which might limit price competition is also checked out Hinchy (2000).

2.1.4 Financial assessment

Investment plans

Peter et al (2000) and Nevitt et al (2001) explain that feasibility studies establish the amount of finances required and composition (debt/equity mix) of the financing needs so that it can be

determined whether or not the project can withstand debt burdens. However, such studies do not necessarily evaluate all available financing options to pick on the less burdensome options. However, investment objectives are explicitly stated and strategies to attain these objectives are highlighted.

Equipment requirements: a list of machinery, general specifications, potential sources of supply and estimated prices is tabulated. Experience with previous equipment is also established so as to know whether or not to go for the same type of equipment.

The following costs are established: capital cost estimate including civil works, equipment, freight, duties and insurance, erection, pre-operating expenses, contingencies, incremental working capital and interest costs during construction.

A time table for project implementation and production build-up is drawn, Pinto (1998).

A financial plan indicating detailed sources (share capital increase, internal cash generation and additional borrowing) is shown with assumptions for project revenues and operating costs.

Financial projections, including income statement, balance sheet, and cash flow during implementation and up to, say, five years after completion (in the same form given as for historic financial statements) and an estimate forecasted financial return on the investment.

Customary levels of inventory for inputs and outputs is established.

Contingencies

The word "contingencies" refers to items not included in the project costs but can be identified during a feasibility study. Despite exhaustive feasibility studies, contingencies tend to be overrun.

Provision for escalation

Escalation refers to the inflation of costs during the project implementation period and should not be confused or combined with contingencies. Factors that drive these costs will include contractual arrangements, duration of the project implementation period and the levels of inflation in the costs of construction and equipment. A project feasibility study will assess the extent to which each major expenditure may be subject to a cost increase, and at what point, if any, in the implementation process the item will be committed and no longer subject to escalation.

Project management costs

In feasibility studies, project management costs are related closely to the project implementation timing and worked out accordingly.

Start-up expenses

Feasibility studies base start-up expenses on the initial stages, when, inevitably there are some material waste and unsaleable final product, and to some extent the failure for machinery to work perfectly.

Direct costs of production

Costs of production are exhaustively established to see if the project can survive based on existing market prices.

Indirect costs including depreciation are also worked out in detail to ensure over-runs are minimized.

Revenues and profitability

Project revenues and profitability are determined based on accounting data that is expected to be captured in the course of the business operations. In feasibility studies these values are calculated using expected sales volumes, price and cost.

Cash flows

EBITDA is termed as the mother's milk of project financing. EBITDA refers to earnings before interest, taxes, depreciation and amortization. EBITDA is the cash flow available to pay interest and debt principal. Conservative projections of assured internally generated EBITDA cash flows must be prepared and justified by appropriate independent feasibility and engineering studies. The EBITDA cash flow projections must be sufficient to service any debt contemplated, provide for cash needs, pay operating expenses, and still provide an adequate cushion for contingencies. Lenders carefully review the projections to determine EBITDA debt coverage over the loan life. Assumptions used in the feasibility study must be realistic and worst case scenarios must be considered and contingency plans prepared (Nevitt P.K. et al. (1997).

Working capital

These are established when the feasibility study is conducted in order to determine the operating cash needs of the project under review.

Whether a project is Greenfield or an expansion of an existing one, it will almost certainly require additional working capital (Hinchy P., 2000). Working capital in some projects is directly related to sales, which means that sales growth will create ever-increasing financing requirements. To the extent that there is a long-term requirement for working capital, it is included in the financial plan.

Financial analysis

The analysis includes, but not necessarily limited to, the following components: tabulation, with sources, derivations and justification, of the total project cost detailing buildings, machinery and equipment, technical installations, working capital requirements and including sub-division into local and foreign exchange requirements, identification of freight and insurance costs, erection charges, engineering, design and technology fees, as well as physical and price contingencies; details of the projected time series, annual sales income (including identification of amounts for sales commissions, allowances and other discounts); analysis of the profitability of the project pay-back period, return on investment and internal rate of return, including sensitivity analysis; proposed financial structure of the project, indicating expected sources of funds, including equity and debt; examination of the major risks and issues of the project and the critical factors which will determine profitability.

The feasibility study provides a detailed project cost and highlights areas of possible risks. However, even with this level of detail, the validity of feasibility studies in horticultural projects is questionable.

Sensitivity analysis

These analyses serve to identify the key factors that influence the performance of the project and the impact that would result from changes in those factors (Malter, et al, 1999). The factors can be analyzed further to understand what causes them. Some of the analyses would include changes in production levels and costs, changes in selling prices, exchange rate fluctuations for export business, yields, etc. However, despite subjecting the financial analyses to sensitivity tests, horticulture projects do not perform as generally predicted in feasibility studies.

CHAPTER THREE

3.0 Research methodology

3.1 Introduction

The objective of the study is to explore aspects of feasibility studies in projects and their relative importance in the successful implementation and performance of a project. The study aims at determining the approach to successful feasibility studies from lessons learnt to-date in the horticultural industry in the Eastern Africa region. The Eastern Africa region will include the countries of Kenya, Uganda, Tanzania, Rwanda and Burundi.

3.2 Population

The population of the study consists of three registered horticultural farms in Rwanda, and two in Burundi, nineteen in Uganda, thirty in Tanzania and 330 in Kenya, as tabulated below:

Population by country

Country	Flower projects	Vegetable projects	Total
Rwanda	2	1	3
Burundi	-	2	2
Uganda	15	4	19
Tanzania	28	2	30
Kenya	217	113	330
Total	**262**	**122**	**384**

Registrars of companies[1]

3.3 Sampling

The study sample will consist of the total population of all registered farms in both Rwanda and Burundi as they are few in number, five in total.

In Uganda, the horticultural farms are concentrated around and within easy reach of Entebbe (the main airport). The study sample for this country will be a random sample of six farms as these farms are in the same ecological zone and the microclimate and soil conditions are unlikely to vary significantly.

Tanzania has thirty registered horticultural farms many of which are around the Arusha town due the favourable climatic conditions around Arusha. The study sample will therefore consist of a random sample of nine farms (9% of total population) from across the country.

Kenya is reported to have numerous horticultural farms, although only 330 are registered. These farms span the whole country, but a greater concentration in regions close to Nairobi and other major towns. A random sample of 33 farms (10% of the population) will form the basis of this study.

The reason for the sizes of sample populations for the three countries is to save on time as the distances to cover are vast.

In view of the varying sizes of the farms and their different locations, the sample will include small, medium and large farms and also across the different ecological zones of each country.

The number of farms in this industry was obtained from the Registrars of companies in the respective countries as of the 15th June, 2001.

It is also understood from the Uganda Flowers Exporters Association (UFEA's) Research and Development Centre, located at Nsimbe Estates on Masaka road, that some of the horticultural farms may have ceased operations as at April 2001 due to the low levels of exports now being

reported. Consequently, in order to collect data from failed farms, convenience sampling will be used. Such farms will be identified, information will be sought from the lending financial institutions and sponsors. The sample size of failed farms will be 50% of the total study sample in each case. The percentage of each sample size to total population per country ranges from 12% to 100%, which can be considered representative.

Sample by country

Country	Flower projects	Vegetable Projects	Total	%ge of sample to total Country population
Rwanda	2	1	3	100
Burundi	-	2	2	100
Uganda	4	2	6	32
Tanzania	7	2	9	30
Kenya	30	10	40	12
Total	**43**	**17**	**60**	**274**

The reason for a greater proportion of samples being drawn from flower farming as opposed to vegetable farming is because flower farming appears to have suffered a greater setback resulting in many business closures than vegetable farming has experienced. Flowers are grown mainly for the export markets and experience greater competition from global players, while a bigger volume of vegetables is consumed locally with few imports of same. Flower farms also require substantial investments and feasibility studies are almost required, particularly by the lending institutions.

3.4 Data collection

Secondary data will be obtained by collecting information from operating and failed firms, using a structured questionnaire that focuses on the details of the feasibility studies done and the performance results achieved by each firm. To increase the speed of the research, data collection will be done by the use of a research assistant, where necessary, but the researcher will personally visit the smaller farms and those farms that existed but have now closed down, to gain greater understanding of their performance against plans.

The questionnaire is shown in Appendix 2, and has two parts, viz:

Part I relates to the hypothesis that *there is no relationship between feasibility studies and actual performance in terms of financial measures*, while Part II raises questions concerning the hypothesis dealing with *project planning and implementation*. This analysis will show the relative importance of factors considered in feasibility studies of horticultural projects and highlight the constraints that hinder the effective implementation of these projects.

The questionnaire will be addressed to company Managing Directors of each farm. A letter of introduction and request for data as well as a questionnaire will be handed over to each of the respective heads of the horticultural farms who will either provide respondents or seek reaction from the appropriate respondents.

In collecting the data specified above, some assumptions have been made.

3.5 Assumptions

(a) The researcher will access firms that have since closed down and that information from the owners will be obtained in written form.

(b) All projects sampled will be those that carried out feasibility studies.

(c) An equal number of failed and operating firms will be captured in the sample selection.

(d) The sampling design will apply as indicated without changing the design structure for lack of appropriate data.

3.6 Data analysis and presentation

a) The data will be tabulated and statistically analyzed for differences, relationships/correlation, proportions and averages for the following factors:

- Production yields
- Sales volumes
- Selling prices
- Revenues
- Profits
- Operating costs
- Distribution costs
- Project capital costs

b) Percentages and proportions for general findings for the following factors will be worked out:

- Project implementation timing
- Project size
- Market availability
- Competitive action
- Water requirements

- Disease incidence
- Crop varieties
- Number of days to crop maturity
- Wastage of harvest
- Management skills and experience
- Employment levels
- Commitment of the project sponsor

To enrich the study, other statistical analyses such as a test of difference, ranking analysis and some descriptive statistics for factors like commitment of the sponsor and management skills, will be done where appropriate. These analyses will provide information on the important management aspects that require to be catered for in the management of horticultural projects.

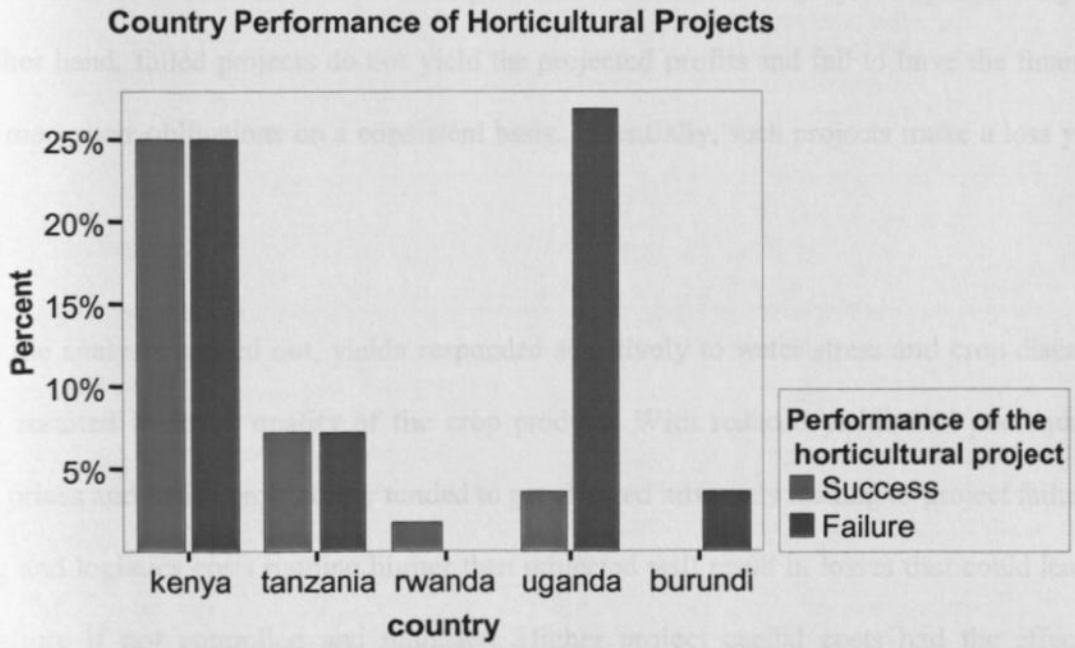
CHAPTER FOUR

4.0 Data findings and discussion

Part A

4.1 The relationship and variation between proposed feasibility studies and actual factors affecting the performance of horticultural projects:

This section aims at looking for and evaluating some of the reasons underlying horticultural projects failure in the Eastern Africa Region. Sampling statistics yielded a collection of 62.5% failed horticultural farms while the successful ones accounted for the remaining 37.5%. From this, it can be generalized that a large number of horticultural farms in Eastern Africa failed in the last ten years.



Apart from gross mismanagement of horticultural projects, no other significant reasons have been tested. Most of the reasons given have merely been hypotheses. This study therefore, aims at analyzing for certain factors that account for the failure of horticultural projects.

These factors include, production yields, sales volumes, selling prices, project capital costs, operating costs, logistics costs and profits.

4.2 Definition of Project failure or success

Horticultural projects that are classified as successful yield profits that consistently match or surpass projected performance as per feasibility studies. Feasibility studies usually indicate whether or not a project will be viable in terms of being able to make sufficient profits to meet its various financial obligations including providing a dividend to its shareholders on a consistent basis save for occasions when unexpected events, that erode profits, come into play. However, such events are seen to be re-dressed at future periods so as to return the project to profitability.

On the other hand, failed projects do not yield the projected profits and fail to have the financial ability to meet their obligations on a consistent basis. Essentially, such projects make a loss year-on-year.

Based on the analysis carried out, yields responded sensitively to water stress and crop diseases. This also resulted in lower quality of the crop produce. With reduced yields and poor quality products, prices and hence profitability tended to get affected adversely leading to project failure.

Operating and logistics costs running higher than projected will result in losses that could lead to project failure if not controlled and managed. Higher project capital costs had the effect of increasing interest repayments and necessitating higher provisions for depreciation. If left

unchecked, runaway capital expenditure could lead to project failure for being unable to meet its debt repayments.

4.3 Factors that influence the performance of a project

The following summary highlights the factors that have an influence, either individually or in combination with other factors, on the profitability of horticultural projects and hence the success or failure of such projects:

Crop Yields

According to the responses provided by the interviewed persons, 98.2% of them indicated that actual crop yields have not at all been in line with what was forecast in the feasibility studies. Only a handful, 1.8%, matched performance as per feasibility studies.

Are the total crop yields in line with feasibility studies * Performance of the horticultural project Crosstabulation

% of Total

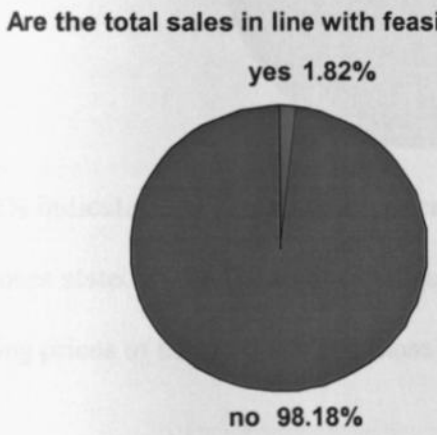
		Performance of the horticultural project		
		Success	Failure	Total
Are the total crop yields in line with feasibility studies	yes	1.8%		1.8%
	no	35.7%	62.5%	98.2%
Total		37.5%	62.5%	100.0%

When the response on actual crop yields was related to projects' performance, it was found that projects whose total crop yield was in line with the feasibility studies and succeeded constituted 1.8% of all the sampled projects. The projects that succeeded in this regard were 35.5%. None of

the projects that had their actual yields in line with the feasibility studies failed. Conversely, the projects that had actual total crop yields deviating from the feasibility studies resulted in 62.5% of them failing.

Total Sales

In terms of forecast performance of the projects, when total sales were taken into account, a similar pattern with what was obtained from the perspective of crop yields was observed.

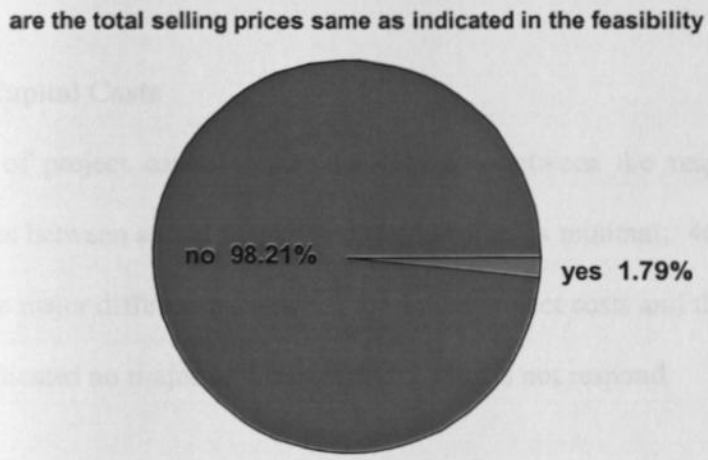


At least 1.8% of all the projects had the actual sales tallying with the forecast in the feasibility studies and the remaining 98.2% indicated otherwise.

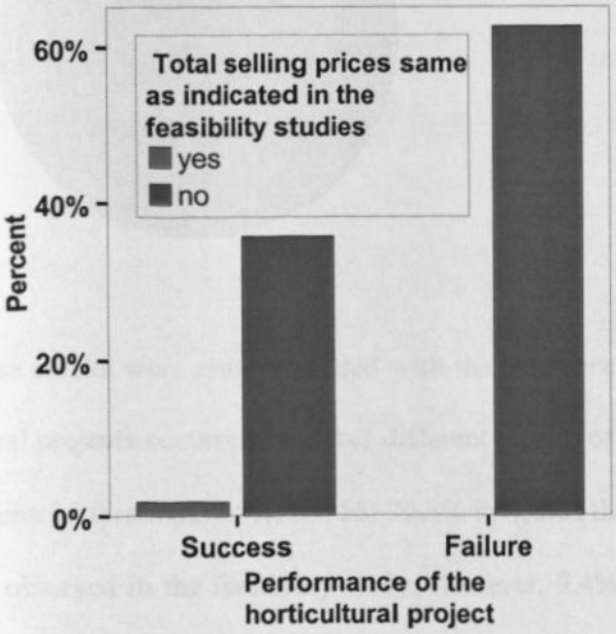
1.8% of successful projects had the actual sales being similar to the sales figures proposed in the feasibility studies. Even though some projects' sales performance did not tally with the feasibility studies, 34.5% of projects are so far successful. The remaining 63.6%, which constituted the majority of the sampled projects had their sales projections differing from the actual figures achieved and these projects also failed.

Selling Price

Selling price per unit of horticultural products is another useful indicator. From the sampled projects, 1.8% had their actual selling prices very similar to those shown in the feasibility studies.



98.2% indicated that actual selling prices differed significantly from the ones stated in the feasibility studies. Consequently, 1.8% of the responses indicated that actual selling prices of the products and those indicated in the respective feasibility studies resulted into



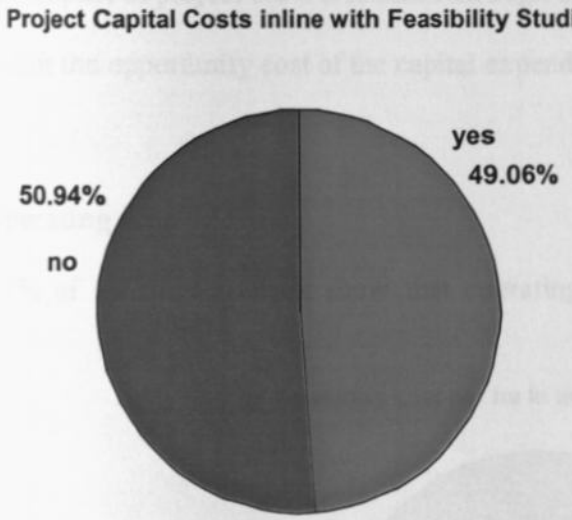
successful ventures. Nonetheless, 35.7% of the projects have been found to be successful despite the actual and feasibility study prices differing.

62.5% of all the responses have shown that even though the actual and stated selling prices did not match, the projects still failed.

Project Capital Costs

In terms of project capital costs, the variation between the responses favoring differences or similarities between actual figures and stated values is minimal. 46.4% of respondents agreed that there were major differences between the actual project costs and the proposed ones.

48.2% indicated no major differences and 5.4% did not respond.



When these results were cross-tabulated with the incidence of either the success or the failure of horticultural projects occurring, a rather different picture of the state of the projects emerged. Out of the successful farms (≅37.5%, n = 56) 26.4% indicated that their actual project costs tallied with what was observed in the feasibility study. However, 9.4% of the successful farms indicated the

opposite. Of all the projects that have failed so far, 22.6% had their project capital costs being similar to those that were forecasted while 41.5%, which form the majority, indicate that there was a difference between forecast and actual project capital costs.

Project Capital Costs inline with Feasibility Studies * Performance of the horticultural project Crosstabulation

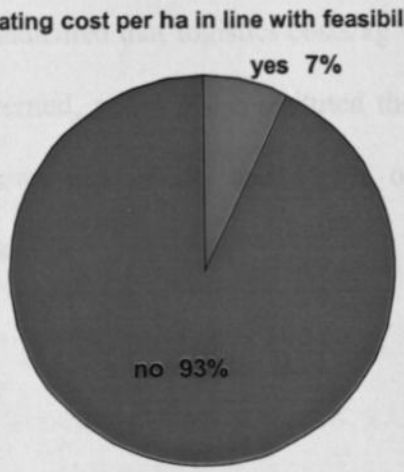
% of Total

		Performance of the horticultural project		
		Success	Failure	Total
Project Capital Costs inline with Feasibility Studies	yes	26.4%	22.6%	49.1%
	no	9.4%	41.5%	50.9%
Total		35.8%	64.2%	100.0%

The impact of project costs is realized through depreciation expense, interest on borrowed funds and/or the opportunity cost of the capital expenditure funds.

Operating costs

7.1% of all the responses show that operating costs/ha for the projects were similar between



forecast and actual values. 91.1% on the other hand explains that forecast figures and actual values for the implementation of these projects differ significantly. There was no response from 1.8% of the sample population.

Out of the successful ventures, 7.3% indicated that operating costs per hectare were similar between forecast and actual figures while 30.9% indicated the opposite. On the other hand, all of the failed ventures, which constitute 61.8% of all the sampled projects, had their forecast figures differing considerably (higher in all cases) with observed values.

Operating cost per ha in line with feasibility studies * Performance of the horticultural project Crosstabulation

% of Total

		Performance of the horticultural project		Total
		Success	Failure	
Operating cost per ha in line with feasibility studies	yes	7.3%		7.3%
	no	30.9%	61.8%	92.7%
Total		38.2%	61.8%	100.0%

Logistics costs

As a factor influencing projects' performance, logistics costs had a rather different orientation. 98.2% of all the responses indicated that logistics costs/kg were not any similar as far as forecast and actual figures are concerned, and 1.8% constituted the non-responses. Although this is the case, the analysis still shows that 38.2% and 61.8% of the projects succeeded and failed respectively, due to other reasons.

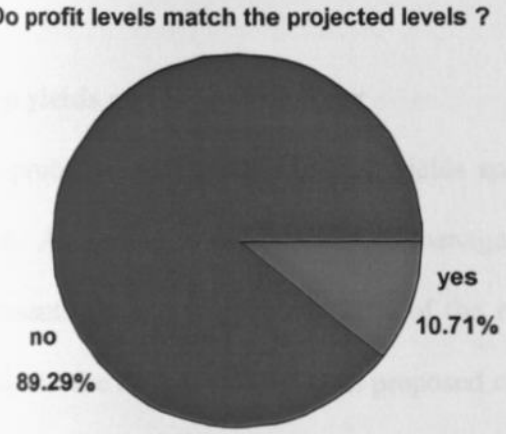
Logistic Costs/kilogram inline with Feasibility Studies * Performance of the horticultural project Crosstabulation

% of Total

		Performance of the horticultural project		
		Success	Failure	Total
Logistic Costs/kilogram inline with Feasibility Studies	no	38.2%	61.8%	100.0%
Total		38.2%	61.8%	100.0%

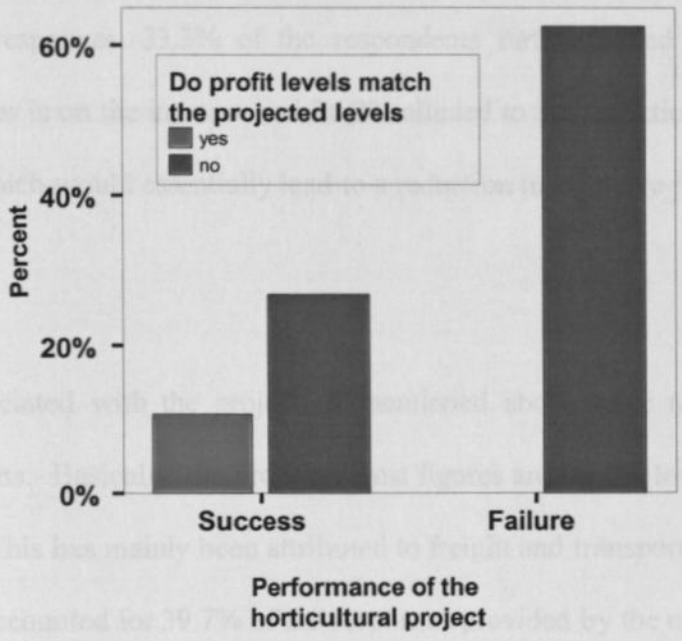
Profit Levels

The actual profit levels that matched those indicated in the feasibility studies accounted for only 10.7% of the projects studied. The balance, 89.3%, show that both the expected and observed profit levels differed significantly.



While 10.7% of the projects succeeded having their profit levels matching those indicated in the feasibility reports a further 26.8% of the projects still succeeded even though the estimated profit levels did not match what was indicated in the feasibility studies.

62.5% of the projects failed, this being in line with the fact that their estimated profit levels were different from what was proposed in the feasibility studies.



Crop yields and Sales Vol./Year

The problem associated with crop yields and sales volumes per year manifests itself in various ways. According to the interviewed managers, it was indicated that high disease incidence, 40%, represents the major problem. 20% of the respondents explained that poor project management results in the differences between proposed crop yields and sales volumes and the actuals realized. Evidence of water stress also impacts significantly on the projects' actual performances. This accounted for 25% of all the responses provided. Lack of trained personnel was cited by 1.5% of all the responses while lack of finances and small-scale size of operations were cited by 1.7% of all the responses.

Low prices

The major problems associated with differences in prices that were expected at the initiation of the projects and current market prices have been explained in different ways. The managers interviewed consented that the quality of products is key to success. This view was represented as 40.5% of the responses. 33.3% of the respondents further added that a general reduction in worldwide prices is on the increase and 26.2% alluded to the reduction as being due to stiff global competition, which would essentially lead to a reduction in effective prices achieved.

Costs

The costs associated with the project as mentioned above have not matched the ones in the feasibility reports. Basically, the proposed cost figures are far too low as compared to the current project costs. This has mainly been attributed to freight and transport charges, which according to the managers accounted for 39.7% of the responses provided by the managers. 17.9% of them also indicated that poor project management skills, has led to the increase in project costs. 16.7% cited that overall project costs have increased as a result of the high frequency in disease incidences. 10.3% also explained that crop maintenance has also led to high costs of operations. The remaining 15.4% generally were in the increase possibly due to high marketing costs in the market place.

Descriptive Statistics

From a general perspective, costs have received a lot of attention from managers of horticultural farms. To further shed light on this problem, these managers were asked on their attitudes concerning some critical issues about project costs. These attitudes were measured using a four

point Likert scale ranging from strongly agree to strongly disagree. In terms of input costs rising, 67.9% strongly agreed, 25.0% agreed, while 5.4% disagreed and 1.87% did not have any opinion.

Passing cost increases through to the customers has been seen to be hard, consequently posing major pressure to the projects. In this respect, 55.4% strongly agreed, 41.1% agreed, 1.8% disagreed and only 1.8% did not hold any opinion.

In the general sense, market prices for horticultural products have declined over time. This has also introduced a lot of cost pressures on these projects. 58.9% of the respondents strongly agreed that the market price of their main product had decreased, 28.6% agreed, 10.7% disagreed and 1.8% did not hold any opinion.

Some farm managers have tended to think that their overall project costs are higher than their competitors'. 21.4% of them strongly agreed, 48.2% agreed, 28.6% disagreed and only 1.8% did not have any opinion.

From the above attitudes measurement, each of the following measured aspect, cost pressures had a mean score. Rising input costs had 1.4 (strongly agree). Hard to pass cost increases to customers had 1.5 (agree). The falling market price for the main product had 1.5 (agree), while costs being higher than that of competitors had 2.0 (disagree).

4.3.1 Wilcoxon Sign Rank Test

The distribution of forecasted figures and actual values of production yields, sales volumes, selling prices, project capital costs, operating costs, logistics costs, and profits were tested for significant differences. The Wilcoxon Signed Rank Test was used because it assumes no prior data

specifications as opposed to a paired sample T-test. In this case, it is vital to test for the significance of the possible variation in forecast and actual values. The following results show the Z value, which represents the sum of the ranks for the less frequent sign and their significance values. Small significance values (<0.05) indicate that the forecast values are different from the distribution of actual figures.

Wilcoxon Signed Ranks Test Statistics

	Z	Asymp. Sig. (2-tailed)
Total crop yields actual - Total crop yields forecast	-5.501[a]	.000
Total sales actual - Total sales forecast	-6.083[a]	.000
selling price actual - selling price forecast	-6.100[a]	.000
Project cost actual - Project cost forecast	-4.832[b]	.000
Operating cost/ha actual - Operating cost/ha forecast	-5.239[b]	.000
Logistic Costs/kilogram actual - Logistic Costs/kilogram f	-6.501[b]	.000
profit levels actual - profit levels forecast	-6.024[a]	.000

a. Based on positive ranks.

b. Based on negative ranks.

c. Wilcoxon Signed Ranks Test

From the results table above, it is clear that for all variables there are significant differences between the forecast and actual values. It can be concluded that, all projects do not have similar forecast and actual values. This may result possibly due to poor feasibility studies done prior to project implementation. It is also possible that the implementation of these projects does not match the plan and feasibility expectations.

4.3.2 Regression and Correlation Analysis

It is expected that, even if forecast values differ from actual results, they are also supposed to give an indication of the possibility of an increase or a decrease in actual values. It is not clear if

forecast values have any relationship with actual values in that if the two have a positive or negative relationship. To do this, regression techniques were employed to assess the nature, direction and strength of the relationship. Forecast values are hypothesized to influence actual values hence they are independent and dependent respectively. The results are tabulated below.

Relationship	**Estimated least squares model**	**R**
Crop yields (CY)	A(CY) = 180.4+0.601F(CY)	0.928*
Total Sales(TS)	A(TS) = -146.2+0.712F(TS)	0.997*
Selling Price(SP)	A(SP) = 3.2-0.001F(SP)	0.065[1]
Project Cost (PC)	A(PC) = 430540+1.747F(PC)	0.397[1]
Operation Cost(OC)	A(OC) = -106.7+1.26F(OC)	0.987*
Logistic Costs (LC)	A(LC) = 1.16+0.481F(LC)	0.518[1]
Profits (P)	A(P) = 2146.5 +0.29F(P)	0.491[1]

Where,

A= Actual

F= Forecast

From the table above, crop yields (R= 0.928), total sales (R= 0.997) and operating costs (R= 0.987) have very strong relationships between what was forecasted and the actual values. From the information collected, it is possible to relate models in the table above.

On the other hand selling price (R= 0.65), project cost (R= 0.397), logistics costs (R= 0.518) and profits (R= 0.491) have relatively low correlation values. Hence for these variables it is not plausible to use the above models to predict possible actual values.

Comments on declining profits

From the assessment of profit levels, it is clear that forecast profit levels are not only different from actual numbers, but they are also lower. The managers who were interviewed responded variously as to the major reasons leading to such a pattern. 43.7% of them indicated that declining market prices was a major cause. 28.7% attributed this to low yields, 13.8% indicated that high operating costs reduced the net profit. 4.6% stated that low economies of scale discouraged the profit benefits of small farms, while 3.4% of them attributed this to poor project management.

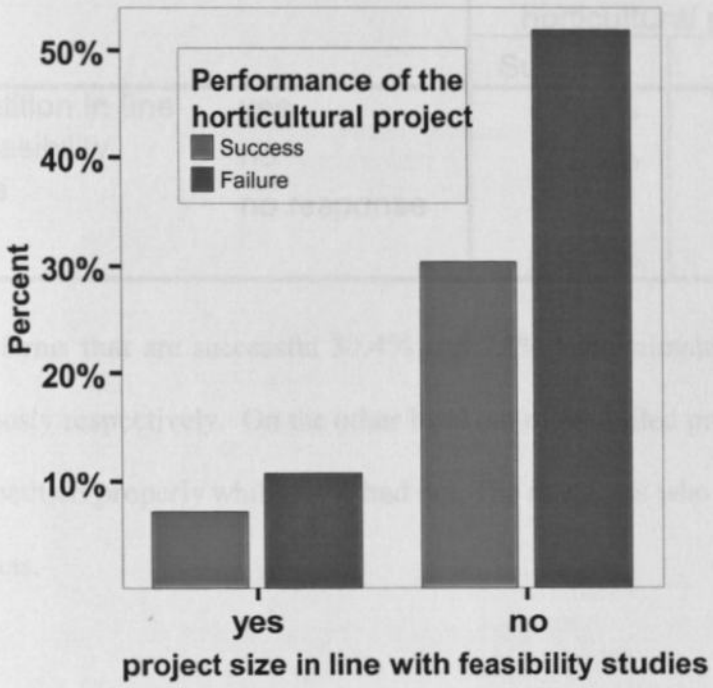
Part B

4.4 Relationships and Variations of the factors that affect project performance - Pre and post project implementation considerations

Several factors including key indicators of the performance of a horticultural project have been known to change after the project has been implemented. This section aims at evaluating key factors that impact on project performance. The approach adopted in this case is a comparative one. Emphasis is put on examining the relationship and/or variation of forecast figures and actual values of both qualitative and quantitative dimensions of these factors. The main factors considered by this study include, project size, competitive action, water requirements, disease incidence, crop varieties, number of days to crop maturity, wastage of harvest, employment levels and commitment of the project sponsor.

Project Size

17.9% of the mangers indicated that the current project sizes were in line with feasibility study propositions while 82.1% stated that their current project sizes were not as indicated in the feasibility studies. The effect of project size on the success or failure of a project had mixed reactions. Out of the successful projects (37.5%), 7.1% had the forecasted project size being in line with the actual size. The rest, 30.4%, that succeeded did not have the actual project size being in line with the forecast. Out of the 62.5% of the projects that have so far failed, 10.7% had their initial sizes being the same as the actual ones. The rest, 51.8%, had the converse of this. This indicates that some successful projects expanded. Thus lack of economies of scale is generally seen to be related with low turnover and profitability and hence failure of some of the projects.



Competitive Action

The major factor that can determine the success or failure of a project is the magnitude of competition being posed by similar projects. As a matter of fact, 85.7% of the managers interviewed had correctly estimated competitive action, while 12.5% made errors in respect of the same. 1.8% were not sure if they had or had not estimated correctly the competition. Consequently, respecting success or failure of a project, correct estimation of competitive action has some major effect.

competition in line with feasibility studies * Performance of the horticultural project Crosstabulation

% of Total

		Performance of the horticultural project		
		Success	Failure	Total
competition in line with feasibility studies	yes	30.4%	55.4%	85.7%
	no	7.1%	5.4%	12.5%
	no response		1.8%	1.8%
Total		37.5%	62.5%	100.0%

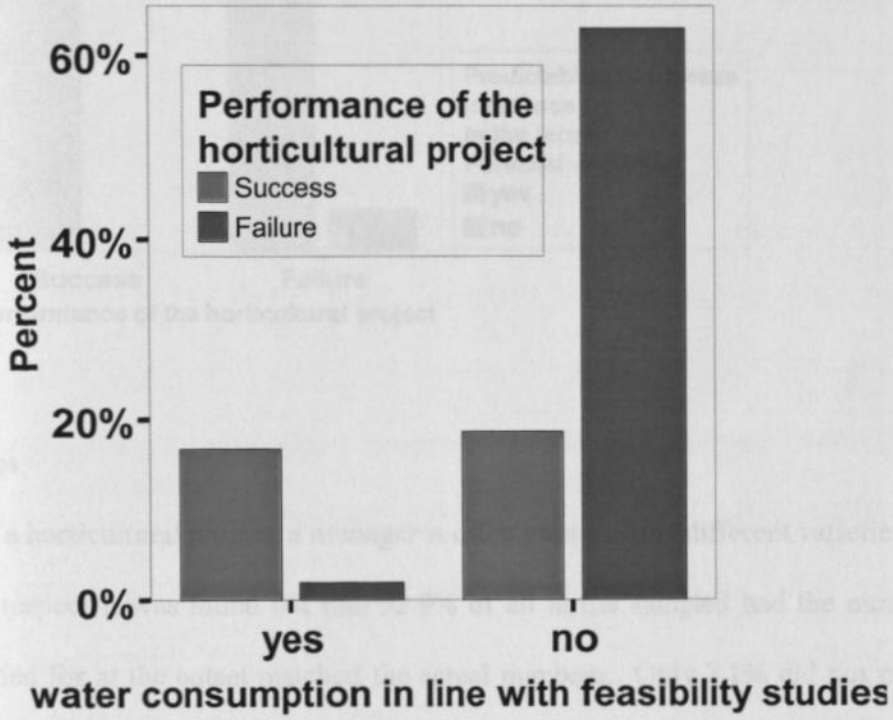
Out of the farms that are successful 30.4% and 7.1% had estimated competitive action properly and erroneously respectively. On the other hand out of the failed projects 55.4% still had assessed future competition properly while 5.4% had not. The managers who did not respond were from the failed projects.

It seems that increases in the number of growers both locally and internationally introduces a lot of competition. This view was represented by 58.9% of all the respondents. The rest of the responses given were not at all related to the competition effects on implemented horticultural projects

Water Consumption

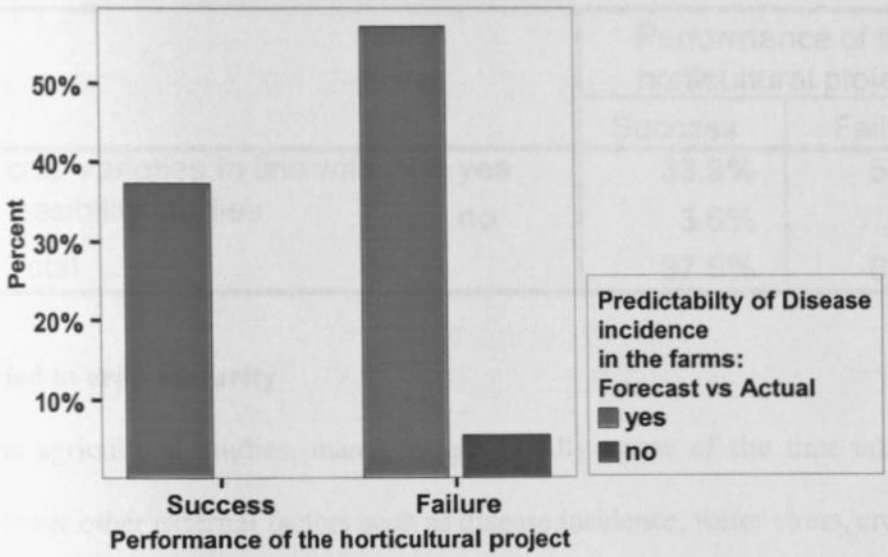
Availability of abundant water is essential in the location of horticultural projects. Depending on the project size, the varieties of crops, just to mention a few, the volume of water to be used can be easily estimated. However, according to this study, the converse holds. Only 17.9% of all the respondents consented that their actual water consumption levels were similar to those predicted by the feasibility studies, 78.6% disagreed, and 3.6% did not have any opinion in this regard. When the responses on water consumption were cross tabulated with either success or failure of

the existing projects, it was found out that when the water consumption was in line with the feasibility studies, 16.7% and 1.9% of the projects succeeded and failed respectively. When water consumption was not in line with the feasibility studies, 18.5% and 63.0% of the projects failed.



Disease Incidence

Diseases are known to reduce overall crop yields resulting in lower production. All farms realized an outbreak of diseases. However, 94.6% of the responses have indicated that the predicted frequency of disease incidences matched the realized ones. Only 5.4% of the farms had the predicted disease incidence varying considerably from the actual occurrences of the diseases. All of the successful farms (37.5%) had the forecasted disease incidences matching the actual ones. Out of the farms that have so far failed 57.1% still had forecast disease incidences matching actual ones while only 5.4% of the failed farm had an inverse pattern.



Crop Varieties

At the start of a horticultural project, a manager is often aware of the different varieties of crops to grow. In this respect it was found out that 92.9% of all farms sampled had the number of crop varieties planned for at the outset matched the actual numbers. Only 7.1% did not match. When this was related to the performance of the projects, 33.9% and 3.6% of the successful farms had the forecast number of crop varieties matching and differing respectively with the actual numbers. Out of the failed farms, 58.9% and 3.6% had the forecast number of crop varieties matching and differing respectively with the actual ones.

crop varieties in line with feasibility studies * Performance of the horticultural project Crosstabulation

% of Total

		Performance of the horticultural project		
		Success	Failure	Total
crop varieties in line with feasibility studies	yes	33.9%	58.9%	92.9%
	no	3.6%	3.6%	7.1%
Total		37.5%	62.5%	100.0%

Period to crop maturity

From agricultural studies, managers are usually aware of the time taken for crops to mature. However other external factors such as disease incidence, water stress, crop maintenance, etc. may lead to a change in the duration a horticultural crop needs to mature. 26.8% of the managers commented that the expected crop maturity duration was in line with what was recommended by feasibility studies. The rest, 73.2%, were opposed to this view. According to the farm that matched both forecast and actual values, 21.4% and 5.4% succeeded and failed respectively. Out of the ones that this period differed between forecast and actual figures 16.1% and 57.1% succeeded and failed respectively.

crop maturity in line with feasibility studies * Performance of the horticultural project Crosstabulation

% of Total

		Performance of the horticultural project		
		Success	Failure	Total
crop maturity in line with feasibility studies	yes	21.4%	5.4%	26.8%
	no	16.1%	57.1%	73.2%
Total		37.5%	62.5%	100.0%

Wastage of Harvest

Due to quality requirements, most farms are forced to discard produce of lower quality. However, this phenomenon does not seem to display itself prominently with regard to the farms sampled although 21.4% of all the managers consented to this happening and 75% of declined while 3.6% did not hold any opinion towards either side. When this was related to the overall project performance, 20.4% and 18.5% of successful farms had this wastage matching and varying when forecast and actual volumes were compared respectively. Accordingly, 1.9% and 59.3% of the failed projects had such a variation in wastage predictability.

product wastage in line with feasibility studies * Performance of the horticultural project Crosstabulation

% of Total

		Performance of the horticultural project		
		Success	Failure	Total
product wastage in line with feasibility studies	yes	20.4%	1.9%	22.2%
	no	18.5%	59.3%	77.8%
Total		38.9%	61.1%	100.0%

Employment Levels

28.6% of all the managers indicated that the labor force was exactly as proposed in the feasibility studies. 71.4% indicated otherwise. Out of the successful projects, 21.4% and 16.1% indicated

employment levels in line with feasibility studies * Performance of the horticultural project Crosstabulation

% of Total

		Performance of the horticultural project		
		Success	Failure	Total
employment levels in line with feasibility studies	yes	21.4%	7.1%	28.6%
	no	16.1%	55.4%	71.4%
Total		37.5%	62.5%	100.0%

that there was a match and mis-match respectively between forecasted and actual employment levels.

When the failed projects were considered, 7.1% and 55.4% had a match and mis-match respectively. The main reason for this was due to the fact that most of the farms registered an increase in the sorting and grading of the products. This view was represented by 62.5% of the managers while 37.5% of them gave no response.

Commitment of the project sponsor

Project sponsors, as per the findings of this study, do not spend enough time on their farms. Only 28.6% of them have been found to do so. The rest, 71.4%, do not appear to give much attention to their projects. When this issue was related to the performance of horticultural projects successful farms were only 23.2% and 14.3% where the sponsor spent most of the time and spent least time

respectively on the farm. Out of the failed farms 5.4% of the sponsors spent time on the farm while the rest, 57.1%, did not spend much time on the farm, the reason being that such sponsors have businesses elsewhere. The farms affected are at least 58.9% of the total number. 7.1% indicated that the sponsors are generally elsewhere away from their project farms. Only 14.3% of the sponsors seem to be dedicated to their project farms.

project sponsor spending time on the farm * Performance of the horticultural project Crosstabulation

% of Total

		Performance of the horticultural project		
		Success	Failure	Total
project sponsor spending time on the farm	yes	23.2%	5.4%	28.6%
	no	14.3%	57.1%	71.4%
Total		37.5%	62.5%	100.0%

4.4.1 Wilcoxon Sign Rank Test

The differences in distribution of the following factors in terms of forecast and actual values were

Wilcoxon Signed Ranks Test Statistics[c]

	Z	Asymp. Sig. (2-tailed)
project size actual - project size forecast	-2.366[b]	.058
water consumption actual - water consumption forecast	-3.456[a]	.001
Disease incidence actual - Disease incidence f orecast	-6.331[b]	.000
crop varieties actual - crop varieties forecast	-1.841[b]	.066
product wastage actual - product w astage forecast	-6.229[b]	.000
employment actual - employment forecast	-5.347[b]	.000

a. Based on positive ranks.

b. Based on negative ranks.

c. Wilcoxon Signed Ranks Test

tested using the Wilcoxon Sign Rank test. The major factors in consideration were project size, water consumption levels, disease incidences, number of crop varieties, product wastage and employment levels. The following results show the Z value, which represents the sum of ranks for the less frequent sign and their significance values. Small significance values (<0.05) indicate that the forecast values are different from the distribution of actual figures.

The above results indicate a varied pattern of similarities and differences in the distribution pattern of the factors.

Water consumption, disease incidence, product wastage and employment levels have asymptotic significance levels of zero. This means that for the above factors, forecast values differ significantly from the actual values.

On the other hand, project size and crop varieties have asymptotic significance levels of 0.058 and 0.066 respectively. These levels are greater than 0.05. This means that the actual figures presented in the feasibility studies are very similar to the realized ones. It seems that the above factors are the only ones that have been so far forecasted realistically

4.4.2 Regression and Correlation Analysis

Regression and correlation techniques were employed in this case to assess the nature and the strength between forecast and actual values of the distribution. As in the previous sections, forecast values were hypothesized to influence actual project values. Actual values were taken to be the dependent while forecast values were taken to be the independent variables.

The following are the regression calculations:

Relationship	Estimated least square model	R
Project size (PS)	A(PS) = 0.713+1.012F(PS)	0.989[1]
Water consumption (WC)	A(WC) = 41.908-0.004F(WC)	0.030*
Disease Incidence (DI)	A(DI) = 2.571+0.643F(DI)	0.347[1]
Crop varieties (CV)	A(CV) = 0.699+0.843F(CU)	0.706[1]
Crop maturity (CM)	A(CM) = 1.656+1.162F(CM)	0.963[1]
Product wastage (PW)	A(PW) = 5.332+0.693F(PW)	0.117*
Employment levels (EL)	A(EL) = 64.759+0.888F(EL)	0.375*

Where,
A=Actual
F=Forecast

From the table above, only project size (R = 0.989), crop varieties (R = 0.706) and duration to crop maturity (R = 0.963) have high correlation levels. This means that forecast values give a good picture of the actual values that will result. Thus the estimated models can give a good picture of what would be the approximate actual figures. Consequently, water consumption, (R = 0.030), disease incidence (R = 2 0.347), product wastage (R = 0.117) and employment levels (R = 0.347) have got very low correlation values, hence their distribution actually differs in characteristics.

Part C

4.5 Insights into better strategies to ensure the success of horticultural projects

4.5.1 Descriptive Results

This section covers some of the insights of the managers of all the farms visited to be applied as key strategies that a new venture should consider before starting a horticultural project. The attitudes were measured on a 5 point Likert scale ranging from least important to most important.

Previous start-up experience

With regard to previous start-up experience, 3.6% thought it was an important issue to consider. 35.7% indicated very important while 60.7% indicated that prior project experience is a key to successful horticultural ventures. The mean ranking was a 5 equal to most important.

Previous professional Experience

1.8% of the interviewed managers thought this was just important. 35.7% thought this was very important. A majority of 60.7% also indicated that previous professional experience merits well in considering to starting a new horticultural venture. The mean ranking was 5 equal to most important'.

A good team

1.8% thought that this was vital. 76.8% registered very important while only 21.4% thought that a good team is essentially needed in coming up with successful new ventures. The mean rank was 4 equal to very important.

A good project must have a management team that has the necessary skills, competence and depth and not a "*one-man show.*" The key individuals should be able to work well with staff, labour unions, local authorities and government.

Capable replacements should be available in the event a key manager leaves.

Commitment of the sponsor

32.1% of the interviewed managers thought that this was very important whilst a majority of 67.3% indicated that commitment to the project is the most important ingredient. The mean ranking was 5, which is equal to most important.

Luck

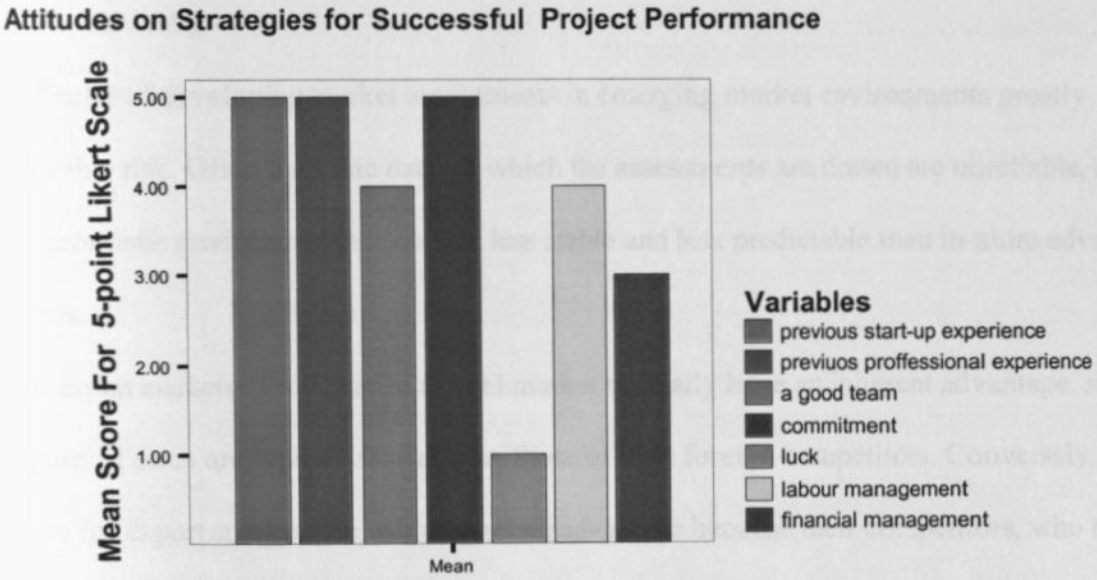
83.9% thought that luck was a least important consideration, 12.5% thought it was somewhat important. Only a handful of 1.8% thought luck was an incentive to successful projects. The main ranking was 1 equal to least important, although farmers who depend on rain-fed crops see luck as crucial depending on the availability of rains.

Labor Management

3.6% indicated that this was important, 90.9% thought that it was very important while 5.5% indicated that really labor management was a crucial aspect to consider when starting up a horticultural project. The mean ranking was 4, which is equal to very important.

Financial Management

3.6% of the managers indicated that this was somewhat important. 66.1% thought this was important, 26.8% and 3.6% registered very important and most important respectively. The mean ranking was 3, which is equal to important.



Working capital management

Relying on very expensive, short-term, local currency financing often proves fatal, especially in environments where real interest rates are very high.

Lack of an assessment of raw material inventory levels and their costs, receivables and their aging, assessing business drivers in the horticultural sector and determining selling price assumptions with breakeven points in order to understand whether the project will succeed or fail, looking at likely key success factors of the project and how to sustain them, conducting a saturation analysis to understand at what per capital income consumption ceases to grow with income, maintenance and periodic refurbishment of capital equipment and installations, understanding profit/cash

leakages through sales made via sponsor-owned entities, an identification of trouble spots, and doing an options analysis, that is, establishing the options available to phase the project so as to reduce implementation risks or to postpone discrete portions so the project can better survive major adverse conditions should they arise, all provide for chances of project survival in the longer-term.

Market & Marketing

The difficulty of developing market assessments in emerging market environments greatly increases this risk. Often the basic data on which the assessments are drawn are unreliable, and the general economic environment may be far less stable and less predictable than in more advanced economies.

Local vs. export markets: Products for a local market normally have an inherent advantage, since their transport costs are typically lower than those of their foreign competitors. Conversely, producers for export markets are at a distinct disadvantage because their competitors, who are producing in the importing markets, will normally have a transport advantage over them.

Market forecasts are the basis on which financial forecasts are developed. Those market forecasts should, therefore be guided in part by past trends: historical demand (quantities and prices), domestic sales and exports; historical supply (quantities and prices), domestic production and imports; reliability of historical market data; relationship of demand to macroeconomic variables (GDP, GDP per capita); relationship between product demand and product prices (elasticity); relationship between the cost of raw materials and product selling prices; cross-country factors (per capita incomes and consumption levels in other countries); regression analysis (determinant factors, correlation, confidence levels).

Overpromising and underdelivering: Too many small-business owners tend to land the job first and worry about the logistics later, whether they are negotiating a contract for services or advertising a product. It is better to "underpromise and overdeliver.

Competition

Despite the importance of historical information, historical trends can never be accepted as necessarily indicative of continuing trends and relationships. Too often, market assessments do not adequately reflect or anticipate the reactions of other suppliers (competitors) in the target market.

Prices

A feasibility study will analyze the prevailing prices for the product in the target markets. But it is a folly to assume that current prices will prevail in the future without much more analysis.

Project management costs

While project management costs are related closely to the project implementation timing, they become much more significant if the project implementation is delayed.

Start-up expenses

In many, if not all projects, the suppliers' responsibilities cease once they have passed limited production/yield tests. Even if the machinery and equipment are working perfectly, however, it will take time, labour (due to learning curve effects) and materials to produce at commercial levels. The initial stages inevitably have some material waste and unsaleable final product. The potential impact of start-up expenses on project costs will depend on the contractual

responsibilities of the suppliers of the raw materials, and the quality and experience of the labour available.

Contingencies

Each capital cost may well have a different level of confidence and therefore a different allowance for contingency, which must be considered carefully during each feasibility study.

Most projects in Eastern Africa are managed by the promoters themselves in an endeavour to save costs, but the intended results are hardly achieved resulting in serious cost over-runs.

Sustainability

Many people see growth and sustainability as in conflict. However, if firms can truly become better, more profitable businesses through improving their environmental, social and corporate governance performance, then the prospects for sustainable growth are much brighter.

4.5.2 Discriminant analysis results

Discriminant analysis was used to determine the most important variables that could correctly discriminate between successful and failed projects based on the forecast and actual values of the measured variables.

The results indicate that when forecast figures were considered only profit was the discriminating variable. This correctly classified the projects into successes or failures when compared to original groupings by 66.1%.

On the other hand, when actual figures were considered, project wastage and project capital costs were the most influential discriminators, resulting to a 78.6% correct classification results of the original groupings.

CHAPTER FIVE

5.0 Conclusions and Recommendations

5.1 Conclusions

A feasibility study is recognized as one of the most important tools for project assessment to ensure all aspects of a project are evaluated so as to determine if the project would be viable or not, especially for new ventures and additional investments to existing projects. The use of feasibility studies has become widespread even among the not so sophisticated in society. The desire to apply this tool has been prompted by the high frequency in project failures that result from lack of understanding of various factors that have an influence on a project including its implementation requirements, management and market dynamics.

The horticultural sector has, probably, witnessed the greatest number of casualties in recent times due to a lack of knowledge and experience in commercial growing of horticultural products and a disinclination to seek expert advice. Too much was taken for granted, with unrealistic costs for crop establishment, cash flows and the resulting profitability/loss. Despite there being prior know-how in the preparation of feasibility studies, it would appear that a number of promoters failed to adhere to the lessons of experience of the already failed farms. In addition, some of the sponsors had sought assistance for this technical evaluation from consultants with no local experience. Further, the consultants, who did not carry out variety trials, recommended planting varieties which were not only unsuitable for the various climatic conditions, but their viability was doubtful. A basic problem for growers was to select the correct varieties that suited the conditions of a country and which were also in demand. This resulted in low yields and quality, hence poor marketability.

Prices for various horticultural products from Eastern Africa were so low compared to other competing countries that local growers were operating below the break-even point. Export prices dropped by more than half, in some instances, which completely negated growers' feasibility studies to lending institutions. Consequently, lending institutions in some cases, shortened the loan pay-back periods which resulted in many companies abandoning horticultural products and some went into receivership, while many small growers who supplied these companies became destitute.

By not adequately understanding the dynamics of the industry many growers found themselves in deep trouble, with highly optimistic projected returns. For example, several feasibility studies projected an average of $0.35 cents per stem of flowers, while the price realized was $0.08 to $0.10 cents.

Banks also contributed to the problem, since their method of calculating suitability for a loan was based on high returns, which growers then incorporated in their loan applications. Banks and other lending institutions also did not have experienced staff to assess growers' loan applications in an industry that was new to the region, and yet capable of a large contribution to the countries' foreign exchange earnings.

Financial institutions (FIs) did not appear to have had sufficient internal technical capacity to independently appraise the projects' feasibility studies, neither did they attempt to secure outside experts to verify what had been presented to them by would-be investors.

It was found out that errors were also made by the FIs during the loan processing procedure, which together with the necessary documentation were often quickly approved. However, there was then a long period before the funds were made available and the projects commenced, which resulted in additional costs as the period for the firm quotations upon which the feasibility studies based their project costs had elapsed and new higher prices were being charged for capital equipment. Additionally, the four to five year loan period was found to be short for a new industry, especially in the agricultural sector.

Further, the currency in which loans were denominated was, usually US Dollars, while sales receipts from auctions were often in Dutch Guilders. This exposed the projects to currency fluctuations of up to 10%, generally in favour of the US Dollar. Growers then had to convert the Guilders into Dollars since the former are not legal tender in Eastern Africa, and finally into local currencies, paying a commission on each transaction.

Projects were also badly affected by the El Nino weather; greenhouses were severely damaged by very high winds and torrential rain. Repairing the greenhouses and replacing plants imposed additional costs not covered in the original proposals. The FIs, however, made no allowances for natural disasters and demanded strict adherence to the conditions and schedule of loan repayments.

From the results obtained, relationships between feasibility studies and actual project performance indicate that these relationships are strong between the following factors:

Crop yields, which determine an economical level of production per hectare of land; total sales, which determine an economical scale of land mass that would provide economies of scale; operating costs which highlight a cost level per hectare above which one cannot go without having

to impact adversely on the performance of a project; and product price, which results in either a profit or a loss.

The key determinants to profitability include price, volume, quality and controlled costs. Most of Eastern Africa's horticultural products go to the European market through the Dutch auctions where they fetch very low prices because of quality problems. Quality is affected by poor growing conditions, which include lack of adequate water for the plants, repeated incidences of disease outbreak, inadequate plant nutrients and poor post-harvest practices. These are issues that are purely of a management nature that translate into high production costs, low prices and low revenues

5.2 Recommendations

5.2.1 The banks, through some appropriate Government departments, should source long term credit to assist pioneers in the agricultural sector, to allow for natural disasters and for expansion, since many of the larger projects already have the infrastructure capable of supporting bigger operations.

5.2.2 The horticultural sector is encouraged to take weather insurance in order to improve the economic stability of weather sensitive enterprises through the Global Weather Risk Facility (GWRF) against crop risk failure owing to drought or severe weather. Weather hedges, or derivatives, protect a range of industries against weather-related damages, most notably in the agriculture and energy sectors. The hedges also help farmers manage their crop failure risk and make them more creditworthy – ***contacts: Aquila Incl.,*** through the International Finance

Corporation (IFC).

5.2.3 Growers need to find a way of selling their products directly into their markets because of the higher prices offered, instead of going through intermediaries or brokers whose interests do not necessarily reflect the expectations of the producers. This can be done by forming a selling organization that everyone subscribes to and one that can access the market directly.

5.2.4 Feasibility studies should be prepared by people with good experience and have an understanding of the local conditions. Further, FIs should use people with relevant expertise in the horticultural sector to countercheck the veracity of each proposal presented to them for financing. On the other hand, individuals who have the finance to invest in horticulture would need to have their proposals also evaluated very carefully before embarking on investing in this sector whose good performance is dependent on a number of factors some of which are natural events like weather patterns.

5.2.5 Market forecasts are the basis on which financial forecasts are developed. Those market forecasts should, therefore be guided in part by past trends: historical demand (quantities and prices), domestic sales and exports; historical supply (quantities and prices), domestic production and imports; reliability of historical market data; relationship of demand to macroeconomic variables (GDP, GDP per capita); relationship between product demand and product prices (elasticity); relationship between the cost of raw materials and product selling prices; cross-country factors (per capita incomes and consumption levels in other countries); regression analysis (determinant factors, correlation, confidence levels).

5.2.6 Operations management

Project sponsors must endeavour to identify qualified and effective managers for their projects in order to make money. A good project must have a management team that has the necessary skills, competence and depth and not a "*one-man show*"

5.2.7 Project management costs

While project management costs are related closely to the project implementation timing, they become much more significant if the project implementation is delayed.

5.2.8 Prices

A feasibility study will analyze the prevailing prices for the product in the target markets. But it is a folly to assume that current prices will prevail in the future without much more analysis.

5.3 Limitations of the study

The researcher encountered the following limitations while undertaking this study:

5.3.1 Difficulty in locating promoters of the failed projects and documents relating to the performance of these projects. While the various registrars of companies provided physical and telephone addresses, some of the companies had changed locations and telephone contacts making it difficult to locate them.

5.3.2 It was difficult to get appointments with the heads of some of the projects, especially the failed ones, and the officer next in line could only release information with approval of the head of

the company. This made the exercise very slow and time consuming.

5.3.3 The researcher found it quite time consuming and expensive to cover the Eastern Africa region, although it was interesting to note the similarities in the performance characteristics of horticultural projects in the various countries of the region.

5.4 Suggestions for further research

5.4.1 The researcher recommends for a study to be undertaken to establish why indigenous people inherently find it difficult to manage the implementation of horticultural projects to specification, within budget and on time, despite having a wealth of knowledge in the sector.

5.4.2 Given the existing infrastructure within the region, a study needs to be conducted to establish the most profitable way of pulling resources and marketing products directly into the consuming countries without having to go through intermediaries who adversely affect the profitability of the various companies.

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Appendix I

INTRODUCTION TO THE RESPONDENTS:

Elijah W Chindia,
University of Nairobi,
Faculty of Commerce,
P.O. Box 30197,
Nairobi.
Kenya.

Dear Sir/Madam,

I am a student in the Faculty of Commerce of the University of Nairobi, Kenya.
In partial fulfillment of the requirements of the degree of Master of Administration (MBA), I am conducting a study entitled ***"The predictive validity of feasibility studies in horticultural projects in Eastern Africa".***
Your firm has been selected to form part of this study. Consequently, I kindly seek your assistance in completing this questionnaire. Any information you might provide to make this study more revealing will indeed be appreciated.

The information and data required is needed for academic purposes only and will be treated in strict confidence.

Your cooperation in participating in this study will be highly appreciated.
Thanking you in anticipation.

Yours faithfully,

Signed: Elijah W Chindia
MBA Student

Signed: Prof. Isaac M Mbeche
Supervisor

Appendix II

HORTICULTURE

INFORMATION QUESTIONNAIRE

Instructions

Please fill in, circle or tick as appropriate.

Where the answer to a question is **"No"** please indicate why, in the space provided below.

PART I, Background Information

Please complete to identify basic information about the company and contact.

Company Name:	
Address:	
Industry Sector:	Flowers / Vegetables
Interview Contact:	
Contact position:	

PART II, Business Statistics

SECTION A Volumes

		Yes	No	Forecast (Kg)	Actual (Kg)
Q1	Are crop yields per hectare as predicted in the feasibility study?				
	Names of Crops:				
Q2	Are the sales volumes/year at levels indicated in the feasibility study?				
	Names of Crops:				

Comments, if any.....

.....

.....

SECTION B Prices

		Yes	No	Forecast ($/Kg)	Actual ($/Kg)
Q3	Are the selling prices same as indicated in the feasibility study?				
	Names of Crops:				

Comments, if any.....

.....

.....

SECTION C Revenues and profits

		Yes	No	Forecast ($/year)	Actual ($/year)
Q4	Do the revenues match the projections in the feasibility study ?				
Q5	Do the profits match projected levels ?				

Comments, if any.....

.....

.....

SECTION D Costs

		Yes	No	Forecast ($)	Actual ($)
Q6	Were project capital costs in line with those established in the feasibility study?				
Q7	Are operating costs per hectare or per Kg in line with those of the feasibility study?				
Q8	Are logistics costs per Kilogramme as predicted in the feasibility study?				

Comments, if any.....

.....

.....

Please tick (✓) to indicate cost pressures on your business.

	Strongly Agree	Agree	Disagree	Strongly Disagree
Our input costs are rising				
We cannot pass cost increases through to our customers				
The market price for our main product is falling				
Our costs are higher than those of our major competitors.				

PART III, project Information

SECTION A The project

		Yes	No	Forecast	Actual
Q9	Did the project implementation timing remain within estimate indicated in the feasibility study?				
Q10	Did the project size change from that indicated in the feasibility study?				

Comments, if any.....
.....
.....

SECTION B Marketing & Competition

		Yes	No	Forecast	Actual
Q11	Is the market for the products produced still available as indicated in the feasibility study?				
Q12	Has the competition changed from the predictions in the feasibility study?				

Comments, if any.....
.....
.....

SECTION C Growing conditions

		Yes	No	Forecast (m^3/ha)	Actual (m^3/ha)
Q13	Is the water consumption as predicted in the feasibility study?				

Comments, if any.....
.....
.....

SECTION D Crop husbandry

		Yes	No	Forecast	Actual
Q14	Is the price of mother plants consistent with projections? State values.				
Q15	Does the farm experience a number of crop diseases ? State number.				
Q16	Are the crop varieties the same as those recommended in the feasibility study? State number.				
Q17	Are the crops maturing within the number of days stated in the feasibility study? State number of days.				
Q18	Is the level of product wastage within the limits established in the feasibility study? State %ge loss.				

Comments, if any.....
.....
.....

SECTION E Management

Q19	Does management have previous start-up experience in horticultural projects?	Yes	No
Q20	Does the project sponsor spend much time on the project?	Yes	No

Comments, if any.....
.....
.....

SECTION F Employment levels

		Yes	No	Forecast	Actual
Q21	Is the number of employees consistent with the figure in the feasibility study?				
Q22	Is the number of managers as indicated in the feasibility study?				

Comments, if any.....
.....
.....

SECTION G Attitude

23. How important do you consider each of the following to be for success in a new venture in horticulture? Please circle.

		Least important		Important		Most important
Q23a	Previous start-up experience	1	2	3	4	5
Q23b	Previous professional experience	1	2	3	4	5
Q23c	A good team	1	2	3	4	5
Q23d	Commitment	1	2	3	4	5
Q23e	Luck	1	2	3	4	5
Q23f	Labour management	1	2	3	4	5
Q23g	Financial management	1	2	3	4	5

Appendix III

Data Findings

Frequency Table

country

	Frequency	Percent	Valid Percent	Cumulative Percent
kenya	28	50.0	50.0	50.0
tanzania	8	14.3	14.3	64.3
rwanda	1	1.8	1.8	66.1
uganda	17	30.4	30.4	96.4
burundi	2	3.6	3.6	100.0
Total	56	100.0	100.0	

Industry Sector

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	flowers	33	58.9	58.9	58.9
	vegetables	23	41.1	41.1	100.0
	Total	56	100.0	100.0	

Project overall performance

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	success	22	39.3	39.3	39.3
	failure	34	60.7	60.7	100.0
	Total	56	100.0	100.0	

Are the total crop yields in line with feasibility studies

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	1	1.8	1.8	1.8
	no	55	98.2	98.2	100.0
	Total	56	100.0	100.0	

Are the total sales in line w ith feasibility studies

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	1	1.8	1.8	1.8
	no	54	96.4	98.2	100.0
	Total	55	98.2	100.0	
Missing	System	1	1.8		
Total		56	100.0		

are the total selling prices same as indicated in the feasibility studies

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	1	1.8	1.8	1.8
	no	55	98.2	98.2	100.0
	Total	56	100.0	100.0	

Project Capital Costs inline w ith Feasibility Studies

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	26	46.4	49.1	49.1
	no	27	48.2	50.9	100.0
	Total	53	94.6	100.0	
Missing	System	3	5.4		
Total		56	100.0		

Operating cost per ha in line w ith feasibility studies

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	4	7.1	7.3	7.3
	no	51	91.1	92.7	100.0
	Total	55	98.2	100.0	
Missing	System	1	1.8		
Total		56	100.0		

Logistic Costs/kilogram inline w ith Feasibility Studies

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no	55	98.2	100.0	100.0
Missing	System	1	1.8		
Total		56	100.0		

Do profit levels match the projected levels

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	6	10.7	10.7	10.7
	no	50	89.3	89.3	100.0
	Total	56	100.0	100.0	

project size in line with feasibility studies

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	10	17.9	17.9	17.9
	no	46	82.1	82.1	100.0
	Total	56	100.0	100.0	

water consumption in line with feasibility studies

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	10	17.9	18.5	18.5
	no	44	78.6	81.5	100.0
	Total	54	96.4	100.0	
Missing	System	2	3.6		
Total		56	100.0		

Disease incidence in the farms

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	53	94.6	94.6	94.6
	no	3	5.4	5.4	100.0
	Total	56	100.0	100.0	

crop varieties in line with feasibility studies

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	52	92.9	92.9	92.9
	no	4	7.1	7.1	100.0
	Total	56	100.0	100.0	

crop maturity in line with feasibility studies

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	15	26.8	26.8	26.8
	no	41	73.2	73.2	100.0
	Total	56	100.0	100.0	

product wastage in line with feasibility studies

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	12	21.4	22.2	22.2
	no	42	75.0	77.8	100.0
	Total	54	96.4	100.0	
Missing	System	2	3.6		
Total		56	100.0		

employment levels in line with feasibility studies

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	16	28.6	28.6	28.6
	no	40	71.4	71.4	100.0
	Total	56	100.0	100.0	

project sponsor spending time on the farm

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	16	28.6	28.6	28.6
	no	40	71.4	71.4	100.0
	Total	56	100.0	100.0	

previous start-up experience

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	important	2	3.6	3.6	3.6
	very important	20	35.7	35.7	39.3
	most important	34	60.7	60.7	100.0
	Total	56	100.0	100.0	

previuos proffessional experience

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	important	1	1.8	1.8	1.8
	very important	20	35.7	35.7	37.5
	most important	35	62.5	62.5	100.0
	Total	56	100.0	100.0	

a good team

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	important	1	1.8	1.8	1.8
	very important	43	76.8	76.8	78.6
	most important	12	21.4	21.4	100.0
	Total	56	100.0	100.0	

commitment

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	very important	18	32.1	32.7	32.7
	most important	37	66.1	67.3	100.0
	Total	55	98.2	100.0	
Missing	System	1	1.8		
Total		56	100.0		

luck

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	least important	47	83.9	85.5	85.5
	somewhat important	7	12.5	12.7	98.2
	important	1	1.8	1.8	100.0
	Total	55	98.2	100.0	
Missing	System	1	1.8		
Total		56	100.0		

labour management

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	important	2	3.6	3.6	3.6
	very important	50	89.3	90.9	94.5
	most important	3	5.4	5.5	100.0
	Total	55	98.2	100.0	
Missing	System	1	1.8		
Total		56	100.0		

financial management

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	somewhat important	2	3.6	3.6	3.6
	important	37	66.1	66.1	69.6
	very important	15	26.8	26.8	96.4
	most important	2	3.6	3.6	100.0
	Total	56	100.0	100.0	

Forecast

Descriptive Statistics

	N	Range	Mean		Std.	Variance
	Statistic	Statistic	Statistic	Std. Error	Statistic	Statistic
Total sales forecast	55	332999.1	16581.41	9367.4516	69470.88	4.8E+09
selling price forecast	56	1065.69	24.4502	18.9558	141.8521	20122.03
Project cost forecast	53	2029000	1255437	95,166.4117	692821.9	4.8E+11
Operating cost/ha forecast	54	395050.0	41029.22	9750.8534	71653.85	5.1E+09
Logistic Costs/kilogram forecast	55	.60	1.5918	1.449E-02	.1075	1.155E-02
profit levels forecast	55	3921243	1324669	138726.361	1028822	1.1E+12
project size forecast	56	98.00	22.9468	3.3431	25.0175	625.873
water consumption forecast	52	25.00	46.0288	.8743	6.3047	39.749
crop varieties forecast	53	5.00	3.3774	.1118	.8140	.663
crop varieties forecast	55	105.00	57.2909	2.6012	19.2908	372.136
product wastage forecast	53	2.00	2.8962	5.771E-02	.4201	.177
employment forecast	55	344.00	140.9273	9.2928	68.9175	4749.624

Actual

Descriptive Statistics

	N	Range	Mean		Std.	Variance
	Statistic	Statistic	Statistic	Std. Error	Statistic	Statistic
Total crop yields actual	56	15047.61	1074.3136	377.2974	2823.4354	7971787
Total sales actual	55	254562.55	11666.33	6694.8198	49650.11	2.5E+09
selling price actual	56	11.95	3.1775	.4251	3.1813	10.120
Project cost actual	53	2.3E+07	1763264	418885.7	3049534	9.3E+12
Operating cost/ha actual	54	552290.00	51340.36	12388.75	91038.36	8.3E+09
Logistic Costs/kilogram actual	55	.60	1.9317	1.345E-02	9.974E-02	9.947E-03
profit levels actual	55	3452933	385870.2	81860.30	607092.2	3.7E+11
project size actual	56	97.00	23.9307	3.4204	25.5957	655.140
water consumption actual	50	32.50	40.1040	1.1776	8.3271	69.341
Disease incidence actual	55	4.00	4.2545	.1223	.9071	.823
crop varieties actual	53	5.00	3.5472	.1335	.9720	.945
crop varieties actual	55	131.00	64.9273	3.1396	23.2838	542.134
product wastage actual	53	10.00	7.3377	.3427	2.4952	6.226
employment actual	55	1196.00	189.8545	22.0066	163.2053	26635.978

Forecast

Descriptive Statistics

country		N	Range	Mean		Std.	Variance
		Statistic	Statistic	Statistic	Std. Error	Statistic	Statistic
kenya	Total sales forecast	27	332997.2	12498.09	12327.1074	64053.53	4.1E+09
	selling price forecast	28	1065.69	42.2007	37.9284	200.6980	40279.68
	Project cost forecast	26	2029000	1236284	143,142.5909	729886.9	5.3E+11
	Operating cost/ha forecast	27	394250.0	38450.78	14180.4737	73683.90	5.4E+09
	Logistic Costs/kilogram forecast	27	.60	1.5907	2.068E-02	.1075	1.155E-02
	profit levels forecast	27	3921243	1552638	223599.7097	1161858	1.3E+12
	project size forecast	28	97.00	22.8400	5.0790	26.8757	722.304
	water consumption forecast	24	15.00	47.9583	.8938	4.3786	19.172
	crop varieties forecast	27	3.00	3.2593	.1653	.8590	.738
	crop varieties forecast	28	80.00	59.2500	3.5696	18.8888	356.787
	product wastage forecast	26	1.50	2.9808	7.061E-02	.3600	.130
	employment forecast	27	344.00	135.7778	14.0066	72.7807	5297.026
	Valid N (listwise)	17					
tanzania	Total sales forecast	8	728.99	252.6013	120.0205	339.4692	115239.3
	selling price forecast	8	11.35	6.4063	1.7586	4.9740	24.741
	Project cost forecast	8	1850000	1127751	217,902.7835	616322.1	3.8E+11
	Operating cost/ha forecast	7	277375.0	87879.71	48497.3056	128311.8	1.6E+10
	Logistic Costs/kilogram forecast	8	.15	1.5563	2.745E-02	7.763E-02	6.027E-03
	profit levels forecast	8	2400000	1530025	230360.1968	651557.0	4.2E+11
	project size forecast	8	59.00	22.3750	9.2117	26.0545	678.839
	water consumption forecast	8	20.00	43.1250	3.3987	9.6130	92.411
	crop varieties forecast	7	4.00	3.5714	.4809	1.2724	1.619
	crop varieties forecast	8	5.00	48.7500	.8183	2.3146	5.357
	product wastage forecast	8	2.00	2.7500	.2500	.7071	.500
	employment forecast	8	220.00	144.5000	22.8340	64.5844	4171.143
	Valid N (listwise)	6					
rwanda	Total sales forecast	1	.00	9.6000	.	.	.
	selling price forecast	1	.00	1.0800	.	.	.
	Project cost forecast	1	.00	2200000	.	.	.
	Operating cost/ha forecast	1	.00	43330.00	.	.	.
	Logistic Costs/kilogram forecast	1	.00	1.2000	.	.	.
	profit levels forecast	1	.00	444000.0	.	.	.
	project size forecast	1	.00	6.0000	.	.	.
	water consumption forecast	1	.00	50.0000	.	.	.
	crop varieties forecast	1	.00	4.0000	.	.	.
	crop varieties forecast	1	.00	50.0000	.	.	.
	product wastage forecast	1	.00	3.0000	.	.	.
	employment forecast	1	.00	104.0000	.	.	.
	Valid N (listwise)	1					
uganda	Total sales forecast	17	325999.1	33560.16	23143.9222	95424.84	9.1E+09
	selling price forecast	17	36.39	6.9212	2.1851	9.0094	81.170
	Project cost forecast	16	1781000	1243878	178,016.5380	712066.2	5.1E+11
	Operating cost/ha forecast	17	71050.00	29268.24	6747.0517	27818.81	7.7E+08
	Logistic Costs/kilogram forecast	17	.20	1.6176	1.482E-02	6.109E-02	3.732E-03
	profit levels forecast	17	2945855	835486.4	172078.5906	709498.2	5.0E+11
	project size forecast	17	47.00	18.7647	3.9968	16.4793	271.566
	water consumption forecast	17	25.00	44.5588	1.5787	6.5093	42.371
	crop varieties forecast	16	1.00	3.5000	.1291	.5164	.267
	crop varieties forecast	16	105.00	58.7500	6.3282	25.3127	640.733
	product wastage forecast	17	1.00	2.8824	6.819E-02	.2811	7.904E-02
	employment forecast	17	221.00	135.5882	14.5693	60.0709	3608.507
	Valid N (listwise)	14					
burundi	Total sales forecast	2	1164.00	988.0000	582.0000	823.0723	677448.0
	selling price forecast	2	2.00	8.8000	1.0000	1.4142	2.000
	Project cost forecast	2	329275.0	1635363	164,637.5000	232832.6	5.4E+10
	Operating cost/ha forecast	2	9519.00	10679.50	4759.5000	6730.949	4.5E+07
	Logistic Costs/kilogram forecast	2	.15	1.7250	7.500E-02	.1061	1.125E-02
	profit levels forecast	2	2634975	2024033	1317487.5000	1863209	3.5E+12
	project size forecast	2	36.50	70.7500	18.2500	25.8094	666.125
	water consumption forecast	2	10.00	45.0000	5.0000	7.0711	50.000
	crop varieties forecast	2	.00	3.0000	.0000	.0000	.000
	crop varieties forecast	2	8.00	56.0000	4.0000	5.6569	32.000
	product wastage forecast	1	.00	2.0000	.	.	.
	employment forecast	2	40.00	260.0000	20.0000	28.2843	800.000
	Valid N (listwise)	1					

Descriptive Statistics

country		N	Range	Mean		Std.	Variance
		Statistic	Statistic	Statistic	Std. Error	Statistic	Statistic
kenya	Total crop yields actual	28	7189.40	613.1743	250.2432	1324.1623	1753406
	Total sales actual	27	254561.15	9524.7022	9424.5993	48971.65	2.4E+09
	selling price actual	28	11.55	2.8779	.6083	3.2186	10.359
	Project cost actual	26	2.3E+07	2132837	844510.1	4306174	1.9E+13
	Operating cost/ha actual	27	551331.00	49633.70	19866.59	103229.8	1.1E+10
	Logistic Costs/kilogram actual	27	.50	1.9246	1.879E-02	9.762E-02	9.529E-03
	profit levels actual	27	3446848	550568.1	145515.8	756122.3	5.7E+11
	project size actual	28	97.00	24.4150	5.3289	28.1976	795.107
	water consumption actual	22	25.00	39.4773	1.7077	8.0096	64.154
	Disease incidence actual	28	4.00	4.1786	.1928	1.0203	1.041
	crop varieties actual	27	4.00	3.2963	.1755	.9121	.832
	crop varieties actual	28	112.50	67.2500	4.3145	22.8301	521.213
	product wastage actual	26	10.00	7.6538	.5875	2.9959	8.975
	employment actual	27	1169.00	214.7778	42.3098	219.8483	48333.256
	Valid N (listwise)	15					
tanzania	Total crop yields actual	8	8440.95	1405.4938	1014.5829	2869.6737	8235027
	Total sales actual	8	562.87	163.8806	79.8960	225.9801	51067.006
	selling price actual	8	8.47	3.8620	1.3244	3.7459	14.032
	Project cost actual	8	1779000	1377893	227292.1	642879.1	4.1E+11
	Operating cost/ha actual	7	307682.00	96798.57	52793.30	139677.9	2.0E+10
	Logistic Costs/kilogram actual	8	.30	1.8688	3.399E-02	9.613E-02	9.241E-03
	profit levels actual	8	1928700	383326.0	226894.9	641755.8	4.1E+11
	project size actual	8	58.00	23.7500	8.8515	25.0357	626.786
	water consumption actual	8	27.50	45.1250	3.3498	9.4746	89.768
	Disease incidence actual	8	1.00	4.2500	.1637	.4629	.214
	crop varieties actual	7	3.00	4.7143	.5216	1.3801	1.905
	crop varieties actual	8	19.00	56.5000	2.4568	6.9488	48.286
	product wastage actual	8	6.50	6.7500	.8018	2.2678	5.143
	employment actual	8	283.00	161.8750	29.3923	83.1340	6911.268
	Valid N (listwise)	6					
rwanda	Total crop yields actual	1	.00	658.0000	.	.	.
	Total sales actual	1	.00	9.7600	.	.	.
	selling price actual	1	.00	1.0200	.	.	.
	Project cost actual	1	.00	2200000	.	.	.
	Operating cost/ha actual	1	.00	23000.00	.	.	.
	Logistic Costs/kilogram actual	1	.00	1.9000	.	.	.
	profit levels actual	1	.00	252000.0	.	.	.
	project size actual	1	.00	6.0000	.	.	.
	water consumption actual	1	.00	50.0000	.	.	.
	Disease incidence actual	1	.00	4.0000	.	.	.
	crop varieties actual	1	.00	4.0000	.	.	.
	crop varieties actual	1	.00	46.0000	.	.	.
	product wastage actual	1	.00	4.0000	.	.	.
	employment actual	1	.00	141.0000	.	.	.
	Valid N (listwise)	1					
uganda	Total crop yields actual	17	15047.61	1826.7018	1075.4663	4434.2612	2.0E+07
	Total sales actual	17	231599.55	22475.92	15719.34	64812.49	4.2E+09
	selling price actual	17	7.45	3.1020	.7342	3.0273	9.164
	Project cost actual	16	1986973	1323495	194495.0	777980.1	6.1E+11
	Operating cost/ha actual	17	104790.00	41525.32	9614.3812	39641.11	1.6E+09
	Logistic Costs/kilogram actual	17	.25	1.9518	1.326E-02	5.468E-02	2.990E-03
	profit levels actual	17	439119.00	151189.6	33926.55	139882.7	2.0E+10
	project size actual	17	47.00	18.7647	3.9968	16.4793	271.566
	water consumption actual	17	20.00	37.6882	1.5935	6.5700	43.165
	Disease incidence actual	16	3.00	4.2500	.2141	.8563	.733
	crop varieties actual	16	1.00	3.5000	.1291	.5164	.267
	crop varieties actual	16	131.00	65.7500	7.5225	30.0899	905.400
	product wastage actual	17	6.50	7.3176	.4150	1.7111	2.928
	employment actual	17	220.00	151.8235	13.9514	57.5231	3308.904
	Valid N (listwise)	14					
burundi	Total crop yields actual	2	10.20	18.4000	5.1000	7.2125	52.020
	Total sales actual	2	530.00	535.0000	265.0000	374.7666	140450.0
	selling price actual	2	1.31	6.3550	.6550	.9263	.858
	Project cost actual	2	99861.00	1800070	49930.50	70612.39	5.0E+09
	Operating cost/ha actual	2	10071.00	12874.50	5035.5000	7121.2724	5.1E+07
	Logistic Costs/kilogram actual	2	.35	2.1250	.1750	.2475	6.125E-02
	profit levels actual	2	466835.50	234345.3	233417.8	330102.5	1.1E+11
	project size actual	2	36.50	70.7500	18.2500	25.8094	666.125
	water consumption actual	2	25.00	42.5000	12.5000	17.6777	312.500
	Disease incidence actual	2	1.00	5.5000	.5000	.7071	.500
	crop varieties actual	2	.00	3.0000	.0000	.0000	.000
	crop varieties actual	2	18.00	69.0000	9.0000	12.7279	162.000
	product wastage actual	1	.00	7.5000	.	.	.
	employment actual	2	6.00	313.0000	3.0000	4.2426	18.000
	Valid N (listwise)	1					

Appendix IV

Explanations of some of the statistical methods used

Wilcoxon Signed Rank Test

Existing literature indicates that in testing for independence of two correlated variables, the T-test is the most widely used technique. However, correlated-samples t-test makes certain assumptions and can be meaningfully applied only insofar as these assumptions are met, namely,

- that the scale of measurement for variable A and B has the properties of an equal-interval scale;
- that the differences between the paired values of variable A and B have been randomly drawn from the source population;
- that the source population from which these differences have been drawn can be reasonably expected to have a normal distribution.

If there is one or more of these assumptions that cannot reasonably suppose to be satisfied, then the t-test for correlated samples cannot be legitimately applied.

Of all the correlated samples, situations that run afoul of these assumptions are commonly those in which the scale of measurement for variable A and B cannot be assumed to have the properties of an equal-interval scale. The most obvious example would be the case in which the measures for variable A and B derive from some sort of rating scale. In any event, when the data within two correlated samples fail to meet one or

more of the assumptions of the t-test, an appropriate non-parametric alternative can often be found in the Wilcoxon Signed-Rank Test.

The Wilcoxon Signed-Rank Test is a nonparametric procedure used with two related variables to test the hypothesis that the two variables have the same distribution. It makes no assumptions about the shapes of the distributions of the two variables. This test takes into account information about the magnitude of differences within pairs and gives more weight to pairs that show large differences than to pairs that show small differences. The test statistic is based on the ranks of the absolute values of the differences between the two variables.

Simple Linear Regression Analysis

Linear Regression estimates the coefficients of the linear equation, involving one or more independent variables, that best predict the value of the dependent variable. In this case two variables are related to determine the nature of the linear relationship. As such two variables are needed, the dependent and the independent variable. In essence simple linear regression defines the linear nature of the changes in the independent variable as it affects the changes in the dependent variable.

The testing of hypothesis in this case is based on the derived coefficients. Other statistics that can be calculated include the Pearson's product moment correlation. The correlation coefficient estimates the strength of the relationship between the observed and predicted values of the dependent variable. It ranges in value from -1 to +1. A small value indicates that there is little or no linear relationship between the dependent and the independent variable. A negative value indicates that as the independent value increases the dependent variable is decreasing. A positive relationship also indicates that as the dependent variable increases the independent variable

increases also. Another statistic is the coefficient of determination, which is the square of the coefficient of correlation. This estimates the explanatory power of the estimated linear model based on the Ordinary Least Squares (OLS) technique.