

**EFFECTS OF FINANCIAL RISK MANAGEMENT STRATEGIES
ON THE PERFORMANCE OF HORTICULTURE FIRMS**

By

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Declaration

This independent study paper is my original work and has not been presented for a degree at the University of Nairobi or any other university.

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This independent study paper has been submitted for examination with my approval as the University Supervisor.

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Dr. Julius M Malombe

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Abstract

Financial risk management can help horticulture firms to stabilize cash flows, reduce the risk of insolvency, manage taxes better, and focus more effectively on their primary businesses. Effective risk management allows corporations to weather difficult situations and be able to survive the fall-out of any losses or scandals. The objective of financial risk management is to reduce chances of a vulnerable situation such as variability of the net cash flows and the inability to meet prior claims on the business with the cash generated by the firm, while achieving the highest possible returns for the shareholders. The inability of the management to identify, measure, prioritize, treat and monitor risks that affect horticulture business on a timely basis is the key challenge which the management needs to address.

The study reviewed literature on evolution of financial risk management to trace the origin of risk management and determine financial risk management strategies used to manage risk. A detailed analysis of sources and financial risk management strategies utilized by horticulture firms were examined to evaluate their effectiveness in minimizing the variability of net cashflows to farmers. Empirical studies that focus on effects of financial risk management strategies were reviewed to establish those strategies which influence performance and value of horticulture firm. Studies on risk management reforms and practices in horticulture business were reviewed to evaluate their effects in reducing cash flow variability.

Five key findings emerge from the study. *Firstly*, horticulture firms employ a range of financial risk management strategies that include insurance, hedging, and diversification and the use of commodity linked bonds to enhance firm's performance since there is no single strategy which can be utilized to manage all horticulture risks. *Secondly*, Literature review indicates that a number of authors have adopted risk management process models that have, three, five or seven steps. However, these varied steps can be summarized as risk identification, assessment, prioritization, monitoring and control. *Thirdly*, horticulture firms that adopt and implement financial risk management strategies improve their performance in terms of increased sales, earnings, profit and market share. The improvement in firm performance is attained particularly when there is strategic fit and alignment between entrepreneurial culture, organizational strategy, management styles and various contextual factors. *Fourthly*, most of the existing risk management models are not appropriately aligned to the unique, dynamic and risky conditions related to horticulture farming and business. *Lastly*, the impact of the growth of exports of cut flowers on the performance of horticulture firms in developing countries has not received much attention from researchers.

Dedication

To my parents for instilling in me virtues of resilience and hard work early in my life. You believed in me even when I doubted my abilities. This work is an indelible mark to your contribution in my life.

To my wife and children, this far we have come. This work would not have seen the light of day in the absence of your moral and financial support. You understood me when I could not express myself. I say thank you.

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List of Abbreviations

EMS.	-	Environmental Management System
EWRM	-	Enterprise Wide Risk Management
RMIS	-	Risk Management Information System
EU	-	European Union
US	-	United States
CAP	-	Common Agriculture Policy
IFS	-	International Financial Institution
EVT	-	Extreme Value Theory
NGO	-	Non-Governmental Organization
LRP	-	Livestock Risk Protection
HCD	-	Horticulture Development Authority
CLB	-	Commodity Linked Bonds
PPO	-	Post Production Organization
SOPs	-	Standard Operating Procedures
MPCI	-	Multiple Peril Crop Insurance
IFS	-	International Financial Statistics
RMA	-	Risk Management Authority
FAO	-	Food and Agriculture Organization
MFIs	-	Micro Finance Institutions
AGRI	-	Adjusted Gross Revenue Insurance
UNCTAD	-	United Nations Conference on Trade and Agriculture Development
CAST	-	Council for Agriculture Science and Technology
EMA	-	Environmental Management Authority
BSC	-	Balanced Scorecard
FEPEX	-	Federation of Fruit &Vegetable Producers and Exporters

CHAPTER ONE

1.0 INTRODUCTION

1.1 Background.

Financial risk management is crucial in a firm since it can enhance value by managing risk when it cost less for the firm to manage risk directly than to pay the capital market to bear them (Stulz, 1985). As a result, well designed risk management activities can be undertaken by management to improve shareholders wealth. Financial risk management aims at minimizing the risk of loss from unexpected changes in price of currencies, interest rates, commodities and equities. In the context of a firm operating internationally, financial risk management also contains an element of political, legal and cultural risk. These attributes of risk comprise exposure to uncertainty in the outcomes of business transactions and asset transfer that comes with most international business operations. Intelligent and effective risk management is necessary to minimize against perceived as well as actual risks, in fact the perceived risks may harm the company more than actual risks. Employing trusted risk management practices and disclosing its risk management practices and predictions, the firm to a large extent controls how firm's value is affected by changes in interest rates, foreign currency, exchanges rates, and commodity prices.

Success in business, to a certain degree, requires owners and managers to take calculated risks. The most successful business is usually managed by people who know when to push forward and when to pull back, when to buy and when to sell, when to stand firm and when to compromise. The successful firm is managed by people who understand what risk in business is, and how this risk should be managed and mitigated. Risk is an undeniable reality of doing business today, whether domestically or globally. A successful entrepreneur does not fear risk, but strives to understand it, to manage it, even to take advantage of it. As risk management tools and techniques become more and more complex, companies require the services of a risk management specialist.

Unfortunately, as the world of business becomes increasingly borderless, risk management, likewise becomes, borderless, and thus more complicated. Risk management strategies that make sense in a domestic environment do not necessarily apply in the international arena, where business is exposed to the additional risks associated with currency prices, exchange rates, and interest rates, as well as more intangible issues of political and cultural risk. While

not necessarily absent in the domestic arena, each of these issues becomes both more complex and more crucial once a company is active internationally.

Intelligent risk management can help a company stabilize cash flows, reduce its risk of insolvency, manage taxes better, and focus more effectively and efficiently on its primary business risks. Effective risk management allows corporations and their lenders to weather difficult situations and be able to survive the fall-out of any losses or corporate accounting scandals (Adler, 2002). Intelligent risk management at the level of international and multinational business operations must take into account a myriad of factors, from the technical and the theoretical to the political and practical.

Farmer's face a range of risks which are unique to horticulture. Prices of raw materials are subject to much greater volatility than for most goods and services in the economy. Production systems are at the mercy of weather conditions and both plant and animal can be subject to health problems that impact on both the quantity and the quality of the output produced. The exchange rate will play an important role in horticulture both directly and indirectly in influencing output and input prices payments to farmers which are fixed in euros. Exchange rate risk is high since farm incomes are extremely sensitive to the level of sterling, especially against the euro. Farm enterprises fully exposed to global commodity markets, face greater risks regarding revenue than those receiving a proportion from Common Agricultural Policy (CAP) support payments. Perishability of horticulture produce has differential impact on risk according to production system. Where a commodity can be stored for significant period of time before sale, the risks are lower in comparison with where the opportunity to manage marketing window is more limited.

Many developing countries rely on export of a small number of commodities for a large share of their export revenue. In many cases, they depend on one single commodity. According to FAO (2003), as many as 43 developing countries depend on only one horticulture product for more than 20 percent of their total export. High dependence on one or few export commodities leaves these countries extremely vulnerable to changing market conditions. The fluctuations in export earnings of many countries are often seen as the causes of boom and slumps in the income and unemployment (Chaudhuri, 2001), booms do not translate into sustainable increases in income whereas crashes produce devastating and long lasting declines. According to UNCTAD (2003), volatility in commodity prices are caused by supply shocks. Step or

prolonged slumps in commodity prices can be very costly for developing countries, making debt repayment difficult and more expensive. Furthermore, volatility in commodity prices also aggravates macroeconomic management, frustrates investments and increases uncertainty in exchange rates, investment returns and import capacity.

The World Bank (1999) showed that the prices of many commodities fluctuate from below 50 percent to above 150 percent of their average prices during 1983-1998. Therefore, high concentration of Africa export item would amount to large fluctuation in total export earning (IMF, 2003). The best way to deal with shocks is to reduce the vulnerability of the firm and economy through policy reforms, and mitigate their impact when they occur by implementing carefully designed risk management strategies. The risk environment of farmers is changing. This is caused partly by a changing role of the government, that is less intervention on the one hand and more regulation on the other and partly by an increasing industrialization of agriculture. The changed environment includes increased price risks, at least for European farm. Changes also occur in relation to risks of catastrophic events like floods. In the past, farmers have often been compensated for such losses by governments but now there is increasing pressure to find private-market solutions.

Given the changing risk environment, farmers need to find ways to cope with the new risks they are confronted with. The problem arises from the fact that many managers tend to accommodate, rather than actively manage the various sources of risk that they face. Specifically, there are at least five major reasons why firms actively manage risks, the existence of non-tradable risks, mitigation of financial distress and the cost of bankruptcy, reduction of tax burden, increased debt capacity and avoidance of external financing. Farmers' perceptions and responses to risk are important in understanding their risk behavior. In the literature much normative analysis has been done to show how farmers should behave under uncertainty (Hardaker et al., 2004). Surprisingly, however, less work has been done to examine how farmers perceive risk and manage it in practice.

1.2 Conceptual Basis.

Horticulture is the practice and science of cultivating gardens for growth of flowers, fruits or vegetables while risk is the quantifiable likelihood of loss or less than expected returns. While financial risk refers to the risks related to the way a farm is financed, the classification of Hardaker et al. (1997) who differentiated between business risks and financial risks can be used

for most horticultural risks. Business risks include production risks, which are related to the unpredictable nature of the weather and to the uncertain performance of crops and price risks, which refer to uncertainty of prices of farm inputs and outputs. Business risks furthermore include personal risks, like illness or death of people who operate the farm, and institutional risks, which originate from uncertainty about the impact of government policies on firm profits.

According to Gabriel et al. (1980) risk can be classified as business or financial risk. Business risk incorporates production risk which impacts on yields and market risk which impacts on input and output prices. This business risk is reflected in the variability of the net operating income of the business. Financial risk is reflected in the added variability of the net cash flows to the owners of equity. It essentially represents the risk of being unable to meet prior claims on the business with cash generated by the firm. Debt servicing commitments usually account for a large component of these prior claims. The classification of risk into business risk and financial risk allows the impact of each of these sources of risk on the firm operation to be clearly monitored by observing their influence on yield, output prices and input costs, and residual cash flows to equity owners. However, it may obscure the subtle forces, which impact on these yields, prices and residual cash flows.

Sonka and Patrick (1984) identified three additional categories of business risk, these being technological, legal/social and human. They argue that risk may be termed technological if it is possible that current investment in assets may be offset by technical improvements in the future or if new technologies impact on the profitability of farming systems. More recently, Anderson (1994) argues in similar vein that any categorization of risk should include social, health and policy risks as well as the traditional yield and price risks which are so familiar to agricultural economist. If the net operating income of a firm business consistently fails to exceed prior commitments, then the survival of the business is threatened. The objective of risk management is to reduce the chances of a vulnerable situation such as this while achieving the highest possible returns for the owners of equity consistent with their attitudes to risk.

Strategies to manage risk can have two broad uses. There are those strategies that can be used to control risk exposure, and those, which aim to control the impact of risk on the firm business (Jolly, 1983). Business risk exposure can be controlled by manipulating the probability distributions facing the firm business so that variability is reduced. This can be done by either smoothing out yields and prices or by cutting off troughs in these. Some of risk responses,

which smooth out yields and prices, are enterprise selection, enterprise diversification and marketing strategies which smooth out price fluctuations. Insurance is an example of a strategy which can be used to cut off troughs. Controlling the impact of risk on the firm business does not influence the underlying distributions faced by the business. Strategies in this category impact on the capacity of the firm business to absorb unfavorable downturns. They could include raising the level of yields and prices so that the level of net operating income is higher, as well as strategies for alleviating financial risk, such as lowering leverage, matching debt repayment to income generation and maintaining cash or credit reserves.

Risk management strategies can be classified as production, marketing or financial and a large number of possibilities within each of these categories are cited by Barry and Fraser (1976) and Sonka and Patrick (1984). Although a range of risk-reducing strategies are possible in principle, the numbers which are actually used by individual farmers in practice is likely to be much more limited. Strategies may be inappropriate because of farm size, type, location or ownership structure. In this study, the strategies for managing risk considered most important by different groups of farmers and growers will be identified. Risk management is the systematic application of management policies, procedures and practices to the tasks of identifying, analyzing, assessing, treating and monitoring risk (Malcolm, 1992).

One of the most fundamental challenges companies face is to find out what gives rise to competitive performance and how it can be sustained (Srivastava et al., 2001). As the rapid increases in business globalization and free trade continue to increase business competition the importance of identifying and understanding strategies likely to produce sustained competitive advantage, growth, and enhanced company financial performance have become even more important to both the managers and shareholders (Tonge et al., 1998).

Kedia (1986) defined performance as the degree to which a system or a component accomplishes its designated function within a given constraints. According to Mian (1996) performance is the act of doing something successfully using knowledge as distinguished from merely possessing it. For the purpose of this study performance is used to mean the results of activities of an organization over a given period of time as measured by growth in market share and profitability.

Horticultural firms' faces challenges which include market saturation and competition from international horticulture firms confirming the importance of sustained competitive performance in today's marketplace. Previous studies utilized different approaches and theoretical bases such as the Balanced Scorecard (BSC), Profit and market share of the firm (Barney, 1991) to assess company performance and to examine the contingent relationship between the financial risk management strategies and the firm's performance in order to align the firm both internally and externally. Therefore, managers focus on identifying financial risk management strategies that can be utilized to take advantage of market opportunities while avoiding threats and promoting performance.

1.3 Statement of the Problem.

The performance and value of horticulture business firms is undermined by poor financial risk management practices. Horticulture firms have lost a lot of income due to risk originating from unexpected changes in price of currencies, interest rates and commodities. Furthermore, volatility in commodity price aggravates macroeconomic management, frustrates investment and increases uncertainty in exchange rates and, investment returns.

Invariably, the problem arises from the inability of management to identify measure, prioritize, treat and monitor risks that affect horticulture business on a timely basis. Even when risks are identified, there are weaknesses in risk control and continuous monitoring given the dynamic nature of horticulture business environment. The principal challenge usually lays on the design and implementation of appropriate financial risk management strategies to actively manage the various sources of risk.

This study investigates risks that are faced by horticulture firms and strategies they utilize in identification, measurement, controlling and monitoring risk to enhance firm's performance. In this respect, the study seeks to address the following questions. :-

- (i) What are the current financial risk management practices and strategies that horticulture firms employ?
- (ii) What is the relationship between the implementation of financial risk management strategies and the value or performance of the firm?
- (iii) What kind of financial risk management reforms should horticulture firms adopt to minimize their risk exposure?

1.4 Significance of the Study

The main objective of the study is therefore to take stock or review the existing body of knowledge, distill the main policy issues and findings and to identify the knowledge gaps. The study will provide some insight into financial risks involved in horticulture industry as well as examining the tools/instruments, which are used to manage financial risks. The study is important to farmers, exporters, managers and investors since they need reliable information on risk measures to direct capital to activities with best risk/reward ratios. They also need estimates of the size of potential losses to stay within limits imposed by readily available liquidity, by creditors, customers and regulators.

1.5 Organization of the Paper

This paper is structured into four main parts as introduction, general literature review, empirical literature review as well as findings. Chapter one, as the introductory chapter gives a brief overview of the pertinent literature to various components of the conceptual basis that informs the study. This section gives the background of the study by exploring the basic tenets underlying the main themes of the study. Additionally, the chapter identifies the research problem and outlines the objective and significant of the study.

Extensive review of the theoretical literature underpinning the major component of the study is presented in chapter two. A substantive review of each of the key variables is presented including origin, strategies, models and the theories of financial risk management. Chapter three reviews the empirical literature pertaining the financial risk management in horticulture firms. The findings, conclusion and recommendation are presented in chapter four together with a discussion of knowledge gaps identified in the study. Finally, future direction of research and opportunities for further related research to the study is present in this section.

CHAPTER TWO

2.0. GENERAL AND THEORETICAL LITERATURE REVIEW

2.1 Introduction.

This chapter takes abroad orientation towards financial risk management strategies in horticulture firm and a review of the theories which inform the area of study. The section also reviews a variety of risk management practices, models and areas of financial analysis against the backdrop of volatile global market in which financial risk management must take into account. A review of the latest literature and research pertinent to financial risk management will be provided in this section.

2.2. The Financial Risk Management Perspectives and Evolution

Money and financial interests drove early thinking on the topic of risk. Aristotle, in his treatise Politics, discusses the concept of options, a financial instrument that allows individuals to buy and sell goods from one another at pre-arranged prices. Options contributed to the dramatic "tulipomania" frenzy in Holland in the 1630s, people purchased and sold paper options instead of the actual tulip bulbs. Options were traded in the U.S. in the 1790s in what would later become the New York Stock Exchange.

Futures were in use in Europe since medieval times, this were another type of financial instrument that helped reduce risk for farmers and commodity buyers. In 1865, futures on products such as grain, copper, and pork bellies were sold on the Chicago board of trade. Insurance, a financial tool that reduces risk for a person or party by "sharing" potential financial burdens with others (who are compensated in some way for taking on the added risk) has roots that reach back to 1800 B.C., when it was used to help finance voyages by ships.

An early form of life insurance was provided by trade and craft guilds in Greece and Rome. As trade expanded in the middle ages, new forms of insurance were used to protect fanners and traders from droughts, floods, and other disasters. Lloyds of London, probably the best-known insurance company in the world, was born in a coffee shop near the Tower of London in 1687, in part because the shop was a gathering place for ship captains who shared information about past and upcoming voyages, routes, weather, and hazards. Those who wanted to share in a risk could sign their names on a board under the terms of a contract that all could see. Uses for insurance continue to expand, protecting individuals and groups from a variety of hazards. Between the 1970s and 1990s, derivatives, complicated financial contracts so named because

they derive their value from one or more assets, became popular, though highly risky investments among individuals and organizations. Derivatives are used to hedge or protect against a financial loss and are particularly useful in conditions where there is significant volatility. Futures and options are two very simple forms of derivatives. The thinking about risk management evolved in part because of changes in mathematical numbering systems, an understanding of the statistical basis of probability, and the rise in popularity of gambling.

2.3 Horticulture Financial Risks and Management Strategies

2.3.1 Horticulture Financial Risks

Although climate variability affects all the factors influencing farm income, it is the impact on yield (production risk) that is most recognized by firm business managers. Hardaker et al. (1997) define production risk as the risk that comes from the unpredictable nature of weather and uncertainty about the performance of crops or livestock. The relationship between climate and production risk is well recognized. Hammer et al. (1996), McKeon et al. (2004) and Partridge (2000 and 2001) discuss the influence of rainfall on the yield of crops, the condition of native pastures and the amount of grass produced for livestock consumption. Mavi and Tupper (2004) also recognize that climate variability creates production risk through its impacts on resources, pests and diseases. Malcolm (1992) defines risk as the probability of something happening, while uncertainty covers all things that could happen which the decision-maker would not expect.

By their nature horticultural products are perishable and unless delivered to the market in time, the quality can deteriorate resulting in rejection or lower prices of the product. The inadequacy of proper air transport and handling facilities constitutes one of the biggest risks in horticultural trade finance. Most major carriers have either reduced or stopped flying most African countries because of poor infrastructure and lack of enough inward cargo. For example in Zimbabwe, for instance, major carriers such as British airways and DHL have reduced their flights from 8 to 2 times in a week. This means a lot of produce is now not getting into market on time.

Besides, there have been major blackouts, caused by shortages of electricity as a result handling facilities are getting poorer causing some products to get bad before they get to market. In a pre-export finance transaction there is a grave risk of the exporter not being able to meet contract requirements. This could arise from events like plant diseases and pests, adverse

weather conditions and drought, power cuts, labour strike and workers sabotage, inefficiency from poor service providers and poor management and sabotage. These events can lead to failure to meet export schedule and hence loan repayment obligations, and therefore exposing the farmers to credit risk.

Price risk could be real, particularly when dealing with a market that has an over supply situation and perishable products. The prices of the horticulture produce could drop drastically during the term of the transaction. In this circumstance it may be difficult to secure any fixed price contract since most contracts depend on auction floor for price fixing. This situation causes difficulties amongst exporters to service their loans and this is deemed too risky for financier. An uncooperative buyer can pose a stumbling block to the smooth operation of a facility either through a total rejection of suppliers on flimsy reasons or delay in payment for deliveries. Therefore lenders insist on financing only contract with reputable buyers who have proved track records.

Interest rate risk arises where interest rates move upwards at random, against export receivables, which are based on firm price contracts, there is every possibility that proceeds of loans may not yield sufficient local currency to undertake operations to meet export contracts. Farm incomes are extremely sensitive to the level of sterling especially against the euro. Between one half and three quarters of the contraction in UK farm incomes face exchange rate

2.3.2 Financial Risk Management Strategies.

Diversification into different production seems to be the best way to reduce in the long run the dependence on agricultural commodities and the associated vulnerability to negative price declines. Three diversification routes are available to developing countries horizontal diversification into alternative crops, vertical diversification into agricultural products and processes aimed at capturing a higher proportion of the value chain and diversification into non-agricultural activities that exploit comparative advantage (ODI/DFJD, 2004).

The objective of well-diversified agricultural system is to gain sufficient flexibility to adjust to the changed conditions smoothly and avoiding price or structural shocks (Taylor, 1992). Small farm survey results from Kirinyaga district in Kenya showed that diversified production

provides small holders with the opportunity to select a particular crop or crops for commercial production such as coffee, green beans or tomatoes in order to increase farm generated income while meeting increase demands for local farm produce and exports crops (Dorsey, 1999).

Hedging involves a transaction that shifts risks from states in which the opportunity costs of liquidity are low to those in which the opportunity costs of liquidity are high (Mello & Parsons, 2000). In this sense, the purpose of hedging is to improve liquidity, reduce financial distress and the costs of external financing, and make value-maximizing investments affordable in addition, maintained liquidity, and provides the flexibility to undertake and plan future investment opportunities (Mello & Parsons, 2000) and thus the value of growth options implicit in a hedging strategy can lead to higher firm value. It has been argued by Mayers and Smith (1987) and Morrelec and Smith (2003) that hedging policies also allow the firm to control the under investment incentives associated with debt financing by increasing the number of states of nature in which shareholders are residual claimants.

This is part of the free cash flow hypothesis of Jensen (1986), which argues that share prices will generally rise as residual cash above pre-committed capital expenditures rise. Hedging strategies that reduce or eliminate low or negative free cash flow states of nature can lead to increases in firm value. The foregoing provides a strong argument that commodity-based firms need to look at their risk management, capital structure, and investment decisions as a simultaneous strategy, rather than separate managerial tasks. Investment might be postponed until certain underlying uncertainties or ambiguities are resolved (Dixit & Pyndick, 1994). If, as in the food industry, the major cause of uncertainty is commodity price risk, and commodity price risk can be managed through hedging strategies, then the option to wait can be reduced significantly by altering the project's risk profile. At this point, one can play a thought experiment on how financing the project, a firm fits into the paradigm.

The poor are especially prone to suffer from shocks, exploit or implicit insurance may be considered an important form of pro-poor expenditure. This market however, is dominated by large corporation government mono-policies and developed countries. Small farmers in poor countries have limited access to insurance against price volatility. Insurance markets are not fully developed for many of the products that would be of most use to Africa countries for managing risk (ibid, 2004). In a perfect capital market, hedging, financing and investment strategies can be viewed as separate transactions (Mello & Parsons,

2000). A firm can borrow funds in one market while making hedging strategies in another. Keeping in mind the claim that hedging strategies are ineffectual for firms with no or little debt, the optimal strategy would be to link the hedging strategies with the financing strategies. In the alternative, if markets are not perfect, management may wish to issue a single credit instalment, a CLB for example, that combines both under one covenant. Broadly defined, these CLBs are debt instruments with a payment structure that is contingent on the outcomes of one or more underlying commodities.

There are two types of commodity-linked bonds; the forward type and the option type (Attah Mensa, 1992). With commodity bonds of the forward type, the coupon and or principal payment to the bondholder are linearly related through a forward or futures contract to the price of a stated amount of the reference commodity. With commodity bonds of the option type, the coupon payments are similar to that of a conventional bond, but upon maturity the bondholder receives the face value plus an option to buy or sell a predetermined quantity of the commodity at a specified price. A food-based firm that faces increasing downside risks as prices fall can secure debt repayment by issuing bonds or otherwise acquiring debt by directly linking to that debt a put option on the underlying commodity. Likewise, a firm that faces the risk of rising commodity prices can mitigate financial risk by linking to its debt a call option on the underlying commodity. Should prices fall below a trigger, the bond principal would be reduced.

Hedging through the use of futures contract, forward contract price agreements or option's is another avenue open to producers to minimize price variability. Successful agriculture commodity contracts have acceptable specification, enjoy a high volume of trading have greatest liquidity and have the lowest buy/sell margins. Major shortcomings with future for risk management in agriculture are the unavailability of contracts being unstable for many farmers' situation and lack of understanding by farmers of the tool (Trewin et al., 1992). In the U.S.A, the market has been affected by claims of market manipulation.

External equity capital involves sharing risks between owner and lender. This is an institutional agreement and contracting procedure for US farmers by which external suppliers would receive equity in firms instead of debt. Crane and Leatham (1995) proposed an accounting schedule for calculating the equity division between owners and input suppliers to reflect relative risk carried. Recently reported research show that net returns from crop under irrigation are usually increased and the variability of returns reduced, as might be the anticipated, but also the

irrigation creates secondary problem with risk components (Burt et al., 1971). These issues mostly relate to the depletion of surface and ground water resources. The application of irrigation water, no matter whether by spray, drip or flood methods, involves capital investment usually with a long payback period. In USA, farmers in the western states have been able to purchase subsidized water since 1902 from the Bureau of Reclamation.

2.3.3. The Global Context of Horticulture Business.

By its very nature, modern horticulture business is international in the sense that production takes place on one country and consumption in another country. Consequently, cross border trading imposes additional costs such as traffic, time costs due to border delays and cost associated with country differences such as language, the legal system or different culture. The inadequacy of proper air transport and handling facilities constitutes one of the biggest risks in horticultural trade finance.

By their nature horticultural products are perishable and unless delivered to the market in time, the quality can deteriorate resulting in rejection or lower prices of the product. Most major carriers have either reduced or stopped flying most African countries because of poor infrastructure and lack of enough inward cargo. For instance, in Zimbabwe, major carriers such as British Airways have reduced their flights from 8 to 2 times in a week. This means a lot of produce is now not getting into market on time. Besides, there have been major blackouts caused by shortages of electricity. As a result, handling facilities are getting poorer causing some products to get bad before they get to market.

Farm incomes are extremely sensitive to the level of sterling especially against the euro. Between one half and three quarters of the contraction in UK farm incomes face exchange rate risk. This risk could be real particularly when dealing with a market that has an over supply situation and perishable products. The prices of the horticulture produce could drop drastically during the term of the transaction. In this circumstance it may be difficult to secure any fixed price contract. Most contracts depend on auction floor for price fixing. This situation causes difficulties amongst exporters to service their loans and this is deemed too risky for financier. An uncooperative buyer can pose a stumbling block to the smooth operation of a facility either through a total rejection of suppliers on flimsy reasons or delay in payment for deliveries. Therefore lenders insist on financing only contract with reputable buyers who have proved track records.

In a pre-export finance transaction there is a grave risk of the exporter not being able to meet contract requirements. This could arise from events like plant diseases and pests, adverse weather conditions and drought, power cuts, labour strike and workers sabotage, inefficiency from poor service providers and poor management. These events can lead to failure to meet export schedule and hence loan repayment obligations. Also in a situation where interest rates move upwards at random, against export receivables, which are based on firm price contracts, there is every possibility that proceeds of loans may not yield sufficient local currency to undertake operations to meet export contracts.

2.3.4 Corporate Risk Management Organizational Structure

The board has responsibility for determining the strategic direction of the organization and creating an environment and the structure for risk management to operate effectively. This may be through an executive group, a non executive committee, an audit committee or such other function that suits the organizations way of operating and is capable of acting as a sponsor for risk management. An organization's risk management policy sets out its approach to and appetite for risk and its approach to risk management. The policy should also set out responsibilities for risk management throughout the organization.

In small organization, a risk manager is appointed while in slightly larger organization; a risk management committee with representatives from all the people involved including the board, staff, volunteers, clients is appointed by the board to review the risks. The person or the committee starts by reviewing the premises, financial procedures, equipment, human relations practices, and client operations to identify any risks, risky behaviour or practices. It looks into what could go wrong and what protections are in place against them going wrong. Everyone is involved in discussing any possible flaws in practices and procedures and reports made to the board.

The risk management department, headed by chief risk officer (CRO) appointed by the board of the organization has the primary responsibility to identify corporate assets subject to loss and arrange for the most efficient method of protection, insurance, self-insurance or a combination thereof or any other method. The CRO is empowered to retain or discard any or all existing risk management policies and protocols. His or her primary goal is to distill the company's myriad

risk positions into a coherent system of checks and balances designed to smooth financial and operational volatility and reveal hidden opportunities

Each member of the risk committee has a dotted line reporting relationship with the CRO. The risk managers will report to the CRO and will be responsible for the daily administration of the risk management program. The second part involves the risk manager or the risk management committee, checking that the changes that have been made in regard to the system procedures, physical plant or attitudes to address the hazard. The committee evaluates the effect of the changes and reviews them regularly to modify them when needed. The third set involves evaluating and prioritizing risk which involves a lot of estimation. The risk managers quantify risks that can be measured and recognize those that cannot.

2.4. Pertinent Financial Risk Management Theories

2.4.0. Introduction

The financial risk management philosophy, which entails implementing safety principle first to add sustainable maximum value to all activities of organization, affects strategy development. Safety affects everyone and every decision made involves an element of safety to consider. Financial risk management philosophy affects strategy development, how risks are identified, and the kinds of risk that are accepted, how risks are managed and eventual implementation of the program. An organizations risk management philosophy is the shared values, attitudes and beliefs that characterize how its leaders consider risk and is a major contributor to the overall compliance culture. Risk management should lead to improved performance and fewer and lower loss incidents.

2.4.1 Agency Theory

Agency theory which was advanced by Jensen and Meckling (1976) described the agency relationship as contract in which one person, the principle, hires a second person, the agent to perform some action. The principle formally delegates decision making authority to the chosen agent. Agency theory extends the analysis of the firm to include separation of ownership and control, as well as managerial motivation. In the field of corporate risk management, agency issues have been shown to influence managerial attitudes toward risk taking and management strategies (Smith and Stulz, 1985).*The* theory, explains a possible mismatch of goals between shareholders, management and debt-holders caused by asymmetries in earnings distribution, which can result in the firm taking too much risk or not engaging in positive financial risk

management strategy (Mayers and Smith, 1987). Consequently, agency theory implies that defined risk management strategies can have important influence on firm value. Agency theory provides strong support for hedging as a response to mismatch between managerial incentives and shareholders interests.

2.4.2 The Stakeholders' Theory

Another relevant theory is the stakeholders' theory developed by Freeman (1984) which is a theory of organizational management and business ethics that addresses morals and values in managing an organization. It identifies and models the groups which are stakeholders of corporation, and both describes and recommends methods by which financial risk management strategies can give due regard to the interests of those groups. Therefore, a well selected financial risk management strategy should only address the needs and wishes of four parties that include investors, employees, suppliers, and customers.

Stakeholder theory focuses explicitly on equilibrium of stakeholder interests as the main determinants of corporate risk management strategies. The most promising contribution to risk management strategies is the extension of implicit contracts theory which is part of stakeholder theory from employment to other contracts, including sales and financing (Cornell and Shapiro, 1987). In certain industries, particularly high-tech services and horticulture, consumers' trust in a company can substantially contribute to the company's value. The value of implicit claims is highly sensitive to expected costs of financial distress and bankruptcy. Since corporate risk management strategies lead to a decrease in these expected costs, company value rises (Klimczak, 2005).

Therefore stakeholders' theory provides a new insight into possible rationale for risk management strategies in industries like horticulture. The more sensitive a company's value is to financial distress, the higher the motivation for hedging. Nevertheless, stakeholder theory has not been tested directly yet. The political philosopher Charles (2004) criticized stakeholders theory for assuming that the interest of the various stakeholders can be best compromised or balanced against each other. He argued that this is a product of its emphasis on negotiation as the chief mode of dialogue for dealing with conflict between stakeholders' interests. He recommends conversation instead and this leads him to defend what he calls a patriotic conception of the corporation as an alternative to that associated with stockholder's theory.

2.4.3. The New Institutional Economics Theory.

The third relevant theory is the new institutional economic theory as advanced by Williamson (1998). The New institutional economics accepts limited rationality and focuses on accepted practice, and offers a different perspective on risk management strategies. The accepted standard of practice do influence risk and risk management strategies employed. New institutional economics therefore shifts the focus to governance processes and socioeconomic institutions that guide these processes, (Williamson, 1998). Although no empirical studies of the new institutional economics approach to risk management have been carried out so far, this theory offers an alternative explanation of corporate behavior.

The theory, predicts that risk management strategies may be determined by institutions or the accepted practices within a market or industry. In emerging markets, as managers and investors become more educated and institutions that support hedging develop, it can be expected that hedging will gain popularity with time. Moreover, the theory links security with specific assets purchase (Williamson, 1987). This implies that risk management can be important in contracts that bind two non-diversified parties, such as large financing contracts or close cooperation within a supply chain. The theory predicts that horticulture firm should base their risk management strategy on practical consideration.

2.4.4 Extreme Value Theory.

Extreme value theory as advanced by Gumbel in 1950 is a branch of statistics dealing with the extreme deviations from the median of probability distributions. The general theory sets out to assess the type of probability distributions generated by processes. Extreme value theory is important for assessing risk for highly unusual events to determine the applicable risk management strategies. Extreme value theory deals with the study of the asymptotic behavior of extreme maximum and minimum observations of a random variable.

Financial risk management is all about understanding the large movements in the values of assets or asset portfolios. It essentially deals with the analysis of the tail regions of the distribution of changes in the market value of the portfolio. Extreme value theory, by dealing with only extreme observations, can provide a better treatment to the estimation of tail quantities to determine the appropriate risk management strategies. Extreme value theory is a practical and useful tool for modeling and quantifying risk. Extreme value theory focuses primarily on analyzing the extreme observation rather than the observations in the central

region of the distribution. Horticultural firms, producers, exporters and even consumers need to understand the price and cost movements in the market since they determine lowest and highest profit/loses thereby directing the financial risk management strategies to be employed. The criticism of the extreme value theory argues that, by focusing on 'extreme' but unlikely events, neglects the importance of incentive structures and institutional culture as causal factors that generate large losses by financial institutions. Their criticism suggests that rather than looking at just exogenous determinants of financial crisis, analysts should also look at determinants such as remuneration structures and the psychology of risk-loving that often emerge within and potentially controllable by the institutions' themselves.

2.5 Financial Risk Management Models.

Currently the risk management model can be viewed as either a descriptive theory that reflects current practice or a prescriptive theory that suggests a refinement of practice. However, we do not find a standard prescriptive model for the risk management process; it is presented in many different versions. Williams and Hems (1989) model contains six steps: defining the objectives the organization wishes to achieve; identifying loss exposures; measuring the potential losses; selecting the best ways to solve the problem; implementing the decisions made; and monitoring and evaluating those decisions. However, in the eighth edition (Williams et al., 1998) the risk management model contains five steps: mission identification; risk assessment; risk control; risk financing; and program administration.

In contrast, Dickson (1995) takes a three-step approach to the risk management process, which he describes as the identification, analysis, and economic control of possible risks. He states that his model definition is highly subjective, and welcomes a difference of opinion. Dickson's model reflects standards used in the risk control auditing community. McNamee (1998) reports that the committee of sponsoring organizations adopts a three-step financial model to monitor risk control. These steps are: to establish objectives; to assess risks (identifying, measuring, and prioritizing them); and to determine the controls needed.

Pritchett et al. (1996) suggest a seven-step process, where the actions are: setting objectives; identifying problems; evaluating problems; identifying and evaluating alternatives; choosing alternatives implementing alternatives; and monitoring the system. Vaughan (1997) presents six steps: determining objectives; identifying risks; evaluating the risks; considering



alternatives and selecting the risk treatment device; implementing the decision; and evaluating and reviewing.

Trieschmann et al. (2001) suggest a four-step risk management process: identifying risk management techniques; evaluating them; selecting them; and implementing and reviewing decisions. Thus, the literature demonstrates the variety of suggested models and fails to provide the industry with a standard to apply. The possible reason for the large variety of models is that the theory is evolving and becoming more descriptive of risk management activities. Another possible reason is that the discipline is actually a composite of many others: management, industrial engineering, and safety.

In the process, the first step is to examine the strategic, organizational and risk management context within which the analysis will take place. In this step it is appropriate to examine the criteria against which risks will be evaluated and to determine the structure, or set of elements, for subsequent analysis. It is important that examination of the context is undertaken at the outset, to provide the framework for the risk analysis. This requires a thorough examination of the operating environment and a full understanding of organizational policies and goals, so as to decide whether a risk is acceptable or not. The second step involves identification of all the risks, which need to be managed, together with possible causes and effects. If risks are not recognized in this step, it is unlikely that they will be controlled. In an organizational setting, it is also necessary to consider risks, which are outside the entity's control.

Analysis of risk, the third step, has two key elements: likelihood and consequences. By combining analysis of these elements, an estimate of the level of risk can be derived in the context of existing control measures. During the analysis stage, minor, acceptable risks can be identified and put to one side. Depending on the degree of risk and the availability of accurate data and resources available, analysis may be qualitative, semi-quantitative or quantitative. After the analysis process, the risks can be evaluated. This involves a comparison between the level of risk identified and the previously established risk criteria. From this can be derived a list of risks in priority order. Some of these might be at such a level that the risk can be accepted and treatment may not be required. Nevertheless, they should be documented, monitored and periodically reviewed to ensure that they remain acceptable.

2.6. Latest Theoretical Perspectives on Financial Risk Management.

Current thinking regarding risk management is moving away from strict rules that are determined for and applied to each member of industry toward a paradigm that carefully considers, manages, communicates, and controls the risks associated with the routine and unique opportunities, problems, and crises we face (Coburn et al., 2005). This undoubtedly will be uncomfortable at first for industry and regulatory bodies, but this different way of doing business has significant potential benefits for all involved. If regulatory agencies continue to move towards a goal of a more scientific basis for regulation, firms will need to formally elucidate and document process risks, controls, and monitoring practices.

The development of compact, relatively cheap and high-powered personal computers has opened up an opportunity for farmers to introduce sophisticated information, planning and control systems relating to production, marketing and finance to reduce risks. Researchers in many Nations are taking the opportunity to build new models and techniques. In recent years, however risk management has received increasing attention in both corporate practice and the literature. This is particularly true for the management of financial risks that is the management of foreign exchange risk, interest rate risk and other financial market risks. A major reason for this is the development of markets for derivative financial instruments.

Forward contracts, futures, options, swaps and other, more complex financial instruments today allow firms to transfer risks to other economic agents who are better able or more willing, to bear them. Derivatives, however, can be used not only to hedge existing risks but also to build up additional, speculative positions in financial markets. A number of large and well-known firms have experienced losses in connection with the use of derivatives therefore these instruments themselves, constitute a source of risk. Hence, it has to be stressed that in financial risk management, derivatives are only a part of the process and not the process itself.

Recently reported research shows that net returns from crops under irrigation are usually increased and the variability of returns reduced, as might be anticipated, but also that irrigation creates secondary problems with risk components. Many National governments are involved in agricultural commodity markets, as a result of rent seeking, economic arguments and equity considerations. Marketing boards are a statutory response to market risk. The economic

argument is that government action may reduce the risk faced by individual producers and thus encourage investment in riskier projects which will have a higher national benefit. If the cost of the intervention is lower than the resultant benefits, there will be a net gain to society.

CHAPTER THREE

3.0 EMPIRICAL LITERATURE REVIEW

3.1 Introduction.

It is universally acknowledged that risk and uncertainty play an important role in horticulture world wide, and it is not surprising that a substantial research focus on techniques for analyzing risky decision has emerged in literature. Concern has been expressed that the research effort expended on risk modeling has not been matched by corresponding understanding of the importance which producers attach to the strategies being modeled, thereby increasing the risk of standardized modeling formulations producing spurious results. As a result, benchmark studies of producer's perception have been initiated.

3.2 Studies on Risk Management Strategies in Horticulture Firms.

Sandra (1996) investigated horticulture risks and analyzed it to identify the importance which producers attach to different risk management strategies in New Zealand deregulated horticulture farming environment. A Nation wide postal survey covering eight farm types was conducted in 1992. Farm types included all major farm type and a number of minor farm types which illustrates the diversity of New Zealand farming activity. A questionnaire were prepared with questions on farmers and property attributes, the importance attached to different risk sources and the use and importance attached to different risk management strategies.

From the study all farmers and growers ranked market risks as very important. Changes in product prices were ranked as the most important risk source in almost every case. Changes in the world economic and political situations were also ranked as important. Weather factors, diseases and pests were seen to be important to farmers. Changes in interest rates and regulatory risks were viewed as a moderate risk source. The marketing strategies that were almost universally popular include use of marketing information, spreading sales and having more than one enterprise and maintaining short-run flexibility. The unpopular ones include forward contracting and futures. Therefore, farmers place important on mix of strategies rather than relying on one strategy to manage financial risks.

Dukhuizen et al. (2001) analyzed risk management strategies in which risks are shared with others to find out whether such strategies provide opportunities for farmers to deal with the new risks with which horticulture is confronted in Netherlands. A survey of attitudes towards risk sharing of farmers was carried out. In a mail questionnaire, survey was carried out among 2700

farmers. The survey included questions about the socio-economic characteristics of the farmers, and about their perceptions of the importance of various sources of risk and risk management strategies including both on farm strategies and strategies in which risks are shared with others. Perceptions were measured on Likert-type scales ranging from one for not relevant to five for very relevant.

Linear regression (see appendix 5) was also used to test whether the respondents who perceived a particular type of risk as more important also assigned more importance to strategies to manage this risk. Such relationships were tested for the perception of price risks and price risk management strategies, the perception of personal risks and personal insurance, and the perception of production risks and business insurance. The author found that risk-sharing strategies provide opportunities for dealing with the new and the old risks with which horticulture farming are confronted with. Theoretically, risk-sharing tools are in principle advantageous to both individual farmers and society as a whole. Empirically, farmers already perceive risk sharing strategies especially insurance as important strategies to manage risks.

Akcaoz et al. (2003) carried a study to identify groups of farmers in horticulture who differ in their risk sources and risk management strategies in the Cukurova region of Turkey. The respondents to the survey were divided into three risk attitude groups, risk averse, risk seeking and risk neutral. Factor analysis was conducted on information obtained from 112 farmers in 2000. A face-to-face questionnaire was conducted on risk sources and strategies, using Likert-type scales ranging from one for more to five for less. The survey work was conducted in June 2000 and data collected from the survey was analyzed using SPSS for Windows 9.0.

In this study, reference gamble (lottery) and preference scales were also used to determine risk attitudes of farmers. The reference gamble is a conceptual device that has been used to aid consistent contemplation and judgment. The term preference scale is used for a numerical scale that represents an individual's preferences for a set of consequences. Higher numbers are 'more preferred' than lower numbers. Preferences for alternatives with uncertain outcomes were measured by the preference scale. From the findings of the research, risk sources were labelled as environmental, price, catastrophe, input costs, production and technological, political, finance, personal, marketing, health and social security. The dimensions of risk strategies were found to be diversification, off-farm income, marketing, planning, financing and security.

Flatena et al. (2003) conducted a study to explore organic and conventional dairy farmers' perceptions of risk and risk management and to examine relationships between farm and farmers characteristics, risk perceptions, and strategies in Norway. The survey was conducted by asking about the types of risk perceived as most important by conventional farmers and about the management strategies the farmers use. The data originate from a survey of sample 363 conventional farmers and a sample of 162 organic dairy farmers in Norway.

From the finding, institutional and production risks were perceived as primary sources of risk, with farm support payments at the top. Compared to their conventional colleagues, organic farmers gave more weight to institutional factors related to their production systems. Conventional farmers were more concerned about costs of purchased inputs and animal welfare policy. Organic and conventional farmers' management responses were more similar than their risk perceptions. Financial measures such as liquidity and costs of production, disease prevention, and insurance were perceived as important ways to handle risk.

Even though perceptions were highly farmer-specific, a number of socio-economic variables were found to be related to risk and risk management. The primary role of institutional risks implies that policy makers should be cautious about changing policy capriciously and they should consider the scope for strategic policy initiatives that give farmers some greater confidence about the longer term. Further, researchers should pay more attention to institutional risks since they influence and determine the way financial risk management strategies are implemented by horticulture firms.

Kiptui, (2008) carried out a study to investigate the impact of real exchange rate volatility on Kenya's exports of horticulture and tea between 1997 and 2007. He used relative prices which are a measure of competitiveness and foreign incomes capturing foreign economic activity. The data used in this study was obtained from different sources. Export volumes and prices of tea and horticulture and the real effective exchange rate were obtained from the Central Bank of Kenya database. The real effective exchange rate was computed through a weighting process, weights being dependent on the importance of the export destination country.

The other source of data was the International Financial Statistics (IFS) of the IMF. From this source they obtain the world non fuel commodity prices, which together with export prices, are used to derive relative prices (being export prices divided by world non-fuel commodity prices)

for both commodities. This source also provides them with the industrial production index of industrial countries.

The study applies co- integration techniques (see appendix 5) and error correction modeling to Kenyan monthly data over the post-liberalization period, from 1997 to 2007. The results indicate the existence of long-run relationships and show that real exchange rate volatility has significant negative effects in the short-run and that the foreign income and relative price variables remain highly significant. Therefore, there is need to pay greater attention to exchange rate volatility by effectively monitoring movements in the exchange rate and designing management strategies to minimize the effects on horticulture products.

3.3 Studies on Financial Risk Management Strategies and Performance of the Firm.

Sadras et al. (2002) compared the long-term profit from a conservative, cereal-based cropping strategy, and a more risky strategy including both cereals and canola in Australia. He investigated the hypothesis that whole-farm profitability could be enhanced by adoption of a dynamic cropping strategy by shifting from the conservative strategy in dry years, to the risky strategy in wet years. Monthly rainfall data from 1960 to 1999 were obtained from the Australian Bureau of Meteorology for 11 locations in the Mallee region of Southeastern Australia.

To develop rules for rainfall forecast, they explored the association between seasonal rainfall and monthly rainfall between December and April. To test this hypothesis, they used 40-years rainfall series to investigate rainfall features in 11 locations in the Mallee, and to test the skill of simple rules to predict seasonal rainfall, as developed by local farmers, and then to calculate whole-farm profit for conservative, risky and dynamic cropping strategies. Rainfall and profit were linked with a whole-farm model that estimates crop yield as a function of seasonal rainfall and water use efficiency. Among locations, annual rainfall ranged from 259 to 358 mm. For each location, two types of seasons were defined as likely wet, when April rain was above the median, and likely dry.

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The results were consisted with hypothesis that the dynamic cropping strategy, shifting from the more conservative to the more risky strategy depending on expected seasonal rainfall, did not improve median farm profit. The dynamic strategy, had, however, a substantial effect on extreme years, alleviating losses associated with the risky strategy in dry seasons, while being

able to capture the benefits of more favorable seasons. These results agree with those by Keeting et al. (1991,1993) who found Nitrogen management based on predicted seasonal conditions did not increase mean gross margin, but reduced the risk of negative gross margin. The results are relevant to the study since they confirm that financial risk management strategies are based on practical consideration but not on rationale suggested by theories for them to have an effect on performance of horticulture firm.

Marian et al. (2004) carried an industry-level study that sought to investigate empirical regularities between firm strategy, management style, organizational structure and performance in the Spanish fresh fruit and vegetable industry using strategic group analysis in 2003. Four groups were formed from key dimensions reflecting firms' strategic orientations. Data were gathered through a large-scale postal survey sent to Spanish fresh produce companies. Two sampling frames were used. The federation of fruit & vegetable producers and exporters (FEPEX) provided a list of its associates, which accounted for more than 70% of fruit and vegetable exports.

Information on citrus producers was obtained from the Spanish citrus management committee, a professional association representing the majority of Spanish citrus fruit exporters. The questionnaire was pre-tested among senior managers of 7 companies and 5 trade association representatives who completed the draft questionnaire and provided feedback on the comprehensiveness and phrasing. Copies of the final questionnaire were sent to senior managers. The performance indicators that best distinguished between strategic groups were identified using multiple discriminant analysis

The findings confirmed that Performance levels did not differ systematically between strategic groups, but performance was found to be influenced by the alignment between entrepreneurial culture and organizational strategy suggesting that organizational performance improves when there is strategic fit between management styles and various contextual factors. The implications of this research for the Spanish fresh produce industry reside in the empirical results which support the Colvin and Slevin (1988) proposition that management styles which enhance communication, joint decision making and cross-functional collaboration, coupled with flexible organizational structures which minimize bureaucratic barriers to innovation, best allow firms to respond quickly to environmental opportunities and challenges and result in optimal performance levels.

Mark et al. (2003) carried an investigation to determine whether well-designed risk management strategies can create value for agricultural cooperatives. They used a sample of 133 representative agricultural cooperatives in U.S.A. in 2002 because cooperatives tend to face both input and output price risks. Simulation method was used by simulating various transactions using real-world pro-former financial statement from a set of representative U.S. dairy cooperatives, and using mean variance, expected utility and value at risk metrics.

The results from simulation showed that, it is indeed possible to improve the return risk profile of a typical cooperative through a variety of common risk management techniques. Further, given the relatively wide size-dispersion among cooperatives, this research shows that the incentives to manage risk, and preferred risk management strategies differ among cooperatives depending on size. This study is relevant to horticulture industry in that it shows how financial risk management strategies can be used and integrated to enhance performance and value of a firm

Gursoy et al. (2007) examined the impacts of some of the internal strategic factors on financial success to identify the performance-enhancing internal strategic factors likely to enable companies in horticulture to gain competitive advantage in the U.S.A. industry. A survey instrument was developed to gather data on 2339 industry professionals' perceptions of the importance of the internal strategic factors on horticulture companies' financial success. Development of the survey instrument involved a series of focus groups, creation of an instrument to systematically measure the perceived importance of the internal strategic factors on the companies' financial success, pre-testing the instrument on a sample of industry professionals using an online survey method, and revision and finalization of the instrument.

A self-administered survey questionnaire was used to collect data and it was mailed to 2339 industry professionals, whose names and addresses were retrieved from a database maintained by the firms in the study, using the Dillman Tailored Design Method (2000). Thus, they suggested that there are several internal strategic factors that are likely to enable companies to perform financially on par with their competitors. In order to be able to have healthy financial performance, managers need to identify those internal strategic factors and develop strategies and action plans to improve the performance in those areas. The theory further suggests that there might be a few internal strategic factors and strategies likely to enhance the financial

performance of companies and/or enable them to perform better than their competitors and the market average by giving them a sustained competitive advantage. It is crucial for managers to identify those performance-enhancing internal strategic factors and strategies to outperform competitors and to improve financial performance in their horticulture firms.

Nartea et al. (2008) explored the potential for risk reduction by New Zealand farmer's in horticulture industry through the diversification of their farm asset portfolios to include financial investments such as ordinary industrial shares, government bonds and bank bills. Low correlations between rates of return on farm and these financial assets suggest that significant reduction of income variability might follow their inclusion in farmers' portfolios. A survey was carried out and Stochastic efficiency analysis used to analyze alternative portfolios of ordinary shares, government bonds and bank bills and New Zealand farmland, using coefficients of absolute risk aversion derived from a negative exponential utility function.

The results suggest that those farmers showing high degrees of risk aversion would gain utility by including financial assets in their portfolios. Deregulation of the New Zealand economy in the 1980s appeared to reduce the potential gains from diversification. Bonds rather than ordinary shares are the main contributors to portfolios, which maximize utility for individuals, classified as somewhat risk averse. This empirical study is relevant to the main study in that diversification as a financial risk management strategy can be used to enhance performance by smoothening income stream.

3.4 Studies on Risk Management Reforms and Practice.

Jaffee (1992) carried a study to investigate whether liberalization of African markets increase competition in a private market. He made an assumption based on Kenya's experience with horticultural exports that liberalizing Africa's markets will bring about competitive, and decentralized private market structures. The data upon which the empirical analysis is based were obtained from field interviews with Kenyan producers, processors, and exporters in 1985 and 1986, from published and marketing boards in Kenya, unpublished official government statistics, and from the sales and crop procurement records of private Kenyans and foreign companies. The researcher concluded that sub-sectors featuring widespread entry and a dominant role for the private sector can indeed develop in a very dynamic fashion. Nevertheless, the experience of Kenyan horticulture indicates that the quest for institutional reform must look beyond the tapping of nascent private entrepreneurship to consider the nature

of potentially successful private enterprises in the African trading context and the ways in which such firms can organize both their crop procurement and trading operations. Such patterns will have strong implications both for efficiency and for the distribution of benefits from expanded trade. Even with market liberalization, the technical characteristics of many crops, their production, and their processing may lead to centralized procurement and marketing arrangements. Hence, market liberalization may simply involve a shift from centralized public control to some form of centralized private control.

Konare (2001) analyzed the current Malian financial sector to investigate the factors constraining lending to the cotton, rice, coarse grains and horticulture sub sectors in 1999 to 2000. The following factors were hypothesized to be constraining horticulture lending in Mali, public policy, the regulatory framework, non-performing collateral laws, inadequate procedures used by loan officers to assess horticulture credit risks, and constraints limiting the effectiveness of the Microfinance Institutions (MFIs).

A series of non-structured interviews were carried out in Bamako with Malian chamber of agriculture officials, agricultural development agency workers, bankers, insurance, non governmental organization (NGO) officers, the support and monitoring unit for micro finance institutions and large-scale traders. In verifying the adequacies of agricultural lending procedures, three banks were selected, one development bank and two commercial banks. Samples of approved loans were selected at each bank; however, those samples had some type of selection bias.

In the selected banks, the loan officers do not maintain a log of rejected loans. Thus, the loan review model was assessed only using existing borrowers' applications, which made the results biased because a group of loan applicants rejected. He concluded that, since the introduction of the agricultural marketing reform, Malian agricultural production has significantly increased on yearly basis, on average of 5%. However, one of the major challenges facing the agricultural sector is a sustainable production credit system.

The banking sector has retained its character of providing short-term finance, and capital markets remain either weak or absent in the majority of cases. Banking and finance structures in Mali remain underdeveloped. The financial markets are characterized by the limited outreach of the commercial banking system, which operates with a high urban bias. A real gap has

emerged in development investment finance that needs to be filled. To improve the performance of the financial intermediation in servicing the citizens of Mali, the financial institutions will need to change to their conduct in providing financial services.

David et al. (2002) on their empirical study on heterogeneity of decisions among agents in U.S.A horticulture industry facing uncertainty on information sources using survey method. Accounting of information exchange was constructed through a combination of 68 personal interviews and 140 mail surveys in four commodities case studies, Washington potatoes and white wheat, Iowa hogs, and California fresh tomatoes were used to demonstrate heterogeneity in informational resources.

This study showed that many other forces might drive heterogeneous decisions by actors within the same market. First, information sources may have varying levels of availability to decision makers. Second, even when information sources are available, they may have varying levels of usefulness to actors depending on the analytic capacity and training of the decision-maker. Therefore Policy-making in any arena dealing with risk insurance must take into account the varying levels of ability when setting policy goals and implementing government programs.

Chad et al. (2006) investigates the construction of a whole-farm crop revenue insurance program in horticulture to include livestock price risk in North America. The insurance product was formed as a gross revenue product. Gross revenues from corn, soybeans, and hogs are jointly insured. The contract would run from March to February 2005, aligning the sign-up for this product with traditional crop insurance sign-up for corn and soybeans. At sign-up, producers were required to provide information on their crop production and the number of animals that they intend to market in each calendar month. Prices for both the crops and livestock are based on the futures prices from relevant markets.

This number of animals is then insured under the assumption of set marketing weights, and insurance prices are set by the futures markets. The livestock component to the insurance is strictly a price protection component, just like the existing livestock insurance products and livestock risk protection and livestock production losses are not covered by this policy. For analysis Iman & Conover (1982) rank correlations was used (see appendix 5). The vast majority of crop and revenue insurance policies sold in North America are single-crop policies that insure against low yields or low revenues for each crop grown on a particular farm. The

results show that at coverage levels of 95% or lower, the fair insurance premiums for this product on a well diversified Iowa farm are far lower than the fair premiums for the corn crop alone on the same farm.

3.5 Current Empirical Research

Martin (2000) investigated the management of financial risk in Germany in non-financial corporations. The study focused on use of derivatives, management of exchange rate risk and interest rate risk, accounting for financial instrument and risk disclosure. The study was based on a questionnaire survey study undertaken in late 1998 and early 1999. The questionnaires were sent to the chief financial officers of major German public corporations. The sample consisted of all listed German corporations that were not subsidiaries of other companies and had revenues of at least DM 400 million in 1997. Excluded from the survey were banks and insurance companies. This left them with a total sample of 154 companies, of these, 74 sent responses. The resulting response rate of 48.1% was high for a survey of this type.

Descriptive statistics was used to analyze the data. The findings confirmed that the majority of the firms were concerned with managing their transaction exposures. Most firms adopted a selective hedging strategy based on exchange rate forecasts. Only a small minority of firms does not hedge foreign exchange risk at all, and only few companies hedge their transaction exposure completely. A detailed analysis of the management of the firms' exposure to the US-dollar, found that only 16% of the firms were fully hedged.

Hong et al. (2004) carried a study to investigate firms' derivatives use and its interaction with external financing dependence in affecting certain variables related to the firm's growth. Survey method was used for data collection. The data are for a sample of firms from the Fortune 500 list, covering the two years of 1994 and 1999. Descriptive statistics were used to analyze the sample. The findings provided evidence of increasing use of derivatives over the period 1994-1999. In addition, larger firms are more likely to use derivatives than smaller firms. A major reason for this is the development of markets for derivative financial instruments. Forward contracts, futures^ options, swaps and other, more complex financial instruments today allow firms to transfer risks to other economic agents who are better able or more willing to bear them.

Norlida et al. (2007), Carried a study to examine the Enterprise Wide Risk Management (EWRM) practices and its impact on shareholder value in Malaysia. A sample of 53 Public limited companies (PLC) in the service sector of Malaysia was chosen based on stratified random sampling technique. From the total, 12 of the companies involved in the study were from the financial companies whilst 41 were from non-financial companies. A total number of 240 financial and non-financial service companies of PLC were chosen as the population. Data collection was made through questionnaire designed by the researchers based on the review of relevant literature.

Analysis of data for this study involved both descriptive and inferential statistics. Descriptive analysis includes the use of frequency and cross tabulation, while inferences were made based on independent sample T-Test and Chi-Square test at 5 % and 10 % significant levels. Overall, the study indicates that risk management has become a priority among most of the listed companies in Malaysia. The findings of the study also show that 91.7% of the risk management programs in financial companies are under the charge/supervision of the risk management department.

From the findings risk management practices among companies of financial sector are more advanced compared with companies of non-financial sector, consequently, risk management practices were found to have an impact on shareholders value. Such findings confirm the statement by Knight (2006) that risk management should not be led by internal audit department. This empirical study is relevant to the study in that it provides an evidence of the current reforms and practices which can be implemented to improve the performance of horticulture firm and enhance its value. In addition, it must be emphasized that the position of risk management program in an organization is highly dependent on leadership.

3.6 Summary

These studies demonstrate that there is no necessarily an automatic linkage between specific risk sources and the use of particular risk strategies to alleviate that risk. Farmers and growers are most concerned about market risk. However, obvious marketing strategies which can reduce this risk, such as forward contracting and the use of futures, are not considered as viable risk responses. More preferred marketing strategies were the use of market information in conjunction with short-term flexibility to enhance prices, though in some cases, no marketing strategies were important, with financial buffers to absorb downturns being more widely used.

Therefore, researchers should be wary of using a particular risk source as a rationale for studying the mechanics of a specific strategy, which is aimed at reducing this risk source, since there may be impediments to the adoption of this strategy which are not obvious to them, with farmers perceiving other strategies which are less directly related to the risk source as more efficient risk strategies. It is also concluded that some risk strategies are universally popular, while others are universally unpopular and some are more important for some farm types than for others.

It would be interesting to know if this conclusion is universal and, if so, what are the characteristics of risk strategies which are widely used and rarely used and also to isolate the conditions under which particular risk strategies are likely to be widely adopted by farmers. More fundamentally, the studies demonstrate that skill in model development must be matched by an understanding of the unique conditions of the farming system under scrutiny. In conclusion the risk that horticultural farmers and exporters face can be generalized into five categories that are production risk, price or market risk, financial risk, institutional risk and human or personal risk.

CHAPTER FOUR

4.0 FINDINGS AND CONCLUSION

4.1 Key Findings and Recommendations

Five key findings emerge. *Firstly* financial risk management strategies utilized by horticulture firms include diversification, hedging commodity linked bonds, forward contracts and insurance. In the long run, product diversification is apparently the preferred way to minimize dependence on agricultural commodities and the associated vulnerability to negative price declines. Most developing countries employ three diversification strategies horizontal, vertical and conglomerate. Horizontal diversification involves use of alternative crops, vertical diversification into agricultural products and processes aimed at capturing a higher proportion of the value chain and conglomerate diversification into non-agricultural activities that exploit comparative advantage. The objective of well-diversified agricultural systems is to gain sufficient flexibility to adjust to the changed conditions smoothly and avoiding price or structural shocks.

The *second* financial risk management strategy is hedging which involves transactions that shift risks from states in which the opportunity costs of liquidity are low to those in which the opportunity costs of liquidity are high. Hedging improves liquidity and reduces financial distress and the costs of external financing, and makes value-maximizing investments affordable. In addition, it maintains liquidity, and provides the flexibility to undertake and plan future investment opportunities hence hedging strategy can lead to higher firm value, especially hedging strategies that reduce or eliminate low or negative free cash flow states of nature.

The *third* financial risk management strategy is the use of commodity linked bonds which are debt instruments with a payment structure that is contingent on the outcomes of one or more underlying commodities. Commodity-based firms need to look at their financial risk management, capital structure, and investment decisions as a simultaneous strategy, rather than separate managerial tasks. With commodity bonds of the option type, the coupon payments are similar to that of a conventional bond, but upon maturity the bondholder receives the face value plus an option to buy or sell a predetermined quantity of the commodity at a specified price. A horticulture firm that faces increasing downside risks as prices fall can secure debt repayment by issuing bonds or otherwise acquiring debt by directly linking to that debt a put option on the underlying commodity. Likewise, a firm that faces the risk of rising commodity prices can

mitigate financial risk by linking to its debt a call option on the underlying commodity. Should prices fall below a trigger, the bond principal would be reduced.

The *fourth* financial risk management strategy is the use of derivative instruments which include use of futures contract, forward contract, price agreements or option's to minimize price variability. Successful agriculture commodity contracts have acceptable specification, enjoy a high volume of trading have greatest liquidity and have the lowest buy/sell margins. Major shortcomings with future for financial risk management in horticulture are the unavailability of contracts being unstable for many farmers' situation and lack of understanding by farmers of the tool and market manipulation. An effective financial risk management strategy improves firm performance.

Current financial risk management strategies include maintaining accurate, up-to-date financial records and financial analysis of key ratios and cash flow projections and statements. By using a financial analysis system, growers can be aware of the magnitude of emerging financial management problems so that they can react to them. Maintaining emergency lines of credit with lenders, delaying or reducing business and personal expenditures are responses to managing cash flow. Insurance is a financial response to risk, which provides a specialized source of liquidity. The capital structure of business debt management is likely to affect the risk exposure of a business and may force a firm to operate at sub-optimal levels leading to inefficiency. Investigation on how to spread depreciation, interest, taxes, insurance, rental or advertising costs that are fixed in the short run over several commodities is necessary. Therefore farmers keep on developing new strategies to suit the dynamic and changing horticulture environment.

Secondly, the study reveals that whereas the stockholder theory and new institutional economics theory offers a new insight on determinants of financial risk management strategy, in contrast financial economics and agency theory offer little supporting evidence. This indicates that new institutional economics and stockholders theory, together with selected elements of financial economics, form the basis for new models. These clearly indicate that there must be other significant factors, not included in present theories, which determine financial risk management practices. Further research will be needed to identify these factors and incorporate them into a comprehensive theoretical model, which will explain risk management practices of firms better. Results point to practical consideration as the main

determinant of financial risk management. This implies that managers considering implementation of financial risk management should first look at their direct exposures and considers what other firms in the market are doing rather than analyze the problem along the lines of theory. Future research may focus on these practical reasons and their implication for corporate value.

Thirdly, financial risk management models are either a descriptive model or prescriptive model. Descriptive model attempts to describe what firms actually do to manage financial risks whereas prescriptive models are concerned with identifying the best decision to take assuming an ideal decision maker. However, we do not find a standard prescriptive model for the risk management process; it is presented in many different versions, some models contains six steps: defining the objectives the organization wishes to achieve; identifying loss exposures; measuring the potential losses; selecting the best ways to solve the problem; implementing the decisions made; and monitoring and evaluating those decisions.

In contrast, other models are comprised of either five, six or seven steps, but also differ in the order of the process steps. The seven step process includes setting objectives; identifying problems; evaluating problems; identifying and evaluating alternatives; choosing alternatives implementing alternatives; and monitoring the system whereas a five step process model comprises of identifying and analyzing problems, examining alternative risk management techniques, selecting risk management techniques, implementing the techniques, and monitoring. Thus, the literature shows existence of a variety of financial risk management models is employed; however, there is no single industry standard model. The possible reason for the large variety of models is that the theory is evolving and becoming more descriptive of risk management activities.

Another possible reason is that the discipline is actually a composite of many others: management, industrial engineering, and safety. However, the literature also reveals a need for a standard model. A standard will promote scientific analysis, enhance understanding, improve efficiency and effectiveness, decrease analysis costs, strengthen decision-making, and emphasize the organization's ability to achieve its goals. Having a standard model also facilitates learning for new students of risk management. And as all new students learn a common risk management process, the implementation of the program will become more efficient. *Fourthly*, financial reforms such as financial liberization including price decontrol,

deregulation of money and capital markets and removal of trade barriers increase competition in private markets and bring price stability in reducing income variability to horticulture farmers. Institutional reforms focusing on credit rating, governance and decentralization of authority, and other different perspectives on financial risk management strategies are necessary in horticulture industry. These practices do influence financial risk management strategies employed. Financial risk management strategies are determined by institutions and practices within market industry. As institutions that support hedging strategy develops and other financial risk management strategy, it is expected that hedging and other strategies will gain popularity with time. Effective institutional reforms will promote financial risk management.

Finally, performance of horticulture firms in terms of market share growth, profitability is influenced by the alignment between entrepreneurial culture and organizational strategy. These suggest that organizational performance improves when there is strategic fit between management styles and various contextual factors. It is indeed possible to improve the return risk profile of a typical horticulture firm through a variety of common financial risk management techniques. The challenge lies on designing and implementing an effective risk management strategy given that high level skills are required. To conclude it is crucial for managers to identify those performance-enhancing internal strategic factors and strategies to outperform competitors and to improve financial performance in their horticulture firms.

4.2 Knowledge Gaps Identified

Financial Risk management strategies adopted by firm managers will be in accordance with their personal preference for risk. The results suggest that the majority of people are risk averse and manage their resource accordingly. However, as risk management becomes more complex, a gap has emerged on developing new financial systems that must enable managers to meet their goals. Therefore managers must make risk management decisions continuously. In past decades, number of developing countries experienced a rapid growth in their export of highly perishable horticultural products to developed high-income countries.

In general this growth can be explained by comparative advantage. However, no evidence has been found that the export growth of cut flowers is related to the outcomes of institutions (performance) hence a knowledge gap on the same. A gap exists as to how hedging strategy is linked to stock volatility and market value. The question remains as to the casual relationship

between these variables. There is need to depart from eclectic approach to risk management theory and attempt construction of a new, comprehensive theoretical model, which would cover all of risk management and close that gap. From literature review and empirical studies researchers have shown that there is a gap between skill in model development and understanding of the unique financial conditions of farming system. There is need to match the two to avoid an unconscious bias in risk modeling on a particular strategies which may have a low probability of adoption in particular region farming system

4.3 Possible Areas for Future Research.

Several areas for future research have been identified, *Firstly*, It is evident from empirical literature that, the primary role of institutional risks implies that policy makers should be cautious about changing policy capriciously and they should consider the scope for strategic policy initiatives that give farmers some greater confidence about the longer term. Further researchers therefore should pay more attention to institutional financial risks. *Secondly*, the results show that the price and income elasticities for horticulture are high and that foreign incomes and relative prices have significant effect on real exports implies that exports growth could be driven by factors beyond the control of local policy makers. This however is a fertile area for further research especially the need to determine whether the source of exchange rate movements determines its impact on exports.

Thirdly, the literature review revealed that the development of flower industry is unbalanced, in the same region; some countries experience a prosperous export growth while others have a mediocre growth or even show a decline. Hence there is need to do a comparative study on key success factors for the growth of horticulture industry. *Fourthly*, the results of theoretical framework imply that companies should not base their decision to start hedging on rationale suggested by theory, but rather focus on practical consideration. Hedging is more popular among larger companies, which indicates that the costs of starting hedging are high or that there are economies of scale. Moreover, since previous research in other markets has led to similar results, such approach may be advisable in other countries as well. New cross-country studies are needed to confirm this.

Fifthly, from empirical literature it was concluded that some financial risk strategies were universally popular with New Zealand farmers, while some were universally unpopular and same were more important for some farm types than others. It would be interesting to know if

this conclusion is universal and ,if so, what the characteristics are of the financial risk strategies which are widely accepted and rarely used and to isolate the conditions under which particular risk strategy are likely to be widely adopted by farmers.

Sixthly, it is clear from the literature that arrangements such as production contracts are growing increasingly important because they ensure farmers' access to capital. However, the use of production contracts also involves some risks, such as unexpected requirements imposed on contractors. Further research into various forms of external equity financing for farmers (without the risk mentioned for production contracts) seems worthwhile, especially given the increasing industrialization of agriculture. *Lastly*, the empirical results indicate that factors like farm type and form of ownership influence farmers' perceptions of risk-sharing strategies. Further research on such factors would be useful for developers and sellers of risk-sharing strategies in order to better tune their products, services and marketing strategies.

Finally, empirical results indicate that there is a mismatch between farmers' perceptions of price risks and the perceived importance of risk management strategies to deal with price risks. In particular, futures markets were not perceived as relevant. Research is needed to clarify whether there is a lack of understanding by farmers of currently available strategies like futures trading, or whether current products for risk sharing do not fulfill farmers' needs. In the first case there is a need for education. In the second case current products need to be adapted or new products developed. Given the indicated importance of insurance schemes, insurers may be able to develop and successfully introduce schemes that cover price risks. *Lastly* the gaps identified in the study form part of possible areas for further study.

4.4 Conclusion

Due to dynamic nature of the risk management environment, many different risk management process models exist (see appendix 1). Some models contains six steps; defining the objectives the organization wishes to achieve, identifying loss exposures, measuring the potential losses, selecting the best ways to solve the problem, implementing the decisions made, and monitoring and evaluating those decisions. In contrast, other researchers have adopted a three step process models approach to the risk management, which includes identification, analysis, and economic control of all possible risks. Other researchers have suggested a four-step risk management process: identifying risk management techniques, evaluating them, selecting them; and implementing and reviewing decisions. However, this confirms that the risk management

industry is evolving, and only few of the existing models provide a specific mechanism for managing the evolution. The current summarized model consists of identifying, measuring, prioritizing, treating and monitoring risks.

Horticulture fanners and growers rely on a mix of strategies to reduce risk that range from production strategies, marketing strategies to financial strategies. Specific strategies include enterprise diversification, vertical integration, production contracts, marketing contracts, hedging by derivative instruments, insuring crops and use of financing strategy. Risk sharing strategies provide opportunities for dealing with the new and the old risks with which horticulture is confronted. Theoretically, risk-sharing strategies are in principle advantageous to both individual farmers and society as a whole. Empirically, farmers already perceive risk-sharing strategies as important strategies to manage risks.

The study shows that financial risk management could increase firm's performance and value by reducing expected taxes, cost of financial distress and agency cost. The improvement in firm performance is attained particularly when there is strategic fit and alignment between entrepreneurial culture, organizational strategy, management styles and various contextual factors which leads to increased sales, earnings and market share.

Based on the study, the following recommendations are made, *firstly*, researchers should pay more attention on key success factors for the growth of flower industry. This is due to the fact that the development of flower industry is unbalanced. In the same region, some countries experience a prosperous export growth while others have a mediocre growth or even show a decline and *secondly*, there is need to depart from eclectic approach to risk management theory and attempt construction of a new, comprehensive theoretical model, which would cover all of risk management aspects and close the knowledge gap between skills in model development and understanding of the unique, dynamic and risky conditions of farming system and business.

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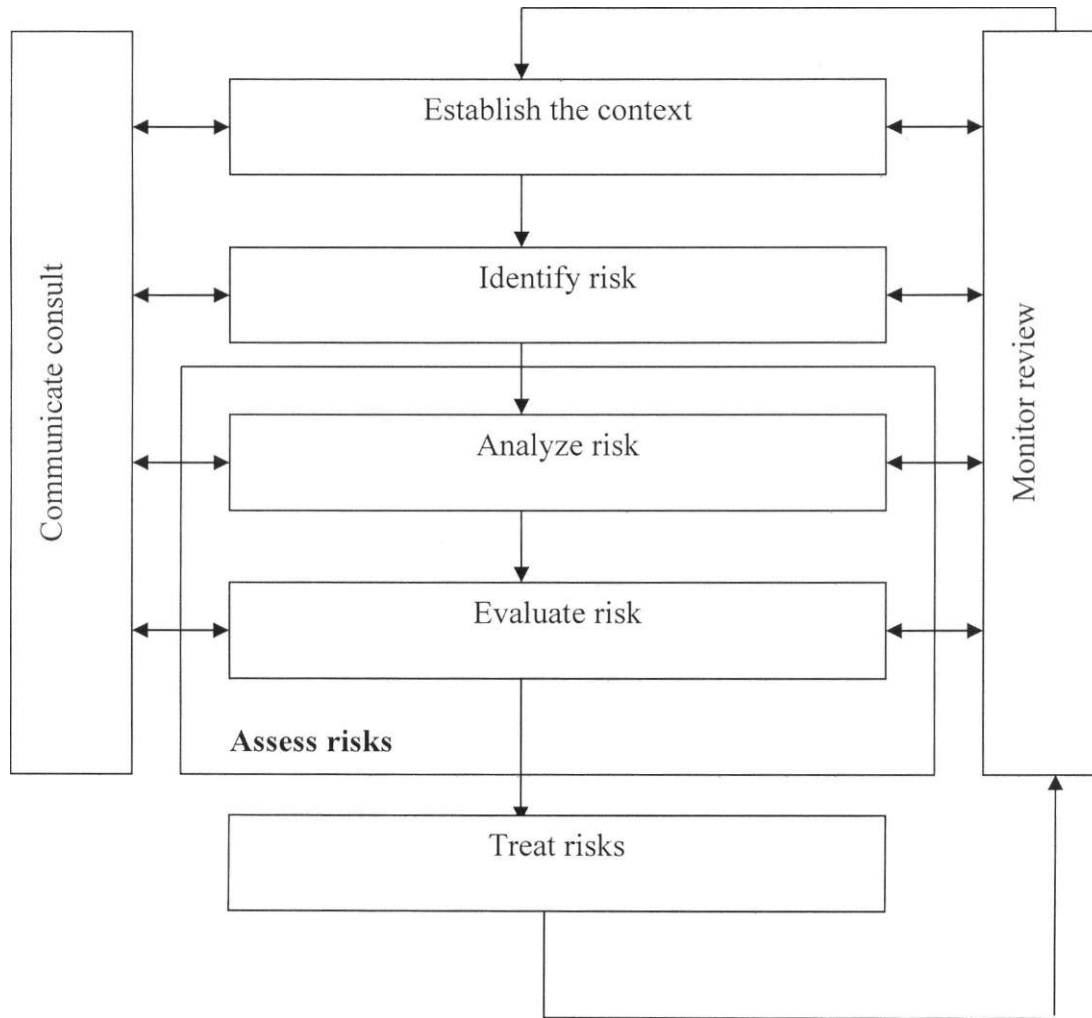
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Appendix 1: Past Risk Management Models

Author(s)	Step 1	Step 2	Step 3	Step 4	Step5	Step 6	Step 7
Williams & Heteins (1989)	Define objectives	Identify loss exposures	Measure potential losses	Select best ways to solve problem	Implement decisions made	Monitor and evaluate	
Williams as at (1998)	Mission identification	Risk assessment	Risk control	Risk financing	Program administration		
Dickson (1995)	Identification	Analysis	Economic control				
Head & Horn (1991; 1997)	Identify and analyze	Examine alternative techniques	Select 'techniques	Implement Monitor			
Dorftman (1994: 1998)	Identify and evaluate	Implement	Monitor				
Pritchett et al (1996[^])	Set objectives	Identify problems	Evaluate problems	Identify and evaluate alternatives	Choose alternatives	Implement alternatives	Monitor systems
Vaughan (1997); Vaughan & Vaughan 1999	Determine objectives	Identify risks	Evaluate risks	Consider alternatives and select risk treatment device	Implement decision	Evaluate and review	
Rejda (1995; 1998)	Identify	Evaluate	Select appropriate technique	Implement and administer			
Skipper (1998)	Identify and evaluate	Explore technique	Implement and review				
Harrington and Niethaus (1999)	Identify	Evaluate	Develop and select methods	Implement	Monitor		
Trieschmann et al (2001)	Identify	Evaluate	Select techniques	Implement and review			

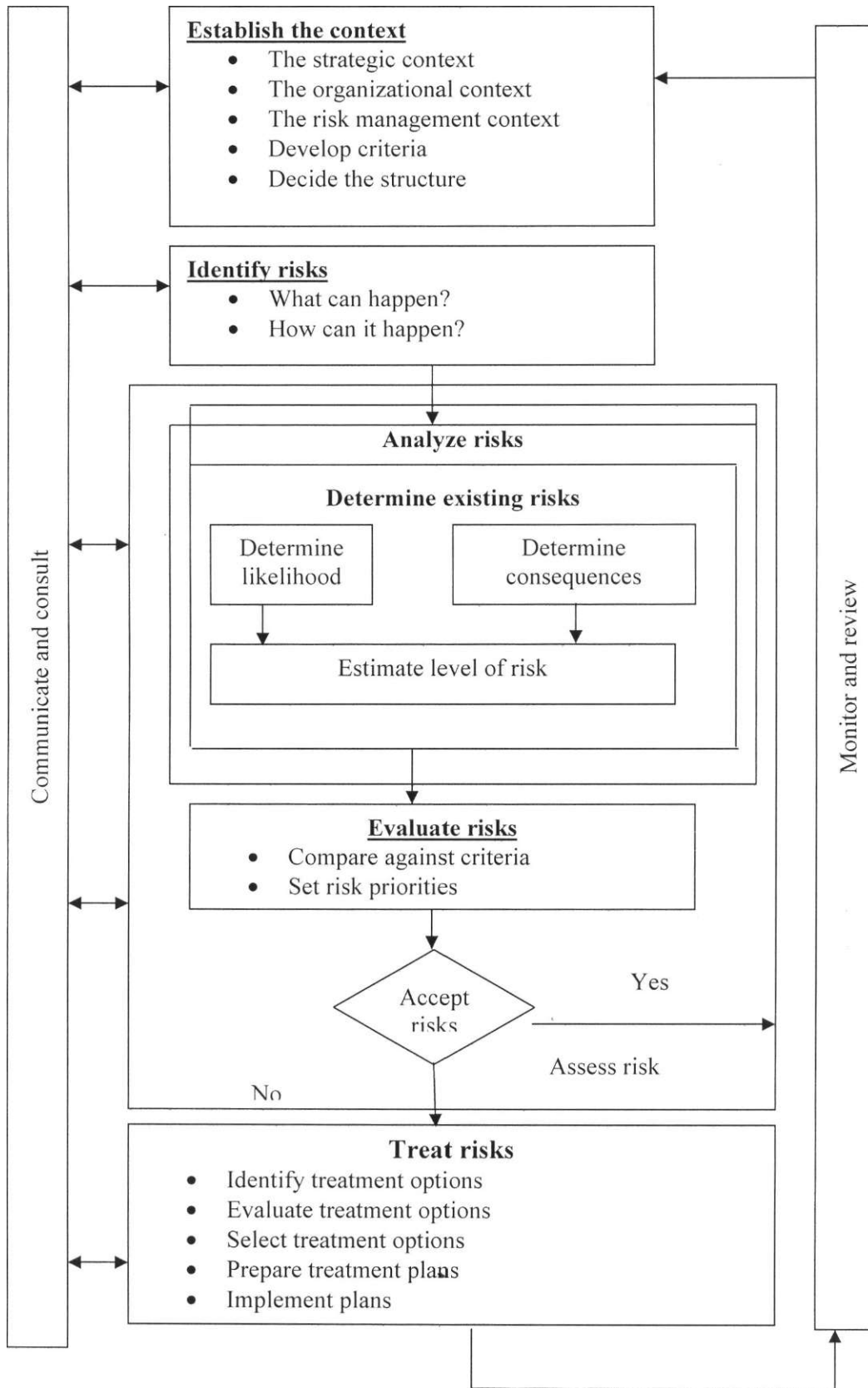
Source: Trieschman (2001:19).

Appendix 2: Risk Management Overview



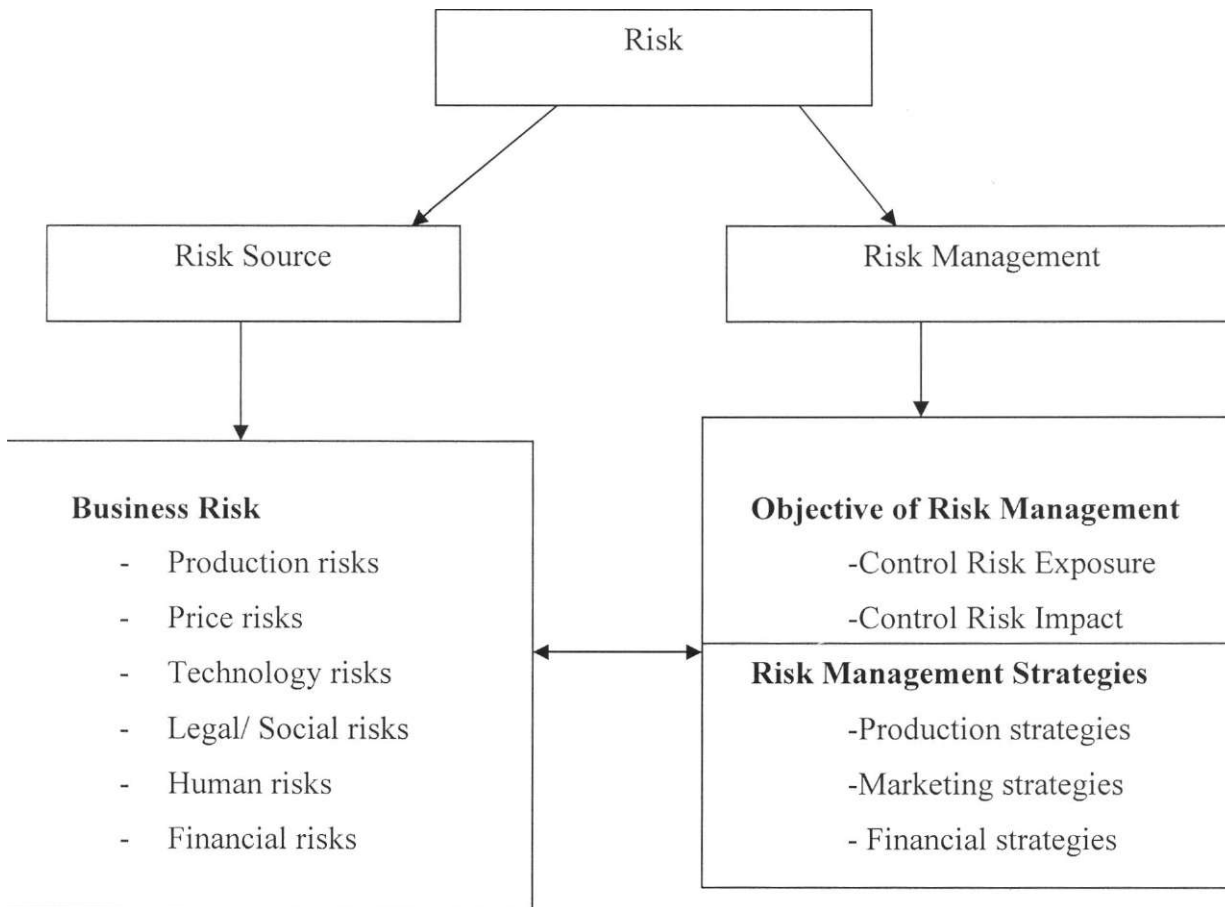
Source: Vaughan (1997:18)

Appendix 3: Risk Management Process



Source: Williams (1989:18).

Appendix 4: Sources of Risk and Risk Management Objectives and Strategies



Adapted from Gabriel et al. (1980:4)

Appendix 5: Models Referred in Study's Empirical Literature

1. Integrated Series and Co- integration Model

A series x_t is integrated of order d (we call it $I(d)$ process) if the series becomes stationary after differencing d times. Two series x and y are co-integrated if both series are of the same order d . A linear combination of the two series is integrated to the order b ($b < d$).

If a P exists such that $y_t - Px_t$ is an $I(0)$ process, then y and x are co-integrated.

$$y_t = a + \beta x_t + e_t$$

A cointegration model between X and Y can be equally rewritten as

$$\Delta y_t = \alpha + \beta \Delta x_t + \gamma (y_{t-1} - \rho x_{t-1}) + u_t$$

While the cointegration model emphasizes the long-run equilibrium relationship between y and x , the error correction model characterizes the short-run adjustment processes towards the equilibrium relationship.

Limitations of Co integration Analysis

Pre-test procedures (unit root test of individual variables) are often inconclusive.

There may be substantial small-sample bias.

Structural breaks in the time series can cause difficulties in unit root test and co integration analysis.

2. The Tobin Model

The **Tobin Model** is an econometric, biometric model proposed by James Tobin (1958) to describe the relationship between a non-negative dependent variable y , and an independent variable x . The model supposes that there is a latent (i.e. unobservable) variable h^* . This variable linearly depends on x , via a parameter (vector) p which determines the relationship between the independent variable (or vector) x , and the latent

variable V_i (Just as in a linear model). In addition, there is a normally distributed error term u_i to capture random influences on this relationship. The observable variable y_i is defined to be equal to the latent variable whenever the latent variable is above zero and zero otherwise.

$$V_i = \begin{cases} y_i^* & \text{if } y_i > 0 \\ 0 & \text{if } y_i < 0 \end{cases}$$

Where V_i is a latent variable:

$$y_i^* = \beta_0 + \beta_1 x_i + u_i, \quad u_i \sim N(0, \sigma^2)$$

If the relationship parameter β_1 is estimated by regressing the observed y_i on x_i , the resulting ordinary least square regression estimator is inconsistent. It will yield a downwards-biased estimate of the slope coefficient and an upwards-biased estimate of the intercept.

The Tobit model is a special case of a censored regression model because the latent variable y_i^* cannot always be observed while the independent variable x_i is observable. A common variation of the Tobit model is censoring at a value y_i different from zero:

3. Chi-squared or χ^2 test

Chi-squared or χ^2 test) is any **statistical hypothesis test** in which the test statistic has a chi square distribution when the null hypothesis is true, or any in which the probability distribution of the test statistic (assuming the null hypothesis is true) can be made to approximate a chi-square distribution as closely as desired by making the sample size large enough.

One case where the distribution of the test statistic is an exact chi square distribution is the test that the variance of a normally-distributed population has a given value based on a sample variance. Such a test is uncommon in practice because values of variances to test against are seldom known exactly.

4. A Linear Regression Model

A linear regression model assumes, given a random sample, a possibly imperfect relationship between Y_i , the regressand, and regressors. A disturbance term, which is a random variable too, is added to this assumed relationship to capture the influence of everything else on Y_i .

Note that the regressors are also called independent variables, exogenous variables, covariates, input variables or predictor variables. Similarly, regressands are also called dependent variables, response variables, measured variables, or predicted variables.

Models which do not conform to this specification may be treated by nonlinear regression. A linear regression model need not be a linear function of the independent variable: linear in this context means that the conditional mean of Y_i is linear in the parameters (3). For example, the model is linear in the parameters (3) and P2, but it is not linear in, a nonlinear function of X_i .

Assumptions

Classical assumptions for linear regression include the assumptions that the sample is selected at random from the population of interest, that the dependent variable is continuous on the real line, and that the error terms follow identical and independent normal distributions, that is, that the errors are i.i.d. and Gaussian. Note that these assumptions imply that the error term does not statistically depend on the values of the independent variables, that is statistically independent of the predictor variables.

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$$y_i^* = \begin{cases} y_i & \text{if } v_i > 0 \\ 0 & \text{if } y_i < 0 \end{cases}$$

Where V_i is a latent variable:

$$y_i^* = \beta x_i + U_i, \quad U_i \sim N(0, \sigma^2)$$

If the relationship parameter β is estimated by regressing the observed y_i on x_i , the resulting ordinary least square regression estimator is inconsistent. It will yield a downwards-biased estimate of the slope coefficient and an upwards-biased estimate of the intercept.

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