FUTURES TRADING IN PEPPER

By

SAPNA K. RANI

THESIS
Submitted in partial fulfillment of the requirement for the degree of

Master of Science in Co-operation & Banking
(Rural Banking & Finance Management)

Faculty of Agriculture
Kerala Agricultural University, Thrissur

Department of Rural Banking &Finance Management
COLLEGE OF CO-OPERATION, BANKING & MANAGEMENT
VELLANIKKARA, THRISSUR – 680 656
KERALA, INDIA
2008

Declaration

DECLARATION

I, hereby declare that the thesis entitled "**Futures Trading in Pepper**" is a bonafide record of research work done by me during the course of research and that the thesis has not previously formed the basis for the award to me of any degree, diploma, fellowship or other similar title, of any other university or society.

Vellanikkara **Sapna K. Rani**

Certificates

CERTIFICATE

Certified that this thesis entitled **"Futures Trading in Pepper"** is a record of research work done independently by **Ms. Sapna K. Rani** under my guidance and supervision and that it has not previously formed the basis for the award of any degree, fellowship or associateship to her.

Vellanikkara

Dr. Molly Joseph
Professor and Head
Dept. of Rural Banking & Finance Mgt.
College of Co-operation, Banking and Mgt.
Vellanikkara, Thrissur

CERTIFICATE

We, the undersigned members of the Advisory Committee of **Ms. Sapna K. Rani** (2004-15-03) a candidate of the Master of Science of Co-operation & Banking with major field in Rural Banking and Finance Management, agree that the thesis entitled "**Futures Trading in Pepper**" may be submitted by **Ms. Sapna K. Rani,** in partial fulfillment of the requirement for the degree.

Dr. Molly Joseph
Professor and Head
Dept. of Rural Banking & Finance Mgt.
College of Co-operation, Banking and Mgt.
Vellanikkara, Thrissur

Sri.N.Mohanan
Assistant Professor (Sel.Gr.)
Dept. of Rural Marketing Management
College of Co-operation, Banking and Mgt.
Vellanikkara, Thrissur

Smt.T.K.Ajitha
Assistant Professor (Sel.Gr.)
Dept. of Agriculture Statistics
College of Horticulture
Vellanikkara, Thrissur

Sri.A.Sakeer Husain
Assistant Professor (Senior Scale)
Dept. of Agricultural Extension
College of Agriculture
Vellayani, Trivandrum

EXTERNAL EXAMINER

ACKNOWLEDGEMENTS

ACKNOWLEDGEMENTS

I humbly bow my head before the Almighty, who blessed me with power, prowess and peace to complete this endeavor successfully, in spite of the most difficult times faced by me during the period of my study.

Any accomplishments require the efforts of many people and this work is no different, in writing this work my ideas have been shaped by several persons. Each interaction enriched my knowledge and added new dimension to understand the needs and action required. It is difficult to list every name.

First and foremost, I express my deep felt gratitude and heartfelt thanks to ***Dr.Molly Joseph,*** *Professor and Head, Department of Rural Banking and Finance Management, Chairperson of my Advisory Committee for her expert counsel, keen interest, constructive criticism, extreme patience, understanding, sage guidance and constant encouragement through out my course of study. I feel greatly honored by getting a chance to work under her guidance.*

During the course of thesis work, I was provided with much needed advice and suggestions by ***Dr.N.Mohanan,*** *Assistant Professor (Sel. Grade), Dept. of Rural Marketing Management and member of my advisory committee and I profoundly thank her.*

I sincerely thank ***Smt.T.K.Ajitha****, Assistant Professor (Sel. Gr.), Department of Agricultural Statistics and member of my advisory committee for her ardent interest and guidance for the improvement and the preparation of the thesis.*

I am respectfully thankful to ***Sri.A.Sakeer Husain****, Assistant Professor (Sr. Scale), Department of Agricultural Extension and a member of my advisory committee for his valuable suggestions and support through out the endeavor.*

I express my heartfelt thanks to Dr.K.A.Suresh, Department of Development Economics, Sri.S.Krishnan, Department of Agricultural Statistics for his incredible suggestions and guidance throughout the course of my study. I am greatful to Dr.K.M.George, Dr.E.V.K.Padmini and Dr.M.A.Lizy for their co-operations and guidance during the entire period of my study.

I am also placing my deep sense of gratitude to Sri.E.V.Ranjith Kumar, Sali, K.S. and Misha Davis for their kind concern, support and encouraging words.

I wish to express my greatfulness to Dr.M.Mohandas, former Associate Dean and Dr.V.Ramachandran, Associate Dean for their timely help and encouragement through out my academic career.

I am highly indebted to all the faculty members of the College for their constant support through out my studies.

I am benefited immensely from the College Library, College of CCBM and University. I owe my thanks to Shri.Sathian, K.P., Librarian and all library assistants for the help extended by them.

I am also placing my deep sense of gratitude to all staffs and non staffs of College of Co-operation Banking and Management, for their co-operation Moral support and timely help.

I acknowledge my sincere gratitude to Sri.C.Raveendranathan, former Lead District Manager, Canara Bank, Thrissur, for his whole hearted co-operation, kind concern, continuous support and generous help through out my thesis work. I am also thankful to Sri.Madhu, Director of OWERD, Smt.P.T.Usa, District Development Officer, NABARD, Thrissur and all the officials of DRDA, Kudumbasree, various banks and NGOs.

With all my regards, I place my heartfelt gratitude to my dearest friends Divya, Neethu, Nimmi, Anooja, Reshma, Shinoj, Maya and Radhika who offered their devoted friendship and challenged me to new heights.

I also sincerely acknowledge the whole hearted co-operation and generous help rendered by my seniors Anju Ravi, Prameela, Bibin Mohan, Aneesh, Anu S. Nair, Jaliya, Sreerekha, Hari and Anuja, my juniors Sowmya, S., Tintu Sara, Divya S. Pillai, Aysha Reshma, Mariyam Mufida, Deepa, Arya, Manju, Nataraj, Sowmya, Anjali and Guru.

I would further like to extend my gratitude to Kerala Agricultural University for the assistance in the form of fellowship.

I am forever indebted to my parents, chichi, chettan and my dear cousins for their never ending boundless affection, deep concerns, prayers, personal sacrifices and unceasing encouragement which made this possible and meaningful.

Sapna K. Rani

Dedication

Dedicated to

my teachers

Contents

CONTENTS

List of Tables

LIST OF TABLES

List of Figures

LIST OF FIGURES

INTRODUCTION

CHAPTER 1
INTRODUCTION

Pepper "the king of spices" which reigns the Indian flora with its sweep pungency and flavour, has a magic spell in human civilization and culture since very ancient days. The flavour and fragrance of this oriental spice established commercial link between the orient and the major centers of civilisation. Indigenous to India especially Kerala, this 'black gold' as it is called, holds the supreme position in the world market because of its celebrated varieties 'Malabar Garbled' and 'Tellicherry extra bold'. Pepper occupies a prime position in food industry with its hot flavour and also in ayurvedic medicine with its curative effect. Kerala accounts for the bulk of pepper production in India. The finest Indian pepper is grown in the monsoon forests of the Malabar Coast in Kerala.

For centuries by gone, India held a virtual monopoly in pepper production and trade. Unfortunately Indian pepper lost its glory over the past two decades mainly because of competition from the major pepper producing countries like Indonesia, Malaysia, Sri Lanka and Brazil. India still holds second position in global production by contributing 19 per cent of total production. India's production has been 50,000 tons during 2007-08 compared to 55,000 tons produced in the previous year due to poor maintenance of pepper plantations and occurrence of disease.

1.1 Significance of the study

Even after long years of independence, agriculture continues to be the back bone of Indian economy, in terms of generation of employment and output. The reform process has left, practically no sector of the economy unaffected and have serious implications as far as India's agricultural economy is concerned. With the removal or relaxation of controls of prices and distribution, by the Government, the management of price risk by various operators has assumed considerable significance. In the emerging scenario, the commodity futures market can play an important role. Futures market has been justified on various grounds such as pricing efficiency, price risk management,

stability in prices, integration of prices, price discovery and price reference and helpful to farmers and traders. It is useful to all segments of the economy. It is useful to the producer because one can get an idea of the price likely to prevail at a future point of time and therefore can decide between various competing commodities that best suits him/her. It enables the consumer to get an idea of the price at which the commodity would be available at a future point of time. He/she can do proper costing and also cover his/her purchases by making forward contracts. The futures trading is very useful to the exporters as it provides an advance indication of the price likely to prevail and thereby help the exporter in quoting a realistic price and thereby secure export contract in a competitive market. Having entered into an export contract, it enables him/her to hedge his/her risk by operating in futures market. A stockist, trader and processor are all interested in this trade as they can be away from the fear of losses from the future fall in price.

The supply of pepper has seen a dramatic increase over a period of ten years till 2003. While prices have fallen from 1997, the market has absorbed the supply of pepper. Between 1997 and 2002, world production of pepper increased dramatically from 189,000 tons to 341,000 tons, an increase of over 12 per cent per annum. The increase in production is mostly attributable to Vietnam's emergence as a major pepper producer along with substantial increase in production from the other pepper producing countries like, Brazil, India, Indonesia, Malaysia, Sri Lanka and China. With the fall in production after 2003 led by India, Brazil and Malaysia, the trend reversal may be significant, especially with Vietnam reporting no increase in production. World pepper production is projected to be lower in 2008 at 2, 62,400 tons as against 2, 72,040 tons in 2007 and 2, 89,230 tons in 2006 following weak crop in India, Brazil, Indonesia and Vietnam. With the increasing demand for pepper, India has opportunities to significantly increase its share in world market.

Pepper as a commodity is always associated with vulnerable price fluctuation which hampers economic growth and is associated with accentuating poverty among the farming community. Vagaries in the pepper price are mostly affecting Kerala as it produces lion's share of the pepper in India. In this context pepper futures market

potentially play a very crucial role in the price risk management process. A pepper futures market can serve two basic functions, to provide a means for price risk management; and to act as a forum for price discovery.

As a prominent pepper producer and consumer, India plays a vital role in the trading of pepper. Kerala which contributes 90 per cent of the Indian production of pepper assumes greater significance in this context. At the time of large fluctuation of prices of agricultural commodities, it is the need of the hour to take steps by the concerned authorities to protect the farmers against the losses incurred. Online trading has been implemented with the objective of helping the farmers to ensure better market and reasonable price for their product in advance. It limits the role of intermediaries and focuses on a price discovery mechanism. Hence a study of online trading in pepper will give an understanding about price discovery mechanism of spot and futures prices and the extent of participation of the farmers and traders as well as impact of futures trading in pepper. Study concentrated in the major pepper producing and trading areas will bring to light the specific problem of the Kerala pepper farmers with respect to online trading.

1.2 Statement of the problem

Price risks in the world pepper economy are large. Pepper is one of the most volatile commodities traded internationally, with prices more often than not changing by upwards of five per cent from one month to another. This creates large risks for farmers, traders and importers of pepper, as well as, to some extent, for Governments' intent on protecting their farmers' incomes.

Futures trading in pepper is not a new idea in India. The Pepper and Ginger Merchants' Association in Bombay organized futures trading in pepper during the 1930s, until it was banned in 1944. After India's independence, the Cochin Hill Produce Merchants' Association reintroduced futures contracts in pepper in April 1952. Five years later, in 1957, this was taken over by the Indian Pepper and Spice Trade Association (IPSTA). IPSTA also established the International Pepper Future

Exchange for the global trading of pepper, along with its domestic exchange. By April 2004 it had launched online trading in pepper. Although the volume of trade through IPSTA is very low compared to other national commodity exchanges, it plays a leading role in fixing the pepper price and disseminating the information to the media. Most of India's major pepper exporters are members of the exchange and use it regularly. As Indian commodity futures markets are bound in a tight web of regulations and the Government can intervene in physical trade in pepper in various ways such as procurement prices and export prices set by the Government, this exchange could not keep international standards before the deregulation of futures markets.

As part of the Agreement on Agriculture (AoA), under WTO, the removal of government interventions in prices and import restrictions resulted in the situation that price movements are fixed according to the international market. This led to the need for the Indian pepper farmers to get oriented itself to be a part of the global pepper market. Moreover the necessity of farmers to protect themselves from the vagaries of the price risk became more evident.

A well developed and effective commodity futures market, unlike physical market, facilitates offsetting the transaction without impacting on physical goods until the expiry of a contract. These provide remunerative price and hedging mechanism to farmers, traders and exporters. The Report of UNCTAD on 'Feasibility study on a Worldwide Pepper Futures Contract' also recommended futures trading as a panacea to protect the poor farmers from the vagaries of falling commodity prices. This system artificially ensures the most salient features of vibrant trade such as transparency, high volumes, large cash flow, and involvement of many players and reduces risk. The present study concentrates on futures trading in pepper with the aim of analyzing the extent of integration of futures and spot prices of pepper traded in the National Multi Commodity Exchange. As futures trading is expected to be advantageous primarily to the farmers, the benefits derived by the participants in the futures market, viz., farmers, farmer traders and traders are also examined in detail.

1.3 Objectives of the study

The objectives of the study are

i) to analyse the price discovery mechanism of pepper futures through National Multi Commodity Exchange of India Ltd. (NMCE); and

ii) to examine the benefits of futures trading in pepper to farmers and traders.

1.4 Utility, scope and limitations of the study

India with a population of over one billion is predominantly an agrarian economy. With the initiation of the economic liberalization policy and signing of the AoA of World Trade Organization (WTO), interest in the futures market have been revived after long four decades of ban. However, the extent of policy support to futures markets will primarily depend on how efficiently they function.

Uncertainty due to agricultural commodity price fluctuations hampers economic growth and is associated with accentuating poverty and suicides among the farming community. It is not uncommon in India that in the event of a bumper crop the prices collapse to such an extent that a farmer is not able to recover even the cost of storage and transportation of his produce. Wide fluctuation in the prices of agricultural commodities create very difficult situation for farmers. Absence of market based risk instruments compels the farmers to diversify their crop mix and go for less risky and less capital-intensive farming. Commodity futures can play a very crucial role in increasing stability of farm income. Thus two main economic roles played by agricultural futures markets are hedging price risk and a price discovery mechanism. Price discovery is the process of determining the prices of a commodity based on supply and demand factors.

Thus futures trading has to ensure a better price to the pepper farmers for their product and as a hedging tool to help the farmer to manage price risk effectively. This online transparent trading mechanism helps a farmer in remote India access international rate for pepper to make a contract on the local exchange and also to take

decision based on information available to him. Also pepper traders, stockists and exporters are benefited from the futures trading since the supply of quality product at pre determined price is assured. So study on futures trading in pepper enables to understand how far these assumptions are met in the case of pepper farmers and traders.

The recent events in the commodity derivatives exchanges i.e., is large scale speculative trading and non participation of hedgers have highlighted the need for better regulation of this fast growing market. Farmers and primary processors find commodity exchanges and their trading floors difficult to access due to high membership and trading fees. The existing regulatory structure needs to ensure that bylaws of the exchanges provide enough access to stakeholders to trade in futures and prices are free from market manipulations. Physical deliveries and standardization of the commodity are issues of concerns both for producers, exporters and traders in this market. These are all problems which open scopes for further study relating to futures trading.

The study is restricted to 60 respondents, 30 from the major pepper producing district i.e., Wayanad and 30 from the major trading district i.e., Ernakulam. Unlimited speculative trading in futures market sets a limit for providing remunerative price for the farmers. Misunderstanding and lack of awareness among the pepper farmers and aversion towards computer based online trading keep farmers away from the futures trading. Also the high delivery unit and high investment in trading keep small and marginal farmers who form the major share of population among producers, away from participating in trading. Lack of efficient co-operative marketing system in pepper intensifies the problem by reducing the opportunity to reap benefits of futures trading. These characteristic features in general limits the scope of operation of futures trading which will naturally be reflected in the findings of the study, although every effort has been taken to get correct and accurate information from the farmers and traders.

1.5 Organization of the thesis

The report of the study has been presented in five chapters. The first chapter discusses the significance of the study, statement of the problem, objectives and utility, scope and the limitations of the study. The second chapter on review of literature provides the theoretical orientation about the study. The third chapter details the methodology adopted in the process of investigation and analysis. The fourth chapter is earmarked for results and discussion of the study. The last chapter highlights the summary of findings and the conclusion followed by references, appendices and abstract of the thesis.

REVIEW OF LITERATURE

CHAPTER 2
REVIEW OF LITERATURE

Literature review aims to portray the critical points of current and collected knowledge on the topic under study. It seeks to describe, summarize, evaluate, clarify and integrate the content of primary report. Moreover, it forms the basis for the justification for future research in the area. As such, review of literature has become an inevitable part of any scientific investigation. Hence a brief review of available literature, on various topics related to the study is attempted and presented in this chapter under the following sub headings:

2.1 Indian pepper economy
2.2 Futures trading in agricultural commodities
2.3 Futures trading in pepper

2.1 Indian pepper economy

India holds lion's share of the world's pepper production and export and Indian pepper is preferred world wide. Studies which reveal the significance of this crop and the problems faced by this industry are discussed in this section.

Workshop on strategies for export development of spices (1989) mentioned that among the spices exported, pepper has the leading position in terms of quantity and value realized. Because of the inherent qualities of Indian black pepper, there is heavy demand for this spice. The workshop identified the problems for the export of Indian black pepper and classified them as arising from international production and external threats from other producing countries.

Raju (1990) pointed out that the productivity of pepper in India is one of the lowest in the world which results in uncompetitive price of the commodity in the international market. It was found that production of pepper has got a significant influence on its export. One of the major deterrents of Indian pepper export is the

impressive gains in the share of export by other competitors both in terms of quality and cost.

Saikat and Sinharoy (1994) examined whether the movements in the international prices of Indian pepper have reflected the variations in the prices of pepper in other exporting countries during the 1980s and whether the domestic price of pepper has moved synchronously with the international price. The results indicated that due to the open trade status for pepper, prices have moved synchronously indicating integration in the world pepper market.

Madan and Selvan (2001) examined the effect of disturbances in the international pepper market on the Indian pepper economy, and identified the constraints, which could be converted into opportunities. The production of pepper and value added pepper products and their economic contribution was also examined. The paper analysed the fluctuating pepper price in the international market and its impact on the pepper industry. The efforts taken to improve the acceptability of the Indian pepper in the international market was then verified in the light of changing food habits modifying the contents of the export basket. The present direction of the Indian exports and the future prospects for Indian pepper in the international market were also analysed with alternative plans to augment exportable surplus of pepper.

Rajesh *et al.* (2002) studied the domestic and international prices of black pepper by doing linear regression analysis and found that export of pepper depended upon the level of production and domestic demand. On the contrary the domestic prices have got negative effect though its magnitude is less. This might be due to the integration of domestic price and overseas price and also the growth in domestic consumption though insignificant.

Peter and Nybe (2002) expressed the view that price competition in global markets is the major challenge for the Indian pepper industry. A realistic price reduction to offer healthy competition to our major competitors, combined with technology adoption for augmenting productivity and quality of Indian pepper is a

prerequisite for the success of the Indian pepper industry in the present liberalized trade regime.

ICICI Direct (2008) reported that the yield of pepper in India is very low at 315 kg per hectare against 1,678 kg in Malaysia and 1,244 kg in Indonesia. One reason for its low productivity in India is that it is grown mostly by small farmers along with other crops on small holdings whereas in other countries like Malaysia and Brazil it is grown as a pure crop. Although in the case of tea, coffee and rubber there are some large scale holdings, in the case of pepper there are virtually no holdings on plantation scale in India. The productivity is also low because of the continued use of old cultivation methods and shortage of well rooted cuttings of high yielding varieties, attack of pests and diseases like slow-wilt, wilt, little leaf and quick wilt. Of these, quick wilt is the most devastating disease, which spreads rapidly destroying a large number of vines, estimated at about 20 per cent of the total crop almost every year in the country.

Umarji (2008) reported that the harvest season in Vietnam, the world's largest producer and exporter ranges from March to mid May. Hence, Vietnam quoted low price hampering Indian competitiveness. However, a rising demand from the Middle East and a falling rupee, boosted Indian pepper exports.

Even with a very low productivity, India is having a significant share of the global pepper market. Neglect to adopt better production techniques and high yielding varieties, diseases such as quick wilt, and fast growing labour charges are adversely affecting the performance of pepper productivity. Efforts are required to maintain and improve the quality of Indian pepper and its price competitiveness.

2.2 Futures trading in agricultural commodities

A well-developed and effective commodity futures market facilitates price discovery and thereby, helps in minimizing the price risk associated with seasonal variations in the demand and supply of commodities. As part of Agreement on Agriculture (AOA) under the World Trade Organisation (WTO), Government had to

withdraw from the role of fixing prices in agricultural sector and assign a new market mechanism i.e., futures market, for price discovery based on diverse domestic as well as international market information, such as price, demand and supply, climatic conditions, etc., and also a tool for hedging risk for various groups such as farmers, traders and exporters. Review of studies on futures trading in agricultural commodities in general, in India and in other countries, are the content of this section.

Ghosh *et al*. (1987) suggested a well-developed and effective commodity futures market, unlike physical market, which facilitates offsetting the transactions without impacting on physical goods until the expiry of a contract. Futures market attracts hedgers who minimize their risks, and encourages competition from other traders who possess market information and price judgment. While hedgers have long-term perspective of the market, the traders, or arbitragers as they are often called, hold an immediate view of the market. A large number of different market players participate in buying and selling activities in the market, based on diverse domestic and global information, such as price, demand and supply, climatic conditions and other market related information. All these factors put together result in efficient price discovery as a result of large number of buyers and sellers transacting in the futures market.

In the study conducted by Frank (1992) the introduction of an agricultural commodity futures market in South Africa was considered. A futures market can be used by both buyers and sellers of a commodity to significantly reduce price uncertainty. Theoretical arguments were used to show that the futures and cash prices should be very close, if not equal, at expiration and that the current futures price should be a good forecast of the cash price at expiration. The study revealed that speculators play an important role by providing liquidity to the futures market, but it is possible that they can distort prices. For a futures market to be a success in South Africa, it was suggested that, there needs to be a free cash market, adequate liquidity and well informed traders. A computer-based trading system is an improvement on the traditional floor trading system mainly because prices are more likely to reflect the underlying supply and demand conditions.

Akiyama *et al*. (1993) investigated into the ability of food - deficit developing countries to import food at stable prices. This paper examined the possibility of using commodity futures for the purpose of price smoothing of food imports for small developing countries. A tighter integration between the theoretical work on the competitive storage model and the role of futures in providing greater stability in imported food prices was presented, as an illustration of the approach using a simple model essentially based on the competitive storage theory. The paper begins by presenting a welfare analysis of stable imported food prices. Recent findings on spot and futures price behaviour relevant to import food price stabilization were reviewed followed by empirical confirmation of these findings in the context of world wheat markets. An import food grain price stabilization programme using futures is presented with advantages of a futures programme over a buffer-stock programme.

A study by Backenhogg (1993) revealed that agricultural reforms will make prices of main farm products fall and fluctuations in prices increase in nearly all agricultural markets. The case was put forward for the development of futures markets for farm products in Germany. Such markets existed to a limited extent from the early 1900s but ceased to be necessary when Common Agricultural Policy (CAP) provided a safe market for most farm products. The function of futures markets in improving price information and reducing risks is explained and their possible benefits in Germany under conditions of CAP reform and agreement on GATT are discussed.

Link (1993) suggested various ways in which German farmers can protect themselves against price fluctuations with the advantages and disadvantages of each of these. The operation of a commodity futures market is explained and the effects of hedging operations on profits are illustrated for cases of rising and falling prices of potatoes and of pigs.

Pavaskar *et al.* (1993) opined that there is a lively debate amongst economists about the nature and practice of hedging in commodity futures markets. The paper examined the debate, not with a view to sharpen the area of disagreement among rural economists, but to demonstrate that the differences are superficial rather

than real, and that, underlying the diverse concepts and views, there is a consensus though unacknowledged, on a single, uniform concept of hedging. The agreement simplifies the task of measuring the economic efficiency of hedging. Subsequently, the paper examined the nature of risks and returns involved in hedging practices in order to ascertain the theoretical efficiency of the futures market for the purpose of hedging. The analysis disclosed the principal economic determinants of hedging decisions, the character of hedging in future markets and its efficiency.

Morgan *et al.* (1994) found that the inability of individual developing nations to provide wide scale commodity price support and the continual renegotiation of international commodity agreements have engendered a search for alternative mechanisms to reduce price volatility for soft commodities. One possibility is the use of futures markets. The authors selected four commodities, viz., cocoa, coffee, sugar and wheat and analysed the efficiency of associated futures markets in terms of price discovery and risk reduction. All four markets exhibited efficiency and therefore provided, in theory, a viable policy alternative for developing economies. The study also briefly reviewed the work indicating why there has been a move away from international commodity agreements towards the use of futures markets as a means of managing price risk in the face of price variability. The study also discussed the relationship between instability and futures trade lag. The last part of the study examined the price discovery and risk management functions for the futures markets for the four commodities. According to the authors, futures trading provide an alternative to forward contracting or government intervention as a means of managing the risk associated with producing and trading in soft commodities. The effectiveness of a futures market is dependent on the ability of that market to provide a forum for price discovery. The study suggested that futures markets for four widely traded soft commodities perform the forward pricing function adequately and can thereby facilitate decision making by agents with respect to production, sale, purchase and storage. Evidence on short-run basis and spot price variability suggested that the markets could facilitate risk management through hedging.

Morgan *et al.* (1994) identified that output and price variability were inherent features of temperate and tropical soft commodities. The authors examined the role of future markets in providing a means of reducing the instability associated with a perishable soft commodity, namely potatoes. The context for the analysis was the gradual reduction in the extent of market intervention and in particular, the lifting of import restrictions. A general overview of the potato market in the UK is presented, and the relationship between trade liberalization, instability and futures trading is examined. The role of the futures market in providing a reduction in price instability by focusing specific attention on both the price discovery and risk management functions of the market is examined. Forward contracts had a history within the agricultural sector for guaranteeing a certain price for a certain quantity, but in the context of reducing instability such contracts have the disadvantage of lacking flexibility. The alternative was futures trading that provide a more flexible and liquid means of managing the problems of instability within an agricultural commodity market.

Link (1996) illustrated the principles of hedging by an example of a maize futures contract at the Chicago Board of Trade (CBOT). The method by which a German maize producer could reduce risk from fluctuating prices by selling through a futures market and the costs of the process are outlined.

Uhlmann (1996) outlined the principles on which commodity futures trading works and the advantages of hedging in reducing risks for raw material producers and purchasers. The essential role of speculators in carrying the risk and that of international merchants and processors in developing the trade is described.

Graf (1997) explained the way in which milling firms would be able to use the market to hedge against falling or rising prices of cereals with examples.

Penning and Meulenberg (1997) opined that agribusiness companies and farmers must cope with the risk of price changes when buying or selling agricultural commodities. Hedging price risk with agricultural commodity futures offers a way of minimizing this risk. Because many new agricultural futures

markets, especially those in Europe, are thin markets, hedgers face liquidity risks which have to be taken into account while evaluating hedging effectiveness.

Tomek (1997) proposed that futures markets provide contemporaneous price quotations for a constellation of contracts with maturities of thirty or more months in the future. Futures markets simultaneously determine a price level. Futures prices can efficiently reflect a complex set of factors but still provide poor forecasts. According to the author, forecasts based on quantitative models cannot, however, improve on efficient futures prices as forecasting agents; empirical models provide as poor, if not poorer, forecasts.

The purpose of the study by Manfredo and Libbib (1998) was to apply the concept of index futures contracts to the produce industry by developing indexes based on prices of fruits and vegetables and to determine the hedging effectiveness of potential futures contracts written on these indexes. Twenty representative fruits and vegetables were chosen to compile indexes for fruits, for vegetables, and for fruits and vegetables together using a trade-weighted arithmetic average of 1989-92 wholesale prices of selected commodities traded on the Dallas Wholesale Fruit and Vegetable Market. The indexes were then tested by simulating a short and long hedge of a portfolio of commodities and by cross hedging selected individual New Mexico and California produce commodities with the indexes. US fruit and vegetable industry did not have a risk management instrument or a well-structured price discovery system, such as commodity futures contracts, to aid in the marketing and management of its price risk. Since the 1980s, financial futures contracts based on indexes of stocks, commodities and currencies have been used to hedge these groups of assets.

Carter (1999) described the main contributions in the literature on commodity futures markets and attempts to determine potential gaps in the literature. It was argued that modern studies have focused primarily on technical questions, with insufficient economic content. More research needs to be directed towards understanding fundamental economic issues such as why so few farmers hedge, the impact of government farm programmes on commodity futures, and the market

impact of commodity pools. The literature has failed to explain the prevalence of inverted markets in grains and oilseeds, and there is unexplainable price volatility in markets such as pigs and orange juice.

Naik and Jain (2000) assessed the performance of Indian futures markets in terms of risk management and price discovery functions. The usefulness of futures markets in risk management was evaluated by analysing the risk involved in the spot, futures, and basis of commodities, while their role in price discovery was evaluated by examining forward pricing ability through tests of co - integration between cash and futures prices and tests for efficiency and lack of bias. Data used in this study pertain to the period 1990-2000 for castor seed, pepper, turmeric, potato and gur, and for 1993-2000 for hessian. It was concluded that the Indian futures markets for agricultural commodities are yet to develop fully as efficient mechanisms of risk management and price discovery. In spite of the high volume of domestic and international trade in physical markets and the high price volatility of many commodities traded, the use of futures markets is relatively low as reflected in the volume of transaction.

Booth and Ciner (2001) investigated about alternative explanations of long-term co - movements among the prices of agricultural commodity futures contracts. An analysis of Tokyo Grain Exchange future prices for maize, red bean, soybean and sugar (during the period of July 1993-March 1998) supported the common economic fundamentals hypothesis. It was concluded that a long-term interdependency of these prices could exist because of common economic fundamentals or herd behaviour by market participants.

Dalhlgran (2001) developed a general model of cash and futures markets for a storable commodity. The cash market model was characterized by the incorporation of long-hedge to establish contractual claims against existing inventories, which may be either short-hedged or unhedged. The futures market model incorporates outright speculation as well as spread speculation. The paper then examined through mathematical analysis the characteristics these markets must possess if they are

informationally efficient, if they are conformable for testing price discovery, and if they are integrated in the short or long run. Results indicated that informationally efficient futures markets were characterized by any one of five conditions, viz., perfectly inelastic utilization demand; perfectly inelastic hedged inventory demand; futures markets not used for hedging; perfectly elastic speculation or infinitely elastic utilization demand; and perfectly inelastic speculation. These conditions further imply that if futures markets are informationally efficient, their prices are not determined simultaneously with cash prices. The extreme assumptions associated with informational efficiency highlight the deficiency of the concept.

Hambloch *et al*. (2001) examined the experience of the commodity futures exchange in Hannover, Germany. This exchange commenced trading in 1998, following moves to establish futures markets in Germany in the mid-1990s. With pricing becoming less of an agricultural policy instrument, and less administrative influence on markets, planning risks are increasing. Futures trading can help maintain security of planning.

Morgan (2001) reviewed the arguments for utilizing futures markets in less developed countries (LDCs) as an instrument of risk reduction and examined the reasons underlying the review of price risk in internationally traded commodity markets by a World Bank task force. The authors concentrated on issues like, why there is currently an interest in the use and establishment of futures markets, what role a futures market can be expected to perform and to what extent producers in LDCs can be helped. The extent and scale of futures market usage across the world was illustrated. It was clear that there is a concentration of exchanges in developed market economies rather than in LDCs, and that there is perhaps little cross-linkage between the two sets of markets.

Yoon and Brorsen (2001) revealed that as opposed to a normal market, an inverted market has a negative price of storage or spread. Market inversions in nearby spreads rarely occur during early months of the crop year since stocks are usually abundant after harvest. However, market inversions frequently occur when the spreads are

observed across crop years near the end of the crop year. The regressions of spreads on the logarithm of US quarterly stocks showed that there exists a positive relationship between the spread and the level of stocks, and further implies that when stocks are scarce, markets will be inverted. Simulations were conducted to determine whether a market inversion is a signal to sell the stocks. The results of the paired-difference tests revealed that as the crop cycle advances towards the end of the crop year, market inversions clearly reflect the market's signal to release stocks in anticipation of new crop supplies. The regressions of actual returns to storage on predicted returns to storage clearly showed that a market inversion is a signal to sell. The results supported the behavioural finance hypothesis that producers are choosing to hold excess stocks because of some type of biased expectations.

Bryant and Haigh (2002) investigated issues of recent interest and controversy regarding bid-ask spreads in commodity futures markets. First, they applied competing spread estimators to open outcry transactions data and compared resulting estimates to observed spreads. This enables market microstructure researchers, regulators, exchange officials, and traders, the opportunity to evaluate the usefulness and accuracy of bid-ask estimators in markets that do not report bid and ask data, providing an idea of the "worst-case" transaction costs that are likely to be incurred. They also compared spreads observed before and after trading was automated on commodity futures markets, and discovered that spreads have generally widened since trading was automated, and that they have an increased tendency to widen in periods of high volatility. Their findings suggested that commodity futures markets have an inherently different character than financial futures markets, and therefore merit separate investigation.

Kenzie and Holt (2002) tested market efficiency and unbiasedness in four agricultural commodity futures markets (live cattle, pigs, maize, and soybean meal) using co - integration and GARCH error correction models. The primary data set included both futures and spot prices for these commodities in Chicago, Illinois, USA, over the period 1959-2000 (an in - sample period from September 1959 to October 1995, and an out-of-sample period from December 1995 to October 2000). Results indicated that each market is unbiased in the long run, although cattle, pigs and maize

futures markets exhibited short-run inefficiencies and pricing biases. Models for cattle and maize outperformed futures prices in out-of-sample forecasting. Results also suggested short-run time-varying risk premiums in cattle and pigs futures markets.

Meulenberg and Pennings (2002) proposed a marketing strategic approach to commodity futures exchanges to optimize the hedging services offered after analyzing the threats and opportunities of commodity futures exchanges. The study demonstrated that market orientation is an important element in the market strategies of commodity futures exchanges. The proposed market strategic framework was applied to the Dutch pig futures market. It was concluded that market penetration is an appropriate strategy. Consequently, to identify the variables that distinguish between farmers who initiate futures positions and farmers who do not, the authors conducted a discriminant analysis on data gathered from 418 Dutch pig farmers. The discriminant analysis showed that latent variables, such as farmers' perceived performance, farmers' reference price and farmers' market orientation, are important discriminating variables. Farmers' cash market behaviour (in terms of the frequency of selling in the spot market) was also identified as an important discriminating variable. The usefulness of these results as input for a penetration policy was also demonstrated in the study.

Santos (2002) remarked that though economists are divided over whether, in practice, futures markets reduce spot price volatility, observers of nascent 19th century US futures markets essentially praised the stabilizing effects of this financial innovation. This paper explored what role, if any, the advent of futures trading may have had on spot price volatility. The author corroborated the CBOT's assertion regarding diminished spot price volatility around the 1870s and showed that early futures prices did indeed fulfil their price discovery function. Moreover, he addressed two alternative hypotheses that relate the decline in spot price volatility to the Civil War. Ultimately, he maintained that the evolution of futures markets is the principal proximate reason why commodity spot price volatility diminished.

Yang and Awokuse (2003) examined risk minimization hedging effectiveness for major storable and non - storable agricultural commodity futures markets in the

USA. Data used consisted of daily cash and nearby futures prices for storable commodities - maize, soyabean and wheat traded on the Chicago Board of Trade; and cotton and sugar traded on the Cotton, Sugar and Coffee Exchange. For non -storable commodities lean pigs, live cattle and feeder cattle traded on the Chicago Mercantile Exchange were selected. The sample period was from 1 January 1997 to 31 December 2001. Based on the error correction model (bivariate GARCH frameworks), it was found that the hedging effectiveness was stronger for storable commodities than non - storable commodities under consideration. The findings thus illustrated an important difference between storable and non storable commodities with regard to their hedging function.

Fortenberry and Zapata (2004) examined the relationships between the New York coffee futures markets and cash markets in two Latin American LDCs (Honduras and Guatemala). The specific objectives were to determine whether the New York futures contract for coffee offers hedging opportunities for Latin American coffee market participants, and to examine the relationship between futures trade composition in New York and the volatility of coffee prices in Latin American cash markets. The first objective was addressed using co - integration analysis, using data for the period March 1990 to December 2001. The second objective was tackled using a combination of a regression model and an analysis of the residual behaviour from the co - integration equations, using bi-weekly data for January 1993 to December 2001. The results shed light on the potential impact of speculative market activity on futures volatility, and the extent to which futures market volatility corresponds to volatility in LDC cash markets.

Garcia and Leuthold (2004) reviewed the research literature on agricultural commodity futures and options markets, focusing primarily on empirical studies. The topics featured included the development of inter temporal price relationships, hedging and basis relationships, price behaviour and institutional issues related to futures markets. Using this base of information as background, future research directions were discussed with respect to risk management and marketing strategies, price and volatility behaviour, electronic trading, price discovery and trading funds, and exchange behaviour.

Kuwornu *et al*. (2004) applied agency theory to assess risk shifting between the principal (marketing firms) and the agent (farmers) in a food marketing channel. The study compared the case in which there is a futures market available for the risk-averse agents with the case in which there is no futures trading. Simulation results revealed that risk shifting from marketing firms to farmers, possibly as a consequence of chain reversal, could be better managed by farmers if they trade on a futures market. This demonstrated the hedging role of futures contracts as a price-risk management instrument.

Mohan and Love (2004) investigated whether coffee producers could benefit by taking coffee production/marketing decisions on the basis of coffee futures forecasts. The methodology employed was to match futures and spot prices for the coffee futures contract traded at the international commodity exchanges. Regression analysis demonstrated that changes in spot prices were not explained by changes in lagged futures prices. On the contrary, it emerged that futures prices tend to adapt to the prevailing spot prices. The deviations of the spot prices from the lagged futures prices were over 30 per cent on average and they did not follow any systematic pattern. Therefore, the hypothesis that coffee futures market information could benefit coffee producers could not be empirically supported.

Tuthil and Frechette (2004) examined optimism and pessimism in commodity price hedging to model the use of corn futures and options by a corn buyer. Optimal futures and options positions were numerically calculated by maximizing rank dependent utility for a variety of cases. The cases represented three different types of agents - pessimists, strong optimists and weak optimists - for several levels of risk aversion, with and without transactions costs. Whether or not an agent trades as a speculator or a hedger was found to depend on his level of optimism or pessimism, risk aversion and transactions costs.

Armesto and Gavin (2005) constructed daily measures of the real interest rate and expected inflation using commodity futures prices and the term structure of Treasury yields. The analysis considered 34 commodities traded on several different

North American exchanges. It was found that commodity futures markets respond to surprise increases in the federal funds rate target by raising the inflation rate expected over the next three to nine months. There was no evidence that the real interest rate responds to surprises in the federal funds target.

Jairath and Kamboj (2005) attempted to examine the present condition of commodity trading and identify the constraints encountered in augmenting futures trading in India. The study covering all the commodity exchanges in India suggested that there is a strong and urgent need to amend Forward Contracts (Regulation) Act, 1952 and SEBI Regulations to allow options in futures trading. To attract foreign investors to invest in Indian agricultural commodity futures, necessary legal provisions have to be made in the Act by amending the Negotiable Instruments Act, 1881. Central Authority may be promoted to institute a system of designated surveyors to inspect and certify delivery. Massive publicity and awareness campaign should be launched with the help of National Institute of Agricultural Marketing to reach at market and farmer level. All commodity exchanges should provide necessary financial support for undertaking the task. Concerted efforts should be put forth by government on priority to address the identified constraints enabling Indian agri-commodity futures to scale up new heights and make their presence felt in the global market.

Mashamaite and Moholwa (2005) tested the existence of price asymmetry in South African futures markets for white and yellow maize, wheat, and sunflower seeds using a dynamic price asymmetry model. The 'sum of coefficients test' and the 'speed of adjustment test' were used to determine whether or not prices move up in the same fashion as they move down, over daily and weekly data frequencies. Data ranged from 1996 (for white and yellow maize), 1997 (for wheat) and 1999 (for sunflower seeds), till the year 2003 for each commodity. Out of the four commodity futures markets studied over varying data frequencies, only daily wheat was price asymmetric. Wheat daily prices responded faster to price decreases than to price increases. The implication of the results was that past prices do affect current prices and contain information. Hence, the weak-form efficient market hypothesis appeared to be contradicted for the wheat futures market. Another important implication of the results was that implementing policies

accounting for asymmetric behaviour through price limit and margin policies would improve the functioning and stability of the wheat futures market in South Africa.

Madhoo (2005) in his study enquired about the differences between commodity and stock exchanges, the liquidity problem of commodity exchanges and the need to restructure the Forward Markets Commission. He pointed out that a Government Task Force recommendation to integrate the securities and commodity futures markets in India, if implemented, will spell disaster to commodity futures trading in the country.

Sahadevan (2005) examined the experiences of the two international futures exchange in India with a focus on the strength and weaknesses of their infrastructure and regulation vis-à-vis that of the best in the world. It reviewed the existing institutional capacity, business processes and procedures that have been relied upon for conducting international futures trading in these exchanges. The paper intended to focus some lights on the agenda for capacity building for an appropriate regulation for fostering technology oriented and internationally competitive commodity futures exchanges in the country. It also identified the role that a model regulator plays in developing vibrant market places with sound user focus and integrity which can attract participants from within and outside the country. In commodity futures business, India still continues with a nascent market in terms of physical infrastructure, systems and procedures. These two exchanges have certain common deficiencies in terms of infrastructure for delivery. Creation of a liquid and vibrant domestic market with adequate infrastructure and transparent trading practices should be the priority of the regulator. The regulation and governance of exchanges are of equal importance; one without the other can never develop an orderly marketplace. The international experience shows that exchanges are only to provide a platform for trade in many commodities and in different forms of contracts.

Shilpa (2005) opined that it is difficult for small and marginal farmers to directly trade with the exchange due to issues like membership and quantities handled by small farmers. Nevertheless they can become the clients of such member and trade on the exchange. The exchange has realized the need for a neutral aggregator to hedge

forward the price risk of such farmers. Hence banks, commodity boards, co-operatives and agri-extension service provider had to play the role of aggregator. An aggregator in every village can collect all the produce and trade on the Exchange on behalf of the farmer.

Wang and Ke (2005) analyzed the efficiency of the Chinese wheat and soybean futures markets. Formal statistical tests were conducted based on Johansen's co - integration approach for three different cash markets and six different futures forecasting horizons ranging from one week to four months. Weekly futures price data for wheat and soybeans for the period January 1998 to March 2002 were provided by the China Zhengzhou Commodity Exchange (CZCE) and the Dalian Commodity Exchange (DCE), while cash prices were obtained from the CnGrain online database. The results suggested a long-term equilibrium relationship between the futures price and cash price for soybeans and weak short-term efficiency in the soybean futures market. The futures market for wheat is inefficient, which may be caused by over-speculation and government intervention.

The findings of Bhar and Hamori (2006) support that of Booth and Ciner (2001) with respect to the long term movements in prices of commodities (maize, red beans, soybeans and sugar) traded at the Tokyo Grain Exchange (TGE). The empirical results suggest that the co-integrating relation exists among commodity future contracts from 2000 to 2003, but not during the 1990s. This indicated that the price mechanism works better and the long-run relationships among prices become more apparent as a market develops.

Erb (2006) found that investors face numerous challenges when seeking to trade in commodity futures. Historically, the average annualized excess return of the average individual commodity futures has been approximately zero and commodity futures returns have been largely uncorrelated with one another. The prospective annualized excess return of a rebalanced portfolio of commodity futures, however, can be equity-like. Some security characteristics (such as the term structure of futures prices) and some portfolio strategies have historically been rewarded with above-

average returns. It is important to avoid naive extrapolation of historical returns and to strike a balance between dependable sources of return and possible sources of return.

Sahi (2006) studied the impact of introduction of futures contracts on the volatility of the underlying commodity in India. Empirical results suggested that the nature of volatility has not changed with the introduction of futures trading in wheat, turmeric, sugar, cotton, raw jute and soy oil.

Chakravarthy (2006) observed that, compared to stocks, trading in commodities is much cheaper, because margins are much lower than in stock futures. Brokerage is low for commodity futures. It ranges from 0.05 per cent to 0.12 per cent. Due to these factors, commodity futures are a speculator's paradise.

Gorton *et al.* (2007) found that commodity futures risk premiums vary across commodities and over time depending on the level of physical inventories, as predicted by the Theory of Storage. Using a comprehensive data set on 31 commodity futures and physical inventories between 1969 and 2006, the authors proved that convenience yield is a decreasing, non-linear relationship of inventories. Price measures, such as the futures basis, prior futures returns, and spot returns reflect the state of inventories and are informative about commodity futures risk premiums. The excess returns to Spot and Futures Momentum and Backwardation strategies stem in part from the selection of commodities when inventories are low. Positions of futures markets participants are correlated with prices and inventory signals.

Kabra (2007) pointed out that the turnover of the Indian commodity futures market has grown exponentially in a short span of time. With skewed market participation that largely favours speculators, the futures market leaves a lot to be desired as an effective instrument of risk management and price discovery for the benefit of the growers, traders, processors, and other stakeholders in the physical trade. It is argued that policymakers have overlooked wider considerations involving the discipline of checks and balances. Owing to the massive size and non-zero-sum game character of these markets, they are likely to introduce a series of unsettling

macroeconomic effects, such as a possible redistribution of incomes from the small players to the big speculative financial market entities. The article concluded with a reference to the factors that could have been behind the snags afflicting the present commodity futures policy, and suggested how the needs of the real economy can be satisfied by strengthening the forward trade that is firmly anchored in the physical trade of the farm commodities under reference.

Himadri (2007) remarked that the modern commodity market finds its origin in the trading of agricultural products. The author has traced the evolution, structure and development of the commodity derivatives market in India and its regulation.

Hirshleifer (2007) opined that trading costs, in the form of either explicit charges or of the costs of becoming informed, limit the participation of some classes of traders in the commodity future markets. When speculators face a fixed cost of participating in a futures market that is used by commodity producers to hedge their stochastic revenues, the futures risk premium deviates from the perfect market prediction. The deviation rises in absolute value with the square root of the trading cost and with the standard deviation of residual returns, and it is unrelated to the covariance of the futures price with producers' non marketable wealth. The residual-risk premium depends not on the total magnitude of the risk that producers hedge (i.e., aggregate revenue variance), but on the variability of their revenue relative to its mean (i.e., the coefficient of variation). Hence, even a commodity that constitutes a minor fraction of aggregate consumption may have a large premium for residual risk if the revenue derived from it has a large coefficient of variation.

Biswal and Badaskar (2007) argued that despite the phenomenal growth rate of Indian commodity futures markets, there are apprehensions about commodity futures market in India. Politicians have constantly frowned upon the concept of futures and forward trading. The exchanges and analysts attempt at allaying all apprehensions about forward and futures trading. There has been widespread interest in the relationship between commodity futures market and its underlying spot trading. This study examined the role of commodity futures market in providing a price discovery

mechanism. The extent to which futures market perform this function can be measured from the temporal relation between futures and spot price. If information is reflected first in futures price and subsequently in spot price, futures price should lead spot prices, indicating that the futures market performs the price discovery function. The price linkage between futures market and spot market was investigated using cointegration (Johansen, 1991) analysis which offers several advantages. To examine the cointegration and error correction dynamics, the authors used futures and spot indices of NCDEX and MCX.

Ravikumar (2007) argued that commodity exchanges or the futures trade that happen in them, were not to be blamed for the inflation. The rise in prices of agricultural commodities was result of production shortfall and the exchanges merely reflect the reality. There had been a shortfall in food grain production over last three years which is the main reason for the rise in price of wheat and rice. The prices of non exchange traded goods have also increased sharply.

Kumar (2008) studied the present status, growth, constraints and developmental policy alternatives for commodity futures market in India. He opined that commodity derivatives play a pivotal role in the price risk management process especially in any agricultural surplus country. He explored the advantages of adding commodities to portfolio of equities in Indian context based on empirical data and quantified the diversification benefit and down side risk protection that commodities offer in portfolio context. The study concluded that the less than perfect or negative correlation of commodities with equities makes them an excellent condition for diversification. This diversification benefit was demonstrated in two ways. First, it was observed by adding commodity futures to a return of portfolio. Second, it was observed that adding commodity futures to equity portfolios provides a significant downside protection and enhances skewness and kurtosis of the return distribution.

Babcock (2008) outlined the advantages of the futures markets that in addition to reducing the costs of production, marketing and processing, futures markets provide continuous, accurate, well-publicized price information and continuous liquid

markets. Futures trading is thus beneficial to the public which ultimately consumes the goods traded in the futures markets. Without the speculator futures markets could not function.

According to Forward Markets Commission (2008) with the gradual withdrawal of the government from various sectors in the post-liberalization era, the need has been felt for providing the various operators in the commodities market with a mechanism to hedge and transfer their risks. India's obligation under WTO to open agriculture sector to the world would require futures trade in a wide variety of primary commodities and their products to enable diverse market functionaries to cope with the price volatility prevailing in the world markets.

Gopal and Tulasi (2008) attempted to explore the effect of the introduction of futures trading on spot prices of pulses. They found that volatility in urad as well as pulses prices was higher during the period of futures trading than in the period before its introduction as well as after the ban of futures contracts.

According to Singh (2008) the existing futures markets and contracts reveal that though the volume of futures trading has increased phenomenally, its ability to provide instruments of risk management has not grown correspondingly. Rather, the growth has been poor, due to high basic risk in most of the contracts which keeps out potential hedgers and leads to greater dominance by speculators. There is an urgent need to educate farming communities on how to use the exchange to hedge their price risks. Moreover to opt for the modern mechanisms, consolidation has to happen in Indian agriculture.

Futures trading have been recognized as effective machinery for controlling agricultural prices and as a hedging tool. Studies have shown mixed results indicating that futures trading have either driven up or brought down volatilities in spot prices, better price discovery and risk management in various countries depending on the commodities and underlying market conditions. Co - integration technique has been

widely used in the study of price discovery of futures and spot which justify the methodology adopted in this study.

2.3 Futures trading in pepper

A pepper futures market can serve two basic functions, one to provide a means for price risk management and secondly to act as a forum for price discovery. It helps to fix the price of pepper according to international information. Studies specifically on pepper futures are limited in number. Hence the opinions and observations regarding futures trading in pepper are presented here.

Vidhyasagar (1996) pointed out that an international pepper exchange would give the players adequate exposure to competitiveness prevailing in the international market. This also extends hedging facility to the pepper producing countries.

Ravindran (2000) pointed out that Indian Spices and Trade Association of India (IPSTA) took the lead role in establishing forward trading in pepper in India. This effected risk transfer and price discovery in trade successfully. The risk is transferred from the hedgers to speculators and the latter also provide liquidity to the market.

UNCTAD (2000) listed out the conditions for a successful futures contract. It was pointed out that it is difficult to estimate the extent of possible speculative interest, but the speculative pool of money in the region was large, and the experience of the Indian futures market would tend to indicate that pepper, with its high price volatility, is indeed of interest to speculators.

Geojit Securities Ltd (2008) reported that Kerala enjoys a near monopoly in area and production of pepper, accounting for about 73 per cent share in the country, with Idukki and Wayanad districts leading. Price risks in the industry remain high. Pepper, considered as an investment can be hoarded for long periods and this is especially true of the Indian scenario where there are large carry forward stocks due to low prices. Pepper farmers and growers have minimal say in the prices for their produce. Futures trading is therefore a possible mechanism for all participants to hedge their price risks. Geojit has installed trading terminals in the remotest parts of Idukki

and Wayanad to empower the small growers and farmers to actively participate in the national price discovery process.

IPSTA (2008) observed that the seller/farmer can use the futures market to obtain fair price for his produce. The farmer can also predict the futures prices as per the price of futures contracts prevailing in IPSTA. On comparing this with the current spot price, the farmer can decide to hold or sell his produce to get maximum benefits. The farmer can also directly participate in the futures exchange to hedge his position.

The review of literature has brought to light the significance of futures trading in agricultural commodities. The studies show that trading in the futures market has benefited farmers through better integration of futures and spot prices of these commodities. The limitations of the system have also been pointed out by some authors. Although studies on futures trading in agricultural commodities in general are in plenty, pepper specific studies are limited. This justifies the present study on futures trading in pepper.

MATERIALS AND METHODS

CHAPTER 3
MATERIALS AND METHODS

The study on "Futures trading in Pepper" has been conducted with the main objectives of analyzing price discovery mechanism of pepper futures and also examining the benefits of futures trading in pepper to farmers and traders. This chapter narrates the methodology and data sources adopted in conducting the present study which are presented under the following sequence:

3.1 Sources of data
3.2 Locale of the study
3.3 Selection of the sample
3.4 Statistical tools used for analysis

3.1 Sources of data

The study has been conducted using both primary and secondary data. The first objective of analyzing the price discovery mechanism of pepper futures was done using secondary data on daily futures and spot prices from May 2003 to March 2008 available from the website of National Multi Commodity Exchange, www.nmce.com. The data regarding major pepper producing, consuming, exporting and importing countries were collected from the website of International Pepper Community, www.ipc.com. Data with respect to area under cultivation, production and productivity of pepper were made available from the website of Directorate of Economics and Statistics. Other sources of secondary data were published statistics of commodity exchanges, Spices Board and India Pepper and Spice Trading Association (IPSTA).

For examining the benefits of futures trading in pepper to farmers and traders, primary data were collected from sample farmers and traders by means of a structured interview schedule. Details regarding the opinions of traders and farmers on futures trading in pepper and benefits derived by them were collected through the survey. The data collection was done during the month of April 2008.

3.2 Locale of the Study

Two districts of Kerala, namely, Ernakulam and Wayanad were selected for identifying the farmers and traders for collecting information regarding the benefits derived from futures trading. These districts were purposively selected since Ernakulam is the major pepper trading area and Wayanad, one of the major pepper producing areas. The farmers and traders were identified based on the information available from the commodity broking firms and IPSTA.

3.3 Selection of the sample

From each of the two districts of Ernakulam and Wayanad, 30 respondents were selected to analyze the benefits of futures trading in pepper to farmers and traders. Out of the 30 respondents from Wayanad, 12 belonged to the category of farmers who are not trading in futures (non – trader farmers); eight are farmers as well as hill produce merchants who are also trading (farmer traders); and the rest 10 are Hill Produce Merchants who are trading in futures (non – farmer traders). In Ernakualm, 18 belonged to the category of traders who are really speculators (non – farmer traders), and the rest 12 are exporters of pepper (non- farmer traders) who are indulging in futures trading as part of hedging their risk in business. Thus the total sample of 60 consisted of 08 trading farmer, 12 non- trading farmers, and 40 non – farmer traders.

3.4 Methodology of data analysis

The primary and secondary data collected for the study have been analyzed using the following statistical tools:

i) Co-integration technique

To examine the price discovery mechanism of pepper futures through NMCE, co-integration technique was used. Co-integration theory suggests that if two non - stationary time series are co-integrated, residuals of the linear combination of these two non stationary series are stationary. Therefore, co-integrated series indicate stable long run relationship between them. This concept provides a basis for the efficiency test of futures market. Evidence of co-integration between non stationary spot and futures

prices indicates that there is a stable long run relationship between them. It establishes that information is transmitted between futures and spot prices adequately and this leads to efficient price discovery. Therefore, co-integration between two non stationary time series is a necessary condition for market efficiency (Chowdhary 1991; Fortenbery and Zapata1993; Fraser and Mac Donald 1992; Lai & Lai 1991).

The daily data of the futures and spot prices of pepper were collected from the website of National Multi Commodity Exchange of India. As a contract starts on 16th of a month and ends on 15th of the sixth month, from 16th to 15th of the next month was considered as one month. The daily data were converted into monthly averages. The monthly averages of futures and spot prices were co-integrated and prediction equation was derived. From this, price discovery of futures and spot was analysed.

Futures market efficiency requires that past spot and futures prices do not provide additional and useful information to agents in forming expectations about the futures spot prices and all available information are fully reflected in the futures price. Therefore, the efficiency of futures market can be explained through distributed lag specification of spot on futures price (Aulton *et al.*, 1997).

$$S_{t+1} = a + b_0 F_{t-1} + cS_t + \sum_{t+1} \quad \ldots\ldots\ldots\ldots\ldots\ldots (1)$$

where $\sum_{t+1} \sim IID(0,\sigma^2)$ and $|c| < 1$ and S and F series are integrated of order one, ie., I(1).

Long-run relationship between spot and futures prices represents systematic and persistent co-movement of these variables over time. The long-run parameters can be derived from the equation (1) using the Bewley (1979) transformation and long-run relationship can be expressed as:

$$S_{t+1} = \gamma + b^e F_t + u_{t+1}$$

where $\gamma = a/(1-c)$ and $b^e = (b_0 + b_1)/(1-c)$.

In order to examine co-integration between spot and futures prices, the residual term is explained as follows:

$$U_{t+1} = b_1 \Delta F_t + c (S_t - \gamma + b^e F_t) + \sum_{t-1}$$

For spot and futures prices to be co-integrated, residual (U_{t+1}) should be stationary or I (O). If ΔF_t and U_{t+1} are I(O), the terms ($S_t - \gamma + b^e F_t$) is also I(O); that is, S_t and F_t are co-integrated (Aulton *et al.*, 1997). Co-integration ensures that the spot and futures price series do not diverge without bound. Co-integration is tested under the null hypothesis that is no co-integration between S_{t+1} and F_t.

ii) Kendall's Co-efficient of Concordance

To know the concordance/agreement among various groups such as traders, farmers and farmer traders, with advantages of online trading Kendall's coefficient of concordance was used.

Kendall's coefficient of concordance (W) was calculated by using the formula,

$$W = \frac{12\ S}{K^2 (N^3 - N)}$$

where, N = Number of object

K = Number of rankings

$$S = \Sigma\ (Rj - \bar{Rj})^2$$

Rj = sum of ranks assigned to each determinant

χ^2 was computed for testing the significance of 'W' by using the formula

$$\chi^2 = K (N-1) W.$$

iii) Mann Whitney U Test

Mann Whitney U Test has been done for the pair – wise comparison of the farmers and traders with respect to the degree of benefits of futures trading enjoyed by them.

If ordinal measurement has been achieved, the *Mann Whitney* U test can be used to test whether two independent groups come from the same population or not. This is one of the most powerful non parametric tests which can be used as an alternative to t-test.

Let H_0: Mx = My

And n_1 and n_2 be the sample sizes where $n_1 < n_2$. To apply U-test first combine the observations of both samples and rank them in order of increasing size ie, give rank one to the smallest observation, rank two to the next smallest and so on. Let R_1 be the sum of the ranks obtained by the sample having n_1 observations, R_2 be the sum of the ranks obtained by the sample having n_2 observations. The test statistic U is calculated as

$$U_1 = n_1 n_2 + \frac{n_1 (n_1+1)}{2} - R_1 \quad \ldots\ldots\ldots\ldots\ldots\ldots (1)$$

or equivalently

$$U_2 = n_1 n_2 + \frac{n_2 (n_2+1)}{2} - R_2 \quad \ldots\ldots\ldots\ldots\ldots\ldots (2)$$

Equations 1 and 2 give different values of U. The smaller value is taken as the test criterion.

Case 1

When $n_1 < n_2 < 9$

Pr(U≤ U') where U' is the observed value of U are tabulated for various values of n_1 and n_2 . If this observed probability is less than or equal to the required level of significance we reject the hypothesis.

Case 2

When $9 \leq n_2 \leq 20$

The critical values of U are tabulated for various values of n_1 and n_2 and at different levels of significance. If the observed value is less than or equal to the value given in the table we reject the hypothesis.

Case 3

$n_2 > 20$

As n_1 and n_2 increase in size, the sampling distribution of U approaches to normal distribution with

$$\text{mean} = \frac{n_1 n_2}{2} \quad \text{and}$$

$$\text{Variance} = \frac{n_1 n_2 (n_1 + n_2 + 1)}{12}$$

$$Z = \frac{U - \frac{n_1 n_2}{2}}{\sqrt{\frac{n_1 n_2 (n_1 + n_2 + 1)}{12}}} \sim N(0,1)$$

iv) T-test

While analyzing the farmer related characteristics of the respondents, the pair - wise comparison of income of farmer traders and non trader farmers was done using

student's t – test, to find out whether there is any significant difference between their income from pepper.

T-test of difference of two sample means

Let m_1 and m_2 be the means of two independent samples of sizes n_1 and n_2 and let S_1 and S_2 be the estimates of standard deviation. The estimate of common standard deviation applicable for both the samples is calculated by pooling together the sum of squares corresponding to the two samples and dividing by the total degrees of freedom ie.,

$$S = \sqrt{\frac{(n_1-1)S_1^2 + (n_2-1)S_2^2}{n_1 + n_2 - 2}}$$

The test statistic is given by

$$S_1^2 = \frac{\Sigma x_1^2 - (\Sigma x_1)^2 / n_1}{n_1-1}$$

$$S_2^2 = \frac{\Sigma x_2^2 - (\Sigma x_2)^2 / n_2}{n_2-1}$$

$$t = \frac{|m_1-m_2|}{S\sqrt{1/n_1 + 1/n_2}}$$

v) Compound annual growth rate

Compound annual growth rate of area, production and yield of pepper in India for the period of thirteen years are calculated. The compound annual growth rate is calculated by taking the nth root of the total percentage growth rate, where n is the number of years in the period being considered.

$$CAGR = \left(\frac{\text{Ending Value}}{\text{Beginning Value}} \right)^{\left(\frac{1}{\text{\# of years}} \right)} - 1$$

Calculated value is compared with table value for $t_{n1 + n2 -2}$ degrees of freedom at required level of significance. The null hypothesis of the sample means are equal is rejected, if the calculated value of t > the table value.

vi) Annual percentage growth rate

Trend in pepper production, area and yield were analysed with the percentage growth over the years using the formula:

$$\frac{\text{Current year value-Previous year value}}{\text{Previous year value}} * 100$$

vii) Percentage share

Country wise Percentage share of area, production and productivity is analysed using the formula:

$$\frac{\text{Individual value}}{\text{Total}} * 100$$

These statistical tools are used in the study to analyse price discovery mechanism of pepper futures and also to know the benefits obtained by the farmers and traders.

RESULTS AND DISCUSSION

CHAPTER 4

RESULTS AND DISCUSSION

Economic liberalization process ushered in India as a sequel to the economic reforms in 1991, which set in motion policies and programmes that are aimed at gearing the economy towards global economic integration. 'Competition' has been recognized as a dominant driving force for achieving the transformation of the economy towards the set objectives. As the economy opens up and there are increasingly lesser price and distribution controls on commodities, the management of price risk by various operators such as producers, exporters, stockists and traders assume considerable significance. Consequently the role of commodity futures and forward markets is bound to increase.

The present study is an attempt in this direction, with the specific objectives of examining the price discovery mechanism of pepper futures and also benefits of pepper futures trading to farmers and traders. With these objectives in view the results and discussion are presented under the following five major sections, namely,

4.1 Pepper economy – An overview
4.2 Commodity derivatives market in India
4.3 Price discovery mechanism of pepper futures in NMCE
4.4 Benefits of futures trading in pepper to farmers and traders.

4.1 Pepper economy – An overview

The dried fruit of the plant, *Piper nigrum* L, generally known as pepper, is an important tropical spice. *Black pepper* is obtained when mature green or yellow berries of the pepper vine are harvested and dried. Pepper has an important place in global trade in spices. Historically, it was the first spice to be traded internationally and largely responsible for opening up trade routes between the West and the East. Today, it is the most important spice traded, in terms of quantity as well as value and accounts for a significant portion of world trade in spices.

Pepper has a chequered history. It is as old as human civilisation itself. The Assyrians and Babylonians (3000BC to 2000BC) traded in pepper obtained from the Malabar Coast of India. The *Vedas*, the Bible and the Quran contain references to pepper. Expeditions in search of pepper led to the discovery of new trade routes. Wars have been fought and countries colonised to gain control over the supply of pepper and other spices.

Pepper occupies an important position in the cuisines of both East and West. It is also widely used as a food preservative. With its antioxidant, anti-microbial, analgesic, anti-pyretic and anti-inflammatory properties, it has wide applications in pharmaceutical products and in Ayurveda, the indigenous system of Indian medicine. No wonder Indian Pepper has fascinated the world from ancient times.

4.1.1 Global Pepper Scenario

The pepper vine thrives best in the tropics, in a moist, hot climate, at the elevations from 1500 feet mean level, with an evenly distributed rainfall of about 100 inches. The richest growth is seen on fertile, flat or gently sloping and rich in humus land with good drainage and light shade.

Pepper is cultivated today in many countries of the world. Brazil, India, Indonesia, Malaysia, and Sri Lanka, who are members of the International Pepper Community, and Vietnam, China, Ecuador, Madagascar, Thailand and Cambodia, produce quantities of pepper significant in world trade. Other countries where pepper is grown on a small scale are Mexico, Brunei, Fiji, Samoa, Micronesia, Guatemala, Honduras, St. Lucia, Tanzania, Malawi, Zimbabwe, Benin, Kenya, Cameroon, Ethiopia, Uganda and Zambia.

4.1.1.1 Global production of pepper

World pepper production has been increasing over the last half century and declined after the year 2003. This increase in production has been mainly due to a substantial expansion in area and production in Vietnam, as well as increased output from Indonesia and China. It is reported that between 1997 and 2002, world production

of pepper increased dramatically from 189,000 tons to 341,060 tons, an increase of over 12 per cent per annum. This increase in production is mostly attributable to Vietnam's emergence as a major pepper producer along with substantial increase in the output from the other producing countries, namely, Brazil, India, Indonesia, Malaysia, Sri Lanka and China. The attractive price for pepper, which prevailed during 1999 and to some extent in 2000, encouraged farmers to expand the area cultivated with pepper.

Table 4.1 depicts the area under cultivation, production and yield of pepper of the major pepper producing countries of the world for the period 2001 to 2004.

As evident from Table 4.1, with respect to the area under cultivation, India has been dominating in all the three years, but on a declining trend, except for the year 2004, where there is an increase of one per cent from 38.7 per cent in 2003 to 39.7 per cent in 2004. It is to be noted that with around 40 per cent of the global area under pepper, India is having only nearly 18 per cent of the world production of pepper. The reason for this is quite evident from the yield / productivity of India, which is the lowest in the world at present. It is to be remembered here that pepper is grown in India mostly as a mixed crop and not as a pure crop as done in many countries. All the three indicators, area, production and productivity have been decreasing for India from the year 2003 onwards, along with the global trend.

Vietnam has emerged as the largest producer of pepper, having 29.9 per cent of production with just 9.1 per cent of the global area under production. The productivity is also the highest for Vietnam, which is more than seven times of that of India.

The pepper yield has peaked in 2002, at 694 kg per hectare, declining in 2003 to 649 kg per hectare, reflecting decreased expenditure on farm maintenance and inputs. The low prices of pepper and the increase in the prices of fuel and fertilizers is said to have compelled many of the growers in the major growing countries to have either neglected the existing vines or shifted to other remunerative crops.

Table 4.1. Global Area, Production and Yield of Pepper, Country-wise, 2001-2004

	2001			2002			2003			2004		
Country	Area (ha)	Production (tonnes)	Yield (kg/ha)	Area (ha)	Prodn (tonnes)	Yield (kg/ha)	Area (ha)	Prodn (tonnes)	Yield (kg/ha)	Area (ha)	Prodn (tonnes)	Yield (kg/ha)
Brazil	39000 [7.5]	43000 [13.9]	1100	41000 (5.1) [7.2]	45000 (4.6)[3.1]	1093 (-0.6)	50000 (21.9)[8.9]	50000 (11.1)[13.8]	1000 (-8.5)	45000 (-10.0)[8.2]	45000 (-10.0)[12.8]	1000 (0.0)
India	218670 [41.9]	79000 [25.6]	361	220620 (0.8)[39.0]	80000 (1.2)[23.4]	363 (0.5)	216550 (-1.8)[38.7]	65000 (-18.8)[17.9]	300 (-17.3)	216550 (0.0)[39.7]	62000 (-4.6)[17.6]	286 (-4.6)
Indonesia	159884 [30.6]	59000 [19.1]	369	184000 (15.0)[32.5]	66000 (11.8)[19.3]	359 (-2.7)	171000 (7.0)[30.6]	80000 (-21.2)[22.0]	468 (30.3)	150000 (-12.2)[27.5]	55000 (-31.2)[15.6]	367 (-21.5)
Malasia	11600 [2.2]	27000 [8.7]	2015	13100 (12.9)[2.3]	24000 (-11.1)[7.0]	1832 (-9.0)	13100 (0.0)[2.3]	21000 (-12.5)[5.7]	1603 (-12.5)	13000 (-0.7)[2.3]	20000 (-4.7)[5.7]	1538 (-4.0)
Sri Lanka	30794 [5.9]	7800 [2.5]	253	31020 (0.7)[5.4]	12600 (61.5)[3.6]	432 (70.7)	31969 (4.7)[5.7]	12660 (4.7)[3.4]	396 (-8.3)	32232 (8.2)[5.9]	12020 (-5.0)[3.4]	373 (-58.0)
Vietnam	36106 [6.9]	56000 [18.1]	1551	47900 (32.6)[8.4]	75000 (33.9)[21.9]	1566 (0.9)	48800 (-3.1)[8.7]	85000 (13.3)[23.4]	1742 (11.2)	50000 (2.4)[9.1]	105000 (23.5)[29.9]	2100 (20.5)
China	17000 [3.2]	21700 [7.0]	1276	17000 (0.0)[3.0]	23000 (5.9)[6.7]	1353 (6.0)	17000 (0.0)[13.9]	33000 (43.4)[9.1]	1941 (43.4)	28400 (67.0)[5.2]	35000 (6.0)[9.9]	1232 (-36.5)
Thailand	2897 [0.5]	8820 [2.8]	3045	2890 (0.2)[0.5]	9960 (12.9)[2.9]	3446 (13.1)	2800 (-3.1)[0.5]	9500 (4.6)[2.6]	3393 (-1.5)	2800 (0.0)[0.5]	9500 (0)[2.7]	3393 (0.0)
Madagascar	4000 [0.7]	3375 [1.0]	844	4000 (0.0)[0.7]	2500 (-25.9)[0.7]	625 (-25.9)	4000 (0.0)[0.7]	2500] (0.0) [0.6]	625 (0.0)	4000 (0.0)[0.7]	2500 (0.0)[0.7]	625 (0.0)
Others	1500 [0.2]	2500 [0.8]	1667	3000 (10.0)[5.3]	3000 (20.0)[0.8]	1000 (-40.0)	3000 (0.0)[0.5]	3500 (16.6)[0.9]	1167 (16.7)	3000 (0.0)[0.5]	4659 (33.1)[1.3]	1553 (33.0)
Total	521451	308195	591	564530	341060	694	558219	362160	649	544982	350679	643

Source: International Pepper Community, Jakartha

Note: Figures in parenthesis represent percentage increase over the previous year
Figures in Square bracket represent percentage share

The expansion of area and increase in production of pepper had been of concern to producers, since the world market has responded to the surplus production with steadily declining prices, to the very low levels prevailing. It is observed that unattractive price level has discouraged farmers from cultivating pepper in new areas. The expectation of future production declines had curbed further deterioration in price. Total supply also decreased in the coming years, due to unforeseen developments such as extreme weather conditions in producing countries and attack of diseases. It is expected that newly planted areas are likely to offset declines in productivity in old and poorly maintained farms.

4.1.1.2 Global Export of Pepper

Generally, pepper is identified by its port of export or the region where it is grown. 'Lampung', a commercially important pungent black pepper is grown in the Lampong Province of Sumatera and in a few other areas of Indonesia. 'Malabar' is a variety of pepper produced in the Alleppey District of the southwest coast of India, while 'Tellicherry' is yet another grade of black pepper, grown in the northern part of the Malabar Coast of India. 'Sarawak' pepper is grown in Sarawak State in Malaysia, along the northwestern coast of Borneo. 'Brazilian' pepper is produced in the State of Para on the Amazon River. Brazil was the first country in the western hemisphere to produce pepper on a commercial scale. Japanese settlers were largely instrumental in producing 'Brazilian' pepper in increasing quantities. 'Muntok' is the most important variety of white pepper grown in the island of Bangka and exported through Pangkalpinang, a port on the south eastern coast of Sumatra. A major production center for white pepper in Bangka was developed by Chinese planters over the past century. 'Brazilian' white pepper is lighter and less pungent than 'Muntok'. 'Vietnam' pepper is now extensively traded though this variety is a new comer. New York and Rotterdam are the main global centres of pepper trade. Malabar Grade 1, Lampung, Sarawad and Vietnam are the major names in global pepper trade parlance. The contribution of the leading global exporters of pepper for the period 1985 to 2004 is given in Table 4.2.

Table 4.2 Global exports of pepper, Country-wise (Quantity in tonnes)

Years	Brazil	India	Indonesia	Malasia	Sri Lanka	Vietnam	Others	Total
1985	24676 (-)[25.6]	19536 (-)[20.3]	26201 (-)[27.2]	18751 (-)[19.4]	1260 (-)[1.3]	1335 (-)[1.3]	4403 (-)[4.5]	96162
1986	22069 (-10.5) [17.6]	49807 (154.9) [39.8]	29572 (12.8) [23.6]	15366 (-18.0) [12.3]	1287 (2.1) [1.0]	3133 (134.6) [2.5]	3658 (-16.9) [2.9]	124892
1987	25500 (15.5) [22.9]	32252 (-35.2) [29.0]	29994 (1.4) [26.9]	13826 (-10.0) [13.2]	2015 (56.5) [1.8]	4275 (36.4) [3.8]	3302 (-9.7) [2.9]	111164
1988	23550 (-7.6) [16.8]	47258 (46.5) [33.8]	41494 (38.3) [29.7]	18554 (34.19) [18.9]	2692 (33.5) [1.9]	2612 (-38.9) [1.8]	3385 (2.5) [2.4]	139545
1989	27692 (17.5) [20.5]	25120 (-46.8) [18.6]	42136 (1.5) [31.3]	25524 (37.5) [17.8]	1575 (-41.4) [1.1]	7551 (189.0) [5.6]	4984 (47.4) [3.7]	134582
1990	28014 (1.1) [18.0]	34429 (37.0) [22.1]	47676 (13.1) [30.7]	27706 (8.5) [15.3]	2609 (65.6) [1.6]	8995 (19.1) [5.7]	5779 (-99.9) [3.7]	155208
1991	47553 (69.7) [26.6]	18945 (-44.9) [11.4]	49665 (4.1) [29.9]	25458 (-8.1) [13.6]	2058 (-21.1) [1.2]	16252 (80.6) [9.8]	5845 (1.1) [3.5]	165776
1992	25702 (-45.9) [16.0]	19399 (2.3) [12.0]	61438 (23.7) [38.2]	21932 (-13.8) [10.8]	2127 (3.3) [1.3]	22358 (37.5) [13.9]	7629 (30.5) [4.7]	160585
1993	24119 (-6.1) [16.7]	47228 (143.4) [32.7]	25801 (-58.0) [17.8]	15727 (-28.2) [15.7]	7779 (265.7) [5.3]	14801 (-33.8) [10.2]	8837 (15.8) [6.1]	144292
1994	21103 (-12.) [14.9]	34111 (-27.7) [24.1]	35134 (36.1) [24.8]	22312 (41.8) [10.0]	3411 (-56.1) [2.4]	15000 (1.3) [10.6]	10431 (18.0) [7.3]	141502
1995	21259 (.0.7) [15.2]	24541 (-28.0) [17.6]	56129 (59.7) [40.3]	13991 (-37.2) [12.5]	2278 (-33.2) [1.6]	17900 (19.3) [12.8]	3103 (-70.2) [2.2]	139201
1996	23418 (10.1) [9.8]	41138 (67.6) [27.0]	36560 (-34.8) [24.0]	19128 (36.7) [17.4]	2987 (31.1) [1.9]	25300 (41.3) [16.6]	3334 (7.4) [2.1]	151865
1997	13961 (-40.3) [12.7]	37816 (-8.0) [26.0]	33011 (-9.7) [23.4]	24808 (29.6) [13.7]	3279 (9.7) [2.3]	23500 (-7.1) [16.5]	5392 (61.7) [3.8]	141767
1998	17250 (23.0) [12.3]	32154 (-14.9) [23.6]	38311 (16.0) [28.2]	18699 (-24.6) [13.6]	5493 (67.5) [4.0]	22000 (-6.3) [16.2]	1822 (-66.2) [1.3]	135729
1999	19615 (13.7) [11.8]	45156 (40.4) [28.5]	35227 (-8.0) [22.2]	21534 (15.1) [13.2]	3754 (-31.6) [2.3]	28000 (27.2) [17.6]	4981 (173.3) [3.1]	158267
2000	20385 (3.9) [18.4]	21108 (-53.2) [12.2]	63938 (81.5) [37.2]	22730 (5.5) [12.5]	4855 (29.3) [2.8]	36465 (30.2) [21.2]	2261 (-54.6) [1.3]	171742
2001	36585 (79.4) [16.0]	21459 (1.6) [10.8]	53291 (-16.6) [26.9]	24929 (9.6) [9.7]	3161 (-34.8) [1.5]	56506 (54.9) [28.5]	2144 (-5.1) [1.0]	198075
2002	37531 (2.5) [16.7]	24900 (16.0) [10.6]	53210 (-0.1) [22.8]	22642 (-9.1) [8.1]	8225 (160.2) [3.5]	78155 (38.3) [33.5]	8609 (301.5) [3.6]	233272
2003	37940 (1.0) [17.5]	17787 (-28.5) [7.8]	60596 (13.8) [26.7]	18530 (-18.1) [7.8]	8240 (0.1) [3.6]	74600 (-4.5) [32.9]	8597 (-0.1) [3.7]	226290
2004	40529 (6.8)	14049 (-21.0) [6.0]	45760 (-24.4) [19.8]	18206 (-1.7) [8.7]	4853 (-41.1) [2.1]	98494 (32.0) [42.7]	8630 (0.3) [3.7]	230521

Source: International Pepper Community, Jakartha

Note: Figures in parenthesis represent percentage increase over the previous year Figures in Square bracket represent percentage share

Exports of pepper from producing countries have increased consistently, from 135,729 tons in 1998 to peak at 233,272 tons in 2002, an annual rate of increase of over 15 per cent. While Vietnam's exports have contributed much to this increase, export increases from Brazil, Indonesia, Sri Lanka and Malaysia have also been significant. Over the last few years, Vietnam has overtaken the traditional pepper producing countries such as India and Indonesia and added considerably to world pepper export. Vietnam is leading the world export of pepper with 42.7 per cent of the market in the year 2004, from 1.3 per cent in 1985, while India's share has declined from 20.3 per cent to 6.1 per cent during the same period. India is being pushed to the fifth position, with Brazil and Malaysia also overtaking her. The growth in exports has been negative for many years compared to the previous year, as far as India is concerned. India, Indonesia and Malaysia were the main countries that exported less, offsetting Vietnam's increase in exports.

The share of India in global pepper export has declined to less than 10 per cent during the last three years. The main factor for this drop is the competition from Vietnam. Though share of India in raw pepper export has declined, India is the major producer of pepper oleoresin and pepper oil in the world. Nearly 90 percent of global pepper oleoresin is produced in India. Indian manufacturers are also turning themselves to be key players in grounded pepper exports.

4.1.1.3 Global Import of Pepper

World imports of pepper, including pepper for re-export in various forms, has increased in line with exports. While there is a trend for foods to be more spicy or "hot", it is not pepper alone that is satisfying this growing demand. Chilies, with many varieties having varying levels of pungency, may be said to be competing with pepper in making food preparations hot (spicy). Compared to pepper, chilies are grown widely in many parts of the world and are easy to use either in fresh or dry form. Though Western palates may be generally assumed to prefer the milder heat of pepper to the pungency of chilies, there is apprehension that because of its low price, chilies may be substituted for pepper in certain applications. The change in the preferences of the people is reflected in the imports of pepper of the respective countries to a certain extent. Details regarding global imports of pepper are depicted in Table 4.3.

Table 4.3. World import of pepper 1999-2003

(Quantity in tones)

Country	1999	2000	2001	2002	2003
USA	56477 [22.3]	53875 (-4.6) [19.9]	57738 (7.1) [20.8]	60747 (5.2) [20.7]	63821 (5.0) [22.5]
Singapore	48149 [19.0]	45491 (-5.5) [16.8]	43806 (-3.7) [15.8]	42616 (-2.7) [14.5]	29415 (-30.9) [10.3]
Germany	19515 [7.7]	1776 (-90.8) [0.6]	19951 (1023.3) [7.2]	21489 (7.7) [7.3]	22994 (7.0) [8.1]
Netharlands	16519 [6.5]	17517 (6.0) [6.5]	19422 (10.8) [7.0]	19289 (-0.6) [6.6]	17399 (-9.7) [6.1]
India	3080 [1.2]	6045 (96.2) [2.2]	6325 (4.6) [2.2]	15635 (147.1) [5.3]	14584 (-6.7) [5.1]
UAE	7000 [2.7]	11000 (57.1) [4.0]	8000 (-27.2) [2.8]	7500 (-6.2) [2.5]	10500 (40.6) [3.7]
France	8599 [3.3]	8311 (-3.3) [3.0]	8578 (3.2) [3.0]	10517 (22.6) [3.6]	10451 (-0.6) [3.6]
Japan	8023 [3.1]	7766 (-3.2) [2.8]	8294 (6.7) [2.9]	8667 (4.4) [2.9]	8579 (-1.0) [3.0]
Russian Federation	4915 [1.9]	6328 (28.7) [2.3]	5330 (-15.7) [1.9]	7194 (34.9) [2.4]	6956 (-3.3) [2.4]
UK	5485 [2.1]	5629 (2.6) [2.0]	5117 (-9.0) [1.8]	4808 (-6.0) [1.6]	5844 (21.5) [2.0]
Canada	6303 [2.4]	5597 (-11.2) [2.0]	5482 (-2.0) [1.9]	5902 (7.6) [2.0]	5647 (-4.3) [1.9]
Others	68934 [27.2]	100042 (45.1) [37.1]	88803 (-11.2) [32.0]	87702 (-1.2) [30.0]	87010 (-0.7) [30.7]
Total	252999	269377	276846	292066	283200

Source: International Pepper Community, Jakartha

Note: Figures in parenthesis represent percentage increase over the previous year
Figures in Square bracket represent percentage share

The United States is the world's largest importer and consumer of pepper with 22.5 per cent share in 2003. Singapore which was closely behind USA has decreased its exports recently. Much of the imports of pepper are re- exported by Singapore. Germany and Netherlands are also important pepper importing countries for domestic consumption as well as for processing and re-export. India has also begun to import significant amounts of pepper, as domestic demand for grinding and extraction as well as other uses is getting expanded. It is to be noted that, even though production of pepper in 2003 showed an increase over previous year (Table 4.1), the total exports (Table 4.2) and imports have shown a negative increase. The fact that imports of chilly into USA are growing faster than imports of pepper is noteworthy here.

4.1.2 Indian Pepper Scenario

In India, pepper cultivation is mainly confined to the Southern States of Kerala, Karnataka and Tamil Nadu. Kerala accounts for almost 70 per cent of the total production of pepper in India. There are many varieties of pepper developed and grown in India, the major among them being, Karimunda, Kottanadan, Panniyur -1, Panniyur-3, Panniyur-4, Panniyur-5, PLD-2 and Subhakara. The area, production and productivity of pepper in India for a period of 13 years from 1994 -95 to 2006-07 is analysed in Table 4.4.

Although area under cultivation and production of pepper are showing positive growth rates in many of the years, in the case of productivity, the growth rate is negative in most of the years. There has been a drastic fall in production and productivity in the year 2006-07 though the intensity of the fall is less in the case of area under cultivation. The adverse climatic conditions and attack of diseases have been the main reasons for the fall in production and productivity. The CAGR is negative for productivity, while that of area and production is not at all significant, which reveals the poor performance of this industry over the years.

Table 4.4 Area, Production, and Productivity of Pepper in India

Year	Area ('000 ha)	Production ('000 tons)	Productivity (kg/ha)
1994-95	193.27 (-)	60.74 (-)	314 (-)
1995-96	198.03 (2.4)	61.58 (1.3)	311 -(0.9)
1996-97	180.26 (-8.9)	55.59 (-9.7)	308 (0.9)
1997-98	181.53 (0.7)	57.33 (3.1)	316 (2.5)
1998-99	191.31 (5.3)	79.84 (3.9)	417 (31.9)
1999-00	209.67 (9.5)	50.13 (-3.7)	239 (-42.6)
2000-01	213.87 (2.0)	63.67 (2.7)	298 (24.6)
2001-02	219.38 (2.5)	62.44 (-1.9)	285 (-4.3)
2002-03	225.33 (2.7)	72.46 (16.0)	322 (12.9)
2003-04	233.41 (3.5)	73.22 (1.0)	314 (-2.2)
2004-05	256.29 (9.8)	79.45 (8.5)	310 (-1.2_
2005-06	260.23 (1.5)	92.94 (16.9)	357 (15.1)
2006-07 CAGR	245.97 (-5.4) 0.020288	69 (-25.7) 0.010678	281 (-21.2) -0.00921

Source: Directorate of Economics and Statistics

Note: Figures in parenthesis represents percentage growth over previous year.

The trend in area under cultivation, production and productivity of pepper in India for the period 1994-95 to 2006-07 are graphically presented in Figure 4.1, 4.2 and 4.3 respectively.

Figure 4.1 Trend in area of pepper cultivation in India

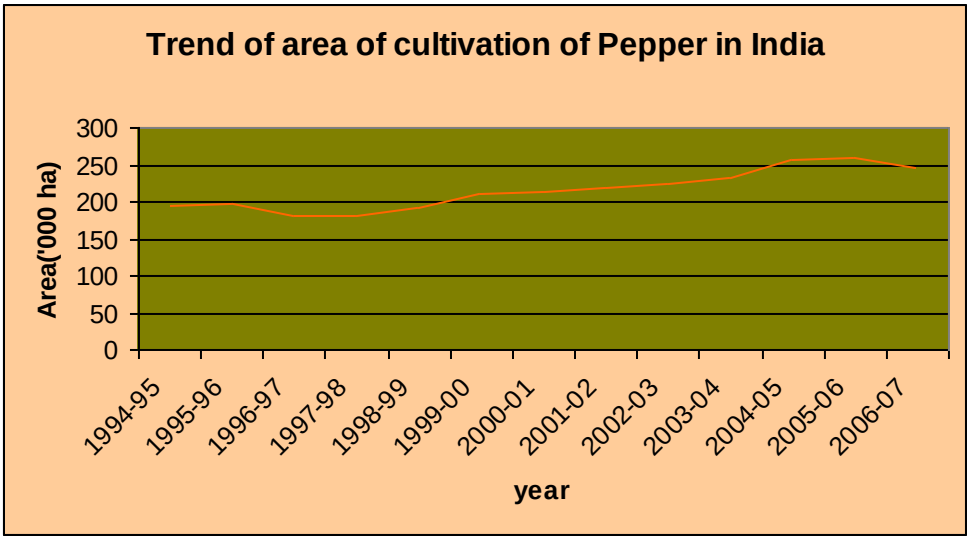


Figure 4.2 Trend in production of pepper in India

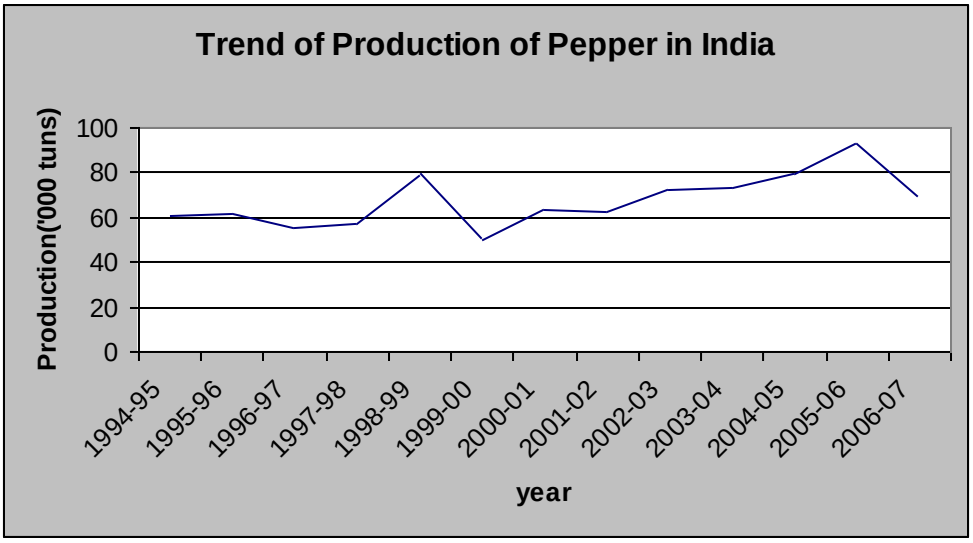
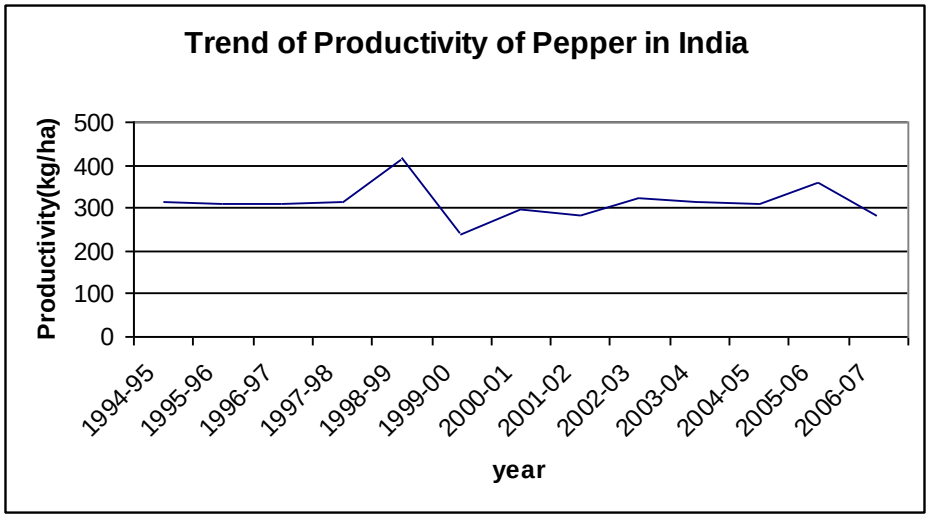


Figure 4.3 Trend in productivity of pepper in India



The drastic fall in area under cultivation, production and productivity since 2005-06 is quite evident from the three graphs. Productivity which was above the 300 mark since 2002-03 has once again fallen below the mark in 2006-07.

An analysis of the state - level area under cultivation, production and productivity of pepper will give a better understanding about the contribution of the different states of the country to this industry. Kerala with more than 80 per cent of the pepper farms small (< 0.2 ha) or medium (0.2 ha to 0. 8 ha) is the largest producer of pepper in India. Karnataka, which is the second largest producing State in India, grows pepper extensively in coffee plantations using shade tree, mainly silver oak as supports. A state – wise contribution to area, production and yield of pepper is detailed in Table 4.5.

Table 4.5. State wise area (ha), production (tonnes) and yield in India

	2002-03			2003-04			2004-05			2005-06			2006-07		
	Area	Prod.	Yield	Area	Prod.	Yield	Area	Prod.	Yield	Area	Prod.	Yield	Area	Prod.	Yield
Goa	0.6 [0.3]	0.1 [0.1]	167	0.59 (-1.6) [0.3}	0.1 (0.0) [0.1]	169 (1.1)	0.59 (0.0) [0.2]	0.1 (0.0) [0.1]	169 (0.0)	0.63 (6.7) [0.2]	0.14 (40.0) [0.]	222 (31.3)	0.65 (21.2) [0.3]	0.17 (21.4) [0.2]	262 (18.0)
Karnataka	10.41 [4.6]	2.32 [3.2]	223	10.69 (2.6) [4.6]	2.26 (-2.5) [3.0]	220 (-1.3)	12.34 (15.4) [4.8]	2.75 (21.6) [3.5]	223 (1.3)	14.8 (19.9) [5.7]	3.24 (17.8) [3.5]	219 (-1.7)	14 (14.2) [.7]	3 (-7.4) [4.3]	214 (-2.2)
Kerala	208.61 [92.6]	67.36 [92.9]	323	216.44 (3.7) [92.7]	69.02 (2.4) [94.3]	319 (-1.2)	237.67 (9.8) [92.7]	74.98 (8.6) [94.4]	315 (-1.2)	238 (0.1) [91.5]	87.61 (16.8) [94.2]	368 (16.8)	226.1 (-99.6) [91.9]	64.26 (-26.6) [43.1]	284 (-22.8)
Meghalaya	0.9 [0.4]	0.68 [0.9]	758	0.9 (0.0) [0.4]	0.68 (0.0) [0.9]	756 (-0.2)	0.9 (0.0) [0.4]	0.58 (-14.7) [0.7]	645 (-1.4)	0.9 (0.0) [0.3]	0.68 (17.2) [0.7]	754 (16.8)	0.9 (0.0) [0.4]	0.68 (0.0) [1.0]	753 (-0.1)
Tamilnadu	4.3 [1.9]	1 [1.4]	233	4.18 (-2.7) [1.8]	93 (9200) [1.3]	223 (-4.2)	4.12 (-1.4) [1.6]	0.91 (-99.0) [1.1]	221 (-0.8)	5.23 (26.9) [2.0]	1.14 (25.2) [1.2]	218 (-1.3)	3.7 (-88.3) [1.5]	0.84 (-26.3) [1.2]	227 (4.1)
Andaman-Nicobar	0.5 [0.2]	1 [1.4]	2000	0.6 (20.0) [0.2]	0.12 (-88) [0.2]	200 (-90.0)	0.66 (10.0) [0.3]	0.12 (0.0) [0.1]	182 (-9.0)	0.66 (0.0) [0.3]	0.12 (0.0) [0.1]	182 (0.0)	0.61 (-98.4) [0.2]	0.04 (-66.6) [0.1]	66 (-63.7)
Pondicherry	0.01 [0.]	0.01 [0.0]	1000	0.01 (0.0) [0.0]	0.01 (0.0) [0.0]	1000 (0.0)	0.01 (0.0) [0.0]	0.01 (0.0) [0.0]	1000 (0.0)	0.01 (0.0) [0.0]	0.01 (0.0) [0.0]	1000 (0.0)	0.01 (-0.0) [0.0]	0.01 (0.0) [0.0]	1000 (0.0)
All India	225.33	72.47	322	233.41 (3.5)	73.21 (1.0)	314 (-2.4)	256.29 (9.8)	79.45 (8.5)	310 (-1.2)	260.23 (1.5)	92.94 (16.9)	357 (15.1)	245.32 (-5.7)	69 (-25.7)	281 (-21.2)

Source: Directorate of Economics and Statistics

Note: Figures in parenthesis represent percentage increase over the previous year
Figures in Square bracket represent percentage share

Table 4.5 reveals the predominant position of Kerala with respect to the pepper industry of India. With 91.9 per cent of the area under cultivation, Kerala produces 93.1 per cent of the total pepper of India at the end of 2006 – 07. Only Karnataka has made some attempt to promote this crop. All the other states have still a very insignificant contribution to this industry. The productivity of Kerala has been decreasing, but has ended up with a slightly better performance than the all India yield.

A discussion about the Indian scenario of pepper would be incomplete without an enquiry into the role of pepper among the other spices of India. Hence a graphical presentation of the area under cultivation and production of the various spices in India during the year 2006-07 is presented in Figure 4.4.

Figure 4.4 Crop - wise share of Area and Production of Spices in India 2006-07

Fig. 4.4a Crop wise Area of Spices in India, 2006 – 07

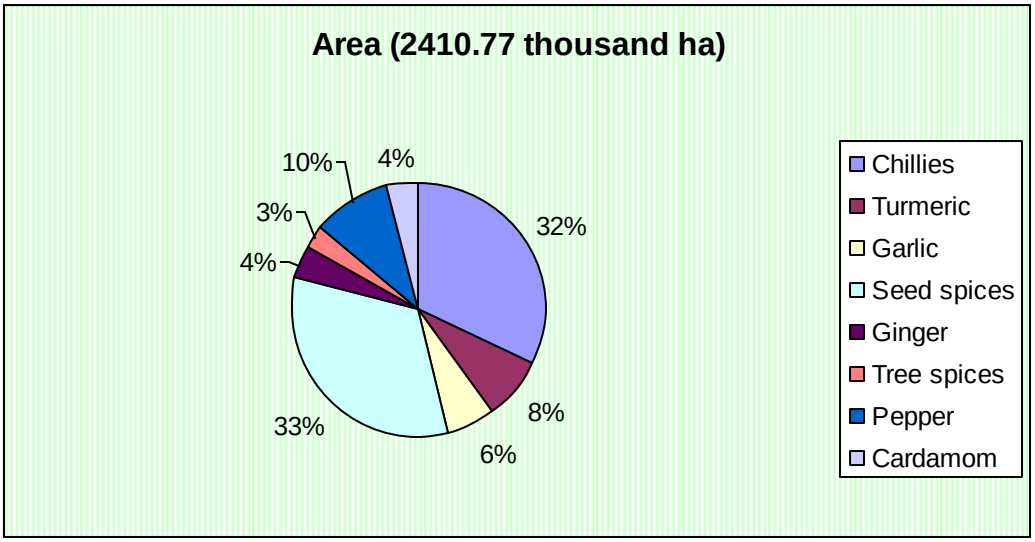
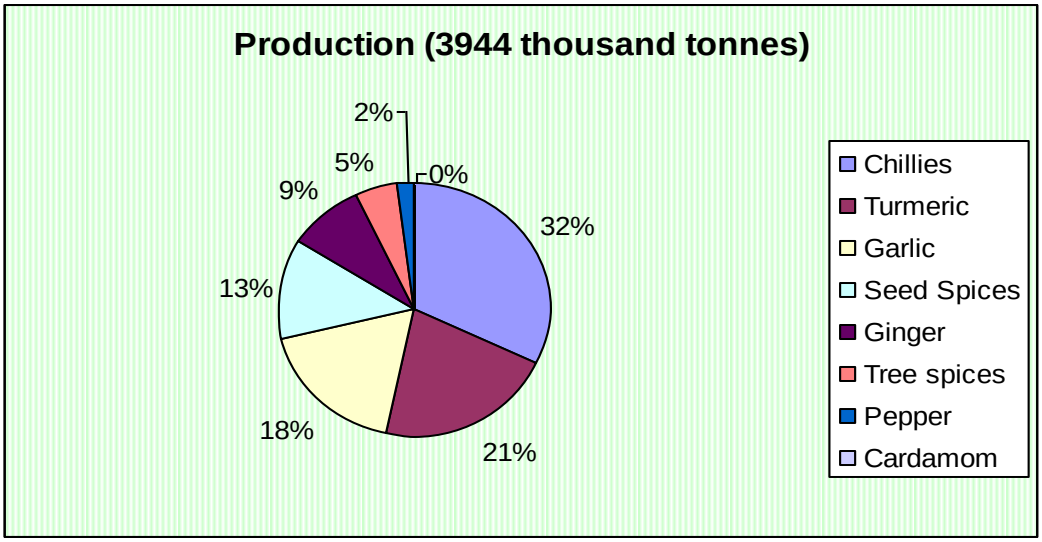


Fig. 4.4b Crop wise Production of Spices in India, 2006 - 07



It is seen from Table 4.4 that with 10 per cent of the area under spices, pepper has a share of two per cent in the total production of spices in the country. Although pepper is in the third position in the area under cultivation, it is the last with respect to the share in the production of the ten major spices of India. Chillies which occupy 32 per cent of the total area under spices have a share of 32 per cent in the total production of spices also in the country. It is noteworthy here that Chilly is the main competitor of pepper since people are substituting chilly for pepper. (4.1.1.3).

4.1.3 Pepper – Kerala Scenario

The humid, tropical, evergreen forests of Malabar coast are home to Black pepper, the "King of Spices". The peculiar agro-climatic system found in Kerala is suitable for the cultivation of pepper. In Kerala, pepper has always been a subsidiary crop cultivated in homestead gardens. In the case of trading Kochi is the major terminal market for export of pepper. Kerala is considered as the spice garden of India with Idukki and Wayanad districts in Kerala accounting for the maximum production of pepper. The other major pepper growing areas include Cannanore, Kozhikode, Kottayam, Trivandrum, Ernakulam and Quilon districts. The district -wise area under cultivation and production of pepper in Kerala for the period 2000-01 to 2005-06 is depicted in Table 4.6.

Table 4.6 District wise area and production in Kerala (Area in hectare and production in kg/ha)

District	2000-01		2001-02		2002-03		2003-04		2004-05		2005-06	
	Area	Pdn	Area	Pdn	Area	Pdn	Area	Pdn	Area	Pdn	Area	Pdn
Thirivanthapuram	5668 [2.8]	1705 [2.8]	6376 [3.1]	1642 [2.8]	6569 [3.1]	1790 [2.6]	6915 [3.1]	1758 [2.5]	7320 [3.1]	2028 [2.7]	6980 [2.9]	1710 [1.9]
Kollam	10418 [5.1]	3713 [6.1]	11381 [5.6]	4275 [7.3]	10633 [5.1]	3235 [4.8].	11305 [5.2]	3301 [4.8]	13565 [5.7]	3743 [5.0]	13509 [5.7]	4625 [5.3]
Pathanamthitta	5059 [2.5]	1228 [2.0]	5613 [2.8]	1455 [2.5]	5214 [2.5]	1231 [1.8]	5154 [2.3]	1356 [1.9]	5651 [2.4]	1328 [1.8]	5529 [2.3]	1419 [1.6]
Alappuzha	2134 [1.1]	297 [0.5]	2054 [1.0]	196 [0.3]	1940 [0.9]	174 [0.2]	1997 [1.0]	167 [0.2]	2079 [0.9]	181 [0.2]	2000 [0.8]	177 [0.2]
Kottayam	8581 [4.2]	1153 [1.9]	9136 [4.5]	1372 [2.3]	9245 [4.4]	1436 [2.1]	9097 [4.2]	1801 [2.6]	9828 [4.1]	2074 [2.8]	9482 [4.0]	1695 [1.9]
Idukki	58209 [28.8]	23282 [38.2]	60537 [29.7]	24560 [42.1]	65142 [31.2]	35534 [52.8]	68595 [31.7]	36417 [52.8]	82316 [34.7]	38787 [51.7]	84219 [35.4]	52063 [59.4]
Ernakulam	7312 [3.6]	918 [1.5]	7941 [3.9]	1219 [2.1]	7309 [3.5]	1171 [1.7]	6973 [3.2]	1107 [1.6]	6825 [2.9]	1014 [1.3]	6700 [2.8]	1274 [1.5]
Thrissur	3938 [1.9]	526 [0.9]	4174 [2.0]	589 [1.0]	4583 [2.2]	787 [1.2]	4959 [2.3]	1032 [1.5]	5950 [2.5]	1126 [1.5]	6033 [2.5]	1282 [1.5]
Palakkad	4916 [2.4]	598 [1.0]	5063 [2.5]	723 [1.2]	5482 [2.6]	778 [1.2]	6079 [2.8]	875 [1.3]	7305 [3.1]	991 [1.3]	7457 [3.1]	1129 [1.3]
Malappuram	8253 [4.1]	1053 [1.7]	8996 [4.4]	616 [1.0]	9846 [4.7]	979 [1.5]	10525 [4.9]	1014 [1.5]	11661 [4.9]	1146 [1.5]	11371 [4.8]	1456 [1.7]
Kozhikode	11939 [5.9]	2277 [3.7]	12775 [6.3]	2722 [4.7]	12365 [5.9]	1765 [2.6]	13094 [6.0]	1800 [2.6]	13993 [5.9]	1934 [2.6]	13923 [5.8]	1869 [2.1[
Wayanad	44908 [22.2]	17915 [29.4]	40088 [19.7]	13083 [22.5]	40839 [19.6]	12064 [17.9]	42287 [19.5]	12173 [17.6]	41573 [17.5]	13897 [18.5]	41464 [17.4]	11483 [13.1]
Kannur	24569 [12.1]	5038 [8.3]	23341 [11.4]	4412 [7.6]	22492 [10.8]	4362 [6.5]	22089 [10.2]	4078 [5.9]	22727 [9.6]	4716 [6.3]	22659 [9.5]	5473 [6.2]
Kasarakode	6229 [3.1]	1226 [2.0]	6478 [3.2]	1376 [2.4]	6948 [3.3]	2052 [3.0]	7371 [3.1]	2136 [2.9]	6876 [2.7]	2015 [2.6]	6672 [2.8]	1950 [2.2]
State	202133	60929	203953	58240	208607	67358	216440	69015	237669	74980	237998	87605

Source: Directorate of Economics and Statistics.

Note: Figures in Square bracket represent percentage share

Idukki district with 35.3 per cent of the area under cultivation is contributing to 59.4 per cent of the production of pepper in Kerala, while, Wayanad, the second largest producer is having only 13.1 per cent of production with 17.1 per cent of land under cultivation. It implies that productivity in Idukki is much higher than that of Wayanad. It is to be noted that area and production in three districts, namely, Idukki, Thrissur and Palakkad have been consistently increasing during the reference period, though on a limited scale. It is to be enquired whether the paddy farmers of Palakkad and Thrissur are slowly shifting to Pepper also along with other crops.

4.2 Commodity Derivatives Market in India

Commodity exchanges have had a long and a chequered presence in India. References to such markets in India appear in Kautilya's 'Arthasasthra'. The words, 'Teji', 'Mandi', 'Gali' and 'Phatak' have been commonly heard in Indian markets for centuries. The history of organized commodity derivatives in India goes back to the nineteenth century when the Cotton Trade Association started futures trading in 1875, barely about a decade after the commodity derivatives started in Chicago. Over time, derivatives market developed in several other commodities in India. Following cotton, derivatives trading started in oilseeds in Bombay (1900), raw jute and jute goods in Calcutta (1912), wheat in Hapur (1913) and Bullion in Bombay (1920). After independence, the Parliament passed Forward Contracts (Regulation) Act, 1952 which regulated forward contracts in commodities all over India. The Act applies to goods, which are defined as any movable property other than security, currency and actionable claims. After the Indian economy embarked upon the process of liberalization and globalization in 1990, the Government set up a Committee in 1993 to examine the role of futures trading. The Committee headed by Prof. K.N.Kabra recommended allowing futures trading in 17 commodity groups. It also recommended strengthening of the Forward Market Commission, and certain amendments to Forward Contracts (Regulation) Act, 1952, particularly allowing option trading in goods and registration of brokers with Forward Market Commission.

4.2.1 Commodity Derivative Exchanges in India

It is only in the last decade that commodity derivatives exchanges have been actively encouraged. But the markets have suffered from poor liquidity and have not grown to any significant level, till recently. There are 25 commodity derivative exchanges with four national commodity exchanges in India as of now and derivative contracts on nearly 100 commodities are available for trade. The four national Commodity Exchanges which are operational at present are National Board of Trade Limited (NBOT), National Multi-Commodity Exchange of India (NMCE), National Commodity and Derivatives Exchange (NCDEX) and Multi Commodity Exchange (MCX).

4.2.1.1 National Board of Trade Limited

National Board of Trade Limited was incorporated on July 30, 1999 to offer transparent and efficient trading platform to various market intermediaries in the commodity futures trade. It has implemented the state-of-the-art technology and the system for efficient handling of trading, margining, clearing and settlement in respect of all the transactions confirmed by the Exchange. NBOT has been mandated to organize futures trading in soyabean and its cake, rape/mustard seed, their oil and cake and palmolein. The Exchange operates on outcry system for trading. All the post trading activities are fully automated including margining. The trades executed in the ring are confirmed only after the margins are debited and limits are checked. The nation wide screen based trading system is under the process of implementation and is likely to be launched in 2008 which will bring in more efficiency, integrity and transparency in the market.

4.2.1.2 National Multi Commodity Exchange

NMCE commenced futures trading in 25 commodities on 26th November, 2002 at Ahamedabad on a national scale and since then, the basket of commodities has grown substantially to include cash crops, food grains, plantation, spices, oil seeds, metal and bullion among others. The first state-of-art, demutualised multi-commodity

Exchange, NMCE was promoted by commodity-relevant public institutions, viz., Central Warehousing Corporation (CWC), National Agricultural Cooperative Marketing Federation of India (NAFED), Gujarat Agro-Industries Corporation Limited (GAICL), Gujarat State Agricultural Marketing Board (GSAMB), National Institute of Agricultural Marketing (NIAM), Neptune Overseas Limited (NOL) and Punjab National Bank (PNB). Even today NMCE is the only Exchange in India to have such investment and technical support such as warehousing, cooperatives, private and public sector marketing of agricultural commodities, finance, research and training from commodity relevant institutions. NMCE facilitates electronic derivatives trading through robust and tested trading platform known as Derivative Trading Settlement System (DTSS).

4.2.1.3 National Commodity and Derivative Exchange Limited

NCDEX incorporated on April 23, 2003 under the Indian Companies Act, 1956 at Mumbai, is a professionally managed on-line multi commodity exchange promoted by ICICI Bank Limited (ICICI Bank), Life Insurance Corporation of India (LIC), National Bank for Agricultural and Rural Development (NABARD) and National Stock Exchange of India Limited (NSE). Later, Canara Bank, Credit Rating Information Services of India Limited (CRISIL Limited), Goldman Sachs, Intercontinental Exchange (ICE), Indian Farmers Fertiliser Co-operative Limited (IFFCO) and Punjab National Bank (PNB) have joined as shareholders of the Exchange. NCDEX is the only commodity exchange in the country promoted by national level institutions. This unique parentage enables it to offer a bouquet of benefits, which are currently in short supply in the commodity markets. NCDEX currently facilities trading in agro commodities, metals, energy products, polymers and carbon credits.

4.2.1.4 Multi Commodity Exchange

MCX is an independent and de-mutualised multi commodity exchange inaugurated on November 10, 2003 with headquarters at Mumbai which has permanent

recognition from the Government of India for facilitating online trading, clearing and settlement operations for commodities futures market across the country. Today, MCX features amongst the world's top three bullion exchanges and top four energy exchanges.

MCX offers a wide spectrum of opportunities to a large cross section of participants including producers/processors, traders, corporates, regional trading centres, importers, exporters, co-operatives and industry associations amongst others. MCX holds more than 55 per cent market share of the total trading volume of all the domestic commodity exchanges and also make large deliveries in domestic commodities, signifying the efficiency of price discovery.

4.2.2 Regulation of Futures Trading in India

In India, the regulation of futures and forward trading has been carried out under the provisions of the Forward Contracts (Regulation) Act, 1952. There are three authorities who regulate futures/forward trading viz. the Central Government, the Forward Market Commission (FMC), and the recognized associations. The roles of these authorities, in brief, are discussed below:

4.2.2.1 Central Government

Under the scheme of the Forward Contracts (Regulation) Act, 1952, the regulation and control of futures trading and of the recognized associations organizing such trading, is primarily the responsibility of the Central Government. Its powers in this regard include the authority to grant recognition to an association, withdraw the recognition, direct the association to make or amend rules, approve the amendments to its rules and bye-laws and supersede the governing body of the association. The administrative control is presently exercised by the Department of Consumer Affairs of the Ministry of Food and Consumer Affairs, Government of India.

4.2.2.2 Forward Markets Commission

The FMC has powers for the regulation of futures /forward trading. These powers are derived from the constitution and the bye-laws of the recognised associations themselves. The recognized associations cannot, without the approval of FMC, conduct trading, declare dividends, give charities from their own funds, alter the security deposits, annual subscription and admission fees payable by their members, change the name or names of panels in which the members are classified, co-opt directors and appoint secretary or remove him. Thus it keeps forward markets under observation and takes necessary action in exercise of the powers assigned to it by/or the under the Act. FMC collects and publishes information regarding the trading conditions in respect of goods as per the provisions of the Act, including information regarding supply, demand and prices, and submit to the Central Government periodical reports on the working of forward markets relating to such goods. It also makes recommendations generally with a view to improve the organizations and working of forward markets .Another function of FMC is to undertake the inspection of the accounts and other documents of any recognized association or registered association or any member of such association whenever it considers necessary.

4.2.2.3 Recognised Associations

The recognised associations are playing a pivotal role in the scheme of regulation of futures trading as envisaged under the Forward Contracts (Regulation) Act, 1952. Futures trading in any particular commodity can be conducted only between, through or with member of such associations as are recognised under the Act, and trading outside the auspices of the recognised association become illegal. At present, futures trading is regulated through 17 recognised associations in 10 commodities viz., pepper, turmeric, potato, gur, castor seed, castor oil, hessian, jute sacking, coffee and cotton. Besides, forward trading in the transferable specific delivery (TSD) contracts/ non-transferable specific delivery (NTSD) contract in raw jute and jute goods is regulated under the auspices of one recognised association.

4.2.3 Recent trends in commodity futures markets

Indian Inflation has touched double digits for the first time in 2008 after a decade - actually after 1995. It has climbed steeply from under five per cent in November 2006, to now over 11.63 per cent for the week ended June 21, 2008, and its effects are being seen in the price hike of all essential commodities. The Government and the RBI are doing their bit to try and combat inflation at the economy level - managing Cash Reserve Ratio (CRR) and controlling credit by increasing lending rates. The rise has been mainly on account of increase in prices of fruits, vegetables, imported edible oils, tea, sea fish, cement, iron and steel and spices. The wholesale price index-based inflation has continued to rise despite efforts being taken by the Government and RBI to tame prices through fiscal and monetary measures.

The Centre's worry on inflation and the role of futures in pushing up prices of major agricultural commodities led to the summoning of the Chief Executive of the Forwards Market Commission to the Capital to discuss ways to clamp down on speculative trading. They implemented a ban on futures trading in soybean oil, rubber, chickpeas and potatoes as the Government sought to control the fastest inflation since 2005. The Government had already halted futures trading in wheat and rice in 2007 and in lentils in 2006 to check a surge in the local prices of the commodities.

A futures contract is an obligation to buy or sell a commodity at a set price for delivery by a specific date. So it had little influence in the inflationary trend which is prevailing world wide. Many experts criticized the Government's policy of putting a blanket ban rather than taking corrective steps.

According to the Deputy Chairman of the Planning Commission Montek Singh Ahluwalia (Business Line, 23 April 2008), commodity futures trading are not the main cause for price rise and inflation in the economy. In his opinion, futures trading should not be banned since it plays an extremely important role in price discovery.

The commodity market regulator, FMC (FMC, 2008) had doubts whether the ban on futures trading in four farm items would help curb inflation, but would surely eat

into the turnover of commodity exchanges. It was opined by the CEO of FMC that it was quite unfortunate that the Government banned four items despite there being strong evidence against futures trading driving up prices. According to him, the ban may not contain inflation as there is no direct link between inflation and futures trading but on the other hand, will bring down about 60 per cent of the NCDEX's turnover.

In the opinion of the former MD and CEO of the NCDEX, Ravikumar, P. H. (NCDEX, 'Market Data', 2007) the futures market did not contribute to the current inflationary trend and it was wrong to blame it for the prevailing shortage of essential commodities such as food grains, pulses and edible oils.

The expert committee, headed by Planning Commission member Dr Abhijit Sen, did not make any specific recommendation regarding continuation or banning of futures trading in commodities. The Committee was set up in 2007 to study the impact of futures trading on commodity prices and suggest measures to minimise such impact. It was reported that (Business Line, 23 April 2008) it was neither possible to say that futures trading in agricultural commodities leads to price rise in the spot market, nor it is possible to say that there is no impact. It was also pointed out that prices in certain commodities have gone up, despite a ban on their futures, on account of surge in their global price.

Economic analysts, traders and food executives have warned that India's threat to impose a blanket ban on future's trading in agricultural commodities would not ease food prices. Analysts pointed out that the ban New Delhi imposed earlier on the trade of pulses, wheat and rice futures had not halted a rise in the wholesale and retail prices of those commodities. The fact that prices continued to surge was a clear indication that fundamental forces, such as strong demand and shortages in supply because of adverse weather, were behind the price jumps.

Inspite of all the above arguments, the surge in the value of agricultural futures on Indian commodity exchanges shows there is large scale speculation in the derivative market. According to report on Business Line the value of futures contracts

turned over was several times the actual trade in agro-products. These futures trading were not played by the farmers, 90 per cent of whom do not know the meaning of even futures trading. It is the paper money owners — the speculators, who bought and sold the commodity futures worth lakhs of crores of rupees. In most markets speculators are many times more numerous than any other participants. The only difference is that, in Indian commodity exchanges, there are only speculators, with no farmers seen in the trading ring.

Even though speculation in the commodity trading is said to be very high it can be controlled by putting a limit in the trading volumes and fluctuations in the prices of the commodity through regularly watching the market movements by the regulators. A complete ban of the commodity derivative markets is opposed by many of the economists and experts. Forward Market Commission has to play a prominent role to increase farmer participation.

4.2.4 Futures trading in Pepper

Global availability of pepper has increased substantially after 1997. Although production has come down in IPC countries, particularly in Indonesia and Malaysia, overall supply has exceeded expectations, primarily due to increased production in Vietnam. With production consistently increasing since 1997, significant quantities of carryover stocks had built up, in producing countries as well as in some consuming and intermediate markets. This sizeable stock and the increasing production trend are pushing down prices of pepper in all producing countries. The steep fall in price, by as much as 70 per cent, has greatly affected pepper farmers, some of whom are dependent on pepper as the primary source of cash income. After the year 2003 when the pepper production declined, the price of pepper has been showing an increasing trend favourable to producers. In this context of wide price fluctuations, the role of futures trading has assumed increasing significance.

India is the forerunner among producing countries in futures or forward marketing of pepper. Futures trading was initiated nearly a hundred years ago in India as an insurance against price risk for commodities handled by traders. Futures markets

allow the transfer of trade risk and a price discovery mechanism for the trade. Risk is transferred from hedgers (usually producers or industrial users) to speculators and the latter also provide liquidity to the market. Futures markets are standardized with regard to trading regulations and terms of delivery. The Indian Pepper and Spice Trade Association (IPSTA) took the initiative to set up forward trading in pepper in India in 1957 at Kochi. IPSTA has recently established the International Pepper Future Exchange for the global trading of pepper, along with its domestic exchange.

Farmers or sellers may use the futures market to obtain a fair market price for their produce. They can make reasonable assumptions about the direction of future prices, based on the future contracts finalized. Comparing futures prices with the current spot price, they can decide to hold or sell their pepper to get maximum returns. Like traders, farmers may participate directly in the futures exchange to hedge their positions.

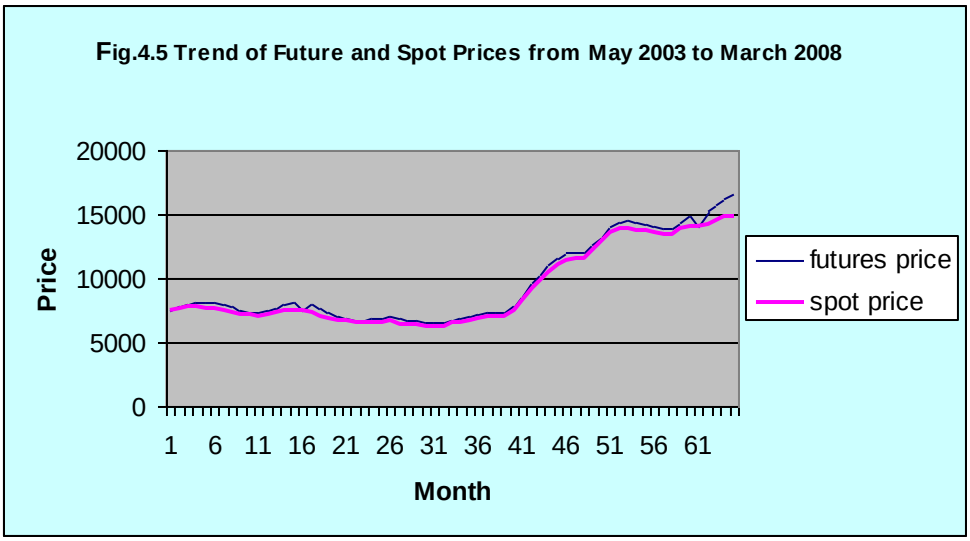
NMCE has fixed one ton as the unit for trading and the Malabar Garbled Black Pepper as the grade for domestic trading. The price band is specified with daily price fluctuations which should not be more than plus or minus three per cent. Limit on daily price fluctuation will be reckoned with reference to the previous close price. If trade hits this price limit, trade would stop for 15 minutes, whereafter price would be extended by another plus or minus of one per cent. No trade would be permitted during the day beyond the revised price limit of plus or minus four per cent per 100 kilogram. The trading limit per member is 300 MT.

There are three other commodity exchanges, which are also involved in the forward marketing of black pepper in India. They are the NCDEX in Mumbai, the MCX, also in Mumbai and the NMCE in Ahamedabad. They have terminals in major cities of the country, including Cochin.

A pepper futures market can serve two basic functions: to provide a means for price risk management; and act as a forum for price discovery. Price risks in the world pepper economy are large. Pepper is one of the most volatile commodities traded internationally, with prices more often than not changing by upwards of five per cent from one month to another. This creates large risks for farmers, traders, and importers of pepper, as well as, to some extent, for Government intent on protecting their farmers' incomes. Futures trading is recommended as a panacea for stabilization of price and hedging mechanism by the UNCTAD in a feasibility study on a worldwide pepper futures contract. Hence an attempt is made in the ensuing section to analyse the price discovery mechanism of pepper futures with the objective of finding out the extent of integration of spot and futures prices and thereby the efficiency of the futures market.

4.3 Price discovery mechanism of pepper futures in NMCE

A good financial market is "an efficient market", where forecasts about future risk and return determine valuation of the security. This price is not constant, because new information is being constantly generated in the economy. So price fixed according to demand, supply and also other economic factors is said to be efficient. Pepper futures to become an efficient market should reveal the future prices of pepper according to demand, supply and other economic factors. Thus, co-integration of the spot and futures prices is an essential precondition for the efficiency of the futures markets. An analysis of trend of futures and spot prices of pepper reveals the efficiency of the price discovery mechanism of pepper futures. Before analyzing the efficiency of the futures market, the trend of monthly averages of the spot and futures prices of pepper for the period May 2003 to March 2008 is analysed and graphically depicted in Fig. 4.5.



The spot and futures prices under the study period reveal an increasing trend. As spot price is always below the futures price there is opportunity for hedging. Both the spot and futures prices are moving more or less in the same direction. Since the trend lines are very closely moving it implies that the two prices are highly related and prediction of one using the other is possible. The significance of this relationship can be revealed through the co-integration technique, which is discussed in the ensuing paragraphs.

Efficiency of the futures market is not strictly testable. Empirical studies on this typically measures the adjustment of futures prices to a particular information set. Therefore, any test of market efficiency is necessarily a joint test of efficiency and a model of asset pricing. Basic theories used for testing efficiency of futures markets are based on weak, semi-strong and strong form efficiency, which depend on the type of information used in the analysis. The test for weak-form efficiency involves examining whether price changes are serially independent (random walk). The information used for testing weak-form efficiency is the historical market prices. For testing semi-strong form efficiency, all publicly available information, both prices and other relevant market information are used. The test for strong-form efficiency uses, apart from all public information, insider information. In this study, co-integration theory is used for testing the weak form of efficiency. While strong form test is rarely possible due to the

difficulties in obtaining insider information, the performance of semi-strong tests depends on the model specification used. Therefore, in this analysis test for efficiency is confined to weak form test.

4.3.1 Theory of co-integration

The theory of co integration postulates that in an efficient market, the current futures price, 'F_t ' of a contract for subsequent delivery at a time 't +1' contains all information available at time 't' for prediction of spot price (S_{t+1}) . To assess this spot price, (S_{t+1}) is regressed on the previous period's futures price (F_t). Efficiency and unbiasedness of a futures market is judged on the basis of the values of intercept, slope and residuals.

The market is said to be efficient and unbiased if intercept and slope are not significantly different from zero and one, respectively, and the residuals are white noise. However, this procedure is inadequate for testing the efficiency of futures market if the data are non-stationary. Co-integration theory suggests that if two non-stationary time-series are co-integrated, residuals of the linear combination of these two non-stationery series are stationary. Therefore, co-integrated series indicate stable long-run relationship between them. This concept provides a basis for the efficiency test of futures market. Evidence of co-integration between non-stationary spot and futures prices indicates that there is a stable long-run relationship between them. It establishes that information is transmitted between futures and spot prices adequately and this leads to efficient price discovery. Therefore, co-integration between two non-stationary time series is a necessary condition for the market efficiency.

Futures market efficiency requires that past spot and futures prices do not provide additional and useful information to agents in forming expectations about the futures spot prices and all available information are fully reflected in the futures price. As co - integration between spot and futures prices is a necessary condition for market efficiency when the price series are non-stationary, a test has been carried out to examine the null hypothesis that there is no co - integration between spot and futures prices. For this purpose, spot price is regressed on futures price. Since original price

series of the spot and the futures price are non - stationary the residual should be stationary if the spot and the futures price are co-integrated.

4.3.2 Co - integration of spot and futures prices of pepper

Price discovery mechanism of pepper futures has been done by co - integration of futures and spot prices of pepper. The daily futures prices of the six month duration contracts of NMCE are converted into monthly averages. As a fresh contract starts on the 16^{th} day of a particular month and ends on the 15^{th} day of the sixth month and in each month a fresh contract is formed, monthly averages of futures and spot are derived. From 16^{th} day of a particular month to 15^{th} day of the next month is treated as one month in NMCE.

These monthly average price series are split into six different series such as futures price at the time of delivery (F_D), future price one month prior to delivery (F_1), two months prior to delivery (F_2), three months prior to delivery (F_3), four months prior to delivery (F_4) and five months prior to delivery (F_5). Each of these price series is co - integrated with the spot price series so that their consistency can be analysed. The test shows the prediction capability of each price series and the degree of risk involved in each series can be arrived at. Thus degree of the efficiency of pepper futures in price discovery is obtained from the test.

Stationarity of the price data has been examined under the null hypothesis that autoregressive parameter $|\alpha_0| = 1$ (unit root, ie. non-stationary against the alternative (one-sided) of $|\alpha_0| < 1$. The Phillips – Perron (PP) test statistics are obtained via non-parametric corrections to the standard statistics of Dickey-Fuller. Standardised bias statistics $Z(\alpha)$ and standard t-statistic z(t) of unit root are presented since the true data generating process is unknown. The results of the Phillips-Perron unit root test applied to each spot and futures price series were stationary at 15^{th} order.

Auto Correlation Function (ACF) is calculated for different lags both for futures and spot prices. The significance of auto correlation is assessed through unit root test. ACF for both futures and spot were found to be significant upto the order of lag 15. As

both ACFs were of the same lagged order, it could be assumed that both spot and futures prices could be co - integrated. Hence price discovery of futures based on spot and spot based on futures is possible and prediction values calculated and are presented in Table 4.7.

Table 4.7 Prediction Equations of Spot Price using Futures Prices

Particulars	Prediction Equations	Variance Explained (%)
Delivery month	$S = 1492.016 + 0.731 * F_D$	83.5
One month prior to delivery	S=1212.272+0.771*F1	86.5
Two months prior to delivery	S=901.996+0.815*F2	89.8
Three months prior to delivery	S=577.350+0.86*F3	93.2
Four months prior to delivery	S = 273.206 +0.905 * F4	96.4
Five months prior to delivery	S = 66.894+0.938*F5	98.9

S = Spot price
F = Futures price
t = time period
Note: Regression co-efficients significant at 1 % level of significance.

The results show that spot and futures prices of the five months, four months and three months prior to delivery are showing high degree of predictability of 98.9, 96.4 and 93.2 per cent respectively, which implies that spot and futures prices of five months, four months and three months prior to delivery are co - integrated. So prediction of spot prices based on one month, two months and three months futures ahead is feasible. A farmer can rely upon futures prices with confidence upto the next three months. But future prices of two months prior to delivery, one month prior to delivery and at delivery month cannot be relied with above 90 percent confidence, since there is lack of co - integration between the series. When compared to 98.9 per cent in five months prior to delivery, the variance explained is only 83.5 per cent during delivery month which means that there is high risk in investment in pepper for six months' futures. Another study by Naik and Jain (2001) on efficiency and unbiasedness

of Indian commodity futures using unit root test has also revealed that, there is no efficiency for futures market of pepper in the month of delivery. The relationship of futures prices of pepper, F_D, F_3, F_4 and F_5 with the spot prices, S_D is presented in Fig. 4.6

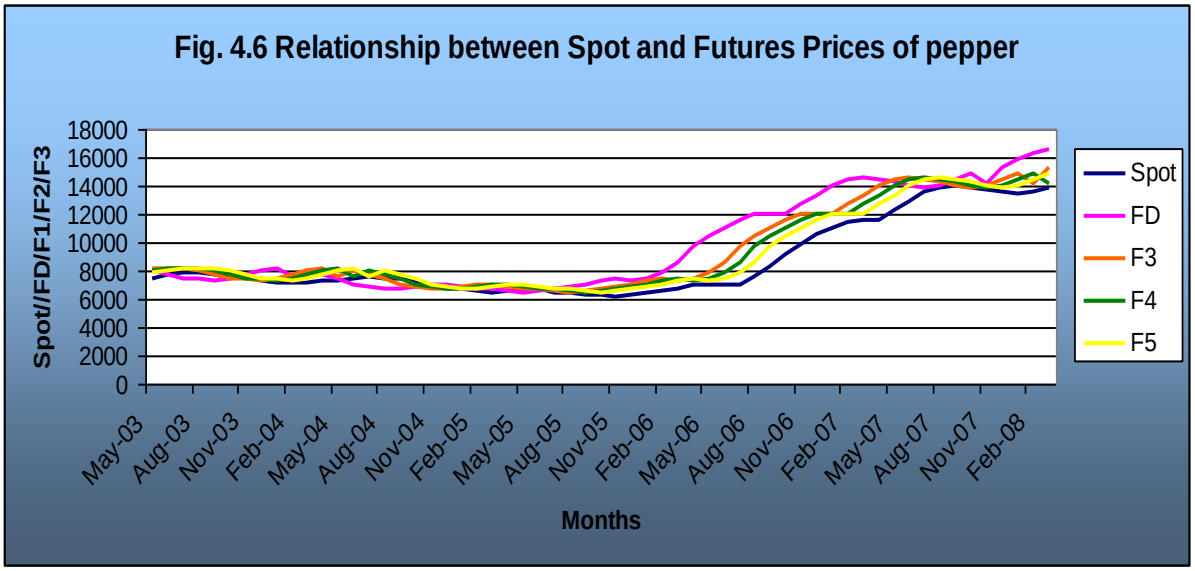
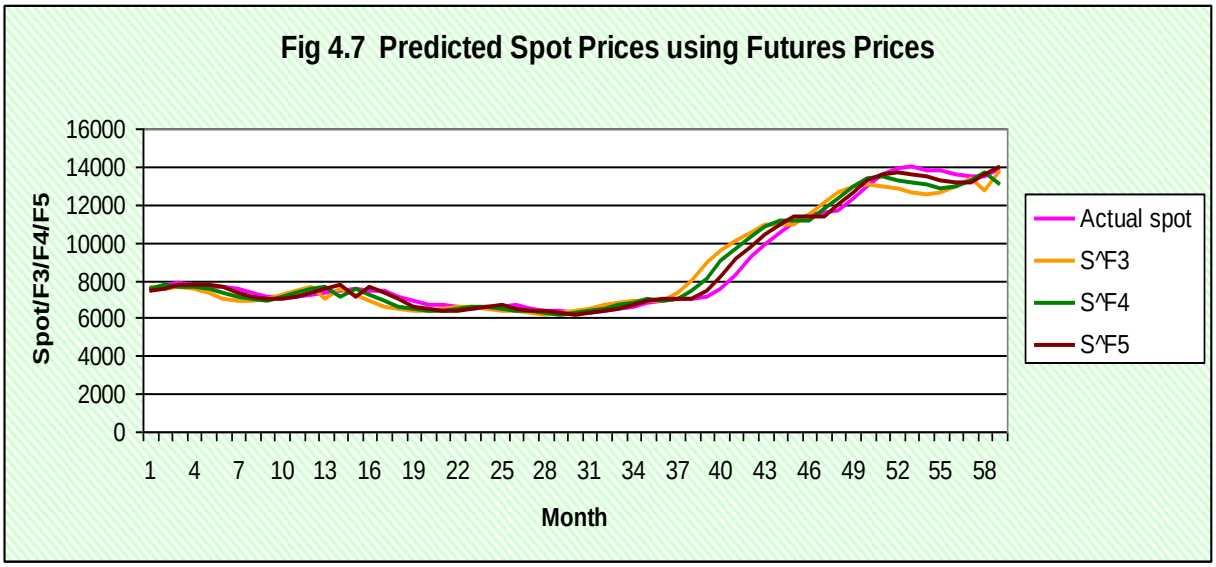


Figure 4.6 reveals the relationship between the spot and futures price series of pepper during the study period. The spot as well as futures prices are showing an increasing trend since January 2006. It is evident from the graph that the futures price at the delivery month F_D is farther away from the spot which proves that there is higher degree of variation from the spot. This reinstates the earlier finding that there is lack of co-integration between spot and futures prices in the delivery month as proved in Table 4.7. Futures prices prior to three months (F_3), four months (F_4) and five months (F_5) prior to delivery are closer to the spot price. This also brings to light the efficiency of the co integration technique in identifying the movement of two variables in the same direction

Predicted values of spot based on futures prices viz; F_3, F_4 and F_5 are calculated and corresponding regression lines are shown in Fig. 4.7.



Predicted values of spot using F_3, F_4 and F_5 suggest that pepper commodity futures market is an efficient and unbiased market. Futures markets of pepper show efficiency in forward pricing in the case of F_3, F_4 and F_5. Nearer the predicted lines to the actual spot line, higher is the predictability. But their forward pricing ability is weak in delivery month and upto two months prior to delivery. This may be due to the squaring up of contracts in the initial months without delivering, resulting in low volume of trade towards delivery month. The study supports the finding that forward pricing ability is weak in delivery month which may be due to low volume of trading in the maturity month as inefficiency is more common in thin markets (Aulton *et al.*, 1997).

4.4 Benefits of futures trading to pepper farmers and traders

Agricultural commodities, including pepper, move through a chain of value-adding activities, beginning with the farmer and ending with the consumer. Each segment of chain derives revenue and profit by adding value to the product. Rather than speculating on price movements, this is the primary economic function of most economic actors in the chain of value-adding. These actors are exposed to price movements, and experience shows that many of them who have successfully treated value within a marketing chain have gone bankrupt due to adverse price movements of

the commodities and products they handle. So they wish to use potential risk management instruments. One such risk management technique is futures trading, which is the subject matter of this study.

Having analysed the first objective of examining price discovery mechanism of futures trading in pepper in NMCE, the next attempt is to analyse the benefits of futures trading to farmers and traders, for which primary data have been collected from 60 respondents from two districts of Kerala, viz, Wayanad, one of the major pepper producing districts of the State, and Ernakulam, the trading centre of pepper in the State. The 60 respondents consist of pepper farmers who are not engaged in pepper futures(non-trading farmers), farmers who are doing on - line trading in futures market (trading farmers) and traders who are dealing in pepper futures, but not undertaking any pepper farming (non – farmer traders) and are hill produce merchants or exporters or speculators. The classification of the sample respondents of the study is depicted in Table 4.8.

Table 4.8 Classification of sample respondents

Sl. No.	Category	Wayanad	Ernakulam	Total
i.	Trading farmer	08	-	08
ii.	Non trading farmer	12	-	12
iii.	Non farmer traders:-			
	Hill produce merchants	10	-	10
	Exporters		12	12
	Speculators		18	18
	Total	30	30	60

Source: Primary data.

Pepper farmers who actually do trading in futures are limited in number. Hence non- farmer traders dominate the sample. Some of the hill produce merchants are large farmers, who are actively engaged in futures trading. As pointed out by many authors (Naik and Jain, 2001), speculators dominate among the participants of futures trading.

Before enquiring into the benefits of futures trading of the farmers and traders, a brief examination of the socio- economic and other relevant characteristics of the respondents related to the topic of study has been done, followed by the advantages of online trading as opined by the trading respondents. The characteristics of the respondents have been presented in three sections viz.

4.4.1 General characteristics of the respondents
4.4.2 Farmer related characteristics
4.3.3 Trader related characteristics

The general characteristics relate to all the 60 respondents, while the other two sections relate only to the category of farmers and traders respectively.

4.4.1 General Characteristics of the Respondents

For analyzing the general characteristics of the respondents, seven indicators, viz., age, sex, religion, educational status, family size, occupational status, and annual income are considered. These indicators have been worked out separately for respondents from Wayanad and Ernakulam districts and depicted in Table 4.9.

There are no farmers below the age of 30 in the sample respondents. It gives an indication about the present generation's aversion towards taking agriculture as a profession.

All the respondents are males. The absence of females indicates that women participation in pepper trading business and exporting is very negligible. In the trading of commodities, women are not participating although there is limited participation of women in the stock market. As land is mostly in the name of male members, women respondents could not be identified.

Table 4.9 General characteristics of the respondents *(in percentage)*

Sl. No.	Characteristics	Ernakulam	Wayanad
1	*Age (in years)*		
	Below 20	07	0
	30-40	40	23
	40-50	17	27
	50-60	33	37
	Above 60	03	13
2	*Sex*		
	Male	100	100
	Female	0	0
3	*Religion*		
	Christian	43	40
	Hindu	43	20
	Muslim	13	30
4	*Educational Status*		
	Illiterate	0	03
	Secondary	50	50
	Graduate	47	43
	Post graduate	03	03
5	*Family Size*		
	2-3	47	47
	4-5	53	36
	6-7	0	17
6	*Occupational Status*		
	Farmers	0	67
	Hill Produce Merchants	0	33
	Trader brokers	60	0
	Exporters	40	0
8	*Annual Income (in Rs.)*		
	Below 50000	10	10
	50000-100000	34	34
	100000-200000	43	43
	Above 200000	13	13

Source: Primary data

In both, farming and trading, Christians dominate. It was observed that the educational qualification of the respondents dealing in futures has been comparatively higher that than that of those who are not trading. Average size of the family is found to be three in both the districts. Size of the family is high among the Muslims compared to others.

As regards the occupational status, farmers include trading and non- trading farmers. Hill produce merchants are traders in futures trading. The trader brokers are actually speculators. Most of these people do not have any idea about pepper, the product in which they are dealing. It is to be noted that majority of the participants in the main trading centre of Kerala belong to this category.

Annual income of the respondents is found to be high for trading farmers compared to non trading farmers in Wayand district, while in Ernakulam it is high for exporters.

An examination of the general characteristics of the respondents reveals that respondents with high educational status and high income are participating in futures trading on a large scale, while others, especially small farmers who form the majority of the farming community have only limited role in this trade.

4.4.2 Farmer related characteristics

The farmer related characteristics include that of the farmer traders and non – trader farmers. These include eight trader farmers and twelve non – trader farmers of Wayanad district. The indicators discussed include size of landholdings, the period for which they have been engaged in pepper cultivation and the storing period of their pepper produce till they sell it in the market and income from pepper are presented in Table 4.10.

A comparison of the size of landholding of trader and non- trader farmers reveal that most of the respondents who are actively trading in pepper futures are large farmers and small farmers have limited role in futures trading. Only farmers who have a minimum land of three acres are trading in futures. It was also observed during the study that large farmers who are also doing hill produce business and are residing nearby the broker firms are actively engaged in trading for hedging and speculative purposes.

Table 4.10 Farmer related characteristics *(in per centage)*

Sl.No.	Indicators	Farmer Trader	Non Trader Farmers
1.	*Size of land holdings*		
	< 1 acre	-	25.0
	1 - 2 acres	-	16.7
	2 - 3 acres	-	8.3
	3 - 5 acres	12.5	33.4
	5 - 10 acres	12.5	8.3
	10 - 20 acres	37.5	-
	20 -40 acres	25.0	-
	40 and above	12.5	8.3
2.	*Duration of pepper cultivation*		
	Below 10 years	12.5	25.0
	10-20 years	25.0	25.0
	20-40 years	50.0	41.7
	40-50 years	12.5	8.3
3.	*Storing period*		
	< one year	12.5	41.6
	1 - 2 years	37.5	16.7
	2 - 5 years	37.5	25.0
	> 5 years	12.5	16.7
4.	*Income from pepper (Rs. per annum)*		
	< 10,000	12.5	33.3
	10,000 - 50, 000	-	16.7
	50,0000 – 1,50,000	50.0	25.0
	1,50,000 – 3,00,000	37.5	25.0

Source: Primary Data

Pepper is a perennial long term crop. It is observed that majority of the farmers have started cultivating pepper 20- 40 years back and are traditional farmers. This supports the earlier finding that agriculture as a profession is not attractive to the present generation.

Storing for a better price is the marketing strategy adopted by the large farmers while small farmers are forced to immediate selling. As pepper is a product with long storage period without involving high cost for storing, large farmers are less affected by its price risk. The large farmers have the capacity to store till the price

become favourable to them. They store for more than five years even, so as to get a favourable price. But small farmers cannot afford to store their product for a long period and are exposed to vulnerabilities of price fluctuations. So futures market as a hedging mechanism is inevitable to them. As price of pepper is favourable to farmers in recent days, most of them are interested to sell off the product readily.

Since most of the non trader farmers belong to the category of small farmers, naturally their income level is less. Hence 50 per cent of them only are having an annual income of more than Rs. 50,000 from pepper, while 87.5 per cent of the trading farmers are having more than Rs 50,000. An effort was also made to identify whether there is any difference in the income between trading and non trading farmers from pepper. For this the annual income of the respondents were converted into income per hectare and compared using t - test. The t – test value was found to be .6175 which is not significant. This implies that there is not much difference between the farmer traders and non trader farmers with respect to income from pepper. This also means that no effort has been made by the trading farmers to increase their production after commencing of futures trading. It was observed that there was no change in the cost of cultivation of both categories before and after commencement of futures trading. Moreover, they are not involved in any value addition activites of pepper due to the high investment costs. So futures trading has not made any impact on the income from the cultivation of pepper of farmer traders and non trader farmers.

Malabar garbled is the usual grade that is specified for trading in most of the exchanges. Even though garbling by steam sterilization fetches better prices for the farmers, it is costlier and most of the farmers are not involved in grading pepper. Only hill produce merchants do garbling. Many of the hill produce merchants who actively participate in futures trading and opt for delivery are practising garbling.

All farmers market their product through private traders. Co-operative marketing societies are not at all functioning in the field of spices market. This is a major set back to small and marginal farmers as they cannot enjoy the benefit of large scale selling by their active involvement in the futures market and gain remunerative prices to them.

4.4.3 Trader related characteristics

This section discusses the characteristics of the trading respondents which include that of the farmer traders and non – farmer traders including hill produce merchants, exporters and speculators of both Wayand and Ernakulam districts. Five characteristics, viz., duration as a pepper trader, duration of online pepper trading, average quantity of pepper traded in a month, length of the contract entered into and method of settlement of the contract are analysed and presented in Table 4.11.

Table 4.11 Trader related characteristics (in percentage)

Sl. No.	Indicators	Wayanad	Ernakulam
1.	*Duration as a Pepper trader*		
	< 1 year	27.7	-
	1 - 3 years	50.0	-
	3 - 5 years	22.3	-
	5 – 10 years	-	26.7
	10-20 years	-	33.3
	20-30 years	-	23.3
	Above 30 years	-	16.7
2.	*Duration of online pepper trading*		
	< 1 year	27.7	-
	1 - 2 years	22.3	33.3
	2 - 3 years	26.3	36.7
	Above 3 years	23.7	60.0
3.	*Average quantity of pepper traded in a month*		
	10-30 ton	83.3	
	30- 50 ton	16.7	
	50-100 ton	-	20.0
	100-300 ton	-	43.4
	300-500 ton	-	33.3
	Above 500 ton	-	3.3
4.	*Length of the contract*		
	Intra day	-	63
	Below one week	-	20
	One month – 6 months	89	11
	above 6 months	11	9
5.	*Method of settlement of contract*		
	Squaring up	94.5	56.7
	Delivery	5.5	43.3

Source: Primary data

While analyzing the benefits of futures trading it is important to know how long they have been involved in the futures trading. The period for which they have been engaged in pepper futures trade shows a remarkable difference between the respondents of the Wayanad and Ernakulam districts. All the respondents in the Wayand district had started futures trading only five years back, while majority of the respondents of Ernakulam were doing futures trading as part of their business for more than fifteen or twenty years. This is mainly because of the fact that the respondents of Ernakulam are mainly professional brokers and exporters who had been doing futures trading through IPSTA even before starting of online pepper trading. But most of the respondents in Wayanad district had started trading in the derivative market only within a period of three years when the commodity trading became an attractive avenue for making abnormal profits.

Online trading in agricultural commodities started only in the year 2003. So the maximum duration of starting of online trading can be only below five years. Study shows that major portion of the respondents had started online trading only within the period of two to three years which shows the initial reluctance on the part of the pepper traders and producers to enter into pepper futures trading, especially in Wayanad. In Ernakulam the majority of the respondents had started online business at the initial stage itself.

It is noteworthy that in the major pepper producing area of Wayanad, the average quantity of pepper traded is only 10 - 30 tons in the case of 83 per cent of the respondents, while in Ernakulam it is 100 - 300 tons in the case of 77 per cent, which implies the speculation motive of the traders.

In Ernakulam, majority of the traders prefer intra – day trading and square up the contract within the day itself. Only exporters are an exception to this. In Wayanad intra – day trading is not common, but square up their contracts towards the end of the contract.

Compared to Wayanad, the traders of Ernakulam are more interested in taking delivery of the contracts. This is mainly because of the fact that delivery procedure is a costly method especially in the remote places like Wayanad even though the warehouse of the Central Warehousing Corporation (CWC) is located in the nearby town. A better share of the respondents of Ernakulam opt for delivery since there are exporters who mainly use futures trading for hedging activities and would prefer in taking delivery rather than squaring up. Lion's share of the commodity procured by the traders in Wayanad is from farmers directly while in Ernakulam it is from the Central Warehousing Corporation.

The analysis of the farmer related and trader related characteristics reveal that traders in Ernakulam district who have better experiences in the futures trading are more active in the futures trading. Most of exporters are using futures trading for hedging and arbitrage purposes, so as to minimize loss of international fluctuations in prices that they face regularly. Some of the experienced farmers in Wayanad district also are using futures trading for hedging purposes. Many of the farmers are not indulging in the futures due to the prevalence of a false notion that it is meant for money making people. As there are stories prevailing throughout Wayand about losses incurred by inexperienced traders, they are afraid of entering into this business. Most of the respondents argued that there is large scale speculation in the trading and big lobbies are playing here. So the actual price is not revealed. Volume of pepper traded in exchanges is actually much higher than actual production which creates high volatility in the market. A large scale awareness programme is extremely necessary to increase the farmer participation so as to make the futures market perfect.

4.4.4 Advantages of online trading

From the early years of 1957 when IPSTA came into being, futures trading in pepper was prevailing in India. It was actually done in open cry method in which all the traders gathered together in the trading ground and trading was done directly. But after the year 2003, when online trading in commodities was introduced, trading in pepper also changed to online method. During the survey, it was pointed out by many of the respondents that the present system of online trading is very much advantageous compared to the old outcry system. Hence a comparative analysis of the advantages of

online trading to different group of traders in the pepper futures is discussed in this section using the responses of the trading farmers and non - farmer traders of Wayanad District and traders of Ernakulam district using Kendal's Co-efficient of Concordance of the ranked variables.

Ten variables have been identified as the advantages of online trading which are increasing liquidity in trading, saving time, better price discovery, increased trade volume, timely knowledge of future position, terminal trading facility, easy settlement, increased number of participants, better hedging facility and transparent trading process. These variables are ranked according to the priority given to each of the responses by all the 48 traders in futures market of both the districts. Analysis of advantages of online trading of these ten ranked variables has been done using Kendall's Coefficient of Concordance. The three groups considered are farmer traders and non- farmer traders of Wayanad District, and non farmer traders of Ernakulam District. The results of the Test are shown in Table 4.12. The variable with the least mean rank is having the most available advantage of online trading to the trading respondents.

Table 4.12 Advantages of online trading

Indicators	Mean Rank		
	Wayanad		Ernakualm
	Farmer traders	Non farmer traders	Non farmer traders
Increased trade volume	2.75	7.50	3.60
Increasing liquidity in trading	3.00	7.80	2.45
Terminal trading facility	3.13	4.20	6.25
Increased number of participants	4.88	2.80	6.55
Better hedging facility	5.00	5.50	4.25
Easy settlement	6.13	2.60	7.52
Saving time	6.50	3.90	3.77
Transparent trading process	6.50	7.60	7.87
Timely knowledge of future position	8.00	5.80	4.62
Better price discovery	9.13	7.30	8.13
Number of respondents	*8*	*10*	*30*
Kendall's W(a)	*0.508*	*0.448*	*0.443*
Chi-Square	*36.545*	*40.342*	*119.689*
Df	*9*	*9*	*9*
Asymp. Sig.	*.000*	*.000*	*.000*

Source: Primary data

The Test proves that there is significant agreement among the respondents of each group with respect to the advantages derived from online trading. Increased trade volume, increasing liquidity in trading and better terminal facility are the most preferred advantages for the farmer traders of Wayanad, while better price discovery is the least beneficial to them. For the non farmer traders, easy settlement, increased number of participants and time saving are of importance, while increased liquidity is of least advantage to them. As far as the traders of Ernakulam are concerned, increase in liquidity in trading, increased trade volume and saving time are the most available advantages to the non farmer traders, while price discovery seemed to be the least available advantage for them.

As regards the traders from Wayanad, the responses imply that there is a high speculative motive among the traders of futures market, rather using the online line trading for price discovery and hedging facility. Since all the respondents of these two groups of Wayanad are hill produce merchants also, they can be benefited from online trading only through using the market for hedging and for price discovery purposes. But the opinion of most of the respondents is that futures prices will not be realized at the time of delivery and hence cannot be relied upon.

Respondents including exporters and even speculators from Ernakulam are of the opinion that futures prices are not reflecting the actual supply and demand in the market. The traders are not taking delivery of their products also due to the difficulties in getting Kerala Government Sales Tax Registration. Many of them are indulging in the speculative trading business with the motive of making profit. Hedging benefits and price discovery are of the least preferable benefits of traders and increased liquidity is the preferable advantage for the speculators so that they can easily square up their contract. So increasing the participation of hedgers is the need of the hour to convert the futures market of pepper into a perfect one.

4.4.5 Comparison of benefits of futures trading to farmers and traders

For analyzing the benefits of futures trading, two sets of questions were prepared one for the farmers and the other for the traders. The opinion towards the first

set of questions meant for farmers were collected from the farmer traders and non trader farmers, while that of the second set of questions meant for the traders were collected from the farmer traders and non farmer traders. Thus the opinion of farmer traders were collected to both set of questions since the farmer traders belong to the category of both farmers and traders. The analysis of benefits has been done for both Wayanad and Ernakulam districts.

The responses are collected by means of 'yes' or 'no' questions to the indicators of benefits administered to farmers and traders separately. Responses are coded as 'one' and 'zero' so that a beneficial indicator denotes 'one' and non beneficial indicator denotes 'zero' so that sum of the 'ones' gives the degree of benefits that each respondent is enjoying from futures trading. Degree of benefits of each respondent varies from one to ten as ten indicators are selected for each group. The positive responses regarding benefits of futures trading from the farmers, consisting of farmer traders and non trader farmers of Wayanad are depicted in Table 4.13.

Table 4.13. Benefits of futures trading to farmer traders and non trader farmers in Wayanad

Sl No.	Indicators	Number of positive responses	
		Non Trader Farmers	Farmer Traders
1	Volatility of pepper price decreased	4	4
2	Pepper price increased	7	6
3	Pepper price go with cost of production	0	3
4	Cost of cultivation can be modified with predicted futures price	0	2
5	Storage period can be determined from futures price	0	6
6	Storage facility increased	0	4
7	Accessibility to market increased	1	4
8	Loan facilities increased	1	1
9	Government policies are favourable to farmers	0	2
10	Futures price move with spot price	0	2

Source: Primary data

As evident from Table 4.12, the highest positive responses are for increase in pepper prices after commencement of futures trading. Futures trading in pepper may not be the single reason for this increase in pepper. The respondents are of the opinion that pepper price does not go always with cost of production and cost of cultivation

cannot be modified according to futures prices. Farmers, in general are not satisfied with Government policies with regard to pepper cultivation. Since there is no delivery of the contracts, there is no need to avail the services of the Central Warehouses. Hence availing of loans on the security of warehouse receipts is not popular. It is noteworthy that positive responses have come more from the farmer traders compared to the non trader farmers. This is due to the benefits derived by these respondents as traders and not as farmers. Hence it can be implied that futures trading is more beneficial to traders than to farmers who do not trade.

Once the opinion of farmers with respect to futures trading is analysed, the next effort is to discuss the benefits to traders. The traders include the farmer traders and non farmer traders of Wayanad and the traders comprising the exporters and speculators of Ernakulam. Ten indicators which are of relevance to pepper futures have been administered to these respondents and the responses presented in Table 4.14.

Table 4.14. Benefits of futures trading to Traders in Wayanad and Ernakulam Districts

Sl No.	Benefits of futures trading to Traders	Number of positive responses				
		Traders				
		Wayanad		Ernakulam		Total
		Trading Farmers	Non Farming Traders	Exporters	Speculators	
1	Pepper price is less volatile	2	1	6	3	12
2	Pepper more suitable product for commodity trading	8	10	10	17	45
3	Increased accessibility to know prices	7	9	11	17	44
4	Increased flexibility to settle trade	7	9	10	16	42
5	Less initial margin requirements	7	8	10	11	36
6	High profitability	2	5	10	9	26
7	Price is more predictable	3	3	8	9	23
8	Increased accessibility to loan facilities	1	0	5	1	7
9	Flexible trading mechanism	5	9	11	15	40
10	High volume of trade	7	10	12	16	45

Source: Primary Data

The highest positive responses are for the opinions that pepper is a suitable commodity for futures trading and there is high volume of trade. The traders consist of speculators and as noted earlier (Table 4.10) the volume of trade is many times higher than the actual production. Hence the earlier finding (Table 4.12) that traders are more benefited from futures trading and they are not reaching to the farming community is reinstated here. Here also the least benefit of the futures trading is with regard to loan facility by way of warehouse receipts since there is no delivery on expiry of the contract. Only the exporters are using the facility of warehouses since they are taking delivery of the pepper and hence they are availing the loan facility on the security of warehouse receipts.

The above discussion of the benefits of futures trading was with respect to the total positive responses for each indicator of benefits. The next discussion is with respect to the degree of benefits of each group of respondents with that of another group based on the already discussed positive responses of the respondents in each group. This will reveal the extent of benefits to each group, thereby enabling a comparison between the groups. Mann Whitney U Test has been applied to arrive at this comparison of benefits. Group – wise comparison has been made in the following cases:

i) Farmers *(trading farmer and non trading farmers)* and traders *(trading farmer and non farmer traders)* of Wayanad
ii) Non farmer traders and non trader farmers of Wayanad
iii) Farmers and non trader farmers of Wayanad
iv) Non farmer traders and farmer traders in Wayanad and
v) Exporters and speculators in Ernakulam

The results of the Mann Whitney U Test conducted for the above categories of respondents are presented in Tables 4.15, 4.16, 4.17, 4.18 and 4.19 respectively.

Table 4.15.Mann-Whitney U for Farmers and Traders in Wayanad

	Number	Sum of Ranks
Farmers	20	253.50
Traders	18	487.50

Test Statistics(b)	
Mann-Whitney U	43.500
Wilcoxon W	253.500
Z	-4.050
Asymp. Sig. (2-tailed)	.000

Two major groups of the study, viz., traders and farmers, of Wayanad are compared in Table 4.15. Here the farmers consist of trading farmer and non trading farmers. Traders consist of trading farmer and non farmer traders. Thus all the 30 respondents of Wayanad are forming part of these two categories for comparison. The trading farmers come in both the groups since they share the characteristics of both. The Mann Whitney U Test is found to be significant which reveals that there is considerable difference between the benefits enjoyed by the farmers and traders. The sum of ranks which shows the aggregate degree of benefits of futures trading is found to be more for traders' group which proves that traders are more benefited from futures trading compared to farmers.

Table 4.16. Mann Whitney U Test for Non Farmer Traders and Non Trader Farmers in Wayanad

Category	Number	Sum of Ranks
Non Farmer Traders	10	230.50
Non Trading Farmers	12	175.50

Test Statistics(b)	
Mann-Whitney U	20.500
Wilcoxon W	230.500
Z	-3.107
Asymp. Sig. (2-tailed)	.002

From the above Table it is clear that there is significant difference between the non farmer traders and non trading farmers in Wayanad district. Non farmer traders are in better position to enjoy the benefit of futures trading in pepper. They are frequent

traders of the futures market and conceive the needed information from the market as part of their business strategy. As futures trading is not popular among farmers they are reluctant to undertake it. This has led to significant difference between farmers and traders in enjoying the benefits of futures trading. This also supports the earlier finding (Table 4.15) that traders are benefiting from futures trading rather than farmers.

Table 4.17 .Mann-Whitney U Test for Farmers and Non Trader Farmers in Wayanad

Category	Number	Sum of Ranks
Farmers	20	233.00
Non Trading Farmers	12	232.00

Test Statistics(b)	
Mann-Whitney U	23.000
Wilcoxon W	233.000
Z	-3.464
Asymp. Sig. (2-tailed)	.001

From the above Table it is clear that there is significant difference between the benefits enjoyed by farmers and non trading farmers in Wayanad district. Farmers include both trading farmer and non trading farmers. Hence based on the results obtained from the earlier Tables (4.15) this category should be in a better position compared to non trading farmers, which is supported here.

Table 4.18 .Mann Whitney U Test for Non farmer traders and farmer traders in Wayanad

Category	Number	Sum of Ranks
Non Farmer traders	10	71.00
Trading Farmer	8	100.00

Test Statistics(b)	
Mann-Whitney U	35.000
Wilcoxon W	71.000
Z	-.458
Asymp. Sig. (2-tailed)	.647

Table 4.18 shows that there is no significant difference between the benefits enjoyed by non farmer traders and trading farmer. The criterion for enjoying the benefits is not whether the trader is a farmer or a non farmer, but whether he trades in futures or not.

Table 4.19 .Mann Whitney U Test for Exporters and Speculators in Ernakulam

Category	Number	Sum of Ranks
Exporters	12	244.50
Traders	18	220.50

Test Statistics(b)	
Mann-Whitney U	73.500
Wilcoxon W	244.500
Z	-1.505
Asymp. Sig. (2-tailed)	.132

Table 4.19 also reveals that there is no significant difference between the benefits enjoyed by exporters and speculators in Ernakualm.This is due to the fact that both belong to the same category of traders. This also supports the finding of the Table 4.18.

Mann Whitney U Test has revealed that there is significant difference between the traders and farmers with respect to the extent of the benefits of futures trading enjoyed by them. It is also proved that there is no significant difference between the different categories of traders, irrespective of whether they are farmers or hill produce merchants or exporters or speculators.

SUMMARY AND CONCLUSION

CHAPTER 5

SUMMARY OF FINDINGS AND CONCLUSION

The study on "Futures trading in Pepper" has been conducted with the main objectives of analyzing price discovery mechanism of pepper futures in NMCE and examining the benefits of futures trading in pepper to farmers and traders. Both primary and secondary data were used for the study. The first objective of analyzing the price discovery mechanism of pepper futures was done using secondary data on daily futures and spot prices from May 2003 to March 2008 of NMCE. For examining the benefits of futures trading in pepper to farmers and traders, primary data were collected from sample farmers and traders by means of a structured interview schedule.

Two districts of Kerala, namely, Ernakulam and Wayanad were selected to identify the farmers and traders respectively, for collecting information regarding the benefits derived from futures trading. From each of the two districts of Ernakulam and Wayanad, 30 respondents were selected to analyze the benefits of futures trading in pepper to farmers and traders. These respondents were classified as trading farmer, non – trading farmers and non- farmer traders. The data collected have been processed using MS – Excel sheets. Co-integration technique, Kendall's Co-efficient of Concordance, Mann Whitney U Test, Student's t – Test, Compound Annual Growth Rate and annual growth rate were used to analyse the data.

5.1 Major Findings

The major findings of the study are summarised below:

5.1 .1 Pepper economy – An overview

Pepper has an important place in global trade in spices. Historically, it was the first spice to be traded internationally and largely responsible for opening up trade routes between the West and the East. Today, it is the most important spice traded, in terms of quantity as well as value and accounts for a significant portion of world trade

in spices. With its antioxidant, anti-microbial, analgesic, anti-pyretic and anti-inflammatory properties, it has wide applications in pharmaceutical products and in Ayurveda, the indigenous system of Indian medicine.

5.1.1.1 Global Pepper Scenario

Pepper is cultivated today in many countries of the world. Brazil, India, Indonesia, Malaysia, and Sri Lanka, who are members of the International Pepper Community, and Vietnam, China, Ecuador, Madagascar, Thailand and Cambodia, produce quantities of pepper significant in world trade.

(i) Global production of pepper

World pepper production has been increasing over the last half century and declined after the year 2003. This increase in production has been mainly due to a substantial expansion in area and production in Vietnam, as well as increased output from Indonesia and China. The attractive price for pepper, which prevailed during 1999 and to some extent in 2000, encouraged farmers to expand the area cultivated with pepper.

Vietnam has emerged as the largest producer of pepper, having 29.9 per cent of production with just 9.1 per cent of the global area under production. The productivity is also the highest for Vietnam, which is more than seven times of that of India. With around 40 per cent of the global area under pepper, India is having only nearly 18 per cent of the world production of pepper due to the poor yield / productivity of India, which is the lowest in the world at present. Pepper is grown in India mostly as a mixed crop and not as a pure crop as done in many countries.

The pepper yield has peaked in 2002, at 694 kg per hectare, declining in 2003 to 649 kg per hectare, reflecting decreased expenditure on farm maintenance and inputs. The low prices of pepper and the increase in the prices of fuel and fertilizers have compelled many of the growers in the major growing countries to have either neglected the existing vines or shifted to other remunerative crops. (Table 4.1).

(ii) Global Export of Pepper

Exports of pepper from producing countries have increased consistently, at an annual rate of increase of over 15 per cent during 1998 to 2002. Vietnam's exports have contributed much to this increase. The share of India in global pepper export has declined to less than 10 per cent during the recent years due to the competition from Vietnam. Though share of India in raw pepper export has declined, India is the major producer of pepper oleoresin and pepper oil in the world. Nearly 90 percent of global pepper oleoresin is produced in India.

Vietnam is leading the world export of pepper with 42.7 per cent of the market in the year 2004, from 1.3 per cent in 1985, while India's share has declined from 20.3 per cent to 6.1 per cent during the same period. India is being pushed to the fifth position, with Brazil and Malaysia also overtaking her. (Table 4.2)

(iii) Global Import of Pepper

World imports of pepper, including pepper for re-export in various forms, have increased in line with exports. Though chilies raise competitive threat to pepper as a supplement product, its dominance as 'king of spices' still continues. The United States is the world's largest importer and consumer of pepper. But the imports of chilly into USA are growing faster than imports of pepper. Singapore which was closely behind USA has decreased its exports recently. Much of the imports of pepper are re-exported by Singapore. Germany and Netherlands are also important pepper importing countries for domestic consumption as well as for processing and re-export. India has also begun to import significant amounts of pepper, as domestic demand for grinding and extraction as well as other uses is getting expanded. (Table 4.3)

5.1.1.2 Indian Pepper Scenario

Although area under cultivation and production of pepper are showing positive growth rates in many of the years under study, in the case of productivity, the growth

rate is negative in most of the years. There has been a drastic fall in production and productivity in the year 2006-07 though the intensity of the fall is less in the case of area under cultivation. The adverse climatic conditions and attack of diseases have been the main reasons for the fall in production and productivity. The CAGR is negative for productivity, while that of area and production is not at all significant, which reveals the poor performance of this industry over the years. (Table 4.4)

With 91.9 per cent of the area under cultivation, Kerala produces 93.1 per cent of the total pepper of India at the end of 2006 – 07. Only Karnataka has made some attempt to promote this crop. All the other states have still a very insignificant contribution to this industry. The productivity of Kerala has been decreasing, but has ended up in 2006 – 07, with a slightly better performance than the All India yield.

With 10 per cent of the area under spices, pepper has a share of two per cent in the total production of spices in the country. Although pepper is in the third position in the area under cultivation, it is the last with respect to the share in the production of the ten major spices of India. Chillies which occupy 32 per cent of the total area under spices have a share of 32 per cent in the total production of spices also in the country. Chilly is the main competitor of pepper since people are substituting chilly for pepper. (Table 4.5)

5.1.1.3 Pepper – Kerala Scenario

Idukki district with 35.3 per cent of the area under cultivation is contributing to 59.4 per cent of the production of pepper in Kerala, while, Wayanad, the second largest producer is having only 13.1 per cent of production with 17.1 per cent of land under cultivation. It implies that productivity in Idukki is much higher than that of Wayanad. Area and production in three districts, namely, Idukki, Thrissur and Palakkad have been consistently increasing during the reference period, though on a limited scale (Table 4.6).

5.1.2 Commodity Derivatives Market in India

The history of organized commodity derivatives in India goes back to the nineteenth century when the Cotton Trade Association started futures trading in 1875, barely about a decade after the commodity derivatives started in Chicago. After long years of banning, commodity derivatives market was reinstalled in the liberalized scenario. The Committee headed by Prof. K.N.Kabra recommended allowing futures trading in 17 commodity groups. It also recommended strengthening of the Forward Market Commission, and certain amendments to Forward Contracts (Regulation) Act, 1952, particularly allowing option trading in goods and registration of brokers with Forward Market Commission.

5.1.2.1 Commodity Derivative Exchanges in India

There are 25 commodity derivative exchanges with four national commodity exchanges in India as of now and derivative contracts on nearly 100 commodities are available for trade. The four national Commodity Exchanges which are operational at present are National Board of Trade Limited (NBOT), National Multi-Commodity Exchange of India (NMCE), National Commodity and Derivatives Exchange (NCDEX) and Multi Commodity Exchange (MCX).

5.1.2.2 Regulation of Futures Trading in India

In India, the regulation of futures and forward trading has been carried out under the provisions of the Forward Contracts (Regulation) Act, 1952. There are three authorities who regulate futures/forward trading viz. the Central Government, the Forward Market Commission (FMC), and the recognized associations.

5.1.2.3 Recent trends in commodity futures markets

Indian Inflation has touched double digits for the first time in 2008 after a decade - actually after 1995. It has climbed steeply from under five per cent in November 2006, to over 11.63 per cent for the week ended June 21, 2008. The Centre's

worry on inflation and the role of futures in pushing up prices of major agricultural commodities led to the summoning of the Chief Executive of the Forwards Market Commission to the Capital to discuss ways to clamp down on speculative trading. They implemented a ban on futures trading in soybean oil, rubber, chickpeas and potatoes as the Government sought to control the fastest inflation since 2005. The Government had already halted futures trading in wheat and rice in 2007 and in lentils in 2006 to check a surge in the local prices of the commodities. Many experts criticized the Government's policy of putting a blanket ban rather than taking corrective steps.

Even though speculation in the commodity trading is said to be very high it can be controlled by putting a limit in the trading volumes and fluctuations in the prices of the commodity through regularly watching the market movements by the regulators. A complete ban of the commodity derivative markets is opposed by many of the economists and experts.

5.1.2.4 Futures trading in Pepper

India is the forerunner among producing countries in futures or forward marketing of pepper. Futures markets are standardized with regard to trading regulations and terms of delivery. The Indian Pepper and Spice Trade Association (IPSTA) took the initiative to set up forward trading in pepper in India in 1957 at Kochi. Pepper is one of the most volatile commodities traded internationally, with prices more often than not changing by upwards of five per cent from one month to another.

5.1.3 Price discovery mechanism of pepper futures in NMCE

Pepper futures to become an efficient market should reveal the future prices of pepper according to demand, supply and other economic factors. Thus, co-integration of the spot and futures prices is an essential precondition for the efficiency of the futures markets. An analysis of trend of futures and spot prices of pepper reveals the efficiency of the price discovery mechanism of pepper futures. The spot and futures prices under the study period reveal an increasing trend. As spot price is always below

the futures price there is opportunity for hedging. Both the spot and futures prices are moving more or less in the same direction. Since the trend lines are very closely moving, it implies that the two prices are highly related and prediction of one using the other is possible. (Fig.4.5)

5.1.3.1 Co - integration of spot and futures prices of pepper

Monthly average price series were split into six different series such as futures price at the time of delivery (F_D), future price one month prior to delivery (F_1), two months prior to delivery (F_2), three months prior to delivery (F_3), four months prior to delivery (F_4) and five months prior to delivery (F_5). Each of these price series was co - integrated with the spot price series to examine their consistency. The test showed the prediction capability of each price series and the degree of risk involved in each series. Futures prices prior to three months (F_3), four months (F_4) and five months (F_5) prior to delivery are closer to the spot price. This reveals the efficiency of the co- integration technique in identifying the movement of two variables in the same direction.

Auto Correlation Function (ACF) was calculated for different lags both for futures and spot prices. The significance of auto correlation was assessed through unit root test. ACF for both futures and spot were found to be significant upto the order of lag 15. As both ACFs were of the same lagged order, it could be assumed that both spot and futures prices could be co - integrated. Hence price discovery of futures based on spot and spot based on futures is possible and prediction values calculated. (Para 4.3.2)

Prediction equations of spot prices using futures prices showed that spot and futures prices of the five months, four months and three months prior to delivery were having high degree of predictability of 98.9, 96.4 and 93.2 per cent respectively, which implies that spot and futures prices of five months, four months and three months prior to delivery are co - integrated. So prediction of spot prices based on one month, two months and three months futures ahead is feasible. A farmer can rely upon futures prices with confidence upto the next three months. But future prices of two months prior to delivery, one month prior to delivery and at delivery month cannot be relied

with above 90 percent confidence, since there is lack of co - integration between the series. When compared to 98.9 per cent in five months prior to delivery, the variance explained is only 83.5 per cent during delivery month which means that there is high risk in investment in pepper for six months' futures. (Table 4.7)

The examination of the relationship between the spot and futures price series of pepper during the study period has revealed an increasing trend since January 2006 in spot as well as futures prices. Futures price at the delivery month $F_{D,}$ is farther away from the spot which proves that there is higher degree of variation from the spot. This reinstates the earlier finding (Table 4.7), that there is lack of co-integration between spot and futures prices in the delivery month. Futures prices prior to three months (F_3), four months (F_4) and five months (F_5) delivery are closer to the spot price. (Fig.4.6)

Predicted values of spot based on futures prices viz; $F_{3,}$ F_4 and F_5, suggest that pepper commodity futures market is an efficient and unbiased market. Futures markets of pepper show efficiency in forward pricing in the case of $F_{3,}$ F_4 and F_5. Nearer the predicted lines to the actual spot line, higher is the predictability. But their forward pricing ability is weak in delivery month and upto two months prior to delivery. This may be due to the squaring up of contracts in the initial months without delivering, resulting in low volume of trade towards delivery month. The study supports the finding that forward pricing ability is weak in delivery month which may be due to low volume of trading in the maturity month as inefficiency is more common in thin markets (Fig. 4.7).

5.1.4 Benefits of futures trading to pepper farmers and traders

To analyse the benefits of futures trading to farmers and traders, primary data have been collected from 60 respondents from Wayanad and Ernakulam districts. The characteristics of the respondents have been presented in three sections viz.

5.1.4.1 General Characteristics of the Respondents

For analyzing the general characteristics of the respondents, seven indicators, viz., age, sex, religion, educational status, family size, occupational status, and annual income were considered. There are no farmers below the age of 30 in the sample respondents. It gives an indication about the present generation's aversion towards taking agriculture as a profession. All the respondents are males. In both, farming and trading, Christians dominate. It was observed that educational qualification of the respondents dealing in futures has been comparatively higher than that of those who are not trading. Average size of the family is found to be three in both the districts. Size of the family is high among the Muslims compared to others. (Table 4.9)

5.1.4.2 Farmer related characteristics

The farmer related characteristics include that of the trading farmer and non – trading farmers. A comparison of the size of landholding of trader and non- trader farmers revealed that most of the respondents who are actively trading in pepper futures are large farmers and small farmers have limited role in futures trading. Large farmers who are also doing hill produce business and are residing nearby the broker firms are actively engaged in trading for hedging and speculative purposes.

Storing for a better price is the marketing strategy adopted by the large farmers while small farmers are forced to immediate selling. So futures market as a hedging mechanism is inevitable to them. As price of pepper is favourable to farmers in recent days, most of them are interested to sell off the product readily.

Since most of the non trading belong to the category of small farmers, naturally their income level is less. Hence 50 per cent of them only are having an annual income of more than Rs. 50,000 from pepper, while 87.5 per cent of the trading farmers are having more than Rs 50,000. Student's t- test revealed that there is not much difference between the trading farmer and non trading farmers with respect to income

from pepper. No effort was made by the trading farmers to increase their production after commencing of futures trading. So futures trading has not made any impact on the income from the cultivation of pepper of trading farmer and non trading farmers (Table 4.10).

5.1.4.3 Trader related characteristics

The characteristics of the trading respondents include that of the trading farmer and non – farmer traders including hill produce merchants, exporters and speculators of both Wayand and Ernakulam districts.

All the respondents in the Wayand district had started futures trading only five years back, while majority of the respondents of Ernakulam were doing futures trading as part of their business for more than fifteen or twenty years. Major portion of the respondents had started online trading only within a period of two to three years which shows the initial reluctance on the part of the pepper traders and producers to enter into pepper futures trading.

In the major pepper producing area of Wayanad, the average quantity of pepper traded is only 10 - 30 tons in the case of 83 per cent of the respondents, while in Ernakulam it is 100 - 300 tons in the case of 77 per cent, which implies the speculative motive of the traders. In Ernakulam, majority of the traders prefer intra – day trading and square up the contract within the day itself. Compared to Wayanad, the traders of Ernakulam are more interested in taking delivery of the contracts. This is mainly because of the fact that delivery procedure is a costly method especially in the remote places like Wayanad even though the warehouse of the Central Warehousing Corporation (CWC) is located in the nearby town. A better share of the respondents of Ernakulam opt for delivery since there are exporters who mainly use futures trading for hedging activities and would prefer in taking delivery rather than squaring up. Lion's share of the commodity procured by the traders in Wayanad is from farmers directly while in Ernakulam it is from the Central Warehousing Corporation. Volume of pepper traded in exchanges is actually much higher than actual production which creates high

volatility in the market. A large scale awareness programme is extremely necessary to increase the farmer participation so as to make the futures market perfect. (Table 4.11)

5.1.5 Advantages of online trading

Analysis using Kendal's Co-efficient of Concordance proved that there was significant agreement among the respondents of each group of respondents with respect to the advantages derived from online trading. Increased trade volume, increasing liquidity in trading and better terminal facility were the most preferred advantages for the trading farmers of Wayanad. For the non farmer traders, easy settlement, increased number of participants and time saving were of importance. Increase in liquidity in trading, increased trade volume and saving time were the most available advantages to the non farmer traders of Ernakulam. But the opinion of most of the respondents was that futures prices would not be realized at the time of delivery and hence could not be relied upon.

Respondents including exporters and even speculators from Ernakulam were of the opinion that futures prices are not reflecting the actual supply and demand in the market. The traders are not taking delivery of their products also due to the difficulties in getting Kerala Government Sales Tax Registration. Many of them are indulging in the speculative trading business with the motive of making profit. Hedging benefits and price discovery were of the least preferable benefits of traders and increased liquidity was the preferable advantage for the speculators so that they could easily square up their contract. So increasing the participation of hedgers is the need of the hour to convert the futures market of pepper into a perfect one. (Table 4.12)

5.1.6 Comparison of benefits of futures trading to farmers and traders

Comparison of futures trading to trading farmer and non trading farmers in Wayanad revealed that futures trading is more beneficial to traders than to farmers who do not trade. While comparing the benefits of futures trading to traders in Wayanad and Ernakulam districts it was found that the least benefit of the futures trading is with regard to loan facility by way of warehouse receipts since there is no delivery on expiry

of the contract. Only the exporters are using the facility of warehouses since they are taking delivery of the pepper and hence they are availing the loan facility on the security of warehouse receipts.

Non farmer traders are in better position to enjoy the benefit of futures trading in pepper compared to non trading farmers in Wayanad. They are frequent traders of the futures market and conceive the needed information from the market as part of their business strategy. As futures trading is not popular among farmers they are reluctant to undertake it. This has led to significant difference between farmers and traders in enjoying the benefits of futures trading. There is no significant difference between the benefits enjoyed by exporters and speculators in Ernakualm. This is due to the fact that both belong to the same category of traders.

Mann Whitney U Test has revealed that there is significant difference between the traders and farmers with respect to the extent of the benefits of futures trading enjoyed by them. It is also proved that there is no significant difference between the different categories of traders, irrespective of whether they are farmers or hill produce merchants or exporters or speculators. Therefore, the criterion for enjoying the benefits is not whether the trader is a farmer or a non farmer, but whether he trades in futures or not.

5.2 Conclusion

The study of 'Futures Trading' in Pepper has revealed that futures prices three months prior to delivery, four months prior to delivery and five months prior to delivery are closer to spot prices and shows high level of co-integration in the price series. Hence prediction of spot prices based on one month, two months and three months futures ahead is feasible. A farmer can rely upon futures prices with confidence upto the next three months. But future prices of two months prior to delivery, one month prior to delivery and at delivery month cannot be relied since there is lack of co - integration between the series. There is high risk in investment in pepper for six months' futures. Traders enjoy more benefits from futures trading compared to farmers.

The criterion for enjoying the benefits is not whether the trader is a farmer or a non farmer, but whether he trades in futures or not.

Starting of terminal outlets in remote areas, extensive campaign for awareness creation about futures trading and computer education to remove the aversion towards screen based trading will attract more number of participants to futures trading. Compulsory delivery of the underlying asset is to be enforced by the regulatory authorities to make the real farmers the beneficiaries of futures trading and thereby ensuring a remunerative price. Also co-operative marketing societies in the field of spice market should be strengthened to give farmers benefits of remunerative prices through large scale marketing and processing.

BIBLIOGRAPHY

BIBLIOGRAPHY

Akiyama, T., Trivedi, P.K. and Reinsel, R.D. 1993. Stabilizing import food prices for small developing countries: any role for commodity futures? *Managing food security in unregulated markets* **28**: 81-104

Alok Kumar Misra. 2008. Commodity Futures Markets in India, Riding the growth phase. International Conference on Commodity futures: Riding the growth phase. Available: http:www.ncdex.com [20 Jan. 2008]

Anon. 1991. The future in futures. *Fertilizer focus* **8**: 36-38

Armesto, M.T. and Gavin, W.T. 2005. Monetary Policy and commodity futures. *Review Federal Reserve Bank of St. Louis*. **87(3)**: 395-405

Aulton, A.J., Ennew, C.T. and Rayner, A.J. 1997. Efficiency tests of futures markets for UK Agricultural Commodities. *J. Agric. Econ.* **48**: 408-423

Bhar, R. and Hamori, S. 2006. Linkages among agricultural commodity futures prices: some further evidence from Tokyo. *Applied Econ. Letters.* **13(8)**: 535-539

Bockenhoff, E. 1993. Commodity futures exchanges for agricultural products are becoming increasingly tropical. *Agrawirtschaft*. **42**: 89-90

Booth, G.G. and Ciner, C. 2001. Linkages among agricultural commodity futures prices: evidence from Tokyo. *Applied Econ. Letters*. **8(8)**: 311-313

Bruce Bab Cock. 2008. Commodity Futures Trading for Beginers. Retail Based Trading Company. Available: http://www.rb-trading.com/begin/ [20 Jan. 2008]

Bryant, H.L. and Haigh, M.S. 2001. Estimating actual bid ask spreads in commodity futures markets. Proceedings of NCR 134 conference on Applied commodity price Analysis forecasting and Market Risk Management, April 23-24, 2001. St. Louis, M.O., USA.

Bryant, H.L. and Haigh, M.S. 2001. Estimating actual bid-ask spread in commodity futures markets. Proceedings of NCR 134 conference on Applied Commodity Price Analysis, Forecasting and Marketing Risk Management, April, 23-24, 2001. St. Louis. M.O. USA.

Bryant, H.L. and High, M.S. 2002. Bid-ask spread in commodity futures markets. *Working paper - Dept. of Agric. And Resource Econ - University of Maryland*. **(02-07)**: 41p.

Chatratch, A., Adrangi, B. and Dhanda, K.K. 2002. Are commodity prices chaotic? *Agric. Eon.* **22(2):** 123-137

Claudeb Erb and Cambell, R.H. 2006. The strategic and tactical value of commodity futures. *Financial Analyst J.* **62**: 69-67

Crater, C.A. 1999. Commodity futures markets: a survey. *Australian J. of Agric and Resource Econ*. **43**: 209-247

Dahlgran, R.A. 2001. An examination of futures price determination through the lens of market integration. Western Agric. Econ. Association - Annual Meeting, Vancouver-British-Columbia, 1-32

Duncan, R., Blair, A. and Duncan, R. 1992. Options of agricultural futures. *Agric. Futures and options a guide to using North American and European markets*. pp.50-64

Fortenbery, R. and Zapata, H. 2004. Developed speculation and under developed markets - the role of futures trading an export prices in less developed countries. *European Review Agric. Econ.* **31(4)**: 451-471

Forward Market Commission. 2008. Characteristics of futures trading. Available: http://www.finc.gov.in/htmldocs/Economicbenefits [20 Jan. 2008]

Frank, D. 1992. Agricultural commodity futures markets in South Africa. *Agrekon*. **31**: 313-320

Frechette, D.L. 2003. The potential value of agricultural trade options. *Agric. And Resource Econ. Review*. **32(2)**: 232-243

Garcia Vedug Sales, J. 1998. The Valencia citrus futures market: assessment, evolution and prospects. *Revista Espamola de Economia Agaria*. **183**: 115-152

Garcia, P. and Leuthold, R.M. 2004. A selected review of agricultural commodity futures and options markets. *European Review of Agric. Econ.* **31(3)**: 235-272

Garcia, P., Adam, B.D. and Hauser, R.J. 1994. The use of mean variance for commodity futures and options hedging decisions. *J. Agric. And Resource Econ*. **19**: 32-45

Gary, B. Gorten, Fumio, H. and Geert, K. 2007. The fundamentals of Commodity Futures Returns. NBER Working Paper No. WI 3249. Available: http//srn.com/abstract [20 Jan. 2008]

Geojit Securities Ltd. 2008. Introduction to commodity futures. *Pepper*. Available: http\\www.geojit.com. [20 Jan. 2008]

George, C.K. 1989. Proceedings of the workshop on strategies for export development of spices. Spices Board, Cochin

Ghoash, S. 1987. Stabilizing Speculative Commodity Markets. Oxford University Press, New York.

Gopal Naik and Jain, S.K. 2001. Efficiency and unbiasedness of Indian commodity futures markets. *Indian J. Agric. Econ*. **56(2)**: 185-197

Gopal Naik and Jain, S.K. 2002. Indian agricultural commodity futures market: a performance survey. *Econ. Pol. Wkly*. **37(30)**: 3161-3173

Graf, G. 1997. A commodity futures market a stabilization element for the cerial market. *Muhle Mischfuttestechnik*. **134**: 337-338

Gravelines, R.S. and Boyd, M. 1999. A note on asymmetry in commodity futures markets. *Canadian J. Agric. Econ*. **47**: 321-329

Greer, T.V., Brorsem, B.W. and Liu, S.M. 1992. Slippage costs in order execution for a public futures fund. *Review Agric. Econ*. **14**: 281-288

Gurshan Shingh Kainth. 2008. Agri. Futures: Need for more farmers involvement. *Agriculture Today*. **3**: 15-14

Hambloch, C., Stratmann, R., Weiss, D., Zimmer, M., Tietjen, J., Kaack, H., Justus, B., Bock, P. and Bosse, W. 2001. Trading on the commodity futures market - examples, concepts and connections. *Materialiem-zur-Markberichter statting*. **17**: 155p

Hennessy, D.A. and Wahl, T.I. 1996. *American J. Agric. Econ*. **78**: 591-603

Hilliard, J.E. and Reis, J.A. 1999. Jump process in commodity futures prices and option pricing. *American J. of Agric. Econ*. **81**: 273-286

Himadri Bhattacharya. 2007. Commodity derivatives market in India. *Econ. and Political Weekly*. **42(13)**: 1151-1162

Holly Wang, H. and Bingfanke. 2005. Efficiency tests of agricultural commodity futures markets in China. *The Australian J. Agric and Resource Econ*. **49**: 125-141

ICICI Direct Commodity learning centre. Indian Scenario pepper. Available: http//www. icici.direct.com on [20 Jan. 2008]

India Pepper and Spices Trade Association. 2008. Trading pattern in IPSTA. Available: http\\www.ipsta.com. [20 Jan. 2008]

International Monetary Fund. 2006. World Economic Outlook. Available: http// www.imf.com. [20 Jan. 2008]

Irwin, S.H., Zulauf, C.R. and Jackson, T.E. 1996. Monte Carlo analysis of mean reversion in commodity futures prices. *American J. Agric. Econ*. **78**: 387-399

Jairath, M.S. and Prashant Kanboj. 2005. Some constraitns to Indian agricultural commodity futures. *Indian J. of Agricultural Marketing* **19(2)**: 130-146

Kabra, K.N. 2007. Commodity futures in India. *Econ. Political Weekly*. **42(13)**: 1163-1170

Kaku, K. 1997. A study on the use of futures markets to manage price risk of cattle and dairy industry in the US and Japan. *Animal Science and Technology* **68**: 61-81

Kaku, K. 2001. Studies on the broiler futures market. *Bulletin of National Institute of Animal Industry*. **61**: 37-11

Khoury, N. and Youraugou, P. 1993. Determinants of agricultural futures price volatilities: evidence from Winnipeg commodity exchange. *J. futures markets*. **13**: 345-356

Kristofersson, D. 2004. Markets and heterogeneous goods. *Markets-and heterogeneous goods.* Dept. of Econ and Resource Mmgt. Orwegian University of Life Science, P.O. Box 5003, N-1432 As, Norway, IV + 154

Labys, W.C., Kauassi, E. and Terrazo, M. 2000. Short term cycles in primary commodity prices. *Developing Economics* **38**: 330-342

Link, P. 1993. An opportunity for German Agriculture? Commodity futures markets. *Neue Landwirtschaft* **1**: 21-22

Link, P. and Musfeldt, E. 1994. Can potatoes be provided with security through the futures market? *Kartoffelbau*. **45**: 68-73

Madan, M.S. and Selvan, M.T. 2001. Indian black pepper: changing scenario. *Indian J. of Arecanut, Spices and Medicinal Plants* **3**: 9-17

Madhoo Pavasker, 2005. Death trap for commodity futures. *Econ. Pol. Wkly*. **40(1)**: 14-19

Manfredo, M.R. and Libbin, J.D. 1998. The development of index futures contracts for fruits and vegetables. *J. Agribusiness*. **16**: 1-22

Mashanite, P. and Moholwa, B. Price asymmetry in South African futures markets for agricultural commodities. *Agrekon*. **44(3)**: 423-433

Mc Kenzie, A.M. and Holt, M.T. 2002. Market efficiency in agric. futures markets. *Applied Econ*. **34(12)**: 1519-1532

Mckenzie, A.M. and Holt, M.T. 2002. Market efficiency in agricultural futures market. *Applied Econ*. **34(12)**: 1519-1532

Meulemberg, M.T.G. and Pennings, J.M.E. 2002. A marketing approach to commodity futures exchange: a case study of the Dutch hog industry. *J. Agric. Econ*. **53**: 51-64

Meulenberg, M.T.G. and Pennings, J.M.E. 2002. A marketing approach to commodity futures exchanges a case study of the Dutch hog industry. *J. Agric. Econ*. **53:** 61-64

Meulenberg, M.T.G. and Penniugs, J.M.E. 2002. A marketing approach to commodity future exchange: a case study of the Dutch hog industry. *J. Agric. Econ*. **53(1):** 51-64

Mohan, S. and Love, J. 2004. Coffee futures: role in reducing coffee producer's price risk. *J. International Development*. **16(7)**: 983-1002

Morgan, C.W. 2001. Commodity futures markets in LDCs: a review and prospects. *Progress in Development Studies* **12**: 139-150

Morgan, C.W., Rayner, A.J. and Ennew, C.T. 1994. Price instability and commodity futures markets. *World Development* **22**: 1729-1736

Morgan, W., Rayner, A.J., Ennew, C.T. and Sapsfor, D. 1994. Trade liberalization, domestic price instability and commodity futures markets. The case of potatoes. *The economics of primary commodities: models, analysis and policy*. **21**: 152-170

Myers, R.J. and Hausan, S.D. 1993. Pricing commodity options when the undertaking futures price exhibits time varying volatility. *American J. Agric. Econ*. **75**: 121-130

Nair, G.K. 2007. Down trend persists in pepper future. Business line. Available: http://www.thehindubusinessline.com. [20 Jan. 2008]

Pavaskar, M.G. and Mittal, A.C. 1993. Economics of hedging. *Indian agriculture* **4**: 25p

Pennings, J.M.E. and Egelkraut, T.M. 2003. Research in agricultural futures markets integrating the finance and marketing approach. *Agrarwirtschaft*. **52(6):** 300-308

Pennings, J.M.E. and Meulenberg, M.T.G. 1998. New futures markets in agricultural production rights: possibilities and constraints for the British and Dutch milk quota markets. *J. Agric. Econ*. **49**: 50-66

Pennings, J.M.E. and Mewulberg, M.T.G. 1997. The hedging of performance in new agricultural futures markets: a note. *Agribusiness New York*. **13**: 295-300

Peter, K.V. and Nybe, E.V. 2002. Spices- dominating Global Markets. *The Hindu Survey of Indian Agriculture.* Pp.87-85

Radhakrishnan, S. 1997. Futures trading of commodities and coffee futures markets - Part II. *Indian coffee*. **61**: 6-7

Rajesh, S.R., Raveendran, N. and Ajjan, N. 2002. Economic Analysis of Pepper Exports. *Spice India*. **14**: 16-17

Raju, K.V. 1990. An economic analysis of the export trade of pepper. *Indian J. Marketing*. **20(6)**: 6

Ravikumar, P.H. 2007. NCDEX woos farmers. *Agriculture Today*. 7: 14p.

Ravindran, P.N. 2000. Black Pepper *Piper Nigrum* [book online], Harwood Academic Publication. Available: http://www.book.google.co.in [20 Jan. 2008]

Sahadevan, K. 2005. Globalisation of Indian commodity futures markets: Some lessons from international experience. *Indian J of Agric. Marketing* **19(2):** 107-118

Sahi Gurpreet, S. 2006. Commodity Futures Market Efficiency in India and Effect on Inflation. Available: http://papers.ssrn.com. [20 Jan. 2008]

Saikat Sinharoy; Nair, S.R. and Sinharoy, S. 1994. International trade and pepper price variations: a countegration approach. *Indian J. Agric. Econ*. **49**: 417-425

Santos, J. 2002. Did futures market stabilizes US grain prices? *J. Agribusiness*. **19(2)**: 129-145

Shilpa Jain. 2005. Realizing the Benefits of Commodity Futures Trading: The farmer's Perspective, paper presented at the International Conference of Asia-Pacific Association of Derivatives)APAD) held at IIM, Bangalore, 27-30 July, 2005

Shraddha Umarji. 2008. Spices Report. Available: http://www.ncdex.com/knowledge research/Research_report/ Spices report. [20 Jan. 2008]

Sulagna Chakravarthy. 2006. How commodity trading works. Available: http://www.redff.com on 19th Jan. 2006 [20 Jan. 2008]

Tome, W.G. 1997. Commodity futures prices as forecasts. *Review of Agric. Econ*. **19**: 23-44

Turvey, C.G. 2001. Randon walks and fractal structures in agricultural commodity futures prides. Working paper of *Dept. of Agric. Econ. An Bursiners University of Guelph* **02/02**: 24p

Tuthill, J. and Frechette, D.L. 2004. Optimism and persimism in commodity price hedging. *European Review Agric. Econ.* **31(3)**: 289-307

UNCTAD. 1995. *Feasibility study on a worldwide Pepper Futures Contract*. Available: http://www.unctad.org. [20 Jan. 2008]

Unlmann, F. 1996. Commodity futures trading in marketing oil seeds in the EO. *Agrarwirtschaft*. **45**: 373-375

Vidhyasagar, T. 1996. Current Status of Getting the IPSIA (Cochin Exchange) Internationalized. *Assodram Souvenir*. P.73

Wang, H.H. and Ke, B.F 2005. Efficiency tests of agricultural commodity futures markets in China. *Australian J. Agric. Resource Econ.* **49(2):** 125-141

Wilson, W.W., Crames, G.L. and Waides, E.J. 1993. Commodity opticins. *Grain marketing* **2**: 229-274

Yang, J. and Awokuse, T.O. 2003. Asset storability and hedging effectiveness in commodity futures markets. *Applied Econ. Letters*. **10(8)**: 487-91

Yoon, B.S. and Brorsen, B.W. 2001. Market inversion in commodity futures prices. Proceedings of NCR 134 conference on Applied Commodity Price Analysis, Forecasting and Market Risk Management, April, 23-24, 2001. St. Louis M.O., USA

Zant, W. 2001. Hedging price risk of farmers by commodity boards: a simulation applied to the Indian natural rubber market. *World evelopment*. **29(4)**: 691-710

ANNEXURE

COLLEGE OF CO-OPERATION BANKING AND MANAGEMENT

KERALA AGRICULTURAL UNIVERSITY, THRISSUR

INTERVIEW SCHEDULE

FUTURES TRADING IN PEPPER

1. Name
2. Age
3. Sex
4. Religion
5. Occupation
6. Annual income : a) <50,000, b) 50,000-1,00,000, c) 1,00,000-2,00,000 d) >2,00,000
7. Family details

Name	Age	Relationship with respondents	Occupation	Income

8. Educational status : a) Illiterate, b) <10th pass, c) Graduate, d) Above graduate
9. Computer literacy : a) e mail, b) internet, c) computer typing, c) any other course
10. Category you belong: a) Farmer, b) Trader

PART A

(To farmers)

1. Size of land holding

2. Details of crops cultivated

Crops	Area		Production	Mixed/Single	Income	Percentage contribution to total income
	Owned	Leased				

3. How long you have been a pepper cultivator

4. Type of farming : a) Mixed crop, b) Home stead, c) Plantation

5. Cost of production

Activities	Before commencement of Future trading (in Rs. annually)	After commencement of Futures trading (in Rs. annually)
Manure		
Irrigation		
Pesticide		
Fertilizer		
Land preparation		
Harvesting		
Labour charges		
Transportation charges		

6. Processing activities done

Products	Before starting futures trading	After starting futures trading
Black pepper		
White pepper		
Pepper oil		
Pepper oleoresin		
Ground pepper		

7. Storing period : a) <1 year, b) 1-2 year, c) 2-5 year, d) >5 year

8. Marketing strategy: a) Immediate sale, b) Storing for a better price, d) Advance sale

9. Grade of your product: a) Malabar garbled, b) Malabar ungarbled

10. Marketing channel

Channel	Before starting futures trading	After starting futures trading
Primary Co-op Marketing Societies		
Private traders		
Future Market		

11. Transportation facilities

12. Accessibility to market: Increased after futures trading/Decreased after futures trading

13. Exploitation from marketing channel

With respect to	Before starting futures trading	After starting futures trading
Pricing of product		
Quantity of product		
Weight of product		
Grade of product		
Old and new product		

PART B
(To group B)

1. How long you have been a pepper trader
2. Details of other commodities traded
3. Preference of pepper as a commodity to others

	Pepper	Others
Profit margin		
Marginal requirements		
Less volatility		

4. Type of trading you opt: Open cry / Online trading
5. Advantages of online trading
   i) Adding liquidity
   ii) Save time
   iii) Better price discovery
   iv) Increased trade volume
   v) Timely knowledge of futures position
   vi) Terminal trading facility
   vii) Easy settlement
   viii) Increased number of participants
   ix) Better hedging facility
   x) Transparent trading process
6. Demerits of online trading
   i) High investment
   ii) Cost of trading
7. Quantity of pepper you trade usually
8. Length of contract period

9. Whether you opt for squaring up of the contract : Yes / No
10. Delivery procedures taken
11. Is futures prices of pepper go with spot price of pepper: Yes / No

Benefits of Futures trading

To Farmers

1) Volatility of pepper price decreased	Yes/No
2) Pepper price increased	Yes / No
3) Pepper price go with cost of production	Yes / No
4) Cost of cultivation can be modified with predicted futures price	Yes / No
5) Storage period can be determined from future price	Yes / No
6) Storage facility increased	Yes / No
7) Accessibility to market increased	Yes / No
8) Loan facilities increased	Yes / No
9) Govt. policies are favourable to farmers	Yes / No
10) Futures price go with spot price	Yes / No

To Traders

1) Pepper price is less volatile	Yes / No
2) Pepper more suitable product for commodity trading	Yes / No
3) Increased accessibility to know prices	Yes / No
4) Increased flexibility to settle trade	Yes / No
5) Less initial margin requirements	Yes / No
6) High profitability	Yes / No
7) Price is more predictable	Yes / No
8) Increased accessibility to loan facilities	Yes / No
9) Flexible trading mechanism	Yes / No
10) High volume of trade	Yes / No

FUTURES TRADING IN PEPPER

By

SAPNA K. RANI

ABSTRACT OF THE THESIS

Submitted in partial fulfillment of the requirement for the degree of

Master of Science in Co-operation & Banking

(Rural Banking & Finance Management)

Faculty of Agriculture
Kerala Agricultural University, Thrissur

Department of Rural Banking &Finance Management
COLLEGE OF CO-OPERATION, BANKING & MANAGEMENT
VELLANIKKARA, THRISSUR – 680 656
KERALA, INDIA
2008

ABSTRACT

The study on "Futures trading in Pepper" has been conducted with the main objectives of analyzing price discovery mechanism of pepper futures in NMCE and examining the benefits of futures trading in pepper to farmers and traders. Both primary and secondary data were used for the study. The first objective of analyzing the price discovery mechanism of pepper futures was done using secondary data on daily futures and spot prices from May 2003 to March 2008 of NMCE. For examining the benefits of futures trading in pepper to farmers and traders, primary data were collected from sample farmers and traders by means of a structured interview schedule.

Two districts of Kerala, namely, Ernakulam and Wayanad were selected to identify the farmers and traders respectively, for collecting information regarding the benefits derived from futures trading. From each of the two districts of Ernakulam and Wayanad, 30 respondents were selected to analyze the benefits of futures trading in pepper to farmers and traders. These respondents were classified as trading farmer, non - trading farmers and non- farmer traders. The data collected have been processed using MS – Excel sheets. Co-integration technique, Kendall's Co-efficient of Concordance, Mann Whitney U Test, Student's t – Test, Compound Annual Growth Rate and annual growth rate were used to analyse the data.

An analysis of trend of futures and spot prices of pepper has revealed the efficiency of the price discovery mechanism of pepper futures. The spot and futures prices under the study period showed an increasing trend. As spot price is always below the futures price there is opportunity for hedging. Both the spot and futures prices are moving more or less in the same direction. Since the trend lines are very closely moving, it implies that the two prices are highly related and prediction of one using the other is possible.

To analyse price discovery mechanism of pepper futures Co-integration technique was used. Futures prices prior to three months (F_3), four months (F_4) and five months (F_5) prior to delivery are closer to the spot price. This also brought to light the

efficiency of the co integration technique in identifying the movement of two variables in the same direction.

The advantages of online trading to different group of traders in the pepper futures by means of Kendall's co-efficient of concordance outlined increased trade volume, increasing liquidity in trading and better terminal facility as the most preferred advantages for the farmer traders of Wayanad. For the non farmer traders, easy settlement, increased number of participants and time saving are of importance, while increased liquidity is of least advantage to them. As far as the traders of Ernakulam are concerned, increase in liquidity in trading, increased trade volume and time saving are the most available advantages to the non farmer traders, while price discovery seemed to be the least available advantage for them.

Pair wise comparison of benefits of futures trading to various groups of respondents by means Mann-Whitney U test revealed that there is significant difference between the traders and farmers with respect to the extent of benefits of futures trading enjoyed by them. It is also proved that there is no significant difference between the different categories of traders, irrespective of whether they are farmers or hill produce merchants or exporters or speculators. The criterion for enjoying the benefits is not whether the trader is a farmer or a non farmer, but whether he trades in futures or not.

Starting of terminal outlets in remote areas, extensive campaign for awareness creation about futures trading and computer education to remove the aversion towards screen based trading will attract more number of participants to futures trading. Compulsory delivery of the underlying asset is to be enforced by the regulatory authorities to make the real farmers the beneficiaries of futures trading and thereby ensuring a remunerative price. Also co-operative marketing societies in the field of spice market should be strengthened to give farmers benefits of remunerative prices through large scale marketing and processing.