COMMODITY FUTURES - A STUDY OF ONLINE TRADING IN RUBBER

By

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THESIS

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I, hereby declare that the thesis entitled **"COMMODITY FUTURES – A STUDY OF ONLINE TRADING IN RUBBER"** *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.*

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ANU S. NAIR

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CHAPTER 1

INTRODUCTION

Natural rubber occupies a place of pride in the plantation sector of India. As such, the rubber plantation industry has an important role to play in the economic development of not only Kerala but also of India as a whole. It provides some of the basic raw materials which are necessary for industrial development of India.

The growth attained by the Indian rubber plantation industry since its commercial beginning in 1902 has no parallel in the agricultural scenario in the country. In terms of growth in area, production, productivity and the extent of price realization at the farm gate, the Indian rubber plantation industry is ahead of other major natural rubber producing countries in the world. Owing to the pace of development of the industrial sector, the domestic as well as external demand for natural rubber has been dynamic.

1.1 Significance of the study

Natural rubber was used almost exclusively to meet 98 per cent of the elastomer demand in 1939, just at the beginning of the Second World War. Even after the war, about 75 per cent of rubber consumed by the industry globally was natural rubber and the rest contributed by synthetic rubber. Many western countries, for socio-political and economic reasons, wanted to reduce their dependency on natural rubber, which is mostly produced by South Asian

countries. This change in trend in rubber consumption has not been seriously taken into account due to environmental impacts. The global natural rubber production sector is dominated by Asian countries. The main natural rubber producing countries are Thailand, Indonesia, Malaysia, India and China.

The state of Kerala and the Kanyakumari district of the state of Tamil Nadu together constitute the traditional rubber – growing region in India. The traditional region accounted for as much as 93 per cent of the tapped area of 408545 hectares cultivated with this crop, at the end of 2004 – 05. Small holding sector, with the average size less than half a hectare dominates the production sector by sharing as much as 88 per cent of area of production. Though size constrained, more than 98 per cent of the total area in small holding sector is occupied by high yielding cultivars and the sector is much ahead in adopting short – term productivity enhancement measures.

India produces about 6 lakh tonnes of rubber (worth Rs.3000 crore) annually of which, over 90 per cent of the production is in the southern part of Kerala. Indian rubber industry comprises of 32 tyre factories, about 250 medium scale units and 6000 small scale units (of which about 600 are well established units) manufacturing every conceivable rubber product from toy balloons to aero tyres. The industry has an annual turnover of Rs.12000 crore.

Rubber being a significant commodity for Kerala economy, any price fall follows political ramifications in the state. Price increases are also not received well by the tyre manufacturers and other consuming industries.

Moreover, large number of small growers, significant presence of growers' co-operatives, state administered procurement programmes, inconsistent import and export policies and manufacturing facilities spread across the country are the factors that has made rubber prices significantly volatile. The removal of Quantitative Restrictions (QR) on natural rubber as part of the Agreement on Agriculture (AOA) under the World Trade Organization (WTO) regime worsened the situation.

Futures trading or hedging is a device by which a manufacturer, a stockist or an exporter protects himself from the risk arising out of adverse price fluctuations. A manufacturer, who carries on his normal manufacturing business and who enters into advance commitments for finished goods on the basis of prevailing prices of raw materials, needs protection against the likely rise in the prices of raw materials. A stockist of goods has the fear of incurring losses on his inventories by a likely fall in prices and he needs protection against such a fall. An exporter who enters into advance export commitments on the basis of currently ruling level of prices may have to incur a loss if the prices rise before he covers his export requirements in the ready market. The exporter thus needs protection against such a likely price rise. Hedging is a sophisticated mechanism which provides the necessary immunity to such interests in the marketing of commodities from the risk of adverse price fluctuations.

Futures trading may bring about an element of stability in the prices of agricultural commodities by smoothening seasonal price fluctuations. The facility of hedging and the presence of speculators help in reducing the volatility in prices. Futures markets also perform the function of price discovery and price reference. The price making function of futures market emanates from the fact that such a market is the prime recipient of all price influences. Also futures trading renders services to the farmers. Apart from holding relatively stable prices and thereby a better average price for their product, it provides to the farmers an advance indication about the expected level of prices of different commodities during the ensuing marketing period, enabling them to undertake proper crop planning at the time of sowing. Futures trading helps exporters also. Apart from providing hedging facilities against price fluctuation, it ensures delivery in time, raises exporter's competitiveness and encourages global competition.

Rubber futures could help the rubber co-operatives who have commitment to provide remunerative prices to grow significantly because futures contracts will help them to decide the procurement price, will help to design forward contracts to suit the needs of growers; and also will help growers through price discovery. Industries with natural rubber as the raw material too would be able to take advantage of rubber futures to manage the price risk in a better way.

As a prominent rubber producer and consumer, India plays a vital role in the online trading in rubber. Kerala which contributes 90 per cent of the Indian production of rubber assumes greater significance in this context. At a time when the prices of most of the agricultural commodities are steeply falling down, it is essential that steps be taken 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 on online trading in rubber will give an understanding about the relationship between the spot and futures prices and the farmers awareness level as well as participation in futures trading in rubber. Since the study area selected represents the major rubber growing districts of the Kerala state, the study will bring to light the specific problem of the Kerala rubber farmers with respect to online trading.

1.2 Statement of the problem

Rubber prices during a few decades before 1997 was remunerative owing to protection given by the Government through market intervention and import restrictions. The price of rubber reached the peak of Rs. 65.5/kg for RSS – 4 on 13, June, 1995. It started declining sharply from January, 1997 and reached the low of Rs. 26/kg in April 2001. The removal of QR which led to volumnous import of rubber led to this pitiable situation. The farmers neglected

the crop and the productivity level has come down. Only by December, 2002, the prices showed improvement.

Since April 2001, under WTO regime as part of the Agreement on Agriculture (AoA), the Quantitative Restrictions (QR) on natural rubber import have been completely removed, a situation which has almost resulted in a market integration. Since rubber is classified as an industrial raw material and with bound rate of only 25 per cent (from June 2004 onwards 20 per cent) for all forms other than latex, the price movement will be dictated by the international market. This points to the need for the Indian rubber sector to get oriented itself to be a part of the global natural rubber market, if it has to withstand the ravages which could be caused by more powerful marketing and consuming networks in the country. The removal of Quantitative Restrictions has its impact on the natural rubber economy in a variety of ways. It will lead to large scale imports if the domestic price increases greater than 20 per cent of international price. While there are a million producers, 50 per cent of the consumption is by the automobile tyre sector which can influence the market significantly through import, and also by keeping away from domestic market. Imports of products can take place if prevailing duties are reduced thereby depressing consumption of domestic rubber further. Natural rubber is classified as an industrial raw material bound rate of which is only 25 per cent except for latex which is unbound. The protection available to rubber and hence domestic production sector in the long run will be at a disadvantage. Being an industrial commodity aggregate measures of support for agricultural

commodities will not be available to natural rubber. However, the oligopsonic nature of the market can have its impact and can regulate price in the domestic market at least in the short term.

Remunerative price is essential to sustain the interest of farmers in growing a crop. Price fluctuations of commodities according to market forces of demand and supply are common. The imbalances of these forces may cause the price to rise very high or fall very low. In addition to remunerative price, it is necessary to reduce violent fluctuations in price. Stabilized price may be achieved by artificial means like regulated market and buffer stocking. But under the WTO regime, the Government can impose only minimum control over trade. In such a situation an alternative mechanism has to be put in place to control violent price fluctuations. International trade bodies under the UN and others recommend futures trading as a panacea to protect the poor farmers from the vagaries of commodity prices. This system artificially ensures the most salient features of vibrant trade such as transparency, high volumes, large cash flow, involvement of many players and reduced risk. Keeping these in view, the basic problem of the present study can be stated as an analysis of online trading in rubber futures. In this context, the study aims to analyse the integration of futures and spot prices, the benefits derived from futures trading by the rubber farmers and the factors which motivate or prevent them from dealing in futures market. It is also proposed to enquire into whether the farmers are the real beneficiaries of the futures trading in rubber as is expected by the policy makers and planners of the country.

1.3 Objectives of the study

The objectives of the study are:

1. to examine the price movements of rubber futures through National Multi Commodity Exchange of India Limited (NMCE).
2. to assess the impact of futures trading on farming decisions of rubber farmers; and
3. to identify the determinants of online trading by rubber farmers.

1.4 Utility, scope and limitations of the study

In India, about a million farmers are involved in the cultivation of natural rubber and the average unit size is 0.5 hectare. Almost 98 per cent are small growers owning less than 2 hectares and producing 88 per cent of the total crop. rubber produced is almost consumed within the country by about 5100 manufacturers and a small quantity has been imported during the past few years. Export of natural rubber form India constitutes one per cent of the world export of natural rubber in the year 2005. As much as 46 per cent of the rubber produced is consumed by 12 large tyre companies and hence they have a major role in price determination. Growers in general and small growers in particular, individually or groups, have no role in this.

The very small and marginal farmers is expected to reap the benefits of futures trading by participating through rubber marketing/producing societies which are in a position to take intelligent market positions based on scientific analysis of supply/demand. Thus they can indirectly be a part of price

discovery. Transparency and price discovery through a nationwide, single, electronic order book is expected to help the grower to know the real price of rubber at any given point of time. The traders will be able to pass on the price risk to the futures market, thus enabling him to offer the best price to the grower without resorting to grading abuses and discounted prices.

Futures trading is thus expected to ensure a better price to the rubber farmers for their product and as a hedging tool to help the farmers to manage price risk effectively. As it is online trading on a nationwide basis, the trading mechanism is very transparent. As the futures prices and spot prices are closely interrelated the online trading brings stability both to the futures and spot market and also a better market is assured to the farmers for their future product. The rubber dealers and exporters also benefit from the futures trading because the supply of quality product at a pre determined price is assured. In view of the above expected benefits, the need for commodity futures trading in rubber has been considered desirable. A study on rubber futures trading will enable the researcher to assess how far these assumptions are actually there in the case of rubber farmers.

The study is restricted to 132 rubber farmers, 99 farmers who are dealing in futures trading and 33 farmers who are not dealing in futures trading from the districts of Kottayam, Thrissur and Palakkad, the major rubber growing districts of Kerala. As there is no regulation for compulsory delivery, the participants are engaging in speculative trading which limits the scope of

futures trading from offering a remunerative price to the real farmers. Futures trading is a computer based online trading and so many of the farmers feel aversion towards this type of trading. As the delivery unit is high, only large farmers and traders can participate in trading which prevents the small and marginal farmers from futures trading. The characteristic features of the present day online trading in rubber 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/traders.

1.5 Organisation of the thesis

The report of the study has been spread out under five chapters. The first chapter deals with the significance of the study, statement of the problem, objectives of the study, utility scope and the limitations. The second chapter entitled the 'Review of Literature' provides theoretical orientation about the study. The third chapter gives a description about methodology adopted in the process of investigation. 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 and appendices and abstract of the thesis.

Review of Literature

CHAPTER 2

REVIEW OF LITERATURE

Review of literature is the part and parcel of all scientific investigations, which would enable the researcher to understand the research gap and justify the study. The objective of the review is also to develop and establish a theoretical framework for the study based on the ideas and concepts expressed in the existing literature. A brief review of the available literature, on various topics related to the study is attempted and presented in this chapter under the following sub headings.

2.1. Production, processing and export of natural rubber

2.2. Futures trading in agricultural commodities

2.3. Futures trading in natural rubber

2.1. Production, processing and export of natural rubber

Natural rubber, one of the major cash crops in India and an important source of livelihood for the Kerala farmers, is facing callenges on the onset of WTO and the Agreement On Agriculture (AOA). The major issues with respect to production, processing and international trade of natural rubber as studied by different authors are discussed in this section.

Kumar and Pillai (1994) in their study of trend in area, production and productivity of rubber plantation industry in Kerala, used the multiplicative model to decompose the growth in rubber production into area effect and yield effect. The analysis revealed that during the study period from 1955-56

to 1991-92, the area effect contributed more to output growth rate than yield effect.

Lalithambika (1994) opined that till 1950, India was a net exporter of natural rubber. In 1973-74, 1974-75, 1976-77 and 1977-78 small quantities were exported mainly to remove the glut in the domestic market. During, the eighties, it imported rubber to supplement domestic production. The recession in demand and steady increase in domestic production led to the export of natural rubber in 1991-92. However, quality improvement of raw rubber and its products are the major challenges of globalising Indian rubber industry.

Mathew (1995) observed that rubber cultivation in India is overwhelmingly small-holder oriented. The small holders account for 85 per cent of the total cultivated area in India. The average size of the small – holdings is less than 0.50 ha.

Lekshmi *et al.* (1996) employed Boyce (1986) method of kinked exponential function to estimate the period-wise growth rate of natural rubber prices. They also attempted to delineate the secular trend of natural rubber price, covering a period of 27 years from 1968 to 1994-95. The trend in price was examined by using a random test supplemented by an analysis of three-year moving average intended to even out the seasonal fluctuations and to capture the secular trend in price movements. A semi log quadratic equation was fitted to detect the direction of price movements. The analysis revealed

that natural rubber price in India did not show any statistically significant trend to move consistently towards particular direction in long run. However, two distinct phases could be identified in natural rubber price movements for the period. The natural rubber price grew at a rate of 7.6 per cent during the entire period; however growth for the first 17 years was 9.1 per cent.

Mathew (1996) highlighted that production of natural rubber has recorded an unprecedented improvement during the Eighth Plan period. In the year 1991-92, the production was only 3.67 lakh tonnes and it improved to 5.07 lakh tonnes during 1995-96. The average annual growth rate worked out to 8.1 per cent. The productivity of rubber plantations measured in yield per hectare has improved substantially during this period.

Mathew (1997) found that the demand for rubber depends on the growth in the production of rubber goods absorbed domestically as well as those exported. Consumption of natural rubber has shot up from less than 20,000 tonnes in 1950-51 to 5.61 lakh tonnes in 1996-97. At the end of March 1997, there were 5,588 licensed rubber goods manufacturers. A majority of them were small–scale operators, consuming less than 100 tonnes of natural rubber per year. About 62 per cent of the consumption was accounted by 100 large scale manufacturers.

Mathew (1999) revealed that, with the liberalization of the procedural formalities, the Indian manufacturers-cum-exporters of rubber products would be permitted to import natural rubber if the domestic prices are higher than

the cost, insurance and freight (c.i.f.) paid values, of the imported rubber. The repercussions of the declining world natural rubber prices and the liberalized export-import polices appeared to have serious impact on the dominant natural rubber production sector in India, as there were limitations in pursuing a protected price policy regime.

Damodaran (2001) pointed out that the natural rubber (unlike other plantation crops) is not covered by the WTO 'Agreement on Agriculture'. Consequently, natural rubber has no way of availing the 'softer provisions' of the 'Agreement on Agriculture'. This special situation calls for equally special measures on the part of major rubber growing states, especially Kerala, which accounts for more than 85 per cent of the planted area and more than 90 per cent of production of natural rubber.

Desalphine (2001) examined the natural rubber manufacturing sector and opined that it has been undergoing a recession since 1997-98. The natural rubber processing industry in the country has been evolved to cater to the requirements of a captive domestic market. The natural rubber processing sector has been dominated by the sheet grades accounting for more than 72 per cent. The decline in demand was mainly due to a slow-down in the industrial growth in the country and the consequent slackness in the automobile industry, which is the dominant end-use segment of natural rubber in India. According to him, in the emerging scenario, with the removal of quantiative restrictions, the processing sector has been increasingly under serious compulsions to face the challenges posed by the potentially cheaper

imports. Therefore, to be globally competitive, priority will have to be given to quality improvements and for reduction in the cost of processing for all marketable form of rubber.

Jacob (2001) opined that comparatively higher cost of production of natural rubber in India has been identified as the most disadvantageous factor for sustaining the country's natural rubber plantation industry under the WTO-mandated regime. But the attainment of highest productivity among the major natural rubber producing countries, competitive structure of the domestic market and the presence of grass-root level network for extension services and group activities in processing and marketing provide the country tremendous opportunities.

Menon (2001) argued that there is no justification to exclude natural rubber from the purview of agriculture. He pointed out that there is no manufacturing operations involved, as far as growers are concerned and the entire operations are purely agricultural. In fact, the entire income from natural rubber in sheet form is treated as agricultural income and is taxed accordingly under the Agricultural Income Tax Act of the respective State Governments. There are several disadvantages arising from rubber being not included in the category of agriculture under the WTO. The first disability is the bound rate of import duty allowed to be levied. While for tea, the bound rate is 150 per cent and for coffee, cardamom and pepper 100 per cent, for natural rubber it is as low as 25 per cent. Another aspect is that agricultural commodities come under the basket of 'green box' arising from which certain

concessions including developmental subsidies could be extended. This would lead to certain bargaining powers on the ground that items in this box are eco-friendly in contrast to pollution prone industrial products.

Joseph and George (2002) studied the implications of WTO agreements on natural rubber in India and opined that classification of natural rubber as an "industrial raw material" was unjustifiable. The study also revealed that natural rubber is a 'price sensitive crop' that has to be closely monitored for any 'surge in imports' from other countries consequent to the elimination of quantitative restrictions (QR). They advocate the ban on the import of natural rubber under the Advance Licensing Scheme (ALS) in order to protect the interests of the domestic producers.

Kumar (2002) observed that the expansion of area under rubber during the fifties, sixties and seventies was the result of plantation development schemes implemented by the Rubber Board. The thrust upto 1978 was for replanting old and uneconomic trees. The widening gap between production and consumption compelled the Government of India to introduce a massive area expansion programme, the Rubber Plantation Development Scheme (RPDS) in 1980. It provided financial and technical assistance to small growers in order to enable them to raise scientifically managed plantations. During the nineties, the rate of expansion of area under rubber reduced drastically, resulting in reduction in production also. The reduction in the rate of production could be attributed to the decline in the extent of tapped area and small growers neglecting short-term productivity enhancement measures

due to price fall. During his study, the author also noted that, in India, 80 per cent of the elastomer requirement is met by natural rubber with synthetic rubber accounting for only 20 per cent. The global trend is almost the reverse. Globally, 41 per cent of the elastomer need is met by natural rubber and 59 per cent by synthetic rubber. The automobile sector dominates the consumption of natural rubber in India, with automobile tyres and tubes accounting for 45.2 per cent of the natural rubber consumption.

Menon (2002) pointed out that the consumption pattern of natural rubber and synthetic rubber underwent tremendous changes over time. During the fifties, the share of synthetic rubber (SR) in global consumption was 40 per cent. It then soared to 76 per cent by 1979. It was then widely felt that natural rubber would soon be totally replaced by synthetic rubber. However, synthetic rubber is no more considered a threat to natural rubber because of the difference in the cost of production and output prices. Both are now considered necessary and complement with each other.

The expansion of area under natural rubber, improvement in the production, the consumption pattern of natural rubber and implications of WTO agreements on natural rubber have been the topics of discussion of the authors in this section. The authors have generally expressed the opinion that natural rubber is not receiving the due patronage, considering its significance in the Kerala and the Indian economy.

2.2. Futures Trading in agricultural commodities

Futures trading or hedging is a devise by which a manufacturer, a stockist or an exporter protects himself from the risk arising out of adverse price fluctuations. The highlights of the studies related to futures trading in all commodities other than rubber which is the specific area of the study is discussed in this section.

Dusak (1973) analysed the long-standing controversy over, whether speculators in a futures market earn a risk premium, within the context of the capital asset pricing model developed by Sharpe, Lintner and others. Under this approach, the risk premium required on a futures contract should depend, not on the variability of prices but on the extent to which the variations in prices are systematically related to variations in the return on total wealth. The systematic risk was estimated for a sample of wheat, corn and soybean futures contracts over the period 1952 to 1967 and found to be close to zero in all three cases. Average realized holding period returns on the contracts over the same period were close to zero.

Ederington (1979) found that the classic economic rationale for futures markets is that they facilitate hedging and they allow those who deal in a commodity to transfer the risk of price changes in that commodity to speculators who are more willing to bear such risks. Obviously it is possible to hedge by entering into forward contracts outside a futures market, but an organized futures market facilitates such transactions by providing a

standardized contract and by substituting the trustworthiness of the exchange for that of the individual trader.

Garbade and Silber (1983) developed a partial equilibrium model to explain the characteristics of price movements in cash and futures markets for storable commodities. Theoretically, the degree of market price integration over short horizons is a function of the elasticity of supply of arbitrage services. The authors tested this relationship for seven commodities. While they found all markets to be integrated over a month or two, there was considerable slippage between cash and futures markets over shorter time intervals, especially for grains viz., corn, wheat and oats. Gold and silver were highly integrated even over one day, but there is nontrivial risk exposure to hedgers over short time intervals (eg. a week) in the futures markets for grains and even to a lesser extent for copper and orange juice.

Hirshleifer (1988) pointed out that trading costs, in the form of either explicit charges or the costs of becoming informed, limit the participation of some classes of traders in commodity futures markets. When speculators face a fixed cost of participating in a futures market which 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 wealths. The residual-risk premium depends not on the total magnitude of the risk that producers hedge (ie., aggregate

revenue variance), but on the variability of their revenue relative to its mean (ie., 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.

Thompson *et al.* (1990) examined the price impacts of delivery specifications for sugar futures by comparing sugar price behaviour with price behaviour in cocoa futures contracts. Their specific focus was on the seven weeks prior to contract expiration. Futures contracts for sugar and cocoa exhibited numerous similarities, except that cocoa contracts differ from sugar in delivery points. Cocoa had three delivery points in the United States while sugar had none.

Bessler and Covey (1991) studied the futures/cash price relationships for slaughter cattle, a non-storable commodity. For a sample of 261 observations on daily live cattle prices, they obtained mixed results. The sample fits (conducted on the first 130 data points) indicated that both cash and futures prices were generated by processes not statistically distinguishable from a random walk. Tests for cointegration based on residuals from a static regression (using the same 130 data points) showed marginal support for the cointegration hypothesis between cash and nearby futures prices. No cointegration was discovered between cash prices and more distant contracts. The results are consistent with the suggestion that, greater the temporal spread between futures and cash prices, the greater the degree of independence.

Bessembinder and Seguin (1992) examined whether greater futures-trading activity (volume and open interest) is associated with greater equity volatility. Each trading activity series is partitioned into expected and unexpected components, and documented. While equity volatility co-varies positively with unexpected futures-trading volume, it is negatively related to forecastable futures-trading activity. Further, though futures-trading activity is systematically related to the futures contract life cycle, no evidence is found of a relation between the futures life cycle and spot equity volatility. These findings are consistent with the theories predicting that active futures markets enhance the liquidity and depth of the equity markets.

A study by Green *et al.* (1992) revealed that slippage occurs for stop orders when prices move before the broker is able to fill the order at the stop price. The authors determined the size of slippage for stop orders placed by a public futures fund in commodity futures market in USA and compared their costs and their distribution for eleven commodities. Slippage was the largest on days with large price movements and for large orders. Funds appeared to trade at times when the market was moving quickly and brokers had trouble in filling orders at the target price.

The study of Gravelines and Boyd (1999) examined asymmetry in futures price changes for various commodities using daily, weekly and monthly data. The data ranged from as far back as 1969 for maize, and as recent as 1984 for oil, with data continuing through to 1995 for each commodity. Tests were used to determine whether or not prices move up in

the same fashion as they move down, over varying data frequencies. The results indicated that every commodity analysed showed atleast some degree of asymmetry.

According to Jain (1999) moving from today's still heavy dependence on public management schemes of essential commodities to tomorrow's system of commodity futures and forward trading is likely to be a long and painful process. The move towards a more open and transparent system of commodity futures and forward trading implies greater scrutiny and the need for more resources to coordinate many diverse interests. In return, it offers the promise of greater accountability, reliability and cost effectiveness.

Kumar (2000) concluded that price discovery is the process that throws out a figure at which one person will buy and another person will sell a futures contract for a specific expiration date. Prices determined via this open and competitive process are considered accurate reflections of the supply and demand of a commodity. Futures contracts are standardized as to quantity, quality and location. Speculation is generally frowned upon by some societies. But the presence of speculators is the sure sign of a healthy market.

Bhose (2001) examined whether futures exchanges of coffee would thrive in any form. The advantages and disadvantages of the internet as a medium for futures trading, the impact of the internet on middlemen (intermediaries), the transfer of power to producers who embraced the efficiencies of the technology and the difficulties with cross-border futures

clearing were considered. It was concluded that traditional business had operating inefficiencies in its structure that reduce speed and increased the costs and complexities. Their network and knowledge would be enhanced by the internet and narrow money yardsticks were misleading.

Brorsen and Fofana (2001) examined the effects of several factors on the success or failure of agricultural futures contracts. Commodities with futures markets and without futures markets were included. Characteristics for which no data existed such as homogeneity, vertical integration, buyer concentration and activeness of the cash market, were measured by the Delphi approach. An active cash market was found to be necessary for futures contract success since this variable alone perfectly predicts whether or not a commodity has a futures market.

Depetris *et al.* (2001) revealed that Argentine dairy sector, which experienced a pronounced growth in the second half of the 90's and was being consolidated as a stable exporter, is showing again the adverse impacts of its own lack of order. A decrease in the external demand and the domestic over supply resulting from dumping the excess production in the internal market caused significant price reductions. The price fall affected milk producers primarily since there were no formal contracts between producers and dairy manufacturers, allowing an immediate transfer of price reduction. The absence of dairy policies and the persistence of the market as price regulator suggested that solutions should consider market mechanisms. This study explored the possibility of setting a futures contract as a market

instrument useful for a more reliable price forecasting, planning of production at all levels of the chain and locking input and product prices to diminish risk of relative price variations.

Isengildina and Hudson (2001) opined that few farmers utilize futures and options markets to price their crops despite significant educational efforts. This study analyzed producer hedging behaviour within the frame work of the overall marketing behaviour. Producer marketing behaviour was modeled as a simultaneous choice between cash sales, co-operative marketing, forward contracts, and hedging. A multinomial logit model was used for empirical estimation using data from a survey administered to a sample of cotton producers from across the USA. The most important factors that explained the use of forward pricing by cotton producers were producer preferences, farm size, use of crop insurance, risk aversion, income from Government payments and off-farm income. Risk aversion, off-farm income, crop insurance and some producer perceptions were important in the choice of the form of forward pricing (direct hedging vs. co-operative marketing and forward contracts).

Jumah and Kunst (2001) used multivariate autoregressive conditional heteroscedasticity models to investigate the effect of dollar or sterling exchange rate fluctuations on coffee and cocoa futures prices between the London International Financial Futures and Options Exchange and the New York Coffee, Sugar and Cocoa Exchange. The period studied was the interval between 6th March 1991 and 18th October 2000. For both commodities and in

both markets, the exchange rate emerged as a main source of risk for the commodity futures price. It was found that the commodities showed similarities not only in their long-run features and first-order shock propagation, but also in their characteristics of volatility propagation.

Naik and Jain (2001) assessed the efficiency of major commodity futures markets in India, using the cointegration technique. The results indicated that the performance of the Indian commodity futures markets is varied across the commodity exchanges. Among all commodity futures markets, Ahmedabad castor seed futures market is an efficient and unbiased market. Hessain and turmeric futures market are inefficient. In other futures markets, efficiency and unbiasedness varied during maturity and also months prior to maturity. The management of the exchanges and the Forward Markets Commission have to find ways to attract hedgers in order to improve the performance of these markets.

Nilsson (2001) analysed the usefulness of futures markets from a Swedish risk management perspective. The main objective of the study was to assess the potential for risk reduction amongst Swedish grain agents. The study used grain futures contracts at CBOT, LIFFE and MATIF, for hedging Swedish milling wheat, feed and malting barley. Optimal hedge ratios were substantially lower than similar estimates in North American studies, owing to spatial and grade differences. The hedging effectiveness tests indicated that implementing hedging strategies might increase the expected income

level by not more than one to five per cent and could decrease price variance substantially.

Rahman *et al.* (2001) examined the feasibility of cross-hedging cotton seed meal with soyabean meal futures. A simple linear regression of cotton seed meal cash prices on soyabean meal futures provided a direct price movement relationship. Using the estimated hedge ratios, the net realized prices were calculated for seven different US cash markets. The net realized prices were higher than cash prices in three of the four years evaluated. The empirical analysis suggested that soyabean meal futures could be used as a potential cross-hedging vehicle for cash cotton seed meal.

Meulenberg and Pennings (2002) proposed a marketing strategic approach to commodity futures exchanges to optimize the (hedging) services offered. First, the environment of commodity futures exchanges was examined. The threats and opportunities of commodity futures exchanges were also analysed. The analysis demonstrated that market orientation is an important element in the market strategies of commodity futures exchanges and concluded with the opinion that market penetration is an appropriate strategy.

Mishra and Osta (2002) opined that crop insurance and hedging are the two risk management strategies used by farmers to manage risk. Using a discrete choice model and farm level data, they investigated the factors influencing US farmers' use of hedging and crop insurance as risk

management strategies. In the case of crop insurance, results indicate that level of education, participation in other risk management strategies (such as renting land, commodity programmes, spreading sales over the year), and controlling debt are positively related to a farmer's decision to purchase crop insurance. For the hedging model, results suggested that education, off-farm income, forward contracting sales of crops and livestock, and computer use are positively related to a farmer's participation in hedging or futures market.

Naik and Jain (2002) evaluated 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 test of cointegration between cash and futures prices and tests for efficiency and lack of bias. It was concluded that the Indian futures markets for agricultural commodities are yet to develop as efficient mechanisms of risk management and price discovery.

Raipuria (2002) examined the status of futures trading in India. He opined that futures trading in the country has been a small town phenomenon covering low volumes, where entry is restricted and controlled by dominant producers. The need to upgrade Indian futures trading to the level of international futures markets is emphasized by him in the study

Sanders and Manfredo (2002) examined the performance of the Minneapolis Grain Exchange's white shrimp futures contract, one of the first futures contracts aimed at the aquaculture industry in Minnesota, USA. Although the market structure largely conforms to the traditional criteria for a successful futures market, the contract's performance is disappointing in terms of liquidity, basis behaviour and ultimately, hedging effectiveness.

YuFei and Turvey (2002) revealed that one of the important problems facing agribusiness firms is the relationship between commodity price risk (a source of business risk) and debt repayment ability (a source of financial risk). They examined the use of commodity-linked loans applied to agricultural credit. A commodity-linked loan is a credit instrument whose payoff is contingent on the value of an underlying commodity or portfolio of commodities. The payoff structure includes an option (call or put) rider that provides a payoff if the commodity price rises above or drops below a present strike price. The payoff is applied directly to the loan.

Bollman *et al.*(2003) investigated the failure of the diammonium phosphate futures in the USA using a survey of industry participants (n=36) and an analysis of price relationships. The results indicated that diammonium phosphate cash and futures markets were not well linked. The results also suggested that the initial specifications of diammonium phosphate futures contract might have resulted in its use as a forward contract with a high rate of delivery, reducing market participation and limiting liquidity. Ultimately, the contract failed because it was a poor hedging tool, and was perceived by

the industry not to offer benefits beyond existing contracting and risk management practices.

Coble *et al.* (2003) examined the interaction of alternative insurance designs with futures hedging and the purchase of options. A numerical analysis was conducted using a revenue simulation model that incorporates futures prices, basis, and yield variability. Four alternative yield and revenue crop insurance designs were evaluated. Optimal futures and, at the money put option hedge ratios were derived for expected utility maximizing cotton and soyabean producers. The findings indicated that the alternative insurance designs do influence forward pricing levels. Alternative behavioural assumptions were seen to influence the optimal hedge. Also, yield insurance generally complimented forward pricing while pure revenue insurance generally had a negative effect. Other insurance designs currently offered had an effect on the optimal hedge that fell between the two extremes of yield insurance and pure revenue insurance.

Mahul (2003) examined the demand for hedging against price uncertainity in the presence of crop yield and revenue insurance contracts for French wheat farms over the period 1992-99. The rationale for the use of options in addition to futures was first highlighted through the characterization of the first best hedging strategy in the expected utility frame work. It was then illustrated using numerical simulations. Futures and crop yield insurance were shown to be complements, whereas futures and crop revenue insurance were substitutes. The presence of options induced the

insured producer to adopt a more speculative position on the futures market. The study concluded that futures and options would definitely improve the producer's welfare.

Schouchana and Perobelli (2003) pointed out that exporters of agricultural products take two risks - one linked to the exchange rate, and the other related to the variation in commodity prices. To protect themselves from these risks, exporters can guarantee their returns with futures contract. The author quoted the example of a beef exporter, concluding a deal regarding the export of one thousand tonnes of beef to be shipped on a future date. The study explained in great detail how futures contracts can protect the exporter against the volatility of both the exchange rate between US dollar and rupees and the price of beef.

Effectiveness of hedging as a risk minimization tool for major storable and non-storable agricultural commodity futures markets in the USA was examined by Yang and Awokuse (2003). The study period was from 1st January 1997 to 31st December 2001. Based on the error correction model, some evidence was found that the hedging effectiveness was stronger for storable commodities than non-storable commodities under consideration. The findings illustrated an important difference between storable and non-storable commodities with regard to their hedging functions.

Koekebakker and Lien (2004) opined that agricultural futures price movements have fat-tailed distributions and exhibited sudden and unexpected

price jumps. There was also evidence to prove that the volatility of futures prices is time-dependent both as a function of calendar-time (seasonal effect) and time to maturity (maturity effect).

National Multi Commodity Exchange (2005) explained that there are two basic categories of futures participants : hedgers and speculators. In general, hedgers use futures for protection against adverse future price movements in the underlying cash commodity. The rationale of hedging is based upon the demonstrated tendency of cash prices and futures values to move in tandem. Speculators are the second major group of futures players. These participants include independent floor traders and investors.

Yang *et al.* (2005) examined the lead-lag relationship between futures trading activity (volume and open interest) and cash price volatility for major agricultural commodities. Granger causality tests and generalised forecast error variance decompositions showed that an unexpected increase in futures trading volume unidirectionally causes an increase in cash price volatility for most commodities. Likewise, there was a weak causal feedback between open interest and cash price volatility. These findings are generally consistent with the destabilizing effect of futures trading on agricultural commodity markets.

Zapata *et al.* (2005) examined the relationship between sugar futures prices traded in New York and the world cash prices for exported sugar. It was found that the futures market for sugar leads the cash market in price

discovery. The finding of cointegration between futures and cash prices suggested that the sugar futures contract is a useful vehicle for reducing overall market price risk faced by cash market participants selling at the world price.

Anonymous (2006) revealed that 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 exchange byelaws provide enough latitude for these sections of stake holders to trade in futures.

Chhabria (2006) opined that demutualised commodities exchanges are a weapon in the hands of the farmers against the exploitation of manipulative middlemen. They offer not only a fair deal, but at the same time provide transparency. Sooner or later, when the flavour of equity markets fade, commodities markets will get a further boost. This can be an important diversification to the investment basket of an average small ticket investor in the time to come. With technology shrinking the space, investors can trade on the commodities exchanges from virtually any part of the country.

According to Iyengar (2006) institutional investors, inclduing mutual funds and financial institutions, are waiting in the wings to enter the booming commodities market for quite some time now. Forward Markets commission has constituted a separate panel to study the issue and suggest regulatory measures. The arrival of both the heavy weights into the market will deepen

the future for commodities trading in India. Armed with a pile of money, institutional investors are sure to bring in hectic speculation and informed trading.

Ravikumar (2006) opined that since the 2000s, commodity markets have seen a secular bull run. Commodities are emerging as an asset class with returns from commodities being better than returns from the stock markets or from the bond.

Sisodiya and Mohapatra (2006) opined that the global commodity rush has rubbed off on India as more and more investors in the country enter the commodity trading. As a result, trading volumes at both the Multi Commodity Exchange (MCX) and National Commodity and Derivatives Exchange (NCDEX), the two commodity exchanges, have surged to record high in recent times. MCX recorded the highest turnover of Rs.11,626.33 crore at the close of trading hours on March 30, 2006, with bullion alone registering a turnover of Rs.9497.54 crore (Gold Rs.5838.06 crore and Silver Rs.3659.48 crore). The total number of trades were 126774; the previous highest turnover was recorded at Rs.8587.55 crore on January 20, 2006.

The main areas of enquiry of the authors were asymmetry in futures price changes, efficiency of futures markets, risk associated with futures trading, hedging effectiveness and the effect of several factors on the success or failure of futures contracts. The relevance of crop insurance in the context of futures trading was also an area of interest to many authors. The need for

futures trading has been justified by the authors on various grounds such as pricing efficiency, price risk management, stability in prices, integration of prices, price discovery and price reference which are helpful for farmers and exporters.

2.3. Futures Trading in Natural Rubber

Studies on futures trading in rubber are scanty. In India futures trading in rubber started only in the year 2003. Of the available studies, majority of them are conducted in India, since India is one of the major rubber producing countries in the world.

Chen (1999) in his article pointed out that many major tyre manufacturers and their suppliers sign long-term variable-price contracts where the contract price will be determined at a future date based on the future prevailing market rubber price at the time of shipment. The tyre manufacturers also buy rubber in the spot market from their suppliers. By adopting these buying and selling patterns, these contracted parties leave their selling and purchasing prices to the vagaries of the market.

Damodaran (2000) argued that various players of the rubber industry suffer from volatile prices and declining margins. They can hedge their positions and 'lock-in' prices. The last five years have seen the progressive irrelevance of bench-mark prices on different types of natural rubber. According to the author futures is the best bet under these circumstances.

Zant (2001) in his study investigated a hypothetical hedging scheme in a domestic commodity market, under which a commodity board offered forward contracts to domestic producers and local traders and covered its commitments on an international futures exchange. It was aimed to quantify welfare gains to agents in the market and the costs and benefits of the board empirically. The empirical work was based on the natural rubber market in India and the Tokyo Commodity Exchange for the period 1990-95. The hedging scheme was shown to increase welfare substantially, particularly welfare to growers. The costs of such a facility for the commodity board (basis risk) were negligible. If the forward price offered on the domestic market is a small fraction below the international futures price, the board can prevent losses at only slightly lower welfare gains.

George (2003) opined that the very small and marginal farmers can also reap the benefits of futures trading by participating through rubber marketing/producing societies which are in a position to take intelligent market positions based on scientific analysis of supply/demand. These intermediaries, large dealers and major consumers will eventually set up futures trading desks for price risk management. Within the first month of trading itself there was evidence of this, as marketing societies have started trading in futures. The major beneficiary of futures trading would be the primary dealer as he can hedge the price risk associated with every ready market transaction by taking an opposite position in the futures market. Actually, it was the absence of such a hedging mechanism that forces the

primary dealer to quote discounted rates to growers which were used mostly to cover the risk too.

Jayarathnam (2003) pointed out that futures trading being highly transparent, the small growers can participate in it in groups. To protect the interests of small growers to suitably formulate the rules and regulations of the exchange and to provide timely alert to the regulatory authority on any malfunctioning of the exchange, the Rubber Board's presence in the Board of Directors of the Futures Exchange might be essential. The Rubber Board might assist the groups of small growers technically and financially for active participation in futures trading. For the healthy and sustained functioning of Rubber Futures Exchange, the one million growers would have to be necessarily fully convinced of its merits.

The authors have examined how the very small and marginal farmers benefit from futures trading and how the small growers interest have been protected through futures trading. The effects of volatility in prices in futures trading of natural rubber are also enquired into by the authors.

The review of literature reveals that of the many techniques available for analysing risk premium and variability in prices, price impact of delivery specifications, assymmetry in futures price changes and efficiency of commodity futures markets, co-integration has been commonly employed by the authors. Hence in this study also, co-integration technique has been employed for analysing the price movements of rubber futures trough NMCE.

Materials and Methods

CHAPTER 3

MATERIALS AND METHODS

The futures market option has been tantalizing the growers, traders, processors and industrialists since the depression in the rubber market. Futures market would facilitate transfer of price fluctuation risk of the physical market. Discovery of the right price for transactions between sellers and buyers, hedging risk in a fluctuating market, low transaction cost to the consumer and supply of quality material are supposed to be the boons of futures market. For the consumer, much of the anxiety about the availability of raw material evaporates when he is assured of a certain quantity, at a suitable price. Production planning will become a painless routine.

The study on "Commodity futures – A study of online trading in rubber" was conducted with the objective of examining the price movements of rubber futures through NMCE, assessing the impact of futures trading on farming decisions of rubber farmers and identifying the determinants of online trading by rubber farmers.

This chapter explains the methodology and data sources adopted in conducting the present study, which are presented under the following sequence.

3.1. Locale of the study

3.2. Sources of data

3.3. Selection of the sample

3.4. Statistical tools used for analysis

3.5. Operational definitions of the concepts used in the study

3.1. Locale of the study

Three districts from Kerala was selected for the study and the districts were Kottayam, Palakkad and Thrissur. Since the proportion of farmers engaged in futures trading are relatively larger in the above districts, they were chosen purposively for the analysis. The information on the above criterion was availed from the commodity broking firms. Kottayam is the home town of rubber and in Palakkad and Thrissur there are substantial number of rubber farmers who are undertaking futures trading in rubber.

3.2. Sources of Data

The study was based on both primary and secondary data. Major sources of secondary information are commodity exchange and publications of Rubber Board. Daily prices of rubber futures and the related spot prices were collected for a period of July 2003 to May 2006. The source of data was the website of National Multi Commodity Exchange (www.nmce.com). The data regarding the major rubber producing countries, major rubber consuming countries, major importers and major exporters were collected from the website www.tirereview.com. The area, production and productivity of rubber were obtained from rubber and its cultivation, 2003 and Economic Survey 2006.

The primary data were collected from sample farmers on the basis of a structured interview schedule. The survey captured details on the farming decisions of rubber farmers like mulching, rain guarding, fertilizer application, marketing channels, storage facilities and grading and the determinants of online trading of the rubber farmers. The data collection was done during the months of November-December, 2006.

3.3. Selection of the sample

From each of the three districts, 33 rubber farmers who are undertaking futures trading in rubber were randomly selected to analyse the impact of online trading in the farming decisions of rubber farmers. Thus a total of 99 rubber farmers constituted the sample for this objective. For analyzing the determinants of online trading by rubber farmers, apart from this sample of 99 rubber farmers, another group of 33 rubber farmers were selected randomly from the Kottayam district. The sample consisted of rubber farmers who were not dealing in futures trading but were aware about the concept of futures trading. Thus a total of 132 rubber farmers constituted the sample for the analysis of this objective.

3.4. Statistical tools used for the study

Following statistical tools were employed to analyse the data.

i) Co-integration technique

To examine the integration of spot and future price movements of rubber through National Multi Commodity Exchange, the co-integration

technique was used. The daily data of the four month futures contract was split into F_3, F_2, F_1 and F_D which indicates futures price three months prior to delivery, futures price two months prior to delivery, futures price one month prior to delivery and futures price of delivery month. As a contract starts on 16th of a month and ends on 15th of the fourth month, from 16th to 15th of the next month was considered as one month. The daily data were converted to monthly averages. The monthly average of the spot price for the delivery month was also derived. Thus the monthly averages of F_3, F_2, F_1 and F_D were co-integrated with the spot price average S_D.

Futures market efficiency requires that past spot and futures prices do not provide additional and useful information to agents in forming expectations about the future 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).

$$S_{t+1} = a + b_o F_{t-1} + cS_t + \Sigma_{t+1} \ldots\ldots\ldots(1)$$

where $\Sigma_{t+1} \sim IID(0,\alpha^2)$ and /</<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 $b^e = (b_o + b_1) / (1-c)$

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

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

For cash and futures prices to be co-integrated, residual (U_{t+1}) should he stationary or I(O). If ΔF_t and U_{t+1} are I(O), the term $(S_t - \gamma - b^eF_t)$ 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 there is no co-integration between S_{t+1} and F_t.

ii) Percentage analysis

Trends in rubber production, area and yield were analyzed with compound growth rate using the function.

$\ln \gamma = \beta_o + \beta_1 t$ when growth rate is $(\text{Exp } \beta_i - 1) \times 100$

The percentage growth over the years was estimated using the formula:

$$\frac{Currentyear - previousyear}{Previousyear} \times 100$$

The impact of futures trading on farming decisions of rubber farmers were analyzed using the simple statistical technique of percentages and averages.

iii) Kendall's coefficient of concordance

To know the concordance/agreement among the judges in ranking the determinants of online trading, Kendall's coefficient of concordance was used.

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

$$W = \frac{S}{1/12\ K^2 (N^3 - N)}$$

where, N = Number of object
K = Number of judge

$$S = \Sigma \left(R_j - \frac{\Sigma Rj}{N}\right)^2$$

Rj = sum of ranks assigned to each determinant

χ^2 was computed for testing the significance of 'W' by using the formula $\chi^2 = K (N - 1) W$.

3.5. Operational definitions of the concepts used in the study

Futures contract: Standardized forward contract, which represents an obligation to make or take delivery of a fixed quantity and quality of a commodity, at a specific location.

Futures market: An organized market place, providing the facilities for futures market trade.

Spot price: It is the price that prevails in the cash market or cash price for immediate delivery.

Futures price: It is the price predicted by the buyers and sellers for the futures contract.

Hedging: It is a device by which a producer, stockiest or trader protects himself against the risk arising out of adverse price fluctuations.

Price discovery: It is the process of determining the price of a commodity based on supply and demand factors.

Margin: The security deposit required from a broker for a position by a clearing house. The initial margin is a deposit made to the clearing house as security when a position is opened. It is renewed daily as open positions are marked to the market or gains (or losses) are calculated and added to (subtracted from) initial margin.

Long: A position with more purchase contracts than sale contracts.

Short: A position with more sale contracts than purchase contracts.

Off set: The process of closing of the open contracts.

Expiry date: It is the date specified in the futures contract. This is the last day on which the contract will be traded, at the end of which it will cease to exist.

Delivery unit: The quantity of asset that has to be delivered under one contract.

Basis: Basis can be defined as the futures price minus the spot price. There will be different basis for each delivery month for each contract. In a normal market, basis will be positive. This reflects that futures prices normally exceed spot prices.

Marking-to-market (MTM): In the futures market, at the end of each trading day, the margin account is adjusted to reflect the investor's gain or loss depending upon the futures closing price. This is called marking-to-market.

Results and Discussion

CHAPTER 4

RESULTS AND DISCUSSION

Commodity futures markets have been in existence in India since 1921. However their growth has been stunted mainly due to restrictive policies implemented during the last four decades. With the initiation of the economic liberalisation policy and signing of the Agreement on Agriculture (AOA) of the World Trade Organisation (WTO), interest in these markets has been revived for their risk management and price discovery roles, as agricultural prices are expected to be determined mainly by the domestic and international market forces. However, the extent of policy support to futures markets will primarily depend on how efficiently they function.

The present study is an earnest attempt in this direction, in as much as to examine the co-integration between spot and futures prices of rubber. In addition to this, the assessment of the impact of futures trading on farming decisions of rubber farmers and the identification of the determinants of online trading by rubber farmers are also within the purview of the study.

With these objectives in view, the results and discussion are arranged under the following five major sections, namely,

4.1. Natural rubber economy – An overview
4.2. Commodity derivatives market in India
4.3. Price movements of rubber futures through NMCE
4.4. Impact of futures trading on farming decisions of rubber farmers
4.5. Determinants of online trading by Rubber Farmers

4.1. Natural Rubber Economy – An Overview

The rubber tree scientifically known as *Hevea brasiliensis*, is sturdy, quick growing and tall. It grows on many types of soils, provided they are deep and well drained. A warm humid climate (21 to 35°C) and a fairly distributed annual rainfall of not less than 200 cm are necessary for its optimum growth. The bark, on tapping, yields latex. The cambium, in between the wood and the bark, is responsible for the increase in girth of the tree including bark renewal.

The history of rubber goes back to prehistoric times. But it gained importance in 19th century following the invention of tyres. Till the 16th century rubber hardly attracted interest in the European region. Despite the pioneer research in finding rubber solvents and in water proofing fabrics which had started before 1800, it was used only for elastic bands and erasers and these were made by cutting up pieces imported from Brazil. From these early days to the mid 19th century, rubber was a novelty material, but it did not find much application in the industrial world. It was used first as erasers and then as medical devices for connecting tubes and for inhaling medicinal gases. With the discovery that rubber was soluble in ether, it found applications in water proof coatings, especially for shoes and soon after this, the rubberised Mackintosh coat become very popular.

The discovery of rubber-sulphur reaction in the early 20th century has revolutionalized the use and applications of rubber and changed the face of the industrial world.

4.1.1. Global natural rubber scenario

World rubber scenario continues to be determined by the trend in global economy. Rubber production and consumption is highly correlated with growth in economy since the major user segments are highly economy driven. Tokyo Commodity Exchange, Singapore Commodity Exchange and Osaka Mercantile Exchange are the major global exchanges undertaking futures trading of rubber. Kuala Lumpur, London and New York are the major global physical markets of rubber.

(i) *Global production of natural rubber*

The global natural rubber production sector is dominated by Asian countries. Of the world production, 85 per cent is the contribution of Asian countries. The main natural rubber producing countries are Thailand, Indonasia, Malaysia and India. The major rubber producing countries of the world and their level of production during 2005 are depicted in Table 4.1.

Table 4.1. Major rubber producing countries in the world, 2005

Rank	Name of the country	Production in 000' tonnes	Percentage
1	Thailand	2910.8	33.5
2	Indonesia	2269.8	26.1
3	Malaysia	1130.7	13.0
4	India	770.5	8.9
5	Vietnam	435.5	5.0
6	China	428.0	4.9
7	Cote d'Ivoire	153.0	1.8
8	Liberia	112.0	1.3
9	Brazil	98.0	1.1
10	Sri Lanka	94.7	1.0

Source: http://www.tirereview.com

Table 4.1 reveals that one-third of the worlds' natural rubber production is from Thailand. India is the fourth biggest producer of natural rubber in the world, contributing only about 9 per cent of the world production. About 60 per cent of the production of natural rubber in the world is contributed by Thailand and Indonesia. The top 10 countries together constitute 96.6 per cent of the world production.

(ii) Global consumption of natural rubber

The level of industrial development of a country may be one of the factors influencing the consumption of rubber. The data regarding the consumption of natural rubber by the major natural rubber consuming countries is shown in Table 4.2.

Table 4.2. Consumption of natural rubber by the major consuming countries, 2005

Rank	Name of the country	Consumption in 000' tonnes	Percentage
1	China	1826.0	20.9
2	USA	1159.2	13.3
3	Japan	859.4	9.8
4	India	786.4	9.0
5	Malaysia	385.8	4.4
6	Republic of Korea	369.8	4.2
7	Thailand	321.5	3.7
8	Brazil	310.9	3.6
9	Germany	260.1	3.0
10	France	233.9	2.7

Source: http://www.tirereview.com

China, the manufacturing hub of the world as is called by the economists, tops the list of rubber consuming countries. It is to be noted that the four countries viz., China, USA, Japan and India with highest GDP as per the World Development Report are the top rubber consuming countries. The prominence of Asian countries is not as high in rubber consumption as in the case of rubber production. India holds the fourth position in rubber production and consumption which is around 9 per cent for both, giving an implication that the whole of the production is consumed by the country. Even the consumption is a little bit higher than production, which implis that there is import of rubber in the country.

One noteworthy feature about Indonesia is that, though it is the second largest producer of natural rubber with a share of 26.1 per cent, she is not among the top consumers of natural rubber. Even Thailand, the largest producer of natural rubber with 33.5 percent is only consuming 3.7 per cent of the world consumption. An enquiry into the export of natural rubber may give an explanation to this.

(iii) Global export of natural rubber

A number of products are manufactured out of natural rubber. The demand for natural rubber increased significantly over the last seven decades. Table 4.3. depicts the share of the top 10 countries with respect to export of natural rubber.

Table 4.3. Export of natural rubber by various countries, 2005

Rank	Name of the country	Export in 000' tonnes	Percentage
1	Thailand	2580.7	40.9
2	Indonesia	2074.5	32.9
3	Malaysia	659.9	10.5
4	Vietnam	371.0	5.9
5	Cote d'Ivoire	152.0	2.4
6	Liberia	111.0	1.8
7	India	60.1	1.0
8	Guatemala	54.0	0.9
9	Cameroon	52.5	0.8
10	Philippines	43.4	0.7

Source: http://www.tirereview.com

It is to be noted that China is not figuring in the top 10 countries exporting rubber although it is the sixth in rubber production. China tops in the list of countries based on consumption (1826000 tonne) with 20.9 per cent of the global consumption while its production is only 428000 tonne with 4.9 per cent of global production (Table 4.1.). So naturally China will not be interested in exports.

Brazil is another country, which though listed as **9th** based on production (Table 4.1) and eighth based on consumption (Table 4.2) is not figuring in exports. A better conclusion with respect to this can be obtained by an analysis of global import of rubber.

Thailand and Indonesia, the largest producers of natural rubber are also the largest exporters of natural rubber constituting 74 per cent of global export of natural rubber. Since their domestic consumption is very less as seen in Table 4.2, they find international market for their product. Being regular exporters of natural rubber, the production and processing practices prevailing in Thailand, Indonesia, Malaysia and Vietnam are well oriented towards export market. All these countries have well rooted marketing channels as well as have regular buyers in the international market.

(iv) Global import of natural rubber

An analysis of the global import of natural rubber will give a better understanding about the global rubber scenario. Hence data regarding import of natural rubber by the top 10 countries are depicted in Table 4.4.

Table 4.4. Import of natural rubber by various countries, 2005

Rank	Name of the country	Import in 000' tonnes	Percentage
1	China	1329.2	21.2
2	USA	1159.2	18.5
3	Japan	848.6	13.6
4	Republic of Korea	369.8	5.9
5	Germany	260.1	4.2
6	France	233.9	3.7
7	Brazil	212.9	3.4
8	Spain	187.4	3.0
9	Canada	156.4	2.5
10	Italy	147.6	2.4

Source: http://www.tirereview.com

Comparing the top ten countries producing natural rubber (Table 4.1) with the above Table, it is seen that China is the only country which is included in the top ten countries importing rubber. While China produces 4.9 per cent of the world production (Table 4.1) constituting sixth in the list of top 10 countries, she is the largest consumer of natural rubber, consuming 20.9 per cent of the global consumption. Since there is big gap between China's production and consumption, this will naturally have to be filled up through imports. Hence China is figuring first in the list of natural rubber importing countries. This also explains the reason for China not figuring at all in the list of rubber exporting countries (Table 4.3.).

Among the top ten importers of natural rubber only three are Asian countries, viz., China, Japan, Republic of Korea. USA is record in both consumption (Table 4.2) and import of natural rubber coming next to China. Japan occupies the third position both in consumption (Table 4.2) and import. Since there is only marginal difference in the production and consumption, in the case of India, she is not figuring in the top ten countries importing natural rubber. Although India is not in the list of top ten importing countries imports to India is taking place in an irregular manner. One of the distinct features of India and China among the leading natural rubber producers is that these two countries absorb the entire domestic production of natural rubber for their internal consumption.

4.1.2. Indian natural rubber scenario

The economic reform process introduced by the Government of India since 1991 has been a crucial factor determining the price of rubber in the country. As a consequence of the various policy shifts targeting outward orientation, including the removal of quantitative restriction on import of natural rubber since April 2001, the ups and down in the international market began to be reflected in the Indian rubber market also.

India, with its captive domestic demand, occupies a unique position among the first four major natural rubber producing countries. The progressive increase in the domestic demand for natural rubber during the post-independence period fuelled the Indian rubber plantation industry to grow faster than its counterparts in other countries.

The attainment of a relatively higher rate of growth is evidenced by the fact that the country's relative share in the global output of natural rubber progressively increased from an insignificant 0.8 per cent during 1950 to 9.0 per cent during 2005.

Presently, India is the fourth biggest producer and consumer of natural rubber in the world. Moreover, the country can take pride in graduating as the premier in productivity of natural rubber despite various infirmities such as relatively small holding size and less than ideal agro-climatic conditions for growing rubber. The higher efficiency of rubber over other major crops in the country is endorsed by the fact that this plantation industry accounts for

1 per cent of India's GDP though rubber occupies only 0.4 per cent of the gross cropped area in the country.

The achievements of the Indian rubber plantation industry during the post-independence period are mainly attributable to the protectionist policy pursued by the Government of India under the various Five Year Plans, aimed at attainment of self-sufficiency in production and import substitution. A better picture about the Indian natural rubber scenario would be obtained if an enquiry into the area, production and productivity of natural rubber in India is made which is done in Table 4.5.

Till 1990, data is available only at five year intervals. From 1990-91 onwards annual data with regard to the three indicators are available. Compound growth rate for the period 1950-51 to 2004-05 is worked out. From the year 1991-92 onwards, growth rate over the previous year has been calculated.

Table 4.5. Area, production and productivity of rubber in India, 1950-51 to 2004-05

Year	Tapped area (ha.)	Production (tonnes)	Yield (kg/ha.)
1950 - 1951	55800	15800	284
1960 - 1961	70253	25697	365
1965 – 1966	112709	50530	448
1970 – 1971	141176	92171	653
1975 – 1976	178480	137750	772
1980 – 1981	194245	153100	788
1985 – 1986	223347	200465	898

1990 – 1991	306413	329615	1076
1991 – 1992	324540 (5.92)	366745 (11.26)	1130 (5.02)
1992 – 1993	330500 (1.84)	393490 (7.29)	1191 (5.40)
1993 – 1994	338550 (2.44)	435160 (10.59)	1285 (7.89)
1994 – 1995	346270 (2.28)	471815 (8.42)	1362 (5.99)
1995 - 1996	356444 (2.94)	506910 (7.44)	1422 (4.41)
1996 – 1997	365580 (2.56)	549425 (8.39)	1503 (5.70)
1997 – 1998	372970 (2.02)	583830 (7.26)	1549 (3.06)
1998 – 1999	387100 (3.79)	605045 (3.63)	1563 (0.90)
1999 – 2000	394800 (1.99)	622265 (2.85)	1576 (0.83)
2000-2001	399901 (1.29)	630405 (1.31)	1576 (0)
2001-2002	400713 (0.20)	631400 (0.16)	1576 (0)
2002-2003	407663 (1.73)	649000 (2.79)	1592 (1.02)
2003-2004	427540 (4.88)	711000 (9.56)	1663 (4.6)
2004-2005	439296 (2.75)	749000 (5.34)	1705 (2.53)
Compound growth rate	8.26	16.36	7.47

Note: 1. Compound growth rate estimated using the functions ln Y = $\beta_o+\beta_1 x$ when growth rate is (Expβ_1-1) x 100

2. Figures in parenthesis denote percentage growth over previous year

The area under rubber cultivation has increased constantly over the decades in India even though the growth rate has not been uniform throughout the years. Rubber crop which was till then confined to the state of Kerala, was exempted from the purview of the land ceiling in the 1960s and a considerable area which were under coconut and arecanut was brought under

rubber. However, owing to the prolonged sluggishness in the rubber market during the nineteen seventies, rubber had a set back in area expansion. The situation however changed by the late nineteen seventies and there was a boom in the planting activity. Table 4.5 reveals a compound growth rate 8.2 during the period 1950-51 to 2004-05. The expansion of area over the years are not that much significant. A serious constraint in expanding rubber cultivation in non-traditional areas is the Forest Conservation Act under provisions of which forest land cannot be brought under rubber cultivation as rubber is not considered as a forest crop.

In India as much as 88 per cent of the production of natural rubber is from small holding sector with an average area of 0.5 hectares or less and the estates only account for 12 per cent of production of natural rubber. It is vivid from the above Table that there has been a steady increase in production of natural rubber over the years. The compound growth rate comes to 16.36. A higher growth in production was possible because of area expansion scheme of rubber board and replanting old and uneconomic trees with high yielding varieties during 1980's. Although in absolute terms, production has been increasing, there has been a decreasing trend since 1999-2000 till 2001-02. The production registered the lowest growth during 2001–2002.

The productivity of natural rubber recorded a continuous growth over the period except in 1999–2000 to 2001–2002, where the productivity is stagnant. Anyway from 2002–2003 onwards it again shows a steady increase.

The compound growth rate for yield works out to 7.47 per cent. The productivity growth attained till mid 90's was largely on account of long term measures such as expansion of area and replanting of old and uneconomic trees with high yielding varieties. Further scope for increasing productivity through switch over to high yielding varieties is limited, as 94 percent of the planting is with high yielding varieties.

4.1.3. Natural rubber scenario of Kerala

Unlike in the case of other major natural rubber producing countries, the introduction of rubber cultivation in Kerala was characterised by the active participation of the peasantry. Despite its colonial heritage, Indians controlled about 73 per cent of the area under rubber even as early as 1946. This was contrary to the dominant foreign ownership and control of natural rubber production in Malaysia and Indonesia during the colonial period. This unique feature of Kerala's rubber sector, which has accounted for more than 90 per cent of the country's natural rubber production during the last one century, had important policy implications.

The introduction of commercial cultivation of natural rubber in the state in the early 20th century coincided with a phase of remarkable commercialisation of agriculture, growth in trading and banking and other conducive factors such as access to general education and development of transport infrastructure.

The introduction of natural rubber cultivation by the British opened up a new vista of enterprise for the peasantry in the state to channel the surplus generated from the commercial cultivation of traditional crops and those from trading and banking. Three important development during the pre-independence phase such as, growth of an indigenous rubber products manufacturing industry since 1920s, by passing of two International Rubber Regulation Agreements (IRRAs) and statutory price regulations of natural rubber since 1942 proved pivotal in the dynamic growth of the natural rubber sector. The cumulative impact of these developments ensured a comparatively remunerative price for rubber.

Growing sub-division and fragmentation of holdings leading to limited options for reinvestment in the dominant small-holder sector with an average size of less than 0.5 hectare is one of the major challenges faced by the natural rubber sector of Kerala. There is limited scope for new planting in Kerala in the absence of adequate area under favourable agro-climatic conditions. Growing market uncertainty in natural rubber prices since 1997 is casting a shadow on the hitherto observed momentum in the expansion of area under the crop despite the fact that rubber farmers are getting remunerative price since the last two years.

4.2. Commodity Derivatives Markets in India

The Indian experience in commodity futures market dates back to thousands of years. References to such markets in India appear in Kautilya's

'Arthasastra'. The words, "Teji", "Mandi", "Gali" and "Phatak" have been commonly heard in Indian markets for centuries.

The first organised futures market was however established in 1875 under the aegis of the Bombay Cotton Trade Association to trade in cotton contracts. Derivatives trading were then spread to oil seeds, jute and food grains. The derivatives trading in India however did not have uninterrupted legal approval. By the Second World War, ie., between 1920's and 1940's, futures trading in organised form had commenced in a number of commodities such as – cotton, ground nut, ground nut oil, raw jute, jute goods, castor seed, wheat, rice, sugar, precious metals like gold and silver. During the Second World War futures trading was prohibited under Defence of India Rules.

After independence, the subject of futures trading was placed in the union list, and Forward Contracts (Regulation) Act, 1952 was enacted. Futures trading in commodities particularly, cotton, oilseeds and bullion, was at its peak during this period. However, following the scarcity in various commodities, futures trading in most commodities was prohibited in mid sixties. There was a time when trading was permitted only for two minor commodities, viz., pepper and turmeric.

Deregulation and liberalisation following the forex crisis in early 1990s also triggered policy changes leading to reintroduction of futures trading in commodities in India. The growing realisation of imminent globalisation under the WTO regime and non-sustainability of the Government support to

commodity sector led the Government to explore the alternative of market based mechanism, viz., futures markets, to protect the commodity sector from price – volatility. In April, 1999 the Government took a landmark decision to remove all the commodities from the restrictive list. Food grains, pulses and bullion were not exceptions.

The long spell of prohibition had stunted the growth and modernisation of the surviving traditional commodity exchanges. Therefore, along with liberalisation of commodity futures, the Government initiated steps to cajole and incentive the existing exchanges to modernise their systems and structures. Faced with the grudging reluctance to modernise, and slow pace of introduction of fair and transparent structures by the existing exchanges, Government allowed setting up of new, modern, demutualised nation – wide multi commodity exchanges with investment support by public and private institutions. National Multi Commodity Exchange of India Ltd, (NMCE), was the first such exchange to be granted permanent recognition by the Government. At present in India there are 25 recognised future exchanges, of which three are national level multi – commodity exchanges.

4.2.1. National Multi Commodity Exchange of India Ltd.

National Multi Commodity Exchange of India Ltd. set up in 26th Novemebr, 2002 is committed to provide world class services of on-line screen based futures trading of permitted commodities and efficient clearing and guaranteed settlement, while complying with statutory/Regulatory requirements. They strive to ensure continuous improvement of customer

services and remain quality leader amongst all commodity exchanges. Improving efficiency of marketing through on-line trading in dematerialised form and minimisation of settlements risks are the other peculiarities of NMCE. NMCE tries to improve efficiency of operations by providing best infrastructure and latest technology. They also implement best quality standards of warehousing, grading and testing in tune with trade practices. NMCE is the first commodity exchange to get the 'National' status. Demutualised corporate structure of NMCE leads to a reliable, effective, impartial and rule based management by professionals having no trade interest.

An important peculiarity of NMCE is the convergence of all the offers and bids emanating from all over the country in a Single Electronic Order Book of the Exchange ensuring equal access to all intermediaries. Participation of diverse interests like importers, exporters, growers, brokers, traders, etc., using an electronic trading system provides a fair, efficient and transparent commodities market Warehouse receipt system based delivery of underlying commodities enables NMCE to meet the current international standards. National Multi Commodity Exchange is the first to establish a Trade Guarantee Fund, thereby offering guaranteed clearing and book entry settlements by assuming counter – party risks. NMCE is having V – SAT based connectivity throughout the country.

i) *Promoters*

The promoters of NMCE are the leading institutions like Central Warehousing Corporation (CWC), National Agricultural Co-operative Marketing Federation of India Limited (NAFED), Gujarat Agro Industries Corporation Limited (GAIC), Gujarat State Agricultural Marketing Board (GSAMB), National Institute of Agricultural Marketing (NIAM), Neptune Overseas Limited (NOL) and Punjab National Bank (PNB).

ii) *Regulatory framework*

The Department of Consumers Affairs in the Ministry of Consumer Affairs, Food and Public Distribution, Government of India, is the apex regulatory body governing all commodity exchanges. Various powers to provide regulatory supervision, besides the powers to grant or withdraw recognition of any exchange rests with this Department of the Government of India. The Forward Markets Commission (FMC) was set up in 1953 to provide regulatory advice to the Government and have closer regulatory interaction with the commodity exchanges. Most of the regulatory powers of the Central Government have been delegated to the FMC. For example, FMC has powers to approve the memorandum and articles of association as well as byelaws of the exchange. It has also powers to conduct inspection of accounts of the exchanges/their members and inquire into the affairs of the exchange. In an emergency, it can even suspend trading. All contracts for

futures trade have to be approved by the FMC before they can be launched on the exchange.

As a self – regulatory organisation, NMCE also plays an important role by ensuring that the provisions in the Articles of Association and Byelaws etc. are followed in letter and spirit. The regulation by the exchange is rule based and incorporated in the software itself. The legal heirarchy of the regulatory framework of commodity exchanges is depicted in Figure 4.1.

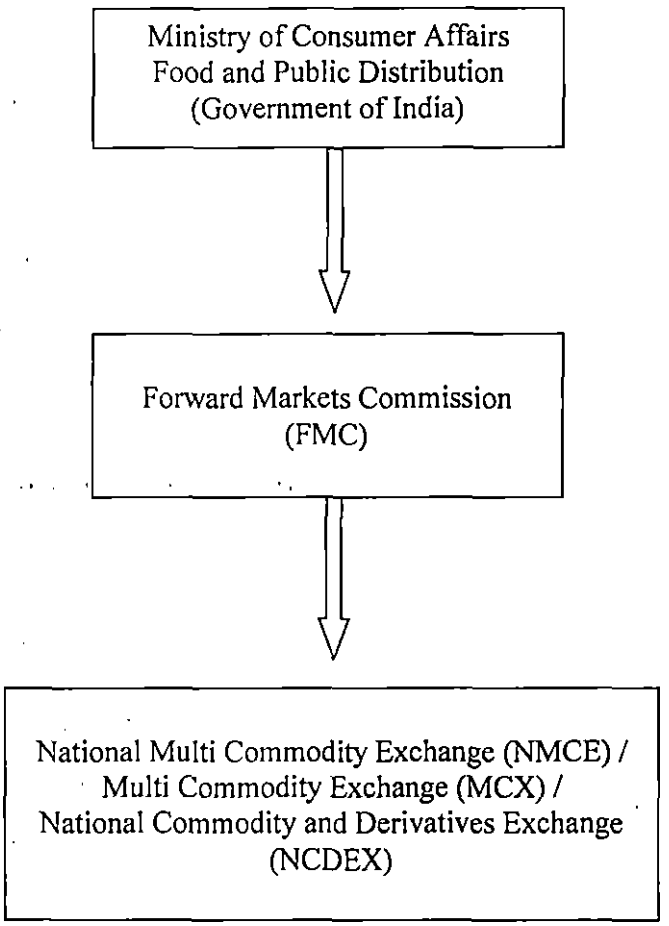


Figure 4.1. Legal Hierarchy of the Regulatory Framework of Commodity Exchanges

iii) Trading system of NMCE Ltd.

National Multi Commodity Exchange is a multi commodity exchange where trading of various commodities are taking place. For different commodities, the contract cycle are different. In the case of rubber the contract cycle is four months. So in each month there will be four contracts each having one month to maturity, two months to maturity, three months to maturity and four months to maturity.

The transactions of contracts in rubber commences from 16th calender day of the commencement month or next working day if 16th calender day of the commencement is a holiday. The duration of the forward contracts in rubber between the commencement month and the contract month shall not exceed four months. For example, a contract commencing on January 16th of the current year shall not continue beyond May 15th of that year. In NMCE Ltd. trading in rubber is between 10 AM and 4 PM from Monday to Friday and between 10 AM and 2 PM on Saturday and on days which are declared as half working days. The size for all contracts in rubber is one tonne (1000 kg) and multiples thereof. The price quoted for rubber contracts is in Indian rupees per 100 kilogram. The trading is done by the individual clients through brokers by opening an account with them. For entering into a contract, the individual clients have to pay an initial margin which is almost equal to 10% of the open position. Then each day's position is marked to market and the gains or losses will be added to or subtracted from the initial

margin. Apart from this the clients have to pay brokerage which will vary depending upon the trading policy of the different broking firms

On the date of expiry, the final settlement price is the spot price on the expiry day. The spot prices are collected from members across the country through polling. The polled bid/ask prices are bootstrapped and the mid of the two boot strapped prices is taken as the final settlement price. The responsibility of settlement is on a trading cum clearing member for all trades done on his own account and his client's trades. A professional clearing member is responsible for settling all the participants trades which he has confirmed to the exchange.

On the expiry date of a futures contract, members are required to submit delivery information through delivery request window on the trader workstations provided by NMCE for all open positions for a commodity for all constituents individually. NMCE on receipt of such information matches the information and arrives at a delivery position for a member for a commodity.

Pursuant to regulations relating to submission of delivery information, failure to submit delivery information for open positions attracts penal charges as stipulated by NMCE from time to time. NMCE also adds all such open positions for a member, for which no delivery information is submitted with final settlement obligations of the member concerned and settled in cash. Physical delivery of the underlying asset, closing out by offsetting positions and cash settlement are the three methods of settlement available in NMCE.

4.2.2 National Commodity and Derivatives Exchange Limited (NCDEX)

NCDEX located in Mumbai is a public limited company incorporated on 23rd April, 2003 under the Indian Companies Act, 1956 and commenced its operations on 15th December 2003. This is the only commodity exchange in the country promoted by national level institutions. It is promoted by ICICI Bank Limited, Life Insurance Corporation of India (LIC), National Bank for Agriculture and Rural Development (NABARD) and National Stock Exchange of India Limited (NSE). It is professionally managed online multi commodity exchange. NCDEX is regulated by Forward Market Commission and is subjected to various laws of the land like the Indian Companies Act, 1956. Indian Contracts Act 1872 Forward Contracts (Regulation) Act, 1952 and various other legislations.

NCDEX currently facilitates trading of 57 commodities. NCDEX is a national – level, technology driven de-mutualised online commodity exchange with an independent board of directors and professional management – both not having any vested interest in commodity markets. It is committed to provide a world – class commodity exchange platform for market participants to trade in a wide spectrum of commodity derivatives driven by best global practices, professionalism and transparency.

4.2.3. Multi Commodity Exchange of India Limitd (MCX)

Headquartered in Mumbai, Multi commodity Exchange of India Ltd. (MCX), is an independent and demutualised exchange with a permanent

recognition from Government of India. Key shareholders of MCX are Financial Technologies (India) Ltd, State Bank of India, Union Bank of India, Corporation Bank, Bank of India and Canara Bank. MCX facilitates online trading, clearing and settlement operations for commodity futures markets across the country.

MCX started offering trade in November, 2003 and has built strategic alliances with Bombay Bullion Association, Bombay Metal Exchange, solvent Extractors' Association of India and Pulses Importers Association.

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 is led by an expert management team with deep domain knowledge of the commodities futures market. Being a nation – wide commodity exchange having state – of – the – art infrastructure, offering multiple commodities for trading with wide reach and penetration, MCX is well placed to tap the vast potential poised by the commodities market.

4.2.4. Forward Markets Commission (FMC)

Forward Markets Commission (FMC) headquartered at Mumbai, is a regulatory authority which is overseen by the Ministry of Consumer Affairs and Public Distribution, Government of India. It is a statutory body set up in 1953 under the Forward Contracts (Regulation) Act, 1952.

The Forward Markets Commission advise the Central Government in respect of the recognition or the withdrawal of recognition from any association or in respect of any other matter arising out of the administration of the forward contracts (Regulation) Act, 1952. It also keeps forward markets under observation and takes such action in relation to them, as it may consider necessary, in exercise of the powers assigned to it by or under the Act. FMC collects and whenever the commission thinks necessary, publish information regarding the trading conditions in respect of goods to which any of the provisions of the act is made applicable, 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 organisation and working of forward markets. Another function of FMC is to undertake the inspection of the accounts and other documents of any recognised association or registered association or any member of such association whenever it considers it necessary.

The Forward Markets Commission is committed towards the development of institutional capability of the commodity market. The Commission has taken several steps in this direction, which include sensitizing policy makers and all other co-traders for improving the efficiency of all the participants in the marketing chain by organising awareness programmes, workshops, subject specific consultancies, study tours and lectures.

In the year 2005, 24 awareness programmes were organised by FMC together with the National and Regional commodity exchanges. Each of these programmes were attended by around 150 to 200 participants including traders, farmers, members of capital markets, members from industries, NGO's, representatives of co-operative bodies, banks, exporters, importers and general investors.

Although much progress has been made in sensitizing players, the task is far from complete. FMC has set itself an ambitious target for reaching out to various market segments and grass root level participants. FMC solicits active collaboration with universities, educational institutions and other organisations desiring to spread awareness about futures trading in commodities.

4.2.5. Recent trends in commodity futures markets

As per the Government's report, India's inflation rate reached a two year high of 6.73 per cent in the week ended 3rd February, 2007. The spike in inflation in recent months, which has come along side robust economic growth, has stocked fears that the Indian economy might be overheating. The Government and the Reserve Bank of India were taking measures to curb inflation, which climbed to 6.73 per cent from the prior weeks' reading of 6.58 per cent. The increase was led by a spurt in the prices of food products and some manufactured goods.

The prices of almost all essential commodities shot up after the Central Government increased fuel prices on June 8, 2006. The price rise is particularly harmful as it affects food grains and all other commodities of daily use like pulses, edible oils, vegetables and sugar.

There is also speculation that the Government may also ban futures trading in agricultural commodities for sometime in order to curtail inflation.

The state-run oil companies, which dominate the retail fuel market, were asked by the Government to cut gasoline prices by about five per cent and diesel prices by three percent. This was expected to directly translate into a 0.4 per cent point reduction in the inflation rate.

Although Government is of the opinion that inflation has been caused by a mismatch between supply and demand of goods, there is a widespread perception that the introduction of online trading has caused much speculation and fuelled the rise of prices of essential commodities. As such, banning futures trading on essential commodities seem to be a critical part of the Governments' strategy to curb inflation. On January 23rd 2007, the FMC imposed a temporary ban on futures trading in urad and tur dal. Since the ban, however the prices have not shown a downward turn, but continue to hover at levels that prevailed prior to the delisting. While the average ruling prices of urad (blackgram) were around Rs.3000 per quintal mid-January, the February prices continued to remain at the same highs, sometimes crossing Rs.3500.

Director of the FMC, Anupam Mishra strongly argued that futures trading of a commodity would not really impact their prices. The futures market provides a platform for price discovery and risk management. It is nothing but a forecast of likely demand and supply and prices at a future point of time. It does not impact prices. The ban was effected because of perceptions that futures markets and speculation were leading to the rise in prices.

According to officials from the FMC, the high prices, in all probability, are due to a mismatch in supply and demand of these two commodities.

With an immediate ban being enforced, many futures traders dealing in urad and tur were hit hard as they had to suddenly pull out of the market. Traders feel a more acceptable solution would be to impose an upper limit on futures contracts held by individual traders in specific commodities. Although speculation is there, it can be curbed by imposing limits on traders.

Again, banning futures trading found special mention in the Budget speech, even though it does not come under the purview of the Finance Ministry. But as pointed out earlier, the price rise in food grains and pulses has little to do with futures trading and much to do with supply constraints.

Going against its own positive assessment on the commodity futures market, the Government has proposed in its budget a wholesale ban on futures trading in commodities like wheat and rice. The decision runs contrary to the Economic survey 2006-07, presented a day ahead of the Union Budget, which

said that a well-developed commodity futures market resulted in "efficient price discovery of the respective commodities and does not impair the long-run equilibrium price of commodities".

It is interesting that the Government has chosen wheat and rice in this round of ban. All of the four rice contracts listed on NCDEX have not traded in the recent past and none of them have any outstanding positions. And the rice index within the wholesale price index has risen by only about five per cent in the past year, hardly warranting any attention from the Government. Wheat is amongst the least traded commodities on the NCDEX, accounting for less than 1 per cent of daily turnover. The total open interest prior to the ban was 89,830 tonnes; 0.13 per cent of India's annual wheat production. Open interest and volumes were low because of restrictions such as high margin and low position limits. With such low levels of trading, there is little chance of prices being manipulated. Ironically, the ban on wheat and tur has coincided with their respective harvest seasons, a time when prices ease because of the increase in supply. So, prices may correct, but that would have little to do with the ban. It is argued that it gives the wrong signals to market participants about Indian Commodity Markets, apart from taking away from farmers the benefit of a very reliable price source.

On the other side as reported by Press Trust of India wheat prices have started falling in response to a ban on futures trading in wheat and rice. The downside in wheat prices continue due to persistent offerings by stockists against slowdown in buying by rolling flour mills after FMC announced the

ban. Wheat data (for mills) remained in negative zone and prices declined to Rs.1000-1005 per quintal from Rs.1020-1035 per quintal while wheat MP (deshi) drifted to Rs.1200-1550 per quintal from Rs.1390-1590 a quintal.

On the one hand, there is increasing pressure to suspend online trading in all essential commodities on the ground that the introduction of online trading has caused much speculation and fuelled the rise of prices of essential commodities. On the other hand, an efficient and well-organized commodities futures market is generally acknowledged to be helpful in price discovery for sellers. Unlike the physical market like Mandis, a well developed commodity futures market offsets the transaction in commodities without impacting the physical goods until the futures contract expires. Thus, a futures market encourages competition by attracting traders who hedge their bets and minimise risks on the basis of their own market information price judgement. As a result, the commodity market attracts participation of hedgers who have a long term perspective of the market and traders, or arbitragers who hold an immediate view of the market.

Even the Economic Survey had observed that "an effective architecture for regulation of trading ensuring transparency as well as timely flow of information to the market participants would enhance the utility of commodity exchanges in efficient price discovery and minimise price shocks triggered by unanticipated supply demand mismatches".

The Economic Survey said that the growth in the volume of trading has been primarily propelled by Multi Commodity Exchange, Mumbai (MCX)

and National Commodity derivatives Exchange, Mumbai (NCDEX). As on December 31, 2006, gold, silver and copper recorded the highest volumes of trade in MCX, while the NCDEX, guar seed, chana and soy oil had the highest volumes of trade. Gold accounted for the largest share (31%) of trade, followed by silver (19%), guar seed (11%) and chana (10%). Clearly, the volumes of commodity futures in tur daal, guar daal, wheat and rice are insignificant and does not figure in the rising price scheme.

A Committee is being set up by the Government to look into the positive or negative effect of futures trading. An enquiry into the price movements of rubber futures through NMCE which is done in the next section is expected to throw some light on a related issue – how far is the level of co-integration between spot and future prices of rubber.

4.3. Price movements of rubber futures through NMCE

Remunerative price is essential to sustain the interest of farmers in growing a crop yielding a commodity. Remunerative price includes the cost of production plus a reasonable profit. Since there is much risk in growing crops, especially plantation crops, a profit of 20% is desirable. Price fluctuations of commodities according to market forces of demand and supply are common. The imbalances of these forces may cause the price to rise very high or fall very low. When the prices increase, the costs of inputs for producing the commodity as well as labour wages increase and these never decrease when the prices tumble. Instability in prices affect from profitability. Therefore in addition to remunerative price, it is necessary to

reduce violent fluctuations in price. Stabilization price may be achieved by interventions in the market like regulated market and buffer stocking. But under the WTO regime, the Government can impose only minimum control over trade. In such a situation a new mechanism has to be put in place to control violent price fluctuations. International trade bodies under the UN and others recommend futures trading as a panacea to protect the poor farmers from the vagaries of commodity prices.

Theoretically, futures trading is buying and selling of standardized contracts between two parties where one of the parties commits to sell and the other to buy, a stipulated quantity (and quality) of a commodity at an agreed price on or before a date in the future.

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 walks or martingale process). 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 of 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, Ft of a contract for subsequent delivery at time t+1 contains all information available at time t for prediction of spot price for time t+1 (St+1). To assess this, traditionally, spot price (St+1) is regressed on the previous periods' futures price (Ft). 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 future spot prices and all available information are fully reflected in the futures price.

As co integration between spot and futures price 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 prevailing in the delivery month is regressed on futures price of three months prior to delivery, two months prior to delivery, one month prior to delivery and the delivery month. 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.

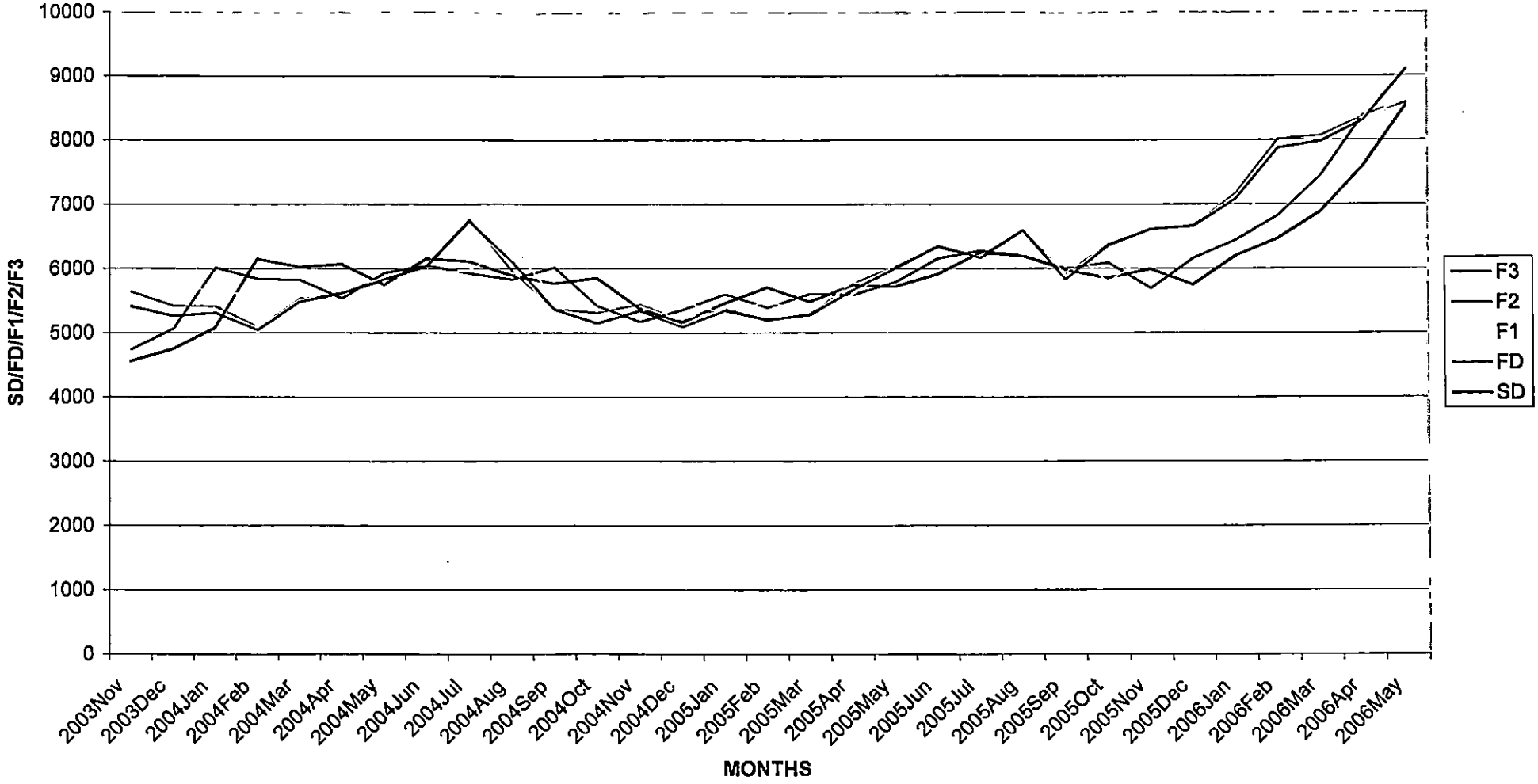
4.3.2. Trend in futures and spot prices

The co-integration of futures price of different months of delivery is examined in relation to the spot price of the delivery month. Here the daily futures prices of the four month duration contracts of NMCE are converted to the 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 fourth month, four monthly averages

are derived. From 16th day of a particular month to 15th day of the next month is treated as one month. Futures price three months prior to delivery (F_3), futures price two months prior to delivery (F_2), futures price one month prior to delivery (F_1) and futures price of the delivery month (F_D) are co-integrated with the spot price of the delivery month (S_D). The relationship of the F_3, F_2, F_1 and F_D with the S_D is presented in the Figure 2.

Figure 2 shows the relationship between spot price and different futures prices under the study period. The spot as well as futures prices are showing fluctuations and from the period January 2006 all these prices are showing an increasing trend. the spot price of the delivery month (SD) the futures price of the delivery month (F_D) are moving more or less the same direction. However, the element of prediction is very less in this case as the spot and futures prices will be the same at the maturity of the contract. Futures price one month prior to delivery (F_1) is closer to the spot price of the delivery month reflecting closer integration of spot price and futures price in this case. Therefore prediction of spot price using futures price one month prior to delivery seems to be relatively efficient. Futures price two months prior to delivery (F_2) is also showing some degree of reliability in predicting spot price of the delivery month. Nonetheless it is not effective as F_D or F_1. It can also be gauged that futures price three months prior to delivery (F_3) is able to predict the spot price only in very rare situations and in majority of the situation it is far away from the spot price. Wide fluctuations has been observed between the spot price (S_D) and futures price (F_3) which reveals that

Figure 2. Relationship between Spot and Futures Prices of Rubber



the integration of these two prices are very less in this case. So the prediction using futures price three months prior to delivery is not effective as it could not predict the spot price of the delivery month in many of the situations.

4.3.3. Co-integration of S_D with F_D, F_1, F_2 and F_3

Stationarity of the price data has been examined under the null hypothesis that autoregressive parameter/αo/=1 (unit root, ie. non-stationary against the alternative (one-sided) of /αo/<1. The Phillips-Perron test statistics are obtained via non-parametric corrections to the standard statistics of Dickey-Fuller: Standardised bias statistic Z(α) 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 (PP) unit root test applied to each spot and futures price series has shown that the series were stationary at 14^{th} order.

Auto Correlation Function (ACF) for different lags were calculated both for spot prices and futures prices and it was found in both the cases that ACF up to lag 14were significant. Since in both cases, the same order of ACF existed, co integration was possible. Thus spot prices of the delivery months are predicted using the futures prices of three months prior to delivery, two months prior to delivery, one month prior to delivery and the delivery month. The prediction equations are given in Table 4.6.

Table 4.6. Prediction equations

	Prediction Equation	Variance Explained (%)
Delivery month	S = -74.5531 + 1.004279 * FD	99.530
One month prior to delivery	S = -392.703 + 1.069172 * F1	89.151
Two months prior to delivery	S = -573.394 + 1.112261 * F2	80.462
Three months prior to delivery	S = -746.84 + 1.157815 * F3	70.329

S - *Spot price*
FD - *Futures price at Delivery month*
F1 - *Futures price at one month prior to Delivery*
F2 - *Futures price at two months prior to Delivery*
F3 - *Futures price at three months prior to Delivery*

As the variance explained using futures price prior to three months of delivery was not very high, the prediction of spot price using the futures price three months prior to delivery is not that much effective. The prediction of spot price is possible on futures price at delivery month, one-month prior to delivery and two months prior to delivery as the variance explained are higher. The prediction of spot price using the futures price of the delivery month is not that much significant as the element of prediction is very low in this case as it is nearing to the delivery date. So, the prediction is effective using the futures price of one month prior to delivery and two months prior to delivery.

4.4. Futures trading and farming decisions of rubber farmers

Due to limited availability of land suitable for rubber cultivation, the scope for increasing production through extending the area of cultivation is

limited in India. Hence, productivity improvement through short-term and long-term measures has received prime importance in the strategy adopted for increasing production. During the nineties, the rate of expansion of area under rubber reduced drastically, resulting in reduction in production also. As quoted by Kumar (The Hindu survey of Indian Agriculture, 2002), the reduction in the rate of production could be attributed to the decline in the extent of tapped area and small growers neglecting short-term productivity enhancement measures due to price fall. In this section, an enquiry is made with the objective of assessing whether futures trading are having any impact on the farming decisions of rubber farmers, so as to increase productivity.

For assessing the impact of futures trading on farming decisions of rubber farmers, primary data has been collected from 99 rubber farmers, who are trading in futures market, 33 each from the districts of Kottayam, Thrissur and Palakkad, which are the major rubber producing districts of the State and where there are a considerable number of rubber farmers who are participating in rubber futures trading. In addition to the 99 trading farmers from the three districts, a sample of 33 non-trading farmers from the district of Kottayam has also been selected. Thus the total sample size comes to 132 respondents, consisting of 99 trading farmers and 33 non-trading farmers. A pre-tested structured interview schedule has been administered for collecting data from the farmers. The data has been analyzed using bi-variate tables and percentages.

Before enquiring into the impact of futures trading, a brief examination of the socio-economic characteristics of the respondents has been made and presented in the ensuing section.

4.4.1. Socio-economic characteristics of the respondents

For analysing the socio-economic characteristics of the respondents, eight indicators, viz., age, sex, religion, educational status, family size, occupational status, size of landholding and annual income are considered. The indicators have been worked out for both the trading farmers and the non-trading farmers together and depicted in Table 4.7.

Table 4.7. Socio-economic characteristics of the respondents

Sl. No.	Characteristics	No. of respondents	Percentage to total
1	***Age in years***		
	30 – 40	9	6.82
	40 – 50	49	37.12
	50 – 60	50	37.88
	60 and above	24	18.18
	Total	132	100.00
2	***Sex***		
	Male	132	100
	Female	0	0
	Total	132	0
3	***Religion***		
	Christian	72	54.55
	Hindu	45	34.09
	Muslim	15	11.36
	Total	132	100.00
4	***Educational status***		
	Secondary	9	6.82
	Higher Secondary (8-12)	41	31.06
	Graduation	60	45.45
	Post Graduation	22	16.67
	Total	132	100.00

5	***Family size***		
	2 – 4	15	11.36
	4 – 5	52	39.40
	5 – 7	65	49.24
	Total	132	100.00
6	***Occupational status***		
	Farmer	70	53.03
	Businessman	45	34.09
	Retired person	17	12.88
	Total	132	100.00
7	***Size of landholding***		
	Small (less than 1 ha)	40	30.30
	Medium (1 – 2ha)	75	56.82
	Large (Above 2 ha)	17	12.88
	Total	132	100.00
8	***Annual Income***		
	Below 1.5 lakh	11	8.33
	1.5 – 3 lakh	72	54.55
	3 – 4.5 lakh	41	31.06
	4.5 – 6 lakh	8	6.06
	Total	132	100.00

Table 4.6. reveals that 75 percent of the farmers belong to the age group of 40-60. The youngsters in the age group of 30-40 are less than seven per cent. It is noteworthy that no farmer below the age of 30 has figured in the sample size from any of the three districts. It gives an indication about the attitude of the present generation towards taking up agriculture as a profession. There are nine farmers coming under the age group of 30-40. It is to be noted that all these nine farmers are trading in futures, which reveals that the younger generation is more adaptable to innovations in farming and price discovery. Moreover, it implies that they are attracted to agriculture, not merely by the profession of agriculture, but because of the opportunity of trading in the futures market.

A noteworthy feature of the respondents is that all of them are males. The absence of females might be due to the reason that the land is in the name of males. In the trading of commodities, women are not participating although there is limited participation of women in the stock market.

Majority of the respondents are Christians, which might be due to the fact that 50 per cent of the respondents are from the district of Kottayam, which is a Christian dominated district.

The educational status of the rubber farmers are high, revealing better socio-economic background for them compared to other farmers. Only nine respondents belong to the group of secondary level of education, which is the lowest educational level among the respondents and it is to be noted that all of them are non-trading farmers. About 17 per cent are post-graduates and all of them belong to the trading category of farmers.

It was already observed that there are only nine farmers in the age group of 30-40 which is the lowest age group of the respondents, and all of them are trading farmers. All of these nine farmers are also post-graduates, who deal in futures trading. This implies that educational background of farmers definitely has a role in trading in futures market, which is discussed in detail in the last section of this chapter.

The average family size of the respondents is found to be four. Majority (49.24%) of the respondents have a family size of 5-7.

The primary occupation is farming for more than half of the respondents. For nearly 47 per cent farming is only a secondary activity. About 35 per cent are doing rubber trading business in addition to rubber farming and all of them are dealing in futures trading. This reveals that rubber traders are more exposed to the futures market and they are in a better position to avail and assess the movements of the domestic as well as international physical market.

According to the size of land holding they possess, the farmers are categorized into small, medium and large. The farmers with less than one hectare of landholding are small farmers, between one and two hectares are medium farmers and above two hectares are large farmers. Majority of the respondents are medium farmers. The average landholding of these 132 rubber farmers is found to be 3.23 acres which is inclusive of both areas under rubber cultivation and under other crops.

The average landholding under rubber cultivation of the trading farmers is 0.9 ha and that of non-trading farmers is 1.0 ha. In both these cases it is above the national average of 0.5 ha. The rubber farmers not dealing in futures trading shows a better average and this might be due to the reason that this category of farmers were selected only from Kottayam district which is a prominent rubber growing region where large farmers are comparatively more.

Annual income of the farmer includes the revenue from rubber and other crops and other sources of income like income from business, pension etc. Since rubber is yielding a very good price in the market since the last two years or more, the rubber farmers are in a better position compared to their counterparts growing other crops. The average annual income of the farmers trading in futures works to Rs.2.56 lakhs and that of non-trading farmers is about Rs.2.36 lakhs which reveals that rubber is a very remunerative crop now-a-days.

An examination of the socio-economic characteristics of the rubber farmers reveals that they are far ahead of their counterparts growing other crops, especially with respect to annual income and educational background. The trading farmers are more advanced in educational status compared to the non-trading farmers. This reveals that rubber farmers represent an educated farming community and the educational background of the respondents act as a catalyst for entering into futures trading.

Once an observation of the socio-economic background of the respondent farmers is made, an assessment of the impact of futures trading on farming decisions of rubber farmers is done in the next section.

4.4.2. Impact of futures trading on farming decisions of rubber farmers

The diagnosis of the performance of the Indian rubber plantation industry has identified technological intervention as the most important single contributing factor for the dynamic growth attained during post-independence

phase (The Hindu Survey of Indian Agriculture). Apart from selection of planting material, cultivation and maintenance during the pre-mature and mature phases, adoption of crop protection measures and harvesting methods are important farm management practices that call for scientific approach by developing and popularising the agro-technology suited for each agro-ecological condition. The growth of trees, yield profile, disease tolerance, weather tolerance, economic life, timber yield and finally the growers' income and efficiency of production are determined by the technology adopted by the growers in various farm operations.

To analyse the impact of futures trading on farming decisions of rubber farmers, various farm management practices undertaken by the rubber farmers, viz., mulching, application of yield stimulants, rain guarding, fertilizer application and tapping methods are discussed. As a prelude to the discussion of the farm management practices of rubber farmers, the area under rubber cultivation and their experience in futures trading in rubber are presented.

i) Area under rubber cultivation

It has been pointed out earlier that the scope for increasing production of rubber through the extension of area under cultivation is less, due to the limited availability of land. To identify whether there is any expansion in area under rubber cultivation of the trading farmers after commencement of futures trading information is collected and presented in Table 4.8.

Table 4.8. Area under rubber cultivation of trading and non-trading farmers

Sl. No.	Area under rubber cultivation	Before commencing Futures Trading		After commencing Futures Trading		Non-trading farmers	
		Number of Respon-dents	Percent-age	Number of Respon-dents	Percent-age	Number of Respon-dents	Percent-age
1	Less than 1.5 acres	35	35.35	35	35.35	0	0
2	1.5 - 3 acres	39	39.40	39	39.40	23	69.70
3	3 - 4.5 acres	10	10.10	10	10.10	19	27.27
4	4.5 acres and above	15	15.15	15	15.15	1	3.03
Total		99	100	99	100	33	100

It is clear from Table 4.7 that there is no change in the area under rubber cultivation of trading farmers before and after commencement of futures trading. It implies that, as such, the advantages if any, of futures trading has not influenced the farmers to increase the area under rubber cultivation. One reason for this might be that it is too early to make such an influence since futures trading in rubber is of recent origin. Secondly, rubber being a perennial crop, shifting from other perennial crops and annual crops is a long term measure.

ii) Duration of trading in futures

While analysing the impact of futures trading on farming decisions, it is essential to know how long these farmers have been involved in futures trading, which is presented in Table 4.9.

Table 4.9. Duration of trading in rubber futures

Sl. No.	Duration	Number of Respondents	Percentage
1	1 year	24	24.24
2	2 years	44	44.45
3	3 years	31	31.31
Total		99	100

Online trading in rubber started only in 2003. Hence the highest duration for futures trading in rubber can be three years only. About one - third of the farmers have started trading in 2003 itself. It implies that rubber farmers are not reluctant to enter futures trading.

4.4.2.1. Farm management practices of rubber farmers

The major farming or cultural practices undertaken by the rubber farmers are mulching, application of the yield stimulant known as ethephon, rain guarding and fertilizer application. Here an analysis is made to assess whether there is any impact on the farming practices undertaken by the rubber farmers after the introduction of futures trading. The cultural practices undertaken by the trading and non-trading respondents and the average cost incurred per acre of rubber are depicted in Table 4.10.

Table 4.10. Farm Management practices of rubber farmers

Sl. No.	Cultural practices	Average cost per acre of rubber (Rs.)		
		Trading farmers		Non-trading farmers
		Before commencement of futures trading	After commencement of futures trading	
1	Mulching	1070.81	1070.81	803.00
2	Application of Ethephon	1131.34	1131.34	821.71
3	Rain guarding	869.29	869.29	590.55
4	Fertilizer application	2633.68	2633.68	2660.71

The purpose of mulching is to protect the plant from soil erosion and weeds. Nitrogen fixing plants are used for mulching. In the trading farmers out of 99 only 76 respondents are undertaking mulching regularly. All of them are undertaking it once in an year. In the non-trading category out of 33 only 27 respondents are undertaking mulching and all of them are undertaking it once in an year. The remaining farmers who are not doing mulching are doing intercropping with tuber crops. No change has been observed regarding the average cost involved per acre for mulching with regard to the trading farmers after the introduction of futures trading. When compared to the trading farmers, non-trading farmers have incurred a lower average cost. This might be due to the fact that since the non-trading farmers belong to Kottayam district where the landholding is comparatively high. they enjoy economies of large scale production.

Rubber holding size in India is relatively smaller with the average size below 0.5 hectare compared to 2–3 hectares in the first three major producing

countries. This disadvantage in economies of scale is a cost pushing factor in India.

Ethephon is a chemical recommended for stimulating the yield of rubber. Among the trading farmers 69 are applying ethephon for their crop. Forty five respondents are applying this once in an year and 24 respondents are applying twice in an year. Among the non-trading farmers only 24 are applying ethephon and the regularity of application for 16 farmers is once and for eight farmers it is twice a year. The remaining farmers in both category are away from applying this yield stimulant because of the cost factor involved in it.

Rain guarding is done for undertaking tapping in the rainy season. Out of the sample respondents who are undertaking futures trading, 64 are protecting their crop by rain guarding. In the category of non-trading farmers 25 are protecting their crop with rain guarding. The average cost involved for the trading farmers is same before and after introduction of futures trading. The average cost involved by the non-trading farmers is less compared to the trading farmers.

Studies have pointed out that only 20 per cent of the small holders come under the umbrella of Rubber Producers Societies (RPS) and among these 50 per cent are practicing rain-guarding. For the remaining 80 per cent of the small-holders, the adoption of rain guarding is marginal at only 20 per cent of the farmers.

The emergence of the free trade regime has necessitated a shift in the research focus with a view to attain competitiveness in cost and quality and improving economic viability of rubber plantations. As a result, discriminatory fertilizer application on the basis of soil and leaf testing carried out through Regional Testing Laboratories of the Rubber Research Institute of India (RRII) are recommended. But the farmers are not practicing this and they follow the traditional recommendations of fertilizer applications because of the practical difficulties in the adoption of the same.

All the sample respondents are applying fertilizer twice in a year for their crop. The cost involved is higher compared to other farming activities. The average cost involved for fertilizer application is Rs.2633.68 and there is no change in the average cost before and after commencement of futures trading. Compared to the trading farmers, non-trading farmers have incurred a marginally higher average cost.

Table 4.9. makes it clear that there has been no influence of futures trading on the cultural practices like mulching, application of yield stimulants, rain guarding and fertilizer application. It is to be noted that in all these cases, except in fertilizer application the average cost per acre of rubber cultivation has been lower for non-trading farmers. While conducting the study, it has been noted that the rubber farmers of Kottayam district have large land-holdings compared to their counterparts in other districts. All the 33 non-trading farmers have been selected from Kottayam district. The economies of

large scale operations might be the reason for this lower average cost for non-trading farmers.

4.4.2.2. Cost and output levels of rubber

Since labour charge is a major cost for rubber farmers, the expenses incurred for tapping, which is over and above the farm management expenses discussed in the previous section is examined here. An enquiry into the output levels of different categories of farmers, in different seasons is also done to assess whether there is any change after the commencement of futures trading.

i) Tapping regularity and labour cost

Given the fact that the yield profile is greatly influenced by the tapping method adopted, technological development in this sphere merit special mention. Major achievements in the area include development of localized technology for rain guarded tapping, yield stimulation during slaughter tapping, controlled upward tapping (CUT), early morning tapping and low frequency tapping (LFT).

Yield stimulants can be applied during the slaughter tapping period because the plants are already in the stage of slaughter and maximum exploitation can be done in this period. In order to prevent bark diseases, controlled upward tapping is recommended in which tapping is done from the upper portion of the plant. But as yield will be low from tapping the upper portion, farmers are not ready to follow this. Early morning tapping is

commonly followed by the farmers as yield will be higher in this type of tapping. In low frequency tapping, tapping rest is given to the plants in alternate days in which the plant gets enough time to regain its health.

There are several methods for tapping rubber trees like ½ spiral daily, ½ spiral alternate daily, ½ spiral third daily, spiral daily and spiral alternate daily. But ½ spiral daily and ½ spiral alternate daily are common among rubber farmers. Among the sample respondents no one is undertaking tapping methods other than these two. The tapping regularity of trading and non-trading farmers are depicted in Table 4.11.

Table 4.11. Tapping regularity of rubber by the respondents

Sl. No.	Tapping regularity	Trading farmers				Non-trading farmers	
		Before commencement of Futures Trading		After commencement of Futures Trading		Number of Respon-dents	Percent-age
		Number of Respon-dents	Percent-age	Number of Respon-dents	Percent-age		
1	½ spiral daily	16	16.16	16	16.16	6	18.18
2	½ spiral alternate daily	83	83.84	83	83.84	27	81.82
Total		99	100.00	99	100.00	33	100.00

It is clear from Table 4.10 that among the trading farmers majority of the respondents (83.84 per cent) are undertaking the method of ½ spiral alternate daily for tapping. Only 16 respondents (16.16 per cent) are adopting the method of ½ spiral daily as intensive tapping will reduce the yield of their

crop in the long run. There is no change in the tapping regularity of rubber before and after commencement of futures trading.

The non-trading farmers also depict similar behaviour of trading farmers with respect to tapping regularity. It can be inferred that most of the farmers are concerned about the long-run health of their plants even at a reduced income. Otherwise they would have gone for ½ spiral daily. Even controlled upward tapping may be adopted in between by the farmers once they are convinced about the advantages in the long-run compared to the continuous ½ spiral alternate daily. Adequate awareness must be created among the farmers regarding such technological developments.

Labour cost is related to the tapping regularity. Labour cost for tapping is considered as per tree labour charge. On an average 35 paise is the labour charge per tree. One acre of rubber normally contains 150 rubber plants. Among the trading farmers, 92 are doing tapping by labourers and only seven respondents are tapping their rubber trees by themselves. The average labour cost works out to Rs.7999.08 per acre for trading farmers. No change has been observed in labour cost for tapping after the introduction of futures trading as they have not made any change in the tapping regularity. In the case of non-trading farmers the average labour cost for tapping one acre of land comes to Rs.8150 per acre which is a little higher than the average cost of tapping of the trading farmers. This is due to the increased number of farmers doing ½ spiral daily in the case of non-trading farmers. When only 16.16 per cent of the trading farmers have ½ spiral daily, 18.18 per cent of the non-trading farmers have ½ spiral daily. It is noteworthy that when the cost of all other farming activities like mulching, application of ethephon and rain-

guarding was on the lower side for the non-trading farmers, the labour cost alone was higher for them. This is because, labour cost for tapping is charged plant-wise. So even if the size of their farms are large, they cannot obtain the economies of large scale operations in the case of labour cost.

It has already been identified that there is no change in the farm management practices of the respondents before and after the commencement of futures trading. A further attempt is made here to find out whether there has been any change in the production of rubber prior to and after futures trading during different seasons. For analysing the seasonal variations in production the farmers have been divided into small, medium and large based on their land holdings. The average production during peak, medium and off seasons of both trading and non-trading farmers has been found and depicted in Table 4.12.

Table 4.12. Seasonal variations in the production of rubber

Category	Season	Average production (in kg)		
		Trading farmers		Non-trading farmers
		Before commencement of futures trading	After commencement of futures trading	
Small Farmers	Peak	584.80	584.80	470.00
	Medium	474.29	474.29	359.17
	Off	343.32	343.32	268.33
Medium Farmers	Peak	537.86	537.86	526.59
	Medium	469.30	469.30	451.06
	Off	390.12	390.12	385.06
Large Farmers	Peak	692.26	692.26	510.83
	Medium	623.52	623.52	455.00
	Off	546.22	546.22	400.00

From the above table it is observed that there is no difference in the average production of rubber in any of the reasons before and after commencement of futures trading. A comparison of small, medium and large farmers reveals that the average production per acre is higher for the large farmers in all the three seasons. The small farmers in trading category are in a better position than the medium farmers in terms of average production. But in the case of non-trading farmers, small farmers have less average production than the other two groups. Compared to the non-trading farmers, trading farmers have a higher average production in all the three seasons for all categories of farmers.

There has not been any change in the average production of rubber by the trading farmers before and after commencement of futures trading because the respondents have neither changed their tapping regularity nor improved any of their farm management practices. This implies that there has not been any change in the cost and output levels of the farmers before and after commencement of futures trading.

It has seen generally that the small growers are highly receptive to technological innovations and short-term productivity enhancement measures (The Hindu Survey of Indian Agriculture, 2006; Rubber and its cultivation 2003). But it is interesting to note from Table 4.12 that large farmers are having the highest average production in all the seasons. This is mainly due to the fact that the production of large farmers will be high during the rainy season when compared to the small and medium farmers, since all the sample

large farmers rain guard their trees, while only around 60 per cent of small and medium farmers adopt rain guarding. On an average, 180 days tapping can be done in rain guarded rubber plantation, but only 150 days without rain guarding in an year. Another factor contributing to the higher level of production in the case of large farmers is the use of yield stimulants. While 83 per cent of the large farmers use yield stimulants, only 47 per cent of small farmers and 78 per cent of medium farmers apply yield stimulants. Further enquiry into these aspects can only reveal whether there is a shift of large farmers towards adoption of short-term technological innovations and short term productivity enhancement measures.

4.4.2.3. Marketing of rubber

The form in which the rubber farmers are disposing their produce is shown in Table 4.13.

Table 4.13. Disposal of rubber by the respondents

Sl. No.	Produce	Trading farmers				Non-trading farmers	
		Before commencement of Futures Trading		After commencement of Futures Trading		Number of Respon-dents	Percent-age
		Number of Respon-dents	Percent-age	Number of Respon-dents	Percent-age		
1	Latex	11	11.11	11	11.11	2	6.06
2	Rubber sheet	88	88.89	88	88.89	31	93.94
Total		92	100.00	92	100.00	33	100.00

The rubber farmers can dispose their produce either as latex or as rubber sheet. It is very difficult to preserve the latex from coagulation for

which they have to use some anti-coagulants. Even if they prefer to dispose as latex, they have to immediately sell it off after collecting the latex. But the rubber sheet can be stored for a long time without any damage. Also rubber sheet gets higher price depending upon their grade.

It is clear from Table 4.12 that there is no change in the disposal of their produce by the rubber farmers before and after commencement of futures trading. Majority of the trading and non-trading farmers are disposing their produce as rubber sheet.

All the respondents who are disposing their produce as rubber sheet are conscious about the grade of their produce.

The completely dried sheets are carefully inspected and graded according to the standards prescribed in the Green Book published by the Rubber Manufacturers Association (RMA) Inc., Washington. This standard at present provides for six grades of ribbed smoked sheets, viz., RSS-IX, RSS-1, RSS-2, RSS-3, RSS-4, RSS-5. Visual grading is followed for grading the rubber sheet. In India, the commonly available grades are RSS-4 and RSS-5. RSS-4 is equivalent to the international grade of RSS-3. The grade of the rubber sheet of the trading and non-trading farmers is shown in Table 4.14.

Table 4.14. Grade of the rubber sheet

Sl. No.	Grade	Trading farmers				Non-trading farmers	
		Before commencement of Futures Trading		After commencement of Futures Trading		Number of Respon-dents	Percent-age
		Number of Respon-dents	Percent-age	Number of Respon-dents	Percent-age		
1	RSS-4	70	79.55	70	79.55	29	93.55
2	RSS-5	18	20.45	18	20.45	2	6.45
Total		88	100.00	88	100.00	31	100.00

Out of the 88 trading farmers who are disposing their produce as rubber sheet majority are having a grade of RSS-4. There is no difference in the grade of their produce before and after commencement of futures trading as they have not made any change in the processing strategy. The non-trading farmers also depict a similar tendency eventhough their share in RSS-4 is still high.

Futures trading could not bring about any change in the grade of the rubber sheet. Perhaps it might be due to the fact that there is no delivery only speculation. If delivery is insisted, a favourable change in this may be expected.

An enquiry was made with regard to the awareness of the respondents about the storage facilities available to rubber farmers, the details of which are presented in Table 4.15.

Table 4.15. Awareness of the respondents about the storage facilities

Sl. No.	Storage facilities	Trading farmers				Non-trading farmers	
		Before commencement of Futures Trading		After commencement of Futures Trading		Number of Respon-dents	Percent-age
		Number of Respon-dents	Percent-age	Number of Respon-dents	Percent-age		
1	Rubber Co-operative Marketing Society	99	100.00	99	100.00	33	100.00
2	Rubber Producing Society	99	100.00	99	100.00	233	100.00
3	Central Warehousing Corporation	-	-	99	100.00	20	60.60

With regard to the awareness of the storage facilities available all the 99 trading farmers are aware about the facilities available in Rubber Co-operative Marketing Societies and Rubber Producing Societies. In fact all of them are members of these societies. But it is noteworthy that all the 99 respondents came to know about the storing facilities available under Central Warehousing Corporation only after starting futures trading. This is the only positive change notified so far since the commencement of futures trading. But nobody is using the facilities of CWC as they have storing facilities only at Cochin, Thrissur and Kozhikode in Kerala. And also they have to renew their warehousing receipts in every three months if they are keeping it in CWC. Another reason is that the respondents are not intending delivery and so they can keep their produce or dispose it off as they wish.

All the 33 non-trading farmers are aware of the storing facilities available at Rubber Co-operative Marketing Society and Rubber Producing

Society. But only 20 respondents (60.60 per cent) are aware of the storage facilities available at Central Warehousing Corporation since they are not much concerned about futures trading.

The strategy adopted for marketing, the channel of marketing etc. are presented below.

Marketing strategy

The rubber farmers are generally in the habit of selling their produce without storing for a better price in the future. The marketing strategy adopted by the sample respondents are shown in Table 4.16.

Table 4.16. Marketing strategy of rubber by the respondents

Sl. No.	Marketing strategy	Trading farmers				Non-trading farmers	
		Before commencement of Futures Trading		After commencement of Futures Trading		Number of Respon-dents	Percent-age
		Number of Respon-dents	Percent-age	Number of Respon-dents	Percent-age		
1	Immediate sale	90	90.91	90	90.91	29	87.88
2	Storing for a better price	9	9.09	9	9.09	4	12.12
Total		99	100.00	99	100.00	33	100.00

Majority of the respondents (90.91 per cent) who are dealing in futures trading are immediately selling their produce. For proper drying they will keep it in their own smoke house and after that they are disposing their produce. Only nine respondents (9.09 per cent) are storing their produce expecting a better market to come. All these nine respondents are storing their produce at Rubber Co-operative Marketing Society where they incur a nominal storage cost of Rs. 100 per tonne for one month. No difference is

found in the marketing strategy adopted by the respondents before and after commencement of futures trading. The same trend is found in the case of non-trading farmers also.

Channel of marketing

The channel through which the rubber farmers are marketing their produce are Rubber Co-operative Marketing Society, Rubber Producing Society and Private Traders.

Not even a single respondent has reported exploitation from any of the marketing channels before and after the introduction of futures trading. Rubber farmers are educated and they have accessibility to the price of the major physical and future markets. This increases their bargaining power and so they are relieved from any kind of exploitation. Also Rubber Producers society and Rubber Co-operative Marketing Society is procuring the produce to help the farmers. The importance of the different channels of marketing of rubber can be understood from Table 4.17.

Table 4.17. Channel of Marketing of the respondents

Sl. No.	Channel of marketing	Trading farmers				Non-trading farmers	
		Before commencement of Futures Trading		After commencement of Futures Trading		Number of Respon-dents	Percent-age
		Number of Respon-dents	Percent-age	Number of Respon-dents	Percent-age		
1	Rubber Co-operative Marketing Society	34	34.34	34	34.34	14	42.42
2	Rubber Producing Society	34	34.34	34	34.34	10	30.30
3	Private Traders	31	31.32	31	31.32	9	27.28
Total		99	100.00	99	100.00	33	100.00

It is evidenced from Table 4.17 that all of these three marketing channels get almost equal importance among the rubber farmers. No difference is being observed in the marketing channel through which they are disposing their produce before and after commencement of futures trading. The fact that nearly one-third of the produce are marketed through private traders reveals the significance of this channel among rubber farmers.

The advantage with the private traders is that the farmers get advance payment from them in times of need. The farmers and traders who are marketing their produce through Rubber co-operative Marketing Society and Rubber Producers Society are getting collective bargaining power as these societies have direct link with tyre manufacturers. The non-trading farmers are depending less on the private traders compared to the trading farmers.

No respondent is interested in marketing their produce directly to the tyre manufacturers as big lot is required for this type of dealing. Also no one is delivering their rubber in futures market as they have to get Kerala Government Sales Tax Registration for this type of delivery. All of them are engaging in futures trading only as a means of speculation where they can bet on the price movements and not at all interested in physical delivery.

4.5. Determinants of online trading by rubber farmers

The third and final objective of the study is to identify the determinants of online trading by rubber farmers, for which primary data has been collected from the trading farmers as well as non-trading farmers. Kendall's co-

efficient of concordance was used to analyse the data collected. For identifying the determinants of online trading, eleven factors have been selected first, which are the most important elements of futures trading.

i) *Computer literacy:* As futures trading is a screen based online trading, knowledge about the basics of computer operations are required by the clients. The bid and ask prices are displayed on the screen and the farmer who is willing to buy or sell through online trading can quote his rate. Hence computer literacy of the clients is a precondition for the operation of futures trading.

ii) *Margin requirements:* For entering into futures trading, each client has to meet the margin requirement as prescribed by the exchange. They have to keep the initial margin in the prescribed bank account and if any gain or loss occurred in a day margin account will be marked to market. In majority of the cases, the margin required is upto 10 per cent of the open position.

iii) *Lot size:* It indicates the minimum quantity of the commodity traded under one contract. For dealing in futures trading one has to pay only the margin money. But when it reaches in delivery of the underlying asset, the prescribed quantity is to be delivered. In the case of rubber the delivery unit is one tonne.

iv) *Accessibility to trading terminal:* The location of trading terminal is a very important element of futures trading. If the terminal

facilities are far off from the farmers, even if they are willing to deal in futures trading they may not be able to do so.

v) *Availability of warehousing facility:* For delivering the underlying asset on the maturity date the farmers have to keep their produce in accredited warehouses. Central Warehousing Corporation (CWC) provides warehousing facility. But in Kerala there are only three warehouses of CWC. They are at Cochin, Thrissur and Kozhikode.

vi) *Grading:* The grading undertaken in the case of rubber is visual grading. Normally the warehouses provide the grading facility. The private traders also grade the rubber sheets of the farmers, but since it is visual grading and as the individual farmer lacks bargaining power, there can be exploitation in this regard.

vii) *Quality requirements:* The quality requirements of each of the commodity traded are prescribed by the exchange. For delivering rubber under online trading the rubber sheet should have the minimum quality of RSS-4 grade.

viii) *Procedural formalities:* For entering into online trading by a farmer, an application should be furnished to the exchange through his broker, for which he has to incur a fee prescribed by the broker. One client account and one depository participant account will be opened by the broker in the name of the client. The client should also have a bank account and the name of the bank will be

prescribed by the broker. All the transactions will be done through this bank account.

ix) *Brokerage:* For providing the online trading facility the brokers charge a commission from the client. Different broking firms charge different brokerage.

x) *Awareness creation:* As most of the farmers are not aware about the concept of futures trading, awareness creation among the different sections of the society is an important indicator. Forward markets commission, exchanges, broking firms and rubber producing societies are taking efforts to make futures trading popular.

xi) *Speculative nature:* Although futures trading have been started to provide the real farmers a remunerative price for their produce majority of the deals are speculative in nature. Compulsory delivery is the only remedy for overcoming this problem.

For identifying the determinants of online trading by rubber farmers, data was collected from a sample of 99 rubber farmers who are dealing in futures trading and another group of sample of 33 rubber farmers who are not dealing in futures trading. The judges were asked to give their ranks for this 11 elements according to their preferences.

For identifying the agreement between the respondents in ranking the determinants, Kendall's coefficient of concordance was calculated and is presented in Table 4.18.

Table 4.18 Kendall's coefficient values in ranking the factors and the calculated χ^2 values

Sl. No.	Particulars	W	χ^2	Probability Level
1	Rubber farmers dealing in futures trading	0.925	915.744	0.0001
2	Rubber farmers not dealing in futures trading	0.613	202.287	0.0001

It is seen from Table 4.18 that Kendall's W is 0.925 at probability level of 0.0001 per cent which implies perfect agreement among the judges who are undertaking futures trading, in identifying the determinants of online trading. In the case of rubber farmers who are not dealing in futures trading the Kendall's W is 0.613 at probability level of 0.0001 per cent which also reveals that there is perfect agreement between the judges in identifying the determinants of online trading.

The determinants of online trading and a comparative picture of judgement of both the sample categories in this regard are illustrated in Table 4.19.

Table 4.19. Rank position of the determinants of online trading

Sl. No.	Determinants	Rank Position	
		Rubber farmers dealing in online trading	Rubber farmers not dealing in online trading
1	Computer literacy	3	3
2	Margin requirements	6	4
3	Lot size	5	5
4	Accessibility to trading terminal	1	1
5	Availability of warehousing facility	9	10
6	Grading	8	8
7	Quality requirements	4	6
8	Procedural formalities	11	9
9	Brokerage	7	7
10	Awareness creation	2	2
11	Speculative nature	10	11

It is clear from Table 4.19 that accessibility to trading terminal, awareness creation and computer literacy are the major determinants of online trading in rubber. This is applicable in the case of both trading and non-trading farmers. If the farmers get terminal facility near to their location move of them might be willing to trade in futures trading. As futures trading is not a popular concept among the farmers, they are reluctant to undertake it. The farmers who are dealing in futures trading have entered to this field because they were made aware of the advantages of futures trading. So awareness creation plays an important role in entering into futures trading.

Some basic knowledge about computer operations are required for futures trading as it is screen based trading. So computer education also plays an important role in futures trading. It has already been observed from Table 4.6 that 22 respondents are post-graduates and all of them are engaged in futures trading. Also nine respondents coming in the age group of 30-40 are post-graduates. As education is related to computer education, it is one of the most important determinant of futures trading. Some of the farmers even have an aversion towards online trading as it is computer based trading.

Although the rank position assigned by both the sample categories are more or less the same, there are some differences in the prominence of the determinants. This is mainly due to the fact that trading farmers opined from their experience in futures trading, while the non-trading category reveals their apprehensions about futures trading. For the farmers not dealing in futures trading, maintaining margin requirement is a more important factor than quality maintenance. The farmers dealing in futures trading do not consider margin requirement as a very important determinant since they know from experience how to manage the margin requirement without much difficulty.

Maintenance of quality is a must irrespective of whether there is delivery or not. If the prescribed quality, ie., RSS-4 is not maintained, the farmers may not fetch competent prices from the Rubber Co-operative Marketing Societies, the Rubber Producing Societies and the private traders.

Hence trading farmers consider quality as a very important determinant of futures trading and rank it above margin requirements.

Lot size (5th rank), brokerage (7th rank) and grading (8th rank) are given equal weightage by both categories of sample respondents. The minimum lot size is one tonne for rubber. As far as the small and marginal farmers are concerned this is found to be a large quantity but they can make delivery through the Rubber Producing Societies or Rubber Co-operative Societies. Brokerage depends upon the policies of the broker who offer services to the farmers. Grading followed in the case of rubber is visual grading.

Availability of warehousing facility, procedural formalities and speculative nature of futures trading are found less important determinants of futures trading. Warehousing facilities are available only at specific centres. But majority of the futures contract are offset by an opposite contract before maturity and the situation of delivery occurs rarely. Hence the farmers do not feel warehousing facility as an important determinant of futures trading. Some procedural formalities have to be fulfilled for entering into futures trading but the brokers are very customer friendly and they offer services to their clients without causing inconveniences to the clients. In the real sense futures trading is speculative in nature but as majority of the farmers do not possess the required quantity and quality of the commodity to deliver and warehouse facility is not available , actually their intention is speculation and they never consider it as a negative phenomenon.

It can be concluded from the analysis of the determinants that starting of more number of terminal outlets in remote areas, conducting of extensive campaign for awareness creation about futures trading and providing computer education for farmers to avoid their aversion towards computer based trading will attract more number of rubber farmers to the field of futures trading, thereby providing more liquidity, stability and popularity for futures trading.

Summary and Conclusion

CHAPTER 5

SUMMARY OF FINDINGS AND CONCLUSION

Natural rubber is the principal raw material for manufacturing about 50,000 products indispensable for the economic and commercial development of any nation. Among the various end uses of natural rubber, the transport sector, which is considered as the engine of economic development, enjoys dominance. The advent of technology in the transport sector was instrumental in revolutionising the importance of natural rubber. India, with its captive domestic demand, occupies a unique position among the first four major natural rubber producing countries. The progressive increase in the domestic demand for natural rubber during the post independence period fuelled the Indian rubber plantation industry to grow faster than its counterparts in other countries.

Price fluctuation is proving to be the bone of rubber industry. Attempts to counter fluctuation by subsidy may pull Governments into a merciless financial vortex. The growers, for long complaining about low prices are looking for a new system which guaranteed them a fair deal. The relevance of futures trading in rubber assumes critical urgency at this juncture. Some consider the futures market system a sure fire solution to the many ills of the natural rubber industry. One of the advantages seen in futures trading is that it would facilitate transfer of price; fluctuation risk of the physical market. Discovery of the right price for transactions between sellers and buyers, hedging risk in a fluctuating market, low transaction cost to the consumer and supply of quality material are supposed to the boons of futures market. For the consumer, much of the anxiety about the availability of raw material evaporates when he is assured of a certain quantity, at a suitable price. Production planning will become a painless routine. Keeping these in view, an attempt was made in the present study to analyse the integration of futures and spot prices through NMCE, the benefits derived

from futures trading by the rubber farmers and the factors which motivate or prevent them from dealing in futures market with the following specific objectives:

1) To examine the price movements of rubber futures through National Multi Commodity Exchange of India Limited (NMCE).

2) To assess the impact of futures trading on farming decisions on rubber farmers; and

3) To identify the determinants of online trading by rubber farmers.

The study was based both on primary and secondary data. Secondary data have been used to examine the integration of futures and spot prices, production, consumption, export, import, area, and yield. Daily futures prices of rubber and corresponding spot prices were collected from the website of NMCE (www.nmce.com). The analysis is done using the technique of co-integration. The trend in area, production and yield of natural rubber is analysed with annual percentage growth rate and compound growth rate. The primary data have been collected using a structured interview schedule. The impact of futures trading on the farming decisions of rubber farmers was analysed using percentages. The Kendall's coefficient of concordance was used to identify the determinants of online trading by rubber farmers.

5.1. The major findings

The major findings of the study were summarised and presented in the following sequence.

5.1.1. Natural rubber economy – An overview

5.1.2. Commodity derivatives market in India

5.1.3. Price movements of rubber futures through NMCB

5.1.4. Impact of futures trading on farming decisions of rubber farmers

5.1.5. Determinants of online trading by rubber farmers

5.1.1. Natural rubber economy – An overview

Rubber got its importance in 19th century with the invention of tyres. Prior to that its uses were as eraser and medical devises. With the discovery of its solubility in ether, rubber found applications in water proof coatings and shoes. It was got a wide importance in the industrial world with the discovery of rubber – sulphur reaction, in the early 20th century.

5.1.1.1. Global natural rubber scenario

Tokyo Commodity Exchange, Singapore Commodity Exchange and Osaka Mercantile Exchange are the major global exchanges undertaking futures trading of rubber. Kuala Lampur, London and New York are the major physical markets of rubber.

i) Global production of natural rubber

Of the world production 85 per cent is the contribution of Asian countries. The major producers are Thailand, Indonesia, Malaysia and India. India occupies fourth position contributing 9 per cent of the world production. The top 10 countries together constitute 96.6 per cent of the world production.

ii) Global consumption of natural rubber

China, USA, Japan and India with highest GDP are the top rubber consuming countries. The prominence of Asian countries is not as high in rubber consumption as in the case of rubber production. India is in the fourth position consuming about 9 per cent of world consumption. Indonesia is the second largest producer of natural rubber but not coming among the top consumers. Thailand contributes 33.5 per cent of the world's production but consumes only 3.7 per cent of the world consumption.

iii) Global export of natural rubber

Thailand, Indonesia, Malaysia and Vietnam are the major exporters of natural rubber. Eventhough China is the sixth largest producer she tops in the

list of major consumers and so not figuring top exporting countries. Brazil, the 9th largest producer and 8th largest consumer is not figuring in exports. Thailand and indonesia together constitute 74 per cent of global export of natural rubber. India holds 74 per cent of global export of natural rubber. India holds 7th position in export contributing one per cent of the total export of natural rubber.

iv) Global import of natural rubber

China the sixth largest producer produces 4.9 per cent of the world production and as the largest consumer consumes 20.9 per cent of the global consumption. So they fill the gap between the production and consumption, through import and hence they are the largest importers of natural rubber in the world. Among the top 10 importers of natural rubber only three are Asian countries, viz., China, Japan and Republic of Korea. USA is the second largest consumer and importer of natural rubber. Japan occupies the third position both in consumption and import. Although India is not in the list of top 10 importing countries, imports to India is taking place in an irregular manner.

5.1.1.2. Indian natural rubber scenario

Presently, India is the fourth biggest producer and consumer of natural rubber in the world. In productivity terms India holds the first position. During the 1060s there was a considerable expansion in area under rubber as rubber had been exempted from land ceiling. In the early nineteen seventies rubber had a set back in area expansion but by the late seventies there was a boom in the planting activity. The compound growth rate of area under rubber is found to be 8.2 during the period 1950-51 to 2004-05.

In India 88 per cent of the production of natural rubber is from small holding sector and only 12 per cent is from estates. The compound growth rate of production comes to 16.36. Although in absolute terms, production

has been increasing, there has been a decreasing trend since 1999 – 2000 till 2001-02.

The productivity of natural rubber recorded a continuous growth over the period except in 1999-2000 to 2001-02. The compound growth rate for yield works out to 7.47 per cent. As 94 per cent of the planting is with high yielding varieties there is limited scope for increasing productivity through high yielding varietres.

5.1.1.3. Natural rubber scenario of Kerala

The peculiarity of rubber cultivation in Kerala is the active participation of the peasantry. Kerala accounted for more them 90 per cent of India's natural rubber production during the last one century. Three important developments during the pre-independence phase such as , growth, of a indegencous rubber products manufacturing industry since 1920s bypassing of two international rubber Regulation Agreements (IRRAS) and statutory price regulations of natural rubber since 1942 proved pivotal in the dynamic growth of the natural rubber sector. The average size of the small holding is less them 0.5 hectare due to sub-division and fragmentation. The absence of area under favourable agro-climatic conditions limits the scope for new planting in Kerala. Growing market uncertainty since 1997 acted as a hindrance for further area expansion but the farmers are getting remunerative price since the last two years.

5.1.2. Commodity derivatives markets in India

The first organised futures market established in 1875 under the aeyis of the Bombay Cotton Trade Association to trade in cotton contracts. Derivatives trading were then spread to oilseeds, jute and food grains.

Futures trading had been prohibited in India in many times. But the deregulation and liberalization following the forex crisis in early 1990s triggered policy changes leading to re-introduction of futures trading in

commodities in India. The growing realisation of globalization under the WTO regime and non-sustainability of the Government support to commodity sector led the Government to explore the alternative mechanism to protect the commodity sector from price-volatility. The long spell of prohibition had stunted the growth and modernisation of the surviving traditional commodity exchanges. Therefore, along with liberalization of commodity futures, the Government initiated steps to modernize the existing exchanges. At present in India there are 25 recognized future exchanges, of which three are national level multi-commodity exchanges.

5.1.2.1. National Multi Commodity Exchange in India Ltd.

National Multi Commodity Exchange of India Ltd. set up in 26th November 2002 is committed to provide world class services of online screen based futures trading of permitted commodities and efficient clearing and guaranteed settlement, while complying with statutory/regulatory requirements. An important peculiarity of NMCE is the convergence of all the offers and bids emanating from all over the country in a Single Electronic Order Book of the Exchange ensuring equal access to all intermediaries. NMCE is having V-SAT based connectivity throughout the country.

The promoters of NMCE are the leading institutions. The Department of Consumer Affairs in the Ministry of Consumer Affairs, Food and Public Distribution, Government of India, is the apex regulatory body governing all commodity exchanges. Most of the regulatory powers of the Central Government have been delegated to Forward Markets Commission. In NMCE four simultaneous contracts are available for rubber futures. The fresh contract commences on 16th day of a month and ends on 15th day of the fourth month. The minimum delivery unit is one tonne for rubber. The price quoted for rubber contracts is in India rupees per 100 kilogram. An initial margin is compulsory for entering into a contract. Each days' position is marked to market and the gains or losses will be added to or substracted from the initial margin. On th date of expiry, the final settlement price is the spot price on the

expiry day. Physical delivery of the underlying asset, closing out by off setting positions and cash settlement are the three methods of settlement available in NMCE.

5.1.2.2. National Commodity and Derivatives Exchange Limited

NCDEX located in Mumbai is a public limited company incorporated on 23rd April 2003 under the Indian Companies Act, 1956. All the promoters of NCDEX is national level institutions. NCDEX currently facilitates trading of 57 commodities. NCDEX is a national level, technology driven de-mutualized online commodity exchange with an independent Board of Directors and professional management.

5.1.2.3. Multi Commodity Exchange of India Limited

Headuqartered in Mumbai, Multi Commodity Exchange of India Ltd. is an independent and demutualized exchange with a permanent recognition from Government of India. MCX facilitates online trading, clearing and settlement operations for commodity futures markets across the country. MCX started offering trade in November 2003. MCX is led by an expert management team with deep domain knowledge of the commodities futures market.

5.1.2.4. Forward Markets Commission (FMC)

Forward Markets Commission head quartered at Mumbai, is a regulatory authority which is overseen by the Ministry of Consumer Affairs and Public Distribution, Government of India. FMC collects and whenever the commission thinks necessary, publish information regarding the trading conditions in respect of goods to which any of the provisions of the Act is made applicable, 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. In the year 2005, 24 awareness programmes were organized by FMC together with the National and Regional

Commodity Exchanges. FMC solicits active collaboration with Universities, educational institutions and other organizations desiring to spread awareness about futures trading in commodities.

5.1.2.5. Recent trends in commodity futures markets

As per the Government's report, India's inflation rate reached a two year high of 6.73 per cent in the week ended 3rd February 2007. Although Government is of the opinion that inflation has been caused by a mismatch between supply and demand of goods, there is a widespread perception that the introduction of online trading has caused much speculation and fuelled the rise of prices of essential commodities. As such, banning futures trading on essential commodities seem to be a critical part of the government's strategy to curb inflation. Government imposed ban on many commodities such as tur, urad, wheat and rice after the ban no reduction in the prices have been observed. An efficient and well-organized commodities futures market is generally acknowledged to be helpful in price discovery for sellers. A committee is being setup by the Government to look into the positive or negative effect of futures trading.

5.1.3. Price movements of rubber futures through NMCE

Theoretically, futures trading is buying and selling of standardized contracts between two parties where one of the parties commits to sell and the other to buy, a stipulated quantity (and quality) of a commodity at an agreed price on or before a sate in the future. Efficiency of the futures market is not strictly testable. Basic theories used for testing efficiency of futures markets are based on weak, semi-strong and strong from efficiency, which depend on the type of information used in the analysis. Weak form of efficiency is tested in the present study using co-integration technique.

5.1.3.1. 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 time t+1 contains all information available at time t for prediction of spot price for time t+1 (S_t+1). To assess this, traditionally, spot price (S_t+1) is regressed on the previous periods' futures price (F_t). Evidence of co-integration between non-stationary spot and futures prices indicates that there is a stable long-run relationship between them.

5.1.3.2. Trend in futures and spot prices

The co-integration of futures price of different months of delivery is examined in relation to the spot price of the delivery month. the daily futures prices of the four month duration contracts of NMCE are converted to monthly averages. The figure of the relationship between spot and futures prices revealed that the futures market is effective in the prediction of the spot price using the futures price of the delivery month and one month prior to delivery. Some degree of reliability is shown in the prediction of spot price using the futures price two months prior to delivery. Wide fluctuations has been observed between the spot price and futures price three months prior to delivery which revealed that the integration of these two prices are very les in this case.

5.1.3.3. Co-integration of S_D with F_D, F_1, F_2 and F_3

Auto correlation Function (ACF) for different lags were calculated both for spot and futures prices and it was found in both the cases that ACF upto lag 14 were significant. The variance explained using futures price prior to three months of delivery was only about 70 per cent, the prediction of spot price using the futures price three months prior to delivery was not that much effective. The prediction of spot price is possible on futures price at delivery

month, one month prior to delivery and two months prior to delivery as the variance explained are higher.

5.1.4. futures trading and farming decisions of rubber farmers

Due to limited availability of land suitable for rubber cultivation, the scope for increasing production through extending the area of cultivation is limited in India. Hence productivity improvement through short-term and long-term measures has received prime importance in the strategy adopted for increasing production. An enquiry was made with the objective of assessing whether futures trading is having any impact on the farming decisions of rubber farmers, so as to increase productivity.

5.1.4.1. Socio-economic characteristics of the respondents

The youngsters in the age group of 30-40 are less that seven per cent and no farmer below the age of 30 has figurd in the sample size which gives an indication about the present generation towards taking up agriculture as a profession. All the nine farmers in the age group of 30-40 are trading farmers which reveals the younger generation is more adaptable to innovations in farming and price discovery. They take agriculture as an opportunity of trading in the futures market.

All the respondents are males and the reason might be that the land is in the name of males. As 50 per cent of the respondents are from the Christian dominated district of Kottayam majority of the respondents belonged to Christianity.

The educational status of the rubber farmers are high, revealing better socio-economic background for them. All the respondents from the lowest educational level are non-trading farmers. all the post-graduates are in the trading category. The youngsters in the age group of 30-40 are post-graduates. The average family size of the respondents is found to four.

More than half of the respondents primarily occupied in agriculture. About 35 per cent of the respondents are rubber traders eventhough they have rubber plantation. All of them are trading farmers as they have more exposure to the physical and futures market.

Majority of the respondents are medium farmers. The average landholding is 3.23 acres. The average land holding under rubber cultivation of the trading farmers is 0.9 ha and non-trading farmers is 1.0 ha. In both cases it is above the national average of 0.5 ha. The non-trading farmers have a better average and the reason might be that the non-trading farmers are from Kottayam district where the large farmers are comparatively more.

Since the last two years rubber is yielding a remunerative price and so the income status of the respondents are better. The average annual income of the trading farmers is Rs.2.56 lakhs and non-trading farmers is Rs.2.36 lakhs.

With regard to the annual income and educational status, rubber farmers are much ahead of their counterparts. The trading farmers are more advanced in educational status compared to the non-trading farmers. This reveals that educational background act as a catalyst for entering into futures trading.

5.1.4.2. Impact of futures trading on farming decisions of rubber farmers

To analyse the impact of futures trading on farming decisions of rubber farmers, various farm management practices, viz., mulching, application of yield stimulants, rain guarding, fertiliser application and tapping methods are discussed. The area under rubber cultivation and the experience of the farmers in futures trading are also analysed.

i) Area under rubber cultivation

The scope for increasing production of rubber through the extension of area under cultivation is less, due to the limited availability of land. It has been observed from the study that futures trading has not influenced the

farmers to increase the area under rubber cultivation. The reasons might be that as online trading in rubber is of recent origin it is too early to make an impact. Also rubber being a perennial crop, shifting from other perennial crops and annual crops is a long term measure.

ii) Duration of trading in futures

The highest duration for futures trading is rubber can be three years as it started only in 2003. About one-third of the farmers have started trading in 2003 and they are not at all reluctant to enter futures trading.

5.1.4.2.1. Farm management practices of rubber farmers

Majority of the farers are undertaking mulching and the remaining are doing intercropping with tuber crops. No change has been observed regarding the average cost involved per acre for mulching with regard to the trading farmers after the introduction of futures trading. Non-trading farmers have incurred a lower average cost because they enjoy the economics of large scale operations as they have larger area.

Majority of the respondents are using the yield stimulant for their plant. A minority is not applying this due to the cost involved in it. Majority of the farmers are protecting their crop with rain guarding. It is found that all the large farmers in both the categories are using rain guarded tapping. The average cost of non-trading farmers is less compared to the trading farmers because of the economics of large scale operations.

Eventhough, discriminatory fertiliser application based soil and leaf testing is recommended farmers are not following this due to practical difficulties. All the sample respondents apply fertiliser twice in a year and the cost involved is higher than other farming activities. No change has been observed in the average cost before and after commencement of futures trading. Non-trading farmers have incurred a higher average cost.

All the farming activities except in fertiliser application, the average cost is lower for non-trading farmers. It might be due to the advantage of economics of large scale operations.

i) Tapping regularity and labour cost

Development of localised technology for rain guarded tapping, yield stimulation during slaughter tapping; controlled upward tapping, early morning tapping and low frequency tapping are the major technological development in the area of tapping methods.

Majority of the farmers are adopting the method of ½ spiral alternate daily as the ½ spiral daily will affect the health of the plant in the long run. In the case of trading farmers, there is no change in the tapping regularity of rubber before and after commencement of futures trading. It can be inferred that most of the farmers are concerned about the long-run health of their plants even at reduced income.

Labour cost is considered as per free labour change. On an average 35 paise is the labour charge per free. Majority of the respondents are engaging labourers for tapping. The average labour cost works out to Rs. 7999.08 per acere for trading farmers. No change has been observed in labour cost for tapping after the introduction of futures trading as they have not made any change in the tapping regularity. In the case of non-trading farmers the average labour cost for tapping one acre of land comes to Rs. 8150 which is a little higher than the average cost of trading farmers. The reason is that more number of non-trading farmers use the method of ½ spiral daily. Labour cost is higher for non-trading farmers as economics of large scale operations cannot be obtained as the labour charge for tapping is plant-wise.

No change has been observed in the average production of rubber in any of the seasons before and after commencement of futures trading. Average production per acre is higher for the large farmers in all the three seasons. trading farmers have better average production than the non-trading

farmers. No change before and after commencement of futures trading is due to the reason that the farmers have neither changed their tapping regularity nor improved any of their farm management practices. This implies that there has not been any change with cost and output levels of the farmers before and after commencement of futures trading.

Large farmers shows a better average production eventhough small farmers are generally highly receptive to technological innovations. The reason is that the production of large farmers in the rainy season is high as all of them are adopting rain-guarded tapping. Another fact is that 83 per cent of the large farmers are adopting yield stimulants while only 47 per cent of small farmers and 78 per cent of medium farmers apply yield stimulants.

5.1.4.2.2. Marketing of rubber

As it is difficult to preserve the latex from coagulation majority of the farmers are disposing their produce as rubber sheet. Also rubber sheet gets higher price depending up on their grade. No change has been observed in the form of disposal after the introduction of futures trading. All the respondents who are disposing their produce as rubber sheet are conscious about the grade of their produce. Visual grading is followed for grading the rubber sheet. Majority of the respondents have got a grade of RSS-4 for their rubber sheet. No difference had been found in the grade of their produce after commencement of futures trading as they have not made any change in the processing strategy. Futures trading could not bring any change in the grade of the rubber sheet as there is no delivery – only speculation. If delivery is insisted, a favourable change in this may be expected.

All the trading and non-trading farmers are aware about the storage facilities available in Rubber Co-operative Marketing Societies and Rubber Producers Societies as all of them are members of these societies. All the trading farmers came to know about the storing facilities available under central warehousing corporation only after starting futures trading and this is

the only positive change notified since the commencement of futures trading. As the respondents are not intending delivery, they are not using this facility. In the non-trading category, 20 respondents are aware of the storage facilities under central warehousing corporation since they are not much concerned about future trading.

i) Marketing strategy

The rubber farmers are generally in the habit of selling their produce without storing for a better price in the future. Only 9 per cent of the trading farmers are storing their produce and all of them are using the storing facilities at Rubber Co-operative Marketing Society where they incur a nominal storage cost. No difference is found in the marketing strategy adopted by the respondents before and after commencement of futures trading. Almost similar strategy is adopted by the non-trading farmers also.

ii) Channel of marketing

No exploitation has been observed from the marketing channels and the reason is that rubber farmers are educates and they have accessibility to the price of the major physical and future markets. In the trading category, all the three marketing channels get almost equal importance. One third of the produce are marketed through private traders shows the significance of this channel among rubber farmers and the advantage with them is that farmers may get advance payments in times of need. The farmers get collective bargaining power while marketing through Rubber Co-operative Marketing Societies and Rubber Producers Societies. The non-trading farmers are depending less on private traders compared to the trading farmers. The respondents are not delivering their produce directly to tyre manufacturers and they are not making delivery in futures market. They need to get Kerala Government Sales Tax Registration for this type of delivery. The farmers feel futures trading as an avenue for speculation where they can bet on the price movements and they are not at all interested in delivery.

5.1.4.5. Determinants of online trading by rubber farmers

Kendall's co-efficient of concordance was applied to identify the determinants of online trading by rubber farmers. Eleven factors have been selected first, which are the most important elements of futures trading. It has been identified that accessibility to trading terminal, awareness creation and computer literacy are the major determinants of futures trading. It has been observed that all the 22 respondents having post graduation are trading farmers and this points out the importance of education in trading in futures. The farmers dealing in futures trading do not consider margin requirement without difficulty.

Quality is a must for any type of delivery and so trading farmers consider quality as a very important determinant of futures trading and rank it above margin requirement.

Availability of warehousing facility, procedural formalities and speculative nature of futures trading are found less important determinants of futures trading. As delivery is not the intention of the farmers they do not bother the warehousing facility. Even if then are some procedural formalities the broking firms are very customer friendly and they offer services without covering inconveniences to the climb. Futures trading is of a speculative nature but as the farmers are not intending delivery they do not consider this element as a negative phenomenon.

Conclusion

The study undertaken on futures trading in rubber revealed that four month contracts are not efficient in predicting the spot prices of the future. But it could predict one month, two months and three months contract efficiently. Also no positive impact was influenced by the futures trading on the farming decisions of rubber farmers. The trading and non-trading farmers considered similar determinants which are important in futures trading speculations is over ruling the futures market and the regulatory framework

has to be strengthened further for compulsory delivery and only by this way the speculation can be limited and the real benefit of futures trading can be enjoyed by the rubber farmers. Also adequate awareness should be created among the farmers about the innovations in price discovery thereby enhancing the number of participants in the price discovery mechanism of futures trading.

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Annexure

INTERVIEW SCHEDULE

(For Academic purpose only)

COMMODITY FUTURES : A STUDY OF ONLINE TRADING IN RUBBER

PART - A

1. Name :

2. Age :

3. Sex :

4. Religion :

5. Occupation :

6. Annual Income (different sources) :

7. Family details:

Name of the members	Age	Relationship with the Respondents	Occupation	Income (Rs.)

8. Education :

9. Size of land holding :

10. Area under rubber cultivation:

(a) Before commencement of Futures Trading :

(b) After commencement of Futures Trading :

11. Other crops cultivated:

Crops	Area	Production	Income

12. How long have you been trading in futures :

13. What are the farming activities you are undertaking for your rubber cultivation:

Activities	Before commencement of Futures Trading		After commencement of Futures Trading	
	Regularity	Cost involved	Regularity	Cost involved
Mulching				
Application of Ethephon				
Rain guarding				
Fertilizer application				
Plant protection measures				
Any other activity				

14. What is your tapping regularity of rubber:

Activities	Before commencement of Futures Trading	After commencement of Futures Trading
½ spiral daily		
½ spiral alternate daily		
½ spiral third daily		
Spiral daily		
Spiral alternate daily		

15. Labour cost for tapping:

Own	By Labourers	Cost involved

16. Seasonal variations in the production of rubber:

Seasons	Before commencement of Futures Trading	After commencement of Futures Trading
Peak season		
Medium season		
Off season		

17. How do you dispose your produce?

Produce	Before commencement of Futures Trading (% production)	After commencement of Futures Trading (% production)
Latex		
Rubber sheet		

18. Are you conscious about the grade of your produce:

Yes ☐ No ☐

19. What is the grade for your rubber sheet:

Grade	Before commencement of Futures Trading	After commencement of Futures Trading
RSS-3		
RSS-4		
RSS-5		
Others		

20. If there is any change in the grade, specify the reasons for the change:

21. Have you ever faced exploitation from any of the marketing channels with respect to grading. If 'Yes', with respect to which factor?

Before commencement of Futures Trading	After commencement of Futures Trading

22. Have you made any change in processing strategy.

Before commencement of Futures Trading	After commencement of Futures Trading

23. Are you aware of the available storing facility:

Before commencement of Futures Trading	After commencement of Futures Trading

24. What is your marketing strategy – Immediate sale or storing for a better price. If you are storing your produce, which storage facility you availed and how much is the cost involved for the availing the facility.

Before commencement of Futures Trading	After commencement of Futures Trading

25. Which is the channel through which you are marketing your produce:

Channel	Before commencement of Futures Trading	After commencement of Futures Trading
Co-operative Rubber Marketing Society		
Rubber Producing Society		
Private Traders		
Tyre manufacturers		
Delivery in futures market		
Any other (specify)		

PART – B

Factors determining Futures Trading. Rank them based on preference.

Factors	Rank
Computer Literary	
Margin requirements	
Lot size	
Accessibility to trading terminal	
Availability of warehousing facility	
Grading	
Quality requirements	
Procedural formalities	
Brokerage	
Awareness creation	
Speculative nature	

COMMODITY FUTURES - A STUDY OF ONLINE TRADING IN RUBBER

By

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ABSTRACT OF THE THESIS

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2007

ABSTRACT

The present study entitled "COMMODITY FUTURES A STUDY OF ONLINE TRADING IN RUBBER" was conducted with the following objectives.

1) To examine the price movements of rubber futures through National Multi Commodity Exchange of India Ltd. (NMCE).

2) To assess the impact of futures trading on farming decisions of rubber farmers; and

3) To identify the determinants of online trading by rubber farmers.

Primary and secondary data have been used for the study. Daily data of rubber futures in NMCE and the corresponding spot prices were collected from the website of NMCE. The data regarding the area production, yield, export, import, major producing countries and major consuming countries were collected from the souvenir of publications of Rubber Board, Economic Survey and website of tire review. Primary data to analyse the impact of futures trading and to identify the determinants were collected using a structured interview schedule. The sample respondents constituted 33 trading farmers from the districts of Kottayam, Palakkad and Thrissur and another group of 33 non-trading farmers from the district of Kottayam.

The trend in area production, and yield were analysed using compound growth rate and percentage change over the previous year. The compound growth rate of area under rubber is found to be 8.2 per cent during the period 1950-51 to 2004-05. Although in absolute terms production has been increasing, there has been a decreasing trend since 1999-2000 till 2001-02. The compound growth rate of production comes to 16.36 per cent. The productivity of natural rubber recorded a continuous growth over the period except in 1999-2000 to 2001-02. The compound growth rate for yield works out to 7.47 per cent.

A look into the global natural rubber scenario revealed that Thailand, Indonesia and Malaysia are the leading producers and they together constitute about 77 per cent of the global production. India is the fourth largest producer and consumer of natural rubber. China tops the list of consuming countries. The major exporters are Thailand, Indonesia and Malaysia and the major importers are China, USA and Japan.

The analysis of the commodity derivatives market in India revealed that out of the three National Commodity Exchanges, National Multi Commodity exchange is the first exchange. All these three exchanges are multi commodity exchanges. The commodity exchanges are regulated by forward markets commission which is coming under the Ministry of Consumer Affairs, food and nutrition.

To analyse the objective of examining the price movements of rubber futures through NMCE the co-integration technique is used. The results revealed that the futures prices of two months prior to delivery (F_2) one month prior to delivery (F_1) and delivery month (F_0) are efficient in predicting the spot prices of rubber and prediction using futures price three months prior to delivery (F_3) is not effective.

The impact of futures trading on the farm management practices of the rubber farmers were analysed using simple percentages and averages. The study revealed that there is no change in any of the activity undertaken by the rubber farmers before and after commencement of futures trading. The non-trading farmers are enjoying the economics of large scale operations. Also the only positive change of the futures trading is their awareness about the storing facilities available at Central Warehousing Corporation eventhough they are not using that facility. The influence of private traders in marketing the product is as high as Rubber co-operative Marketing Society and Rubber Producers Society. No exploitation was faced by any of the farmers as they are educated farming community having better bargaining power. The futures trading could not make a considerable impact on the farming decisions of rubber farmers because they are not at all interested in delivery and so

they are least bothered about the underlying asset. They consider futures trading as an avenue for speculation where they can bet on the price movements.

For identifying the determinants of online trading by rubber farmers, Kendall's coefficient of concordance was applied. Accessibility to trading terminal, awareness creation and computer literacy were found the most important determinants of futures trading. There are some differences in the ranks assigned by trading and non-trading members. Availability of warehousing facility, procedure formalities and speculative nature were found least important determinants.

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 move 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.