THE IMPACT OF NEW ECONOMIC POLICY ON INDIAN AGRICULTURE: A STUDY OF SELECTED CASH CROPS

Thesis

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By

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Certificate

Certified that this written account on '*The Impact of New Economic Policy on Indian Agriculture: A Study of Selected Cash Crops*', submitted for the award of the Degree of Doctor of Philosophy of the University of Calicut is a bonafide record of research work done by Mr. Jomon Mathew under my guidance and supervision. No part of this work has been submitted earlier for the award of any other degree by any other university.

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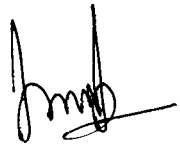
Declaration

I, Jomon Mathew, do hereby declare that this written account titled '*The Impact of New Economic Policy on Indian Agriculture: A Study of Selected Cash Crops*' is a bonafide record of research done by me under the guidance of Dr. U T Damayanthi, Professor in Economics, University of Calicut.

I also declare that this thesis has not been submitted by me earlier for the award of any degree, diploma, fellowship or any other similar title.



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Jomon Mathew

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List of abbreviations

AMS	-	Aggregate Measure of Support
AoA	-	Agreement on Agriculture
BoP	-	Balance of Payments
BSS	-	Buffer Stock Scheme
CACP	-	Commission on Cost and Agricultural Prices
DGCI&S	-	Directorate General of Commercial Intelligence & Statistics
EPW	-	Economic and Political Weekly
GATT	-	General Agreement on Tariff and Trade
IMF	-	International Monetary Fund
NEP	-	New Economic Policy
NR	-	Natural Rubber
NTBs	-	Non-Tariff Barriers
QRs	-	Quantitative Restrictions
RSS	-	Ribbed Smoked Rubber
SR	-	Synthetic Rubber
STC	-	State-Trading Corporation
WTA	-	World Trade Agreement
WTO	-	World Trade Organization

Introduction

Jomon Mathew “The impact of new economic policy on Indian agriculture: A study of selected cash crops ” Thesis. Department of Economics, Dr. John Matthai Centre , University of Calicut, 2006

1 *Introduction*

Chapter 1

INTRODUCTION

1.1 Introduction

The world economy in the 1990s faced exciting challenges and opportunities with global transformation of historic dimensions. There has been a decisive movement towards deregulation in the main industrial countries, and market mechanism has become prominent. Economic interdependence has increased. The rapid changing global economy is frequently referred to as the compelling reason for the sweeping economic reforms initiated in India.

The beginning of 1990s also witnessed the initiation of far reaching changes in the Indian economic policy framework with the introduction of macro economic stabilization and structural adjustment policies. An important aspect of this process of change has been the liberalization of economic policy regime. The process encompassed not only internal liberalization but also liberalization of external trade, technology flows and movement of capital. In other words, globalization has been an integral part of the liberalization process in India. Liberalization and the consequent outward orientation of the economy meant massive reduction in tariff and non-tariff barriers to trade.

The economic liberalization has left particularly no sector of the economy unaffected. India's agricultural sector, which is considered as the backbone of the Indian economy in terms of generation of employment and output has been a major focus along with the other sectors in the reform period. The reforms initiated in the

Indian economy since 1991 are expected to have serious implications as far as Indian agricultural sector is concerned.

The New Economic Policy announced by the government of India since July 1991 has put entirely fresh and new approach to its management and correction of its various distortions. The liberalization process in the agricultural sector received further impetus with the establishment of the World Trade Organization (WTO). India along with 122 other countries has signed the World Trade Agreement (WTA) on April 15, 1994 after prolonged negotiations of GATT spread over eight years. The WTA contains 29 individual legal texts and a number of additional ministerial declarations and undertakings specifying the obligations and commitments of member countries. This was the first time that agriculture brought under the purview of the global trade regulating agreements. The WTO, which replaced GATT originating from the 1947 Geneva trade conference, came into existence on January 1, 1995 with the stated objective of creating a *fair and equitable system of global trade* among the member countries.

The WTO Agreement on Agriculture (AoA) brought agricultural products under the multinational rules and paved the way for liberalization of agricultural trade. The AoA has three basic components relating to market access (Tariffication), domestic support and export competition (see also Appendix I).

Market access for agricultural products is governed by a tariff only regime. Non-tariff boarder measures are replaced by tariffs that provide equivalent levels of protection with access opportunities being maintained or expanded through current and minimum access tariff quotas. Tariffs, resulting from the 'tariffication' process together with other tariffs on agricultural products are to be reduced by a simple

average of 36 per cent over 6 years in the case of developed countries and 24 per cent over10 years in the case of developing countries.

Domestic support measures are aimed at identifying acceptable measures that support farmers and prohibit unacceptable trade distorting support to farmers. The main conceptual consideration is that there are two categories of domestic support. They are support with no or minimal distortive effect on trade on the one hand (often referred to as 'Green Box' measures) and trade distorting support on the other hand (often referred to as 'Amber Box' measures). All domestic support is quantified through the mechanism of total Aggregate Measure of Support (AMS). Commitments made require a 20 per cent reduction in total AMS by developed countries over 6 years; 13 per cent by developing countries over 10 years and no reduction commitment is required in case of least developing countries.

In the area of export competition, GATT agreement calls for reducing direct export subsidies to a level of 36 per cent below 1986-88 level in case of developed countries over a period of six years. The quantity of subsidized exports by the developed countries is to be reduced by 21 per cent during the same period. In case of developing countries, direct export subsidies are to be reduced by 24 per cent and the quantity of subsidized exports is to be reduced by 14 per cent.

There are mixed reactions among scholars and economic as well as political thinkers concerning the possible impact of New Economic Policy and the AoA on the agrarian sector of our economy. The impact of structural adjustment programs and the globalization of the agricultural sector in India is well documented by *Bhalla (1994)*[1], *Gulati (2001)*[2] *and Purcell (1996)*[3]. The expected immediate impact of the removal of protection as manifested in the tariff reduction, inter alia, includes the

transmission of world prices of various agricultural commodities to the domestic markets. P S George (2005)[4] is of the opinion that the structural adjustment policies initiated in the 1990s were expected to improve the terms of trade for tradable agriculture and to make it internationally competitive. In his opinion, since the establishment of WTO has brought new dimensions to agricultural production and trade, it was expected that globalization of Indian agriculture offered opportunities for deriving large benefits from increased agricultural exports of high value agricultural products.

However, R K Khatkar (1995)[5] and Bhalla (1994)[6] argued against the reform process. Subramanian (1993)[7] analyzed the effect of liberalization of trade on the movement of terms of trade against the agricultural sector and has concluded that trade liberalization would lead to higher price transmission elasticities for all unprocessed commodities except coarse cereals. Chand (1998)[8] observed that dismantling the trade barriers on imports would increase volatility of Indian prices and farm income. Obviously, there appears no clear consensus among scholars in their attitude towards the policy of economic reforms in agriculture.

1.2 Statement of the problem

The Indian economy is passing through a period of fundamental changes. This new change is attributed as the New Economic Policy (NEP). Agriculture has historically been considered special for socio-economic and strategic reasons and has remained largely outside GATT's normal regulatory framework. The Uruguay Round marked a significant turning point in Indian agriculture. The macro economic stabilization policies initiated during 1991, structural adjustment policies that

followed and the Agreement on Agriculture that came in to existence on January 1, 1995 did have their effects on the agricultural sector as well.

With India being under balance of payments cover, we were not bound to undertake any reduction commitment concerning market access. Regarding domestic support, India had not undertaken any reduction commitment, as our AMS was negative and that too by huge magnitude. Similarly, in India, exporters of agricultural commodities do not get direct subsidy and therefore, we need not have any reduction commitment of export subsidies. However, liberalization of agriculture all around the world is supposed to have serious implications on Indian agricultural sector too. It is clear from the available literature that the impact of policy reforms varies from one crop to another and one region to another. Therefore, it is impossible to draw a common conclusion about the impact of New Economic Policy on the agricultural sector as a whole. It requires a crop specific study in particular. It is in this context, we take up the present study on cash crops like natural rubber and tea.

India's natural rubber sector occupies very significant position in the national economy in terms of production and consumption. India, with 8.62 per cent of the total world production of rubber, has occupied the fourth position in terms of production, the other major countries being Indonesia, Thailand, and Malaysia. However, the treatment of natural rubber as an industrial raw material and imposition of higher bound rate compared to that in other major rubber producing countries are among the serious challenges the rubber economy faces in the reform era. The tea industry has also been of considerable importance in the national economy of India. India remains to be the largest producer and consumer of tea in

the world. India is one of the major tea exporters accounting for about 13.09 per cent of total world tea export. Tea has been contributing a significant share in total export earning of agricultural crops in India. Similarly, the ministerial declaration launching the Uruguay Round recognized that special attention should be given to liberalization of tropical products, since these are the main sources of export earnings of many developing countries. In this context, the present study aims to bring out the possible impact of economic reforms on rubber and tea economy of India.

In the context of the above stated problems, the present study addresses quite a few questions. A major question addressed here is related to the behavior of area, production and productivity of selected cash crops in the light of reforms initiated in the agricultural sector. The study also observes the behavior of prices of agricultural commodities in the context of the new policy environment. It was an interesting task to see whether the markets for the selected crops, say natural rubber and tea, are integrated or not during the reform period. Further, in the light of cutting down the tariffs and non-tariff barriers, the foreign trade of the country is supposed to have affected in both positive as well as negative lines. The present study also aims to assess the trade performance of selected cash crops.

1.3 Objectives of the study

In the light of the problems stated above, we come down to the following specific objectives.

- *To examine the impact of New Economic Policy on growth and instability of area, production and productivity of natural rubber and tea*

- *To analyze the price movement and market integration of natural rubber and tea in the light of economic reforms*
- *To assess the trade performance of natural rubber and tea in the WTO regime*

1.4 Methodology and database

The present study confines to Indian economy especially changes taken place in the agricultural sector in the context of the economic reforms initiated in the early 1990s. Even though the impact of policy changes varies significantly across crops, our focus in this study is to examine the impact of liberalization policies and the resultant Agreement on Agriculture on cash crops like natural rubber and tea. The period of analysis is 20 years starting from 1985 to 2004. For the purpose of analysis, the period of study has been sub divided into pre-reform period (1985 to 1994) and post reform period (1995 to 2004). Such a classification is deliberately made because the reform process in the agricultural sector was initiated with the signing up of World Trade Agreement in the year 1994 and the introduction of WTO on 1 January 1995. Further, the implementation period of AoA was starting from 1995.

The study is based exclusively on time series secondary data. During the course of study, large amount of data pertaining from 1985 to 2004 had been reviewed. It was sometimes difficult to make right choice of the appropriate data. Data on the Indian scenario of tea and natural rubber were mainly collected from 'Tea Statistics' and 'Indian Rubber Statistics' respectively. In order to make international comparison, the data supplied by international organizations like Food and Agricultural Organization, World Trade Organization report etc. were used.

Other sources of data such as RBI Bulletin, CMIE data, Reports of Economic Survey, data from EPW Research Foundation, and the publications of various departments of the Government of India and the Commodity Boards have been widely used for the study.

1.4.1 Tools for analysis

In order to satisfy the stated objectives, several statistical tools like Kinked Exponential Growth Model, Cuddy–Della Valle Index, Augmented Dickey-Fuller (ADF) test, Johansen-Juselius test, simple growth rates, import penetration ratio etc were used in this study. A brief review of these tools is made in the following section.

- **Kinked Exponential Growth Model**

The usual technique for estimating growth rate in the sub-periods of the time series is to fit separate exponential trend lines by ordinary least squares to each segment of the series. A distinctive feature of kinked exponential growth model, as opposed to conventional discontinuous models, is that they make use of information regarding the values of the variable in question throughout the time series in estimating the growth rates for a given sub period. Exponential growth model has been used for growth rate estimation of the pre-reform and the post-reform periods. For growth rate estimation of sub periods, we use the following kinked exponential growth rate formula (Boyce, 1986)[10].

$$In\ Y_t = \alpha_1 D_1 + \alpha_2 D_2 + (\beta_1 D_1 + \beta_2 D_2)\ t + u_t$$

Where D_j is a dummy variable which takes the value 1 in the j^{th} sub period and 0 otherwise*

Discontinuity between two trend lines can be eliminated via a linear restriction such that of the intersect at the break point k:

$$\alpha_1 + \beta_1 k = \alpha_2 + \beta_2 k.$$

Substituting for α_2 (and noting that $\alpha_1 D_1 + \alpha_2 D_2 = \alpha_1$), we get the restricted form:

$$InY_t = \alpha_1 + \beta_1 (D_1 t + D_2 k) + \beta_2 (D_2 t - D_2 k) + u_t$$

Where, InY_t is the logarithm of the series, α is the intercept, and β_1 and β_2 are the exponential growth rates for the two sub periods.

- **Cuddy–Della Valle Index**

Instability was measured using coefficient of variation around the trend line as suggested by Nadakarni (1969)[11] and Cuddy and Della (1978)[12] instead of simple coefficient of variation. The Cuddy – Della Valle Index (CV*) is given as

$$CV^* = (CV)(1 - R^2)^{.5}$$

Where,

CV = simple estimate of coefficient of variation (in percent) and

R^2 = coefficient of determination from a time trend regression adjusted by the degrees of freedom

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* *Here k coincides with an observation in the time series- rather than falling between two observations – it can be assigned to either sub periods (but not to both) in the construction of the dummy variable without affecting the results.)*

The instability in the study refers to the adjusted coefficient of variation. The instability indices were computed around the trend line using the Cuddy – Della Valle Index.

- **Augmented Dickey-Fuller (ADF) Test**

The most basic non-stationary time series is the random walk, the Dickey-Fuller[13] test essentially involves testing for the presence of a random walk

$$y_t = y_{t-1} + u_t \tag{1}$$

Although this has a constant mean, the variance is non-constant and so the series is non-stationary. If a constant is added, it is termed a random walk with drift. To produce a stationary time series, the random walk needs to be first-differenced:

$$\Delta y_t = u_t$$

The Dickey-Fuller test is used to determine if a variable is stationary. To overcome the problem of autocorrelation in the basic DF test, the test can be augmented by adding various lagged dependent variables. This would produce the following test:

$$\Delta y_t = (\rho - 1) y_{t-1} + \alpha_i \sum_{i=1}^{m} \Delta y_{t-i} + u_t \tag{3}$$

The correct value for m (number of lags) can be determined by reference to a commonly produced information criteria such as the Akaike criteria or Schwarz-Bayesian criteria. As with the DF test, the ADF test can also include a drift (constant) and time trend.

- **Johansen- Juselius test**

Johansen- Juselius[14] model is explained in the following way. Given a vector of Y of 'n' potentially endogenous variables, the model of Y as an unrestricted vector auto regression with k lags can be specified as

$$Y_t = aY_{t-1} + ...+ a_k Y_{t-k} + u_t \quad (1)$$

Y is (n x 1) and a_i is an (n x n) matrix of parameters.

In its reduced form with each variable in Y_t regressed only on lagged values of both itself and all other variables can be specified as

$$\Delta Y_t = C_1 \Delta Y_{t-1} + ...+ C_{k-1} Y_{t-k+1} + \pi Y_{t-k} + u_t \quad (2)$$

Where, $C_i = -(i - a_t - .....-a_i)$;

$(i = 1 ...k - 1)$ and

$\pi = - (I - a_i - ..... - ak)$

π can be represented as

$$\pi = \alpha \beta'$$

where α is the speed of adjustment to disequilibrium, while β' is the matrix of long run coefficients in such a way that $\beta' Y_{t-k}$ in equation 2 represents up to $(n - 1)$ co integration relationship in a multivariate model ensuring that Y_t converge in their long run steady state solutions.

Rewriting equation 2 as

$$\Delta Y_t + \alpha \beta' Y_{t-k} = C_1 \Delta Y_{t-1} + ... + C_{k-1} \Delta Y_{t-k+1} + u_t \quad (3)$$

enables correcting short run dynamics by regressing ΔY_{t-k} and Y_{t-k} separately on the right hand side of equation 3

Thus the vector V_{ot} and V_{kt} are obtained from,

$$\Delta Y_t = X_1 \Delta Y_{t-1} +.....+ X_{k-1} \Delta Y_{t-k+1} + V_{ot} \quad (4)$$

$$Y_{t-k} = Z_1 \Delta Y_{t-1} + ...+ Z_{k-1} \Delta Y_{t-k+1} + V_{kt} \quad (5)$$

Equation 5 is used to form the residual matrices as

$$R_{ij} = Z' \sum V_{it} V'_{jt} (1, J = O, k)$$

The null hypothesis that there are 'r' co integrating vectors is tested by using two likelihood ratio tests called the trace test and the maximum eigen values. The asymptotic distribution of these likelihood ratio tests represent multi-variate version of the Dickey-Fuller distribution.

- **Annual growth rates**

The annual growth is given as

$$Xi = (X_1 - X_0) / X_0$$

Where

Xi = rate of change

X_1 = current year value of variable

X_0 = last year value of the variable.

- **Import penetration ratio**

Import penetration ratio (import as percentage of apparent consumption) = import as percentage of gross output plus external imports minus external exports.

1.5 Scheme of the study

The present study is arranged in seven chapters. The introductory chapter highlights the statement of the problem, objectives of the study, methodology and database and the limitations of the study. The second chapter reviews the literature related to the topic of study. In the third chapter, an overview of the agricultural sector in India is given. The fourth chapter analyses the impact of the New Economic Policy on growth and instability of area, production and productivity of natural rubber and tea in India. An analysis of the price movement and market integration of natural rubber and tea in the light of economic reforms is done in the fifth chapter. Chapter six makes an assessment of the trade performance of natural rubber and tea in the WTO regime. The conclusions derived from the study are highlighted in the final chapter.

1.6 Limitations of the study

The present study is subject to certain limitations such as

- The study is limited only to cash crops like tea and natural rubber. Therefore, its results cannot be generalized to the agricultural sector as a whole.
- The study is based only on the secondary data. Therefore, all those drawbacks and limitations attributed to the secondary data might have crept into our study.
- The period of analysis covers only 20 years from 1985 to 2004. The study could have been made more accurate and comprehensive by selecting a few more years for analysis.

- Non-availability of certain required data made the study incomplete especially while analyzing the market integration of the selected commodities.

References:

1. Bhalla, G.S. (1994), *Economic Liberalization and Indian Agriculture*, Institute of Industrial Development, New Delhi
2. Gulati, A (2001), "*Indian Agriculture and the WTO: Preparing for New Millennium*", in Chadha, G.K (ed), WTO and the Indian Economy, Deep and Deep publications
3. Pursell,Garry, (1996), "*Indian Trade Policies since 1991/92 Reform*", World Bank, Mimeo
4. George P S, (2005), "*Globalization and Agricultural Transition in Kerala*", Centre for Development Studies, Trivandrum, P: 145
5. R K Khatkar (1995), "Indian Agriculture in the New Economic Era", *Indian Journal of Agricultural Economics*, Vol.50, No3, July-September
6. Bhalla, G.S. (1994), op. cit.
7. Subramanian S (1993) "*Agricultural Trade Liberalization in India*", Development centers of OECD, Paris
8. Chand, R (1998), "Removal of Import Restrictions on Indian Agriculture: the Challenges and Strategy", *Economic and Political Weekly*, 33(15), pp: 850-854
9. Rubber Board, Kottayam (2005), "*Indian Rubber Statistics*", Vol. 28
10. Boyce, James K (1986): "*Kinked Exponential Model for Growth rate Estimation*", Oxford Bulletin of Economics and Statistics, Vol.48, pp. 385-391
11. Nadakarni, M. V., (1969), "Yield Certainty in Maharashtra Agriculture", *Indian Journal of Agricultural economics* 24:327-333
12. Cuddy and V. Della (1978), "Measuring the Instability of Time Series Data", *Oxford Bulletin of Economics and Statistics*, February issue.
13. Dickey, D A, Fuller, W A (1981), Likelihood ratio tests for autoregressive time series with a unit root, *Econometrica,* Vol.49, pp 1057-1072
14. Johansen, S and K. Juselius (1990), "Maximum Likelihood Estimation and Inference on Co integration with Application to the Demand for Money", *Oxford Bulletin of Economics and Statistics*, Vol. 52, pp. 169-210

Review of Literature

Jomon Mathew “The impact of new economic policy on Indian agriculture: A study of selected cash crops ” Thesis. Department of Economics, Dr. John Matthai Centre , University of Calicut, 2006

2 *Review of Literature*

Chapter 2

REVIEW OF LITERATURE

There has been no systematic study on the impact of liberalization and globalization on Indian agriculture. However, there are a few empirical studies, which can provide a broad framework for the present study, '*The Impact of New Economic Policy on Indian Agriculture: A study of Selected Cash Crops*'. It has been the subject matter of serious discussions and several studies for the last few years. There are mixed reactions among those economic, political and social thinkers on the vast implications of economic reforms for India's agricultural sector. In this chapter, an attempt is made to review those studies in such a way that it serves as a support base for the present study. The discussion that follows is grouped under two heads:

a) Studies related to agricultural sector in general, and

b) Studies related to natural rubber and tea.

The existing literature on the impact of policy reforms provides sufficient theoretical base for the empirical verification to the objectives that we proposed.

2.1 Studies related to agricultural sector in general

The impact of structural adjustment programs and the globalization on the agricultural sector in India is well documented by *Bhalla (1994)*[1], *Gulati (2001)*[2] *and Purcell (1996)*[3]. The expected immediate impact of the removal of protection as manifested in the tariff reduction, inter alia, includes the transmission of world prices of various agricultural commodities to the domestic markets.

The studies have shown that the prices of various agricultural commodities in India were far below the international prices (Gulati and Sharma 1994)[4] and domestic prices were growing faster than international prices (Bhatia 1994)[5]. A recent study on trade liberalization concluded that liberalization would lead to a rise in prices of those commodities with prices below the world market prices and fall in prices if they were above the international prices (Chand 1997)[6], indicating the possibility of price parity between domestic and world markets. Another study on major cereals, pulses and oil seeds (Chand 2001)[7] suggested that domestic price of rice increased by 2.42 percent, wheat by about one-tenth of international prices. Conversely for the crops facing import substitution namely soybean oil and seed, the domestic prices declined by 18.5 percent and 7.03 percent respectively.

Subramanian (1993)[8] has analyzed that as a result of liberalization of trade, the terms of trade moves against the agricultural sector and concluded that trade liberalization would lead to higher price transmission elasticities for all unprocessed commodities except coarse cereals.

The conclusion of the study by Parikh et al (1995)[9] includes the following observations:

- Trade liberalization in the medium run increases allocative efficiency within agricultural sector and between agricultural and non- agricultural sectors.
- Agricultural liberalization increases the output of all agricultural commodities except coarse grains and other foods.

- Liberalization leads to higher volume of exports of all agricultural goods, except coarse grains , and
- Prices of several agricultural commodities, which are not protected, would rise with trade liberalization.

Chand (1998)[10] observed that dismantling the trade barriers on imports would increase volatility of Indian prices and farm income. On the positive side, the removal of Quantitative Restrictions would promote competition in the domestic market leading to price advantage for the consumers.

Gulati (1998)[11] observed that agriculture could move on to a higher growth trajectory if supply side bottlenecks are freed and a protective cover is accorded to the poor.

An interesting study on understanding of co-movement and the extent of integration of crops in Kerala wherein domestic market prices are mostly influenced by the world price because of its export oriented nature under the liberalization regime was done by Varma (2001)[12]. The study used correlation analysis on coconut and rubber facing a different trading environment as compared to coffee, cardamom and pepper. The results of correlation suggested that the extent of integration was increased in the case of rubber where as it decreased in the case of coconut oil in the post reform period. However, the scope of the study has been limited, as it did not analyze the process of transmission of world prices to the domestic market.

Dhawan B D and S S Yadav (1997)[13] observed that the Central Government has an important role to play through macro-economic policies that affect agriculture by provision of adequate resource transfer to States, and in ensuring that State finances and options are not affected adversely by the macro-economic

consequences of decisions taken at the Centre. However, according to the Economic Survey 1995-96, there is a rising trend in non-development expenditure while development expenditure as a percentage of GDP is declining. Of this, the expenditure on agriculture and allied services is declining. The total spending, both plan and non-plan, under the heads agriculture, irrigation and rural development in the Central Budget (including fertilizer subsidy) has been reduced from 1.99% of GDP during 1989-90 to 1.46% during 1995-96. In 1996-97, it was 1.45%, but the actual spending under these heads in 1996-97 was only 1.32% of GDP according to the revised figures. During 1997-98, this has been budgeted at only 1.29 percent of GDP.

Sen, Abhijit (1997)[14] argued that the public investment in agriculture is the responsibility of the states, but many states have neglected investment in infrastructure for agriculture. There are many rural infrastructure projects, which have started out but are lying incomplete for want of resources (Government of India, 1995). The total net transfers (i.e., state's shares of central taxes, loans, and grants to the states less interest and amortization of loans) from the centre to states have also reached a new low. This was over 6 percent of GDP in 1990-91 and had fallen steadily to 4.7 percent in 1995-96.

According to C.H Hanumantha Rao (1998)[15], "There is no basis for complacency about the role of public investment in agriculture - which is vital in inducing private investment and for deriving the full benefits of economic reforms. To raise such public sector investments in, say, canal irrigation or electrification, subsidies on these critical inputs need to be cut down. This requires major reforms in the pricing and institutional framework for the management of these inputs."

The trade policy review (1994)[16] indicated that India's share in the world exports was almost marginal (0.52 per cent) during 1993 while USA (13.3 per cent) Germany (11.1 per cent) and Japan (7.6 per cent) had significant contribution. It reveals the importance of GATT agreement, which is expected to bring expansion in India's trade by 1.5 to 2.0 billion dollars per annum.

According to an economic review (1992-93)[17], the agricultural trade with its declining share remained the important component of the international trade in India. Major findings of the review are:

- Agriculture accounted for 33.2 per cent of the total exports in 1980 and gradually it slid down to 16.5 per cent in 1993 due to substantial changes in the composition of exports.
- India has the highest share in tea around 11 per cent of world tea exports.
- The item wise value of agricultural exports indicates significant increase in most of the items except for tea and raw cotton.

According to Dunkal Draft (1993)[18] proposals, the GATT agreement would influence India's international trade in general and agricultural trade in particular. It is being argued that a relaxation of trade restrictions and the reduction in subsidies would make agriculture competitive and farmers would get international prices for their produce by galvanizing the export potential of the agricultural sector.

According to Ashok Gulati and Sharma (1993)[19], Japan was subsidizing agricultural products to the tune of 72.5 per cent of the total value of its agricultural crops. The level of subsidies were 37.0 per cent in European Community, 26.0 per

cent in U S , 33.0 per cent in Canada, while the subsidies were negative in India i.e., agriculture was taxed in some countries including India.

Montek Singh Ahluvalia (1996)[20] summarized the stated objective of the New Economic Policy in his inaugural address on 'New Economic Policy and Agriculture- Some Reflections'. It reported that the objective is to raise the rate of growth of the economy from around 5.5 per cent achieved over the past 15 years to 7 or 8 per cent per year. There can be no doubt that an acceleration of GDP growth in this magnitude cannot be achieved by focusing on industry alone. It also requires a significant improvement in agricultural growth from somewhere between 2 and 3 per cent in the past, to around 4 per cent per year. This in turn requires that the general framework of the economic policy, which inevitably impinges upon agriculture in several ways, as well as the policies specifically, aimed at agriculture, work together to achieve faster agricultural growth.

Ahluwalia[21] quotes a Government of India Report to study the beneficial impact of trade liberalization upon agriculture in terms of familiar two-sector model of trade theory. A policy of heavy protection operates to a disadvantage of the agricultural sector because industrial prices are raised relative to world prices as a result the profitability of investment in industry is raised relative to agriculture. This leads to a shift of resources from the unprotected sector (agriculture) to the protected sector (industry).

Parikh et al (1995)[22]favor the extension of market reforms to agricultural sector. The study says that agriculture has not remained unaffected by the on going reform process in the country, as the indirect impact of liberalization of the economy in general on agriculture may turn out to be far more important than the possible

impact of the liberalization measures directly affecting this sector. The over all liberalization of the economy would result in higher investment and growth in agriculture induced by favorable terms of trade.

Amalesh Banerjee (1995)[23] pointed out the negative as well as positive impact of economic reforms on Indian agricultural sector. The negative aspect of the new policy with regard to agriculture is the reduction of subsidies on fertilizer, electricity, irrigation, credit and public distribution. Price, trade and distribution will be based on market principle. The cost of these inputs will increase and this will whip up the scourge of inflation and poverty. The negative aspect of Dunkal agreement will be on scientific innovation and research in agriculture and other areas of technical adaptation. The positive aspect of the new policy is the emergence of market principle in our otherwise parasitic subsistence system. Access to world market has brought about an opportunity for diversification of Indian agriculture.

Singh R K et al[24] examine the implications of the Structural Adjustment Programs for agricultural production environment, as enunciated in the New Economic Policy of the Government of India. The paper pinpoints some of the aspects which are biased against the agricultural sector , which include a drastic reduction of funds to the agricultural sector, adverse terms of trade due to declining trends in commodities prices, domestic market restrictions, issues associated with food security and environmental and sustainability in agriculture. The study makes a plea for revisiting economic policy to capture India's comparative advantage in agriculture.

Bhole (1995)[25] made an attempt in his paper 'Prospects of Indian Agriculture in New Economic Environment' to identify the potential areas of export

under new economic environment (and the commodities having comparative advantage based on domestic and world prices). The study indicated that despite high rank in production, India' share in total world export of most agricultural commodities was negligible. However, India could contribute sizeable share in world export of tea (14.31 per cent). Close examination of nominal protection coefficients and provisions under the New Economic Policy indicates that India is having a most advantageous position for export of basmati rice followed by tea.

Usha Tuteja (1995)[26] examined the performance of agricultural exports in the post liberalization period. It is felt that the New Economic Policy has opened the floodgates of opportunities but there are limitations too. India is not a larger supplier of agricultural commodities except for tea. The optimism that the relaxation of trade restrictions would make agriculture competitive and farmers would get international prices for their produce should be reviewed due to the following considerations:

- Firstly, it relates to creating surpluses for exports. These exports would be at the cost of domestic consumers.
- Secondly, in the context of rising prices inputs, like fertilizers may become out of reach for resource poor farmers.
- Thirdly, it is not easy to sell in international market because proper identification of products, superior quality, good delivery system and competitive prices are other pre-conditions.

Shukla S P (2002)[27] observes that in sharp contrast to the erstwhile doctrine of minimal interference, the Agreement on Agriculture takes a more integrated view of agricultural trade; tries to reduce the trade distorting effects of boarder protection, domestic support policies and export subsidies and attempts to subject trade and

domestic support regimes to a comprehensive discipline. The agreement incorporates a measure of discipline particularly for industrial countries that should benefit small and efficient exporter countries to some extent. Commitments, however, by industrialized nations with regard to the reduction of domestic support and export subsidies are modest in comparison to prevailing level of subsidization. In contrast, a large number of developing countries may find the discipline too burdensome.

Savithri T M (1999)[58] in an analysis of prices of agricultural commodities in Kerala, concluded that there is a strong price integration existing in the agricultural markets in Kerala. Coconut, tea, rubber, turmeric, areca nut and pepper are good examples of agricultural commodities having short run market integration.

Brahm Prakash, Sushila Srivastava and S Lal (1995)[29] in their study on the *Impact of New Economic policy on Export of Agricultural Commodities from India* examined the current trends in foreign trade of India. They suggested that export of agricultural commodities could further be boosted by proper co-ordination between national and international trade agencies. Raising the outlay for research and development for exportable crops, investment in agricultural sector, exporting the value added products rather than raw materials and providing brand status to the items are some of the measures to benefit the agricultural sector. In addition to these, developing processing and post harvesting handling technologies, decreasing the minimum export process of a few commodities adopting the differential procurement prices for durum wheat, creating required infrastructure for export of marine products, incentive for export etc are to be promoted.

S K Goyal and Satnam Kaur (1995)[30] in a study on the performance of agricultural export in the light of new economic policy , revealed that the world prices had shown a declining trend for most of the commodities during 1980-92, while India's prices had shown a reverse trend during the same period. They suggested that emphasis should be laid on those commodities in which India has comparative advantage and on the export of value added products rather than primary products for increasing the share of India's world agricultural exports.

R K Grover, K N Rai and D B Yadav (1995)[31] attempted to examine India's position in world trade over time and the impact of liberalization on agricultural exports and to identify the potential commodity groups for exports. The result of the study was that the post liberalization period has been marked with an increase in the export of agricultural commodities especially basmati rice, marine products, oil meals, meat and meat products, fruits etc. In the present era of structural adjustment programs where the removal of barriers to international trade is one of the major elements, it is high time to realize and set up a committed monitoring and evaluating body for promoting the pace of exports on the more sustained competitive lines. Such an agency shall offer a cohesive approach to various aspects of international trade and ensure quality control, collection and discrimination of data pertaining to the production, exports and international price.

Ashok Gulati (1996)[32] is of the view that globalization of industry and agriculture would make a perceptible change in turning the relative incentive environment in favor of agriculture. This would happen primarily through changes in the terms of trade in favor of agriculture. Private investment too would be attracted towards agriculture. Thus, a favorable combination of price and non-price

factors would have the potential to trigger growth in agriculture. He also pointed out that Indian agriculture as per the calculations of Aggregate Measure of Support (AMS) under GATT negotiations was not net subsidized but taxed to the tune of 20% of the value of agricultural Gross Domestic Product.

The paper presented by R K S Kushwaha, G N Singh, C P Singh and R N Yadav (1995)[33] revealed that with the proposed abolition of subsidized rate of interest, as envisaged in New Economic Policy only the target group of farmers would suffer. This is because, they would not be able to avail of loans from market at competitive rate of interest for agricultural development. They suggested that the subsidized rate of interest to target group of farmers should be continued for some more years.

R K Khatkar (1995)[34] examined the growth of Indian agriculture in the context of NEP. He revealed that agricultural domestic product and domestic capital formation in the agricultural sector, both in private and public sectors, have declined after liberalization. The study favored the need for increased private as well as public investment for the creation of infrastructure facilities on irrigation projects and agro-processing units.

While analyzing the impact of GATT commitments on agriculture, Ashok Gulati and Anil Sharma (1994)[35] pointed out that India stands to gain rather than lose from trade liberalization by the GATT members. Where as all developed countries provide positive support to the cultivators, in India the product specific and non-product specific AMS was worked out to be negative.

R Mukherji (1995)[36] in a study on the impact of the new economic policy on Indian agriculture pointed out that the policy would aggravate India's struggle to

cause and interest of the international monopoly capital and capital market economy under its command. According to him, Indian agriculture under the new economic policy would remain more acutely dependent and vulnerable to the internal structure and institutional rigidities. He concluded that Indian agricultural sector would fail to reap the advantage of surging capitalism of a bygone era. It would be more lopsided coercive, exacting and perverted to pay more tribute for the international finance capital in the near future.

Nasarudeen P and R Sunderasan[37] attempted to study the impact of economic liberalization on Indian agricultural exports and concluded that there are clear signals of agricultural sector responding to the changing economic order. However, its ability to adjust to and tap advantage of liberalizing economic environment are constrained by the distribution in the agricultural input–output markets and which is leading to inefficiency in input use and restricting agricultural production choices and frontiers. Thus for the smooth adjustment of the agricultural sector to emerging changes in economic environment it is crucial to reform input and output markets.

R K Singh, G M Rather and S K Singh (1995)[38] examined the implications of structural adjustment programs for agricultural production environment as enunciated in the new economic policy of the Government of India. The study made a plea for revising economic policy to capture India's comparative advantage in agriculture. They suggested major elements of strategies for promoting agriculture during the new economic regime, such as price policy, trade policy, investment for infrastructure development and augmenting productivity to the levels of developed countries.

According to Sukhpal Singh (1995)[39], the severe effects of the economic policy changes in agricultural sector will be felt in the areas of agricultural trade and capital investment in agro-activities. He pointed out that there would be serious distortions in agricultural sector with the emergence of new trade regime – both internal and external – and the dominance of agro-business corporations by way of corporate and contract farming.

V S Vyas (1999)[40] in a study on Agricultural Trade Policy and Export Strategy, reviewed the performance of Indian agriculture and the development in agricultural trade especially agricultural exports. He concluded that because of the diverse climate and soil conditions, India has the necessary qualification to emerge as a leading exporter of agricultural commodities. It is important to design a strategy, which should give us benefit of external trade without jeopardizing the basic goals of food security and poverty alleviation.

Brajesh Jha (2001)[41] reported that export of tea, coffee, and spices are free from any restriction. One can export natural rubber without any restriction, but imports require license. India has comparative advantage in these commodities. Therefore, allowing import with a moderate duty (30%) would protect the domestic farmers and simultaneously improve country's impression in the WTO because of import restriction. He pointed out that trade for a large number of agricultural commodities have been restricted in India. As regards restrictions on exports of agricultural commodities, there were group of commodities in which India has definite export advantage. The examples in this category include the traditional export items like tea, coffee, spices, tobacco, jute, and a few newly emerging export items like fruits, vegetables, oil meals etc.

2.2 Studies related to natural rubber and tea

According to Mani (1983),[42] domestic production, internal consumption and stock are the key factors that determine variations in natural rubber prices. A more recent study (Lakshmi et al, 1996)[43] covering a period of 27 years from 1968-69 to 1994-95 had also arrived at a similar conclusion. According to the study, among different economic variables, viz; production, consumption, stock, import and world prices of natural rubber, the production of natural rubber was found to be the most significant variable influencing the price. The study could not find any positive relation between world prices and domestic prices for rubber.

Uma Devi (1981) [44] studied the short run and long run supply responses to the price, in the case of natural rubber in India covering the period from 1955 to 1980. The short run supply elasticity in the case of smallholdings was only 0.578. The corresponding figure in the case of estates is -0.345. Long run supply elasticities were estimated by taking both estates and holdings together. In the case of long run supply, there is positive response to price only if prices as far back as seven years are taken into account. Otherwise, there is significant negative relationship between price and new planting activity.

Viju Ipe and Prabhakaran (1988)[45] found out that the long run elasticities with respect to the expected price and change in the expected yield of rubber and coconut were 0.0297 and 0.0035 respectively. They identified certain important factors that might have accelerated rubber cultivation as,

- the increasing prices and yield of rubber,
- fall the productivity of coconut due to pests and diseases,

- the subsidy scheme for planting rubber
- different slab rates and exemptions provided in the Agricultural Income tax Act in Kerala
- the plantation Labor Act which did not apply to holding below 10.17 hectors and
- the Agrarian Relations Bill of Kerala which exempted rubber and other plantation crops from ceiling level.

Uma Devi (1988)[46] in the plantation economy of the third world found that the price elasticity of supply of rubber is less than unity. The study also revealed that the backward and forward linkage effect of plantation sector with the rest of the economy is negligible.

Veeraputran (1999)[47] reported strong convergence between world and domestic prices of natural rubber since 1992. He has also noted the correlation between the two sets of prices becoming stronger in the nineties. His analysis of seasonality in rubber prices showed lack of correspondence between seasonal variation in domestic production and prices. However, the seasonality indices for consumption and price moved together. According to the study, except for production and imports, all other variables viz; stock, demand, government intervention and the prices of synthetic rubber are significantly related to the price of natural rubber. Synthetic rubber emerges in the analysis as a close substitute for natural rubber. Zant (1998)[48] had also observed the tendency for domestic and international prices of rubber to converge in the recent period.

Joseph and George (2002)[49] attempted for systematic documentation and analysis of the policy changes in the rubber sector on account of the establishment of the WTO. The study made a critical comparison between the policy changes affected by the Government of India on the one hand and the options that are available in the WTO framework on the other. The study provided many valuable insights in to the process of policy making both at the levels of the WTO and the Government of India. He did not attempt to analyze the developments in the rubber economy of the country in the light of policy changes.

Ipe (1988)[50] analyzed the seasonal fluctuations in the prices of natural rubber for the period from 1968-69 to 1983-84 by using the classical decomposition model. The study revealed that unlike the behavior of prices of annual crops, the seasonality of production was not reflected in the price movement of natural rubber. The impact of production on prices was mild and subdued. Such behavior of price in relation to production is attributed to the oligopsony in the buying market.

Asopa[51] reveals that the world production of tea increased at an annual growth rate of 2.22 per cent over the period 1978-1999, but in the 1990's a decline in tea production has taken place as reflected in the negative compound growth rate of 1.62 per cent per annum. As far as black tea production is concerned, India is way ahead of other countries, producing 36.59 per cent of world's black tea.

Poornima (2002)[52] attempted to analyze the impact of trade liberalization on the prices of rubber, coconut and coconut oil. The study has almost exclusively focused on the behavior of prices and found that gap between domestic and international prices of rubber is narrowing since 1992. From 1992 onwards, both domestic and international prices of rubber have been moving together. Analysis of

changes in instability and seasonality shows that trade liberalization did not have an impact on the extent of intra-year and inter-year fluctuations in the prices of these commodities.

The policy of the Government of India (2002)[53] towards the import of Natural Rubber has undergone change during 2001-2002. With effect from April 2001, Quantitative Restriction (QRs) on import of natural rubber has been removed. Total import of natural rubber during 2000-2001 was 8970 tons. However, with the removal of Quantitative Restrictions on import of natural rubber since April 2001, around 50000 tons of natural rubber were imported during 2001-2002. As regards to export of natural rubber, export is restricted due to lower international price of natural rubber compared to Indian price. The export of natural rubber declined from 13356 tons during 2000-2001 to 6995 tons during 2001-2002.

Asopa[54] predicted that the future of tea is neither bleak nor bright. As the productivity increases and newly planted bushes come of age, supplies would increase but they could be moderated by droughts and adverse weather. On the demand side, the liberalization of trade after the 1974 Uruguay Round agreement may excerpt some positive influence on the world tea economy but nothing spectacular is likely to happen on that front. However, there could be some imbalance in demand and supply.

Asopa[55] quotes the FAO observation that the impact of the economic and trade liberalization and production expansion programs initiated by major exporting countries will be felt in the coming decade. The effects of reduction of import tariffs and the resultant declining prices would be more pronounced in developing countries that should provide a rapid rise in their tea consumption. Since tea trade in

most developed countries is already quite liberalized with no or only few restrictions on bulk and packaged black tea, their tea consumption would not be affected in a significant way by trade liberalization. The study reveals that export from India, the world's largest tea producer and consumer are expected to grow.

An inter-governmental group[56] under the auspices of United Nations studied WTO impact on world tea economy and made projections until the year 2005. WTO requires member nations to reduce import duty by 24% from the existing rates by the year 2005. Among the importing nations, Pakistan has a high import duty of 25%. The developed nations (UK, USA) already have no duty and therefore, will not be affected. In India, tea import is allowed but only for re-export and not for consumption. The import duty on tea is at 35% but for imports under Indo-Lanka bilateral agreement import from Sri Lanka is allowed at a concession rate of 7.5% only. The impact on Indian domestic industry will be negligible because of the re-export clause. Tariff reduction is likely to cause higher imports by Pakistan, Iran, Iraq, and Egypt. India and other exporting countries will benefit from freer trade and lower tariff barriers.

2.3 Concluding remarks

A review of earlier studies reveals that for the last few years, a series of studies have been undertaken to verify the impact of the New Economic Policy on the agricultural sector of India. Most of the studies were conducted on the regional basis and several of them concentrated on the food crops for analysis. There are a few studies on cash crops focusing on prices, export performance, marketing and the like. A major limitation that could be traced out is that they lack a national nature and coverage. The above limitation of the existing studies calls for more studies on

natural rubber and tea as they are of high national importance in terms of their contribution to domestic consumption, foreign exchange earning etc. Hence, the present study is an attempt to fill this gap.

References:

1. Bhalla, G.S. (1994*), "Economic Liberalization and Indian Agriculture",* Institute of Industrial Development, New Delhi
2. Gulati, A (2001*), "Indian Agriculture and The WTO : Preparing for New Millennium, in Chadha, G.K (ed), WTO and the Indian Economy,* Deep and Deep publications
3. *Pursell,Garry,(1996), "Indian Trade Policies since 1991/92 Reform",* World Bank, Mimeo
4. Gulati,A and Sharma, A (1994), "Agricultural Under GATT: What it holds for India", *Economic and Political Weekly*, vol.27, No.39, pp.1857-1863
5. Bhatia, M.S (1994), "Agriculture Pricing, Marketing and International Trade Under New economic Environment', *Indian Journal of Agricultural Economics,* vol.49,no.3
6. Chand Ramesh (1997), "Removal of Import Restriction and Indian Agriculture: The Challenge and strategy", *Economic and Political Weekly*, Vol. 33 No.15,pp 850.854.
7. Chand, R and Jha, D. (2001), "*Trade Liberalization, Agricultural Prices and Social welfare*", in Acharya, S.S. and Chaudhri, D.P (eds), Indian Agricultural Policy at the Crossroads, Rawat Publications
8. Subramanian S (1993), "*Agricultural Trade Liberalization in India",* Development centers of OECD, Paris
9. Parikh Kirit et.al (1995), *Strategies for Agricultural Liberalization : Consequences for growth, Welfare and Distribution* , Indira Gandhi institute of development Research, Mumbai
10. Chand, R (1998), "Removal of Import Restrictions on Indian Agriculture: the Challenges and Strategy", *Economic and Political Weekly,* 33(15), pp: 850-854
11. Gulati A (1998), *"Indian Agriculture in an open economy: will it prosper? In Economic Reforms and Development" (Ed)* Isher Alhuwalia and IMD Little, Oxford University press, Delhi, pp.122-146
12. Varma, Poornima (2001), "Impact of Trade Liberalization on Rubber and coconut", M.phil dissertation submitted to the Jawaharlal Nehru University. Centre for Development Studies

13. Dhawan B D and S S Yadav (1997), Public Investment in Indian Agriculture, *Economic and Political Weekly*, Vol. XXXII, No. 14

14. Sen, Abhijit (1997). The Wages of Neglect, *Frontline*, April 4

15. Hanumantha Rao C.H (1998). Raise real public expenditure, *Business Line*, 15/7/98

16. Trade Policy Review, GATT, 1994

17. Economic Review, volume 1, Report on Currency and Finance, RBI, 1992-93

18. Draft Dunkal Proposals, Rajya Sabha Secretariat, New Delhi, Dec. 1993

19. Gulati, Ashok and Sharma, Anil (1994) "Agriculture under GATT: What it holds for India", *Economic and Political Weekly*, Vol . xxxix, No.29, July 16, pp 1857-1863.

20. Montek Singh Ahluwalia (1996), New Economic Policy and Agriculture: Some Reflections, *Indian journal of Agricultural Economics*, Vol.51, No.3, July-Sept

21. ibid.

22. Parikh, Kirit S; N S S Narayana; Manoj Panda and A Ganesh kumar (1995), *Strategies for Agricultural Liberalization: consequences for Growth, Welfare and Distribution* , Indira Gandhi Institute of Development Research, Mumbai

23. Banerjee, Amalesh (1995), 'Reforming Agriculture-Real and Financial', *Indian Journal of Agricultural economics,* Vol.50, No.3, July-Sept

24. Singh R K, Rather G M and Singh S K (1995), "Structural Change: Implications for agricultural Production Environment in India", *Indian Journal of Agricultural Economics*, Vol.50, No.3, July-Sept

25. Bhole B D (1995), 'Prospects of Indian Agriculture in New Economic Environment', *Indian journal of Agricultural Economics*, Vol.50, No.3, July- Sept

26. Usha Tuteja (1995), 'Implications of new Economic Policy on Agricultural Exports in India', *Indian journal of Agricultural Economics*, Vol.50, No.3, July- Sept

27. Shukla S P (2002), "From the GATT to the WTO and Beyond", Governing Globalization: issues and Institutions, Edited by Deepak Nayyar, Oxford University press, p.268

28. Savithri T M (1999), "Production, Productivity and Prices- A Study on Agricultural Commodities in Kerala", Ph. D Thesis, University of Calicut, Kerala

29. Brahm prakash, Sushila Srivastava and S Lal (1995), Impact of New Economic policy on Export of Agricultural Commodities from India, *Indian Journal of Agricultural Economics*, Vol.50, No.3, July- September, p.534

30. S K Goyal and Satnam Kaur (1995) New Economic Policy and its impact on Indian Agricultural Exports, *India Indian Journal of Agricultural Economics,* Vol.50, No.3, July- September

31. R K Grover, K N Rai and D B Yadav (1995), 'Liberalization and the potential Commodity Groups for India's Agricultural Export' *Indian Journal* of *Agricultural Economics,* Vol.50, No.3, July-September

32. Ashok Gulati (1996), New Economic Policy and Indian Agriculture, *Indian Journal* of *Agricultural Economics,* Vol.51, No.1&2, January-June, pp.35-37

33. R KS Kushwaha, G N Singh, C P Singh and R N Yadav (1995), New Economic Policy and Subsidized Agricultural loaning, *Indian Journal of Agricultural Economics,* Vol.50, No3, July-September

34. R K Khatkar (1995), Indian Agriculture in the new economic Era, *Indian Journal* of *Agricultural Economics*, Vol.50, No3, July-September

35. Ashok Gulati and Anil Sharma (1994), Agriculture under GATT: what it holds for India, *Economic and Political Weekly*, July 16, pp.1857-1863

36. R Mukherji (1995), The impact of New Economic Policy on Indian Agriculture, *Indian Journal of Agricultural Economics,* Vol.50, No3, July-September, pp.536-37

37. Nasarudeen P and R Sunderasan, Impact of economic Liberalization on agricultural exports, *Indian Journal of agricultural Marketing* ,(comp-spi), 13(2), pp:129-136

38. R K Singh, G M Rather and S K Singh (1995), Structural change: Implications for Agricultural Production Environment in India, *Indian Journal of Agricultural Economics*, Vol.50, No3,July-September

39. Sukhpal Singh (1995), Structural Adjustment Program and Indian agriculture-towards an assessment of implications , *Indian Journal of Agricultural Economics*, Vol.50, No3,July-September

40. Vyas V S (1999), Agricultural Trade Policy and Export Strategy , *The Indian Economic journal,* Vol.34, No.13, march-April, pp:27-33

41. Brajesh Jha (2001), 'Indian Agriculture and the Multilateral trading System', Rajiv Gandhi Institute for contemporary Studies, Rajiv Gandhi Foundation , New Delhi.,pp.207-212

42. Mani S (1983), *'Analysis of Indian Natural Rubber Market'*, M. Phil Thesis, Centre for Development Studies, Trivandrum

43. *Lakshmi N, Mohankumar, S and T George (1996), 'The Trend and Pattern of Natural Rubber Prices in India: An exploratory Analysis'*, Indian Journal of Natural Rubber Research, *9(2), 82-92*

44. Uma Devi, short run and long run responses to the price in the case of natural rubber in India (1981)

45. Viju Ipe and Prabhakaran (1988), Price responses of a perennial crop- a case study of Indian Natural Rubber, IJAE Vol.No.4 oct-Dec-1988

46. Uma Devi, "Plantation economy of the third world" (1988)

47. Veeraputhran (1999), *'Trends and Fluctuations in Indian Natural Rubber Prices: 1968-69 to 1997-98'*, M. Phil Thesis, Centre for Development Studies, Trivandrum

48. Zant, W (1998), *Stock holding, Price Stabilization and Future Trading: Some Empirical Investigation of Indian Natural Rubber Market*, International Books, The Netherlands

49. Joseph T and T George (2002), *WTO and natural Rubber Sector in India (vol.2)*, Economic Research Division, Rubber Research Institute of India

50. Ipe Viju (1988), *Seasonal Fluctuations in the Price of Natural Rubber in India, Indian Journal of Natural Rubber Research*, vol.1; No.1, pp.31-34

51. *Asopa, V N*, "Competitiveness in Global Tea Trade", *oxford and IBH Publishing Co. Pvt. Ltd., New Delhi, pp.20-21*

52. Poornima Varma (2002), *'Agriculture under Economic Liberalization: A study Rubber and Coconut Prices in Kerala'*, M.Phil. Thesis, C D S, Trivandrum

53. Indian Rubber Statistics, Vol.25, 2002

54. Asopa V N, 'Competitiveness in Global Tea Trade', Oxford and IBH Publishing Co. Pvt. Ltd., New Delhi, p. 29.

55. ibid, pp36-38

56. Website: www.teaindia.org

An Overview of the Agricultural Sector in India

Jomon Mathew “The impact of new economic policy on Indian agriculture: A study of selected cash crops ” Thesis. Department of Economics, Dr. John Matthai Centre , University of Calicut, 2006

3 *An Overview of the Agricultural Sector in India*

Chapter 3

AN OVERVIEW OF THE AGRICULTURAL SECTOR IN INDIA

3.1 Introduction

Agriculture continues to be the mainstay of the Indian economy. Agriculture is described as the backbone of Indian economy mainly because of the three reasons. One, agriculture constitutes large share of country's national income though the share has declined from 55 percent in early 1950s to about 25 percent in early 2000s. Two, more than 2/3rd of workforce of the country were employed in agricultural sector until 1971. Recent census data for the year 2001 indicates that agriculture workers (cultivators and agricultural labourers) account for 58.4 percent of workforce of India. Three, growth of other sectors and overall economy depends on the performance of agriculture to a considerable extent. Agriculture has also played important role as foreign exchange earner. Because of its backward and forward linkages with other economic sectors, changes in agricultural performance have a multiplier effect on the entire economy. Its performance, therefore, is crucial in the task of reduction and eventual elimination of poverty in India.

This chapter gives an overview of the agricultural sector in India. It also reviews policies and initiatives in agricultural sector in the light of the New Economic Policy and the WTO Agreement on Agriculture.

3.2 Place of agriculture in the national economy

National Income statistics provide a wide view of the country's entire economy, as well as of the various groups of the population who participate as producers and income receivers , and that , if available over a substantial period ,

they reveal the basic changes in the country's economy in the past and suggest, if not fully reveal, trends for the future. (National Income Committee, 1951)[1]. The composition and structure of India's National Income have been changing during the plan period. The contribution of the primary sector in national income, export earning and employment are well summarized in the table given below.

Table 3.1

Share of agriculture in national income, employment and trade

Year	Per cent share in economy		
	GDP	Export	Employment
1950-51	57.7	NA	69.4
1960-61	53.0	44.3	69.5
1970-71	46.3	31.7	67.8
1980-81	39.7	27.8	60.5
1990-91	32.2	18.5	59.0
2000-01	24.6	17.6	58.4

Source: EPW Research Foundation (2002), *National Accounts Statistics of India (1950- 51 to 2000-01)*

Note: Agricultural GDP includes fishery and forestry. Agricultural exports do not include forestry.

The percentage share of agricultural sector in national income was 57.7 during 1950-51. This share has declined to 24.6 percent during early 2000s. The 2001 census data indicates that agriculture workers account for 58.4 percent of workforce of India. Agriculture also plays an important role as foreign exchange earner. Agricultural exports accounted for 44.3 per cent of India's total merchandise

exports during 1960-61. The share has declined over time but agriculture still contributes more than 17 percent of export earnings of India (Table 3.1).

3.3 Agricultural growth since 1950-51

India has made a lot of progress in agriculture since independence in terms of growth in output, yields and area under many crops. It has gone through a green revolution, a white revolution, a yellow revolution and a blue revolution. Today, India is the largest producer of milk, fruits, cashew nuts, coconuts and tea in the world, the second largest producer of wheat, vegetables, sugar and fish and the third largest producer of tobacco and rice.

Performance of agriculture on production front can be seen from the growth rates presented in table 3.2. The table shows the growth rates for agriculture and allied sectors that include crop, livestock and fishery sub sectors. Separate estimates for GDP of crop sector and livestock sector are not available, because, due to dominance of mixed crop plus livestock farming system, it is considered impossible to distinguish between inputs used in crop activity and livestock activity. However, separate estimates for value of output of these two activities are available.

Among the three sub sectors, output of fishery has grown at the highest rate during all the five decades since 1950-51. In the last three decades, output of livestock sector has been growing at a faster rate compared to crop sector. Growth rates in different sub sectors of agriculture indicate that Indian agriculture is diversifying towards livestock and fishery products away from crop products. Outputs of crop sector showed best growth during the period from 1980-81 to 1990-91.

Table 3.2

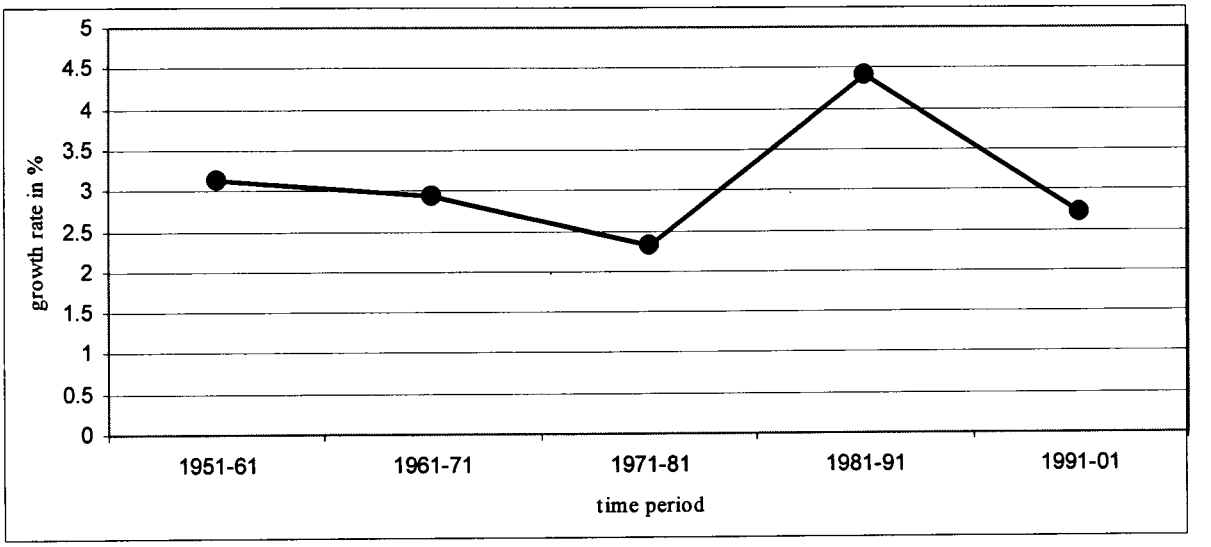
Average of annual growth rates in GDP and output of agriculture and its sub sectors at 1993-94 prices (%)

Period	Agriculture and allied activities	Agriculture	Fishery	Crops	Live stock	Fruits and vegetables	Other crops
1951-52to 1960-61	3.12	3.41	5.49	3.58	1.52	0.72	4.04
1960-61to 1970-71	2.92	2.97	3.91	3.29	0.93	6.53	2.79
1970-71to 1980-81	2.31	2.59	2.82	2.94	3.73	4.39	2.73
1980-81 to1990-91	4.40	4.72	5.57	4.73	4.71	3.65	5.03
1990-91to 2000-01	2.72	2.75	5.01	2.29	3.78	5.54	1.47

Source: EPW Research Foundation (2002), *National Accounts Statistics of India (1950-51 to 2000-01)*

Figure 3.1

Growth of agricultural sector since 1950-51



Accounts Statistics of India (1950- 51 to 2000-01)

Growth rates of overall agriculture and all the sub sectors except fruits and vegetables received setback after 1990-91(Chand 2004)[2]. The deceleration in growth rate appeared in the initial years of reforms and it deteriorated further in the post WTO period. In the case horticultural sector (fruits and vegetables), output growth rate increased from 3.65 percent during the decade before reforms to more than 5.54 percent during the reforms (EPW, 2002)[3]. It is worth noting that after 1991-92 output of horticultural sector increased annually by about 6 percent that is more than double the growth rate in output of non-horticulture crops. Output of non-horticulture crops has recorded lowest growth after 1990-91 in the post independence period.

3.4 Capital formation in Indian agriculture

Investment is one of the crucial factors determining the growth rate of agricultural sector. The government plays a very significant role in boosting agricultural growth through its increased investment in this field as also inducing the private investment in agriculture. The figures published by the Government in the economic survey reveal the mutual role of the two parties. Though the overall growth of the Indian economy has depended much upon the performance of agriculture, over the years, not much public investment has been made on its development. There is a steady deceleration in public investment in gross capital formation in agriculture. At the same time, private investment has been increasing over the years. During 1960-61, the total investment in the agricultural sector was 1670 crores of which the public sector contributed 590 crores and the public sector, 1070 crores. However, during 1980-81, the total investment increased to 4640 with 2840 and 1800 crores by the private and the public sectors respectively (Economic Survey, 1998-99)[4]

However, during the 1990s the capital formation in agriculture as percentage of GDP declined as shown in table 3.3. The investment in agriculture as percentage of GDP declined from 1.6 per cent in 1993-94 to 1.3 per cent in the subsequent years i.e., during early 2000s. This declining trend was mainly due to near stagnation or fall of public investment in agriculture since the early nineties. The year 2001-02 is likely to be a turning point as public investment in agriculture has touched Rs. 4794 crores, which was significantly higher than that of the previous five years. If this trend were maintained, then it would be an indication of some success resulting from the Government's recent efforts in diverting higher flow of resources to agriculture.

Table 3.3

Gross capital formation in agriculture at 1993-94 prices (Rupees in crores)

Year	Total investment	Private investment	Public investment	% share (private)	% share (public)	Investment in agriculture as percent of GDP
1993-94	13523	9056	4467	67.0	33.0	1.6
1994-95	14969	10022	4947	67.0	33.0	1.6
1995-96	15690	10841	4849	69.1	30.9	1.6
1996-97	16176	11508	4668	71.1	28.9	1.5
1997-98	15942	11963	3979	75.0	25.0	1.4
1998-99	14895	11025	3870	74.0	26.0	1.3
1999-00	17304	13082	4222	75.6	24.4	1.4
2000-01	16687	12768	3919	76.5	23,5	1.3
2001-02	18057	13263	4794	73.5	26.5	1.3

Source: Central Statistical Organization.

3.5 Foreign trade of agricultural commodities

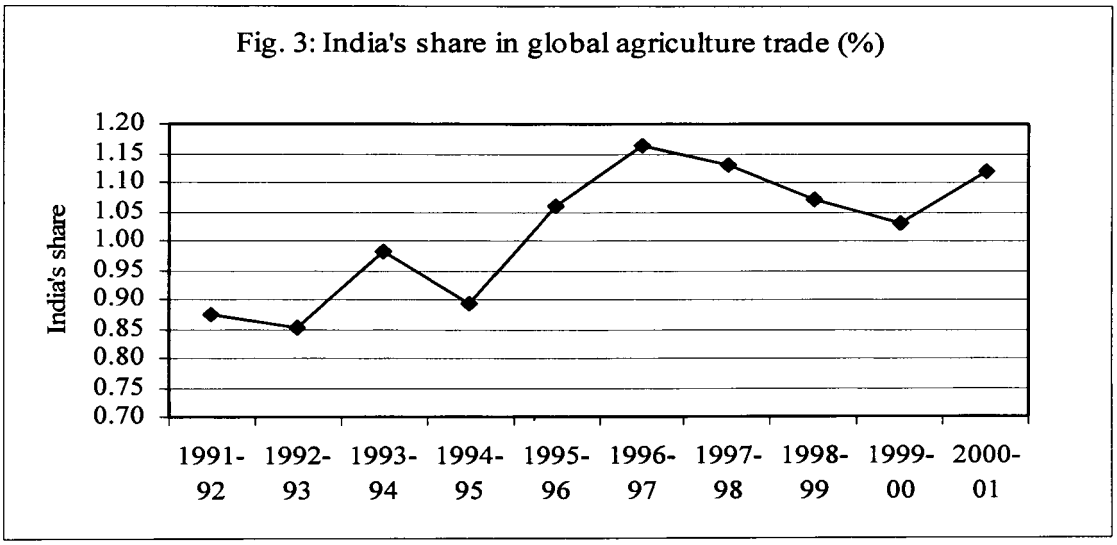
Foreign trade plays a crucial role in the economic development of a country that the underdeveloped countries have launched on a massive scale especially after Second World War. For a country of its size, India is a minor participant in world

trade. At present, India accounts for less than 1 per cent of overall world exports and imports (Mattoo and Subramanian2003)[5].

Subsequent to the economic reforms initiated in 1991, removing the restrictions and protective licensing regime, free trade in a large number of items has become the order of the day. With the removal of Quantitative Restrictions on agricultural items and urea, the Indian farmer community has been placed to face stiff competition from the developed nations.

Figure 3.2

India's share in global agricultural trade (%)



Source: Ramesh Chand, "India's Agricultural Trade Policies and its stand in the Doha Round of WTO Negotiations", National Centre for Agricultural economics and Policy Research, New Delhi

Ramesh Chand[6] gives a picture of india's share in global trade in the ten year period since 1991-92 (see figure 3.2). Untill 1995-96, India's share was less than one per cent of the global agricultural trade. However, with the introduction of AoA, our participation in the trade improved and the share gone up to 1.15 % during 1996-97, thereby maintaining the position above one per cent in the succeding years.

3.5.1 Agricultural Exports

Exports from India are broadly classified into several categories like agriculture and allied products, oils and minerals, manufactured goods, mineral fuel etc. Among them, agriculture and allied products occupied significant place in the total export earning of the country. Agriculture and allied products alone contributed 31.7 per cent of the total export earning of India in 1970-71, which fell down to 30.6 per cent in 1980-81 (Ruddar Datt and K P M Sundharam)[7]

Table 3.4

Export Value of Agricultural Commodities in Total National Exports

(Rupees in crores)

Year	Agricultural exports	Total national export	% of agricultural exports to total national exports
1990-91	6012.76	35527.28	18.49
1991-92	7838.13	44041.81	17.80
1992-93	9040.30	53688.26	16.84
1993-94	12586.55	69748.85	18.05
1994-95	13222.76	82673.40	15.99
1995-96	20397.74	106353.35	19.18
1996-97	24161.29	118817.32	20.33
1997-98	24843.45	130100.64	19.10
1998-99	25510.64	139751.77	18.25
1999-00	25313.64	159095.20	15.91
2000-01	28909.30	202509.76	14.28
2001-02	16254.29	115762.05	14.04
2002-03	N A	N A	13.58
2003-04	N A	N A	12.62

Source: website, http://www.agriculture.industry-india

India has been a consistent but small net exporter of agricultural products since 1980. The major devaluation of the Indian rupee that followed the balance of payment crisis in 1991 has had a much greater impact on the value of exports of clothing, textiles and other manufactured goods than on exports from the agricultural sector. The share of agricultural exports in total Indian exports has been declining in recent years. In 2003-04, agricultural products made-up around 12 per cent of the total value of Indian exports compared with 18 per cent in 1990-91. No one agricultural product dominated export trade.

Table 3.4 shows the contribution of agricultural sector in total national exports from 1990-91 to 2003-2004. Agricultural share fluctuated during the reference period and registered the highest value during 1996-97 i.e., 20.33%. It started declining further from 1996-97 onwards thereby showing 12.62 % during 2003-04[8]. The declining trend in the relative share of agriculture is primarily due to increased non-agricultural exports from the country and hence agricultural sector plays major role in earning a good sum of foreign exchange.

3.5.2 Agricultural imports

Import of agricultural as well as non- agricultural commodities registered sharp increase in the recent past. Data given in table 3.5 show the trend of India's total as well as agricultural imports since 1990-91. Regarding the percentage share of agriculture in the total imports, the share was too narrow in the early 1990's; say 2.79% in 1990-91 and 3.09 % in 1991-92. However, the share increased to 6.6 in 1994-95 and thereafter after a slight slop in the share for the next three financial years, it recorded the highest share of 8.17 % during 1998-99 for the first time in the decade.

During 2001-02, agricultural commodity imports were valued at $2.3 billion, two-third of which was accounted for by a single commodity, namely edible oil. In recent years, edible oil accounting for nearly 60 to 65 per cent of the value of total agricultural imports has become the single largest import item. Raw cashew nuts, nuts (almonds from USA) and pulses are among the other dominant agricultural imports, each of which accounts for nearly 5 to 10 per cent of the total agricultural imports in recent years. There was a substantial increase in the import of pulses during 2001-02 with its share in the total agricultural imports rising by over 28 per cent. Agricultural imports in 2003-04 constituted only a small proportion (6.19 per cent) of the country's total imports.

Table 3.5

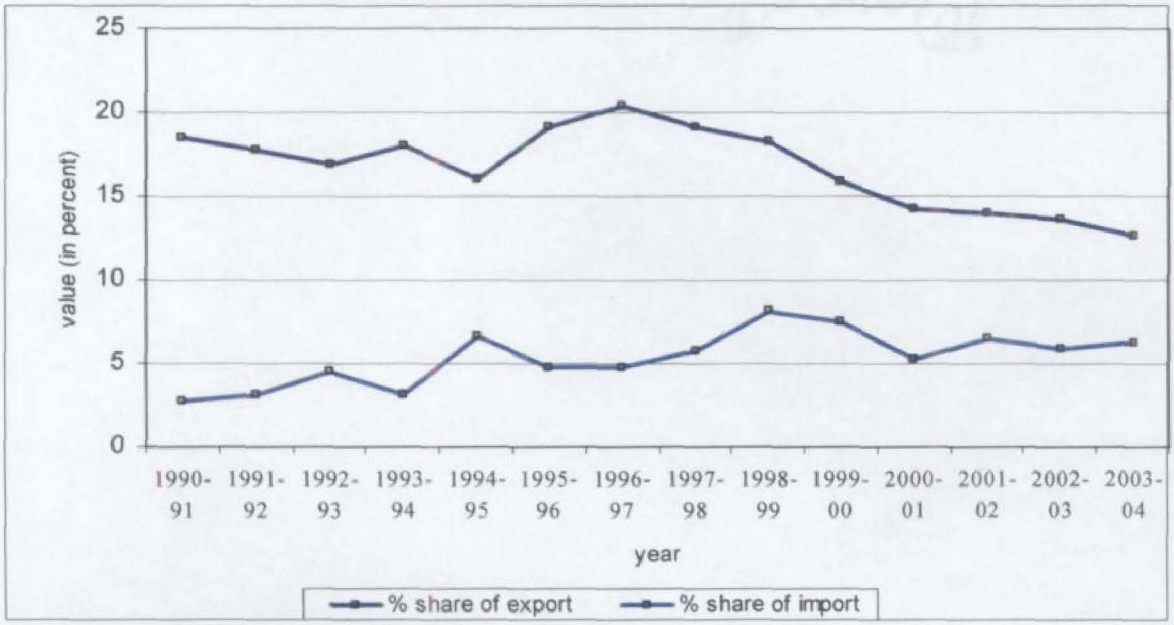
Import value of Agricultural Commodities in Total National imports
(Rupees in crores)

Year	Agricultural Imports	Total National Imports	% Agricultural Imports to Total National Imports
1990-91	1205.86	43170.82	2.79
1991-92	1478.27	47850.84	3.09
1992-93	2876.25	63374.52	4.54
1993-94	2327.33	73101.01	3.18
1994-95	5937.21	89970.70	6.60
1995-96	5890.10	122678.14	4.80
1996-97	6612.60	138919.88	4.76
1997-98	8784.19	154176.29	5.70
1998-99	14566.48	178331.69	8.17
1999-00	16066.73	215528.53	7.45
2000-01	12030.36	226773.47	5.31
2001-02	9311.55	141989.68	6.56
2002-03	N A	N A	5.92
2003-04	N A	N A	6.19

Source: http://www.agriculture.industry-india

Figure3.3

Percentage share of agriculture in the total national trade



Source: http://www.agriculture.industry-india

3.6 Agricultural sector under the New Economic Policy

After achieving independence, India adopted protectionist trade policy. In the case of agriculture, trade was subject to quantitative restrictions, canalization (the exclusive importing of certain goods through designated government agencies), licenses, quotas and high tariff rates. During 1990-91, India had one of the most restrictive import tariff structures among the developing countries of the world; some form of quantitative restriction on imports (Chadra 2001)[9] was protecting an estimated 93 per cent of India's local production. The balance of payments crisis in 1991 caused a reassessment of trade policy. The exchange rate was devalued, restrictions on capital inflows and foreign investment loosened, tariffs reduced and quantitative import restrictions eased. However, the reductions in tariffs were mainly focused on manufacturing industries; change for the agricultural sector was largely ignored. It was with the commencement of World Trade Organization (WTO) in

1995 and the implementation of the Uruguay Round Agreement on Agriculture (AoA) that major reforms were introduced in the agricultural sector.

3.6.1 Agreement on Agriculture (AoA)

The liberalization process in the agricultural sector had to wait until the formation of the WTO to gather momentum. The GATT was a failure in promoting free trade in agricultural products (Bernad and Michel, 1995)[10]. Agricultural trade was practically kept out of free trade regime until the formation of WTO. The AoA necessitated far reaching measures of liberalization in Indian agriculture. The inward oriented policies were systematically replaced by outward oriented policies.

The AoA establishes a number of generally applicable rules with regard to trade-related measures, primarily in the areas of market access, domestic support and export subsidies. These rules relate to country specific commitments to improve market access and reduce trade-distorting subsidies. The reduction commitments under AoA are presented in the table given below.

Table 3.6

Reduction commitments under AOA

Item	Developing Countries (%)	Developed Counties (%)
Tariffs:		
• Average cut for all agricultural products	24	36
• Minimum cut per product	10	15
Domestic support: (Base period: 1986-1988)		
• AMS	13	20
Exports subsidy: (Base period: 1986-1990)		
• Subsidy outlays	24	36
• Subsidized quantities	14	21
Implementation period for All commitments	1995-2004	1995-2000

Source: WTO, 2001[b]

3.6.1.1 Market access

Under market access commitments in the AoA, member countries were required to replace all types of non-tariff barriers with tariffs, and to reduce tariff levels under a time-bound program. In addition to these commitments, this measure also called for maintaining current access opportunities and establishing minimum access tariff quotas. For countries such as India, where Quantitative Restrictions (QRs) covered all agricultural imports for Balance of Payment (BoP) reasons, only ceiling bindings had to be submitted. For these ceiling bindings, there was no upper limit, provided the tariffs had not been bound in earlier rounds of negotiations.

The process of tariffication of non-tariff barriers was a central element of the Uruguay Round Agreement on Agriculture. Under this agreement, non-tariff measures were to be converted to tariff equivalents. Developing countries were given the flexibility to offer 'ceiling bindings' (agreed maximum Tariffs) on products that were subject to previously unbound tariffs or subject to some form of qualitative restriction. These ceiling bindings could be higher than the September 1986 applied tariffs (the rate at which developing countries were required to limit tariffs under the General Agreement on Tariffs and Trade then in place). In addition, there was no obligation to reduce these ceiling bindings during the implementation period (FAO, 2003)[11]

3.6.1.2 Domestic support

Countries use a number of policy instruments such as support prices and input subsidies, which affect incentives that farmers receive in terms of prices and hence influence resource allocation. In the AoA, the impact of price support and related policies is captured through the AMS. India has a product price support system in

the form of minimum support prices announced by the government for different commodities, based on the recommendations of the Commission for Agricultural Costs and Prices. Our analysis shows that for 18 major commodities, the product-specific support, as defined under the AoA during the base period, was (-) US$18.11 billion (Table 3.7). As a percentage of the value of agricultural output (crop sector), the product-specific AMS is (-) 26.1 percent during this period. During 1995-96, the estimated product specific AMS turned out to be (-) 34.36 percent of the value of agricultural output, and during 2000-2001, the same was estimated to be (-) 28.6 percent of the value of agricultural output.

The non-product-specific support, which includes subsidies on irrigation, fertilizers, electricity, credit and seeds, was about 1.25 percent of the value of agricultural output during the base period. During 1995-1996, the non-product-specific support was roughly 1.88 percent of the value of agricultural output, which was worked out to be about 2.32 percent of the value of agricultural output during 2000-01.

Table 3.7

Domestic support to Indian agriculture

Period	Product specific support (US$ billion)	As a percentage of the value of output of the agricultural sector	Non-product specific support (US$ billion	As a percentage of the value of output of the agricultural sector
(1986-87 to1988-89)	-18.11	-26.10	0.87	1.25
1995-96	-26.37	-34.36	1.44	1.88
1996-97	-27.67	-32.44	1.58	1.86
1997-98	-25.38	-29.52	1.84	2.14
1998-99	-27.75	-30.13	1.86	2.02
1999-00	-25.50	-27.24	2.07	2.21
2000-01	-26.00	-28.58	2.11	2.32

Source: WTO, 2001[b]

The negative product specific support to Indian agriculture shows that various controls on domestic as well external trade have kept domestic prices of major crops below world prices. In the case of domestic trade, these controls included restrictions on the movement of agricultural commodities, compulsory procurement levies, licensing and stocking requirements and credit controls. The controls on external trade comprised export prohibitions, quantitative restrictions, minimum export prices and canalization. The net result of these policies has been that the negative product specific support outweighs the positive non-product specific support.

3.6.1.3 Export competition

Export subsidies included in reduction commitments are direct subsidies paid by the government or any other agency, including payments in kind; payments that are made from the proceeds of levy imposed on agricultural products; subsidies that are given to reduce the cost of marketing including internal handling, processing, international transport and freight subsidy on export shipments.

As India does not have a system of direct export subsidies, it was not bound to make any reduction commitment on export subsidies. A few benefits were available to the exporters of agricultural commodities through income tax exemptions under section 80 - HHC of the Income Tax Act (1961) on profits from export sales. In 2000, the government decided to phase out these benefits over a period of five years starting from 2000-2001, making profits taxable by 2004-2005.

As the agreement allows developing member countries to subsidize costs of marketing agricultural products including handling, upgrading and other processing costs and the costs of domestic and international transport and freight, India is

making use of these provisions. The schemes facilitate mainly the exports of horticultural items and are operated by the Agricultural and Processed Food Products Export Development Authority (APEDA). Because the exports of many agricultural items have been adversely hit owing to the fall in commodity prices and aggressive subsidization by those members that are allowed to subsidize their exports, the government is thinking of extending these subsidies, which are permissible under the agreement, to other agricultural products as well. Though there is no commitment by India on export subsidies, there are restrictions on introducing direct export subsidies in the future that are not compatible with the agreement.

3.7 Bound rates of plantation / cash crops

Cash crops are high value crops of great economic importance and provide huge employment opportunities, the important among them being tea, sugar, coffee, rubber and tobacco. In recent times, cash crops have even facilitated the external sector, especially export crops like tea and coffee. The policies relating to the cash crops also underwent changes with the advent of the Agreement on Agriculture. A major factor causing changes in production, prices and trade is the commitment concerning the bound rates.

India is among the biggest producers, consumers and suppliers of tea in the world. However, even tea has been under-performing. Tea production in India peaked in 1998 and has been on the decline ever since. In fact, tea production declined by 5.9% in 2005. Natural rubber also did well in terms of production. Increases in production are despite the lifting of quantitative restrictions on natural

rubber imports since April 1, 2001. Globally, rubber prices have hit the roof. They jumped 123% in 2005, indicative of the growing demand[12].

Table 3.8

Bound and applied duty rates of different plantation / cash crops in India

Item	Base rate*	Bound Rate (%)	Basic duty in 2000-01Budget (%)
Raw coffee	140	100	70
Roasted coffee	140	150	70
Tea	140	150	70
Mate	140	100	35
Vanilla	Rs.60/Kg+40	100	35
Clove	140	100	35
Nutmeg	140	100	35
Cardamom	140	100	35
Ginger	140	150	35
Turmeric	140	150	35
Natural Rubber	85	25	25
TSR	85	25	25
Latex	--	UB	35

Source: GATT (1994: V/ Part I /27-29); Goyal (2000: 425-435); (2001: 412-417)

Note : * Base rate of duty is the duty prevailed on 1-9-1986 for all items except NR and the duty prevailed on 1-1-1990 for NR (GATT, 1994: V/ Part I-I, Part II-I), UB- Unbound, TSR- Technically Specified Rubber.

Table 3.8 presents a comparison of bound rates committed by the GOI for different plantation/cash crops. Since all the items except natural rubber are classified as agricultural products, the bound rates are 100 and 150 per cent for raw and processed forms respectively. Therefore, operationally, the bound rates of dry forms of natural rubber have been 29.4 per cent of the base duty compared to 107 per cent in the case of processed tea and coffee. Consequently, the flexibility drawn

from the higher bound rates was effectively used by enhancing the import duty rates of tea and coffee in the Union Budget for 2000-2001. This is to ensure protection in the context of the removal of Quantitative Restrictions on March 31, 2001 whereas the existing import duty of 25 per cent for dry forms of NR could not be raised.

3.8 Concluding remarks

Agriculture continues to be the backbone of Indian economy by providing livelihood for more than half of her total population. The primary sector of the economy also acts as a significant contributor to GDP and foreign exchange. In recent year, Indian agriculture has experienced profound changes. Changes elsewhere in the economy will also continue to put pressure for changes in the agricultural sector. A major change that took place in this sector is the globalization of Indian agriculture.

The first tentative change to support arrangements was introduced following India's implementation of the Uruguay Round Agreement on Agriculture (AoA), which required India to revise its trade support policies. As a result, the strict controls on trade in agricultural products were loosened with the virtual removal of all quantitative restrictions. The replacement of these control measures with relatively high tariffs has so far had little impact on trade or opened the domestic market up to competition. Globalization of Indian agriculture offers both opportunities and challenges to policy makers. Opportunities exist for deriving large benefits through substantial increase in the agricultural exports, especially, high value labor-intensive agricultural products. The challenges lie in modernizing small-scale agriculture and making it efficient and competitive

References:

1. Government of India (1951), *First Report of the National Income Committee*, April 1951, p.6
2. Chand Ramesh (2004), "*Agriculture Growth during the Reforms and Liberalization: Issues and Concerns, Policy Brief 20*", National Centre for Agricultural Economics and Policy Research, New Delhi
3. EPW Research Foundation (2002), *National Accounts Statistics of India (1950- 51 to 2000-01)*
4. Economic Survey (1998-99), p.120; Economic Survey 2001-02, p.202
5. Mattoo, A. and Subramanian, A. (2003), '*India and the multilateral trading system post-Doha: defensive or proactive*?' in Mattoo, A. and Stern, R.M. (Eds), India and the WTO, World Bank and Oxford University Press.
6. Ramesh Chand, "*India's Agricultural Trade Policies and its stand in the Doha Round of WTO Negotiations*", National Centre for Agricultural economics and Policy Research, New Delhi.
7. Ruddar Datt and K P M Sundharam (2003), "*Indian Economy*", forty Eighth Revised Edition, S Chand & Company Ltd., New Delhi, p. 514
8. Web site: http://www.agriculture_industry-india
9. Chadra, R. (2001), 'Trade and balance of payments' in *Economic and Policy Reforms in India*, National Council of Applied Economic Research, New Delhi, pp. 89–128.
10. Bernard H and K Michel (1995), "The Political Economy of the World Trading System: From GATT to WTO", Oxford Press, Oxford
11. FAO (Food and Agriculture Organization of the United Nations) (2003), "*WTO Agreement on Agriculture: The Implementation Experience– Developing Country Case Studies*", Rome, 2004, FAOSTAT database, Rome (http://faostat.fao.org).
12. "Meter's down for cash crops", Times News Network, March 3,

Area, production and productivity of natural rubber and tea under the New Economic Policy

Jomon Mathew “The impact of new economic policy on Indian agriculture: A study of selected cash crops ” Thesis. Department of Economics, Dr. John Matthai Centre , University of Calicut, 2006

4 *Area, production and productivity of natural rubber and tea under the New Economic Policy*

4.1 *Origin and expansion of rubber cultivation in India*

4.2. Growth and instability of area, production and productivity of natural rubber

4.3 Origin and development of tea industry in India

4.4. Importance of tea industry in the national economy

4.5 Growth and instability of area, production and productivity of tea

4.6 Index numbers of agricultural production and productivity

4.7 Summing up

Chapter 4

AREA, PRODUCTION AND PRODUCTIVITY OF NATURAL RUBBER AND TEA UNDER THE NEW ECONOMIC POLICY

Indian agriculture was brought under the purview of global trade regulating agreement with the signing of the World Trade Agreement evolved at the Uruguay Round on April 15, 1994. The world Trade Organization (WTO) came in to existence on January 1, 1995 aiming to ensure a *fair and equitable system of global trade* among the member countries. These policy reforms initiated since the 1990s posed serious challenges to hitherto pursued institutional support mechanism and supposed to have serious implications on area, production and productivity of important cash crops like rubber and tea.

The purpose of this chapter is to analyze the impact of New Economic Policy on the growth and instability of area, production and productivity of natural rubber and tea.

4.1 Origin and expansion of rubber cultivation in India

Natural rubber is a plantation tree crop* which is obtained from the bark of *Hevea Brasilians*, a tropical forest tree first found in Amazon forest of South America. Rubber tree is sturdy, quick growing and tall. It grows on many types of soil provided the soil is deep and well drained. A warm humid equitable climate (21° to 35°) and a fairly distributed rainfall of not less than 200 c m are necessary for the

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* *According to Barlow (1996), a plantation crop is understood to be the one cultivated systematically in plantations, as opposed to growing naturally in "native groves". Plantations can be established on family smallholdings of a few hectares or on commercial estates with hired managers and work forces*

growth of this plant. In India, these conditions are favorable traditionally in a narrow belt extending from Kanyakumary district in Tamil Nadu in the south to Dakshin Kannada and Kodagu districts of Karnataka state in the Western Ghats. Normally the life span of rubber tree is 35 years and starts yielding i.e., tapping** on an average after 6 to 7 years depending on clones. Unlike other crops, NR fetches yield through out the years.

India was the first country in the east to undertake commercial cultivation of natural rubber. Before the commercialization of rubber cultivation in India, it was widely found in the forests of Assam during 1880-1890 and its annual production was 200-400 tons. The commercial cultivation of rubber started in 1905 with the formation of Periyar Syndicate in the erstwhile Travencore States in Kerala by a group of British planters. In the same year, rubber was also introduced in erstwhile Cochin State at Palappilly. The important reason for the choice of foothills of southwestern India for rubber planting was the ideal agro climatic conditions. The favorable socio-economic factors also contributed to the rapid expansion of rubber cultivation in the region.

It was estimated that during 1905 to 1907, rubber was cultivated to the extent of 404.86 hectares. Travencore Rubber and Produce Company and Malayalam Rubber and Produce Company were the major large-scale estates that were established during 1904-1910. Rubber was exported to London from India, as many of the planters were London based.

** *Latex is obtained from the bark of the rubber tree by tapping. Tapping is a process of "controlled wounding" during which these shavings of bark are removed.*

Natural Rubber cultivation in India has been traditionally concentrated in Kerala and to some extent in the adjoining states of Karnataka and Tamil Nadu. The agro-climatic conditions in these states were very favorable for rubber cultivation. Since mid eighties, rubber cultivation was extended to the northeastern states of Tripura, Assam, Meghalaya and Nagaland. It has to be noted that rubber plantations were established in India from the beginning of the twentieth century. Kerala, being the largest producer of natural rubber in India, accounted for 83% of the area under cultivation during 2003-04. During the same period, Tripura was the second largest rubber producing state with 5% of total area under rubber cultivation, followed by Karnataka (3.6%) and Tamil Nadu (3.3%).

The world rubber consumption is estimated to have increased to 20.03 million tons in 2004 from 19.33 million tons in 2003. China is the leading consumer of natural rubber in the world with a share of 19.69 per cent of total world consumption. Followed by China, USA (13.82%), Japan (9.84%), India (9.00%) and Malaysia (4.87%) are the other leading natural rubber consumers in the world as per the 2004 estimates.[1]

Table 4.1

Share of different countries in world production of natural rubber (%)

Year	Thailand	Indosesia	Malaysia	India	Others	Total
1980	13.01	26.49	39.74	4.02	16.74	100
1985	16.45	25.68	33.40	4.50	19.97	100
1990	24.90	24.64	25.21	6.32	18.93	100
1995	29.73	23.97	17.84	8.23	20.23	100
2000	34.80	22.27	9.12	9.33	24.48	100
2004	34.33	23.97	13.56	8.62	19.52	100

Source: Computed from various issues of 'Indian Rubber Statistics', published by Rubber Board of India, Kottayam

India's natural rubber sector occupies very significant position in the national economy in terms of production and consumption. India's share in world rubber production has been going on increasing at a slow rate over the last two decades. With 8.62% of the total world production of natural rubber, India remains the fourth largest producer of natural rubber in the world next to Thailand, Indonesia and Malaysia as per the latest figures. A notable feature is that while Malaysia and Indonesia stepped down in rubber production, India and Thailand improved their share in total production over the last two decades. China (5.64%) and Vietnam (4.81%) are the major contributors among other countries.[2]

4.2 Growth and instability of area, production and productivity of natural rubber

This section analyzes the impact of the New Economic Policy on the growth and instability of area, production and productivity of natural rubber in India. The analysis is primarily based on secondary data ranging from 1985 to 2004. The time series data on area, production and productivity are compiled from various issues of Indian Rubber Statistics, published by Rubber Board of India, Kottayam. For the purpose of comparison, the period of study has been sub-divided into pre liberalization (1985-1994) and post liberalization (1995-2004) periods. In order to eliminate the impact of cyclical elements, three-year moving averages were taken to smooth out the amplitude of fluctuations in area, production and productivity.

Growth rate of area, production and productivity in the two sub-periods were estimated using the kinked exponential growth model[3]. There are different criteria to measure instability. The present analysis uses the Cuddy Della Valle Index to study instability.

4.2.1 Growth rate analysis

The growth rate analysis of area, production and productivity of natural rubber is made in the following section.

4.2.1.1 Growth rate of area under rubber cultivation

Small rubber growers dominate the rubber plantation industry in India and the average size of smallholdings is around 0.50 ha. Nearly 10 lakhs growers are engaged in the rubber cultivation in India. The small holders account for 88 per cent of the total area and 91 per cent of the total production of natural rubber.[4]

The total area under rubber cultivation in India was 382831 hectare during 1985-86. In the succeeding years, there had been a rapid expansion on cultivated area of rubber. Between 1985-86 and 1994-95, there was an increase of 132716 hectors, showing a growth of 34.67%. However, the post liberalization period represented a slow increase of only 49925 hectors, i.e., 10.29% growth between 1994-95 and 2004-05.

The annual growth rate of area under natural rubber cultivation in India, given in table 4.2 reveals that during the last 20 years there had been continuous increase in the area of natural rubber under cultivation. Further, the period wise analysis shows that pre liberalization period registered far better average rate of growth i.e., 3.37% per annum compared to the post liberalization period, which showed only an average of 1.2% rate of growth per year.

Table 4.18 shows the results of kinked exponential growth rate estimation. It can be found that the growth rate of area under rubber cultivation had been very significant both for pre and post liberalization series. The rate of growth was 3.06%

during the pre liberalization period whereas the rate of growth declined to 0.80% during the post liberalization period.

Table 4.2

Area under natural rubber cultivation

Year	Area in hectares	3 year moving average	Annual growth rate
1985-86	382831	-------	--------
1986-87	402329	402224	5.09
1987-88	421512	421475	4.77
1988-89	440584	440812	4.52
1989-90	460341	458669	4.48
1990-91	475083	474646	3.20
1991-92	488514	487657	2.83
1992-93	499374	498769	2.22
1993-94	508420	507780	1.81
1994-95	515547	516014	1.40
1995-96	524075	524289	1.65
1996-97	533246	533951	1.75
1997-98	544534	543607	2.12
1998-99	553041	552053	1.56
1999-00	558584	558098	1.00
2000-01	562670	562751	0.73
2001-02	567000	566556	0.77
2002-03	570000	570333	0.53
2003-04	573980	573993	0.70
2004-05	578000	------	1.01

1. Growth between 1985-86 and 1994-95: 132716 ha
   Overall growth rate : 34.67%, Annual average growth rate: 3.37%
2. Growth between 1995-96 and 2004-05: 49925 ha
   Overall growth rate : 10.29%, Annual average growth rate : 1.2%

Source: Computed from different issues of 'Indian Rubber Statistics', published by Rubber Board of India, Kottayam

A possible reason for the lower growth rate may be due to non-availability of land for expansion of rubber cultivation in the major rubber growing regions. Though the rate of growth showed a declining tendency, the total area under natural rubber cultivation has been going on increasing through out the period of analysis. The tempo of planting has always been sensitive to price fluctuations.

Table 4.3

Growth rate of area under rubber cultivation

Sub – Periods	Growth rates
Pre liberalization period (1985-86 to 1994-95)	3.06* (21.09)
Post liberalization period (1995-96 to 2004-05)	0.80* (4.93)

Source: Computed from 'Indian Rubber Statistics' (various issues), published by Rubber Board of India, Kottayam

Note: 1.*Growth rates are statistically Significant at 1 per cent level

2. Figures in the parenthesis denote the t values

4.2.1.2 Growth rate of natural rubber production

The production of rubber in India includes both natural rubber and synthetic rubber. The total production of synthetic rubber constitutes only a small percentage of the total production of rubber in India. During 1994-95, the share of synthetic rubber was only 11.9 percent where as the share remained almost stagnant (11.2%) during 2004-05. The Production of natural rubber has increased at a steady rate over the years.

During 1985-86, the total natural rubber production in India was 200465 tons, which increased to 471815 tons during 1994-95. These 10 years of pre-liberalization period marked a remarkable overall growth rate of 155.04 per cent in production. However, the increase in natural rubber production during 10 years of post liberalization period was only 242090 tons i.e., the quantity increased from 506910 tons during 1995-96 to 749000 tons during 2004-05, showing only 47.76 per cent growth in production of natural rubber.

Table 4.4

Production of natural rubber in India

Year	Production in tons	3 year moving average	Annual growth rate
1985-86	200465	-------	-----
1986-87	219520	218394	9.5
1987-88	235197	237963	7.14
1988-89	259172	263889	10.19
1989-90	297300	295362	14.71
1990-91	329615	331220	10.87
1991-92	366745	363283	11.26
1992-93	393490	398465	7.29
1993-94	435160	433488	10.59
1994-95	471815	471295	8.42
1995-96	506910	509383	7.44
1996-97	549425	546722	8.39
1997-98	583830	579433	6.26
1998-99	605045	603713	3.63
1999-00	622265	619238	2.85
2000-01	630405	627890	1.30
2001-02	631000	636802	0.09
2002-03	649000	663667	2.85
2003-04	711000	703000	9.55
2004-05	749000	---------	5.34

1. Growth between 1985-86 and 1994-95: 271350 tons
Overall growth rate: 35.36%, Annual average growth rate: 9.97%
2. Growth between 1995-96 and 2004-05 : 242090 tons
Overall growth rate: 47.76%, Annual average growth rate: 4.77%

Source: Computed from 'Indian Rubber Statistics' (various issues) published by Rubber Board of India, Kottayam

The overall growth rate of natural rubber production in India has been showing an increasing trend during the last 20 years. However, a close examination of the annual growth rate presents a quite different picture. During the pre liberalization period, the annual average growth rate was 9.97% that declined to 4.77% per year during the post liberalization period. The results of exponential growth model indicate that the growth rate had been highly significant and positive for the period of analysis. The rate of growth was 9.78% during the pre liberalization period. However, the post liberalization series shows comparatively lower rate of growth i.e., 3.59%.

Table 4.5

Growth rate of natural rubber production

Sub – Periods	Growth rates
Pre liberalization period (1985-86 to 1994-95)	9.78* (47.41)
Post liberalization period (1995-96 to 2004-05)	3.59* (15.44)

Source: Computed from 'Indian Rubber Statistics' (various issues) published by Rubber Board of India, Kottayam

Note: 1.*Growth rates are statistically Significant at 1 per cent level

2. Figures in the parenthesis denote the t values

4.2.1.3 Growth rate of rubber productivity

Productivity measured in terms of yield per tapped hector has significance in two levels. Firstly, as India has a strong rubber industry base, the demand for NR is increasing year after year. However, the pace of increase in production is less than that of increase in consumption. Such a situation necessitates

import of natural rubber that will result in loss of foreign exchange. In order to avoid this, production has to be increased. Since production of natural rubber in traditional growing area has reached its saturation point, productivity has a crucial role in increasing the production of NR. Secondly, as far as majority of small farmers are concerned, in order to retain the revenue from rubber cultivation, increase in productivity is essential.

Table 4.6

Productivity of natural rubber

Year	Yield (Kg/Ha)	3 year moving average	Annual growth rate
1985-86	898	--------	----------
1986-87	926	923	3.11
1987-88	944	948	1.94
1988-89	974	982	3.18
1989-90	1029	1026	5.65
1990-91	1076	1078	4.57
1991-92	1130	1132	5.02
1992-93	1191	1202	5.31
1993-94	1285	1279	7.89
1994-95	1362	1356	6.00
1995-96	1422	1429	4.41
1996-97	1503	1491	5.70
1997-98	1549	1538	3.06
1998-99	1563	1563	0.90
1999-00	1576	1572	0.83
2000-01	1576	1576	0.00
2001-02	1576	1581	0.00
2002-03	1592	1587	1.28
2003-04	1663	1653	4.46
2004-05	1705	1704	2.53
2005-06	1745	-----	2.35
1.Growth between 1985-86 and 1994-95 :464 Kg/Ha Overall growth rate : 51.67%, Annual average growth rate: 4.74% 2.Growth between 1995-96 and 2003-04 : 170 Kg/Ha Overall growth rate : 19.9%, Annual average growth rate: 2.32%			

Source: Computed from 'Indian Rubber Statistics' (various issues) published by Rubber Board of India, Kottayam

Productivity of NR in India was 898 kg/hector in 1985-86. There had been continuous improvement in the yield of NR in the succeeding years. The ten years of pre liberalization period recorded an overall growth rate of 51.67% in yield per hector of NR. However, the post liberalization period from 1994-95 to 2004-05 showed only an increase of 19.9% yield per hector. It was 1705 kg/hector in the year 2004-05. It has further increased to 1745 kg/ha during 2005-06.

An analysis of growth rate reveals that during the pre liberalization period there had been an average growth of 4.74% per annum. However, the average rate of growth slightly declined to 2.32% per annum during the post liberalization period. The results of kinked exponential growth model also indicate the same trend. The series showed 5.14% growth during the first sub period. However, the second sub period shows positive but comparatively lower rate of only 1.91% growth. Even though the rate of growth has registered a declining trend, the overall performance of natural rubber in terms of productivity is significantly positive and thus provides an optimistic picture.

Table 4.7

Growth rate of natural rubber productivity

Sub – Periods	Growth rates
Pre liberalization period (1985-86 to 1994-95)	5.14* (23.88)
Post liberalization period (1995-96 to 2004-05)	1.91* (7.85)

Source: Computed from 'Indian Rubber Statistics' (various issues) published by Rubber Board of India, Kottayam

Note: 1.*Growth rates are statistically Significant at 1 per cent level

2. Figures in the parenthesis denote the t values

4.2.2 Instability analysis

The instability indices give the degree of fluctuations around the trend and are zero when there is perfect stability or changing at constant rate. Values above zero would indicate the extent of instability around the trend pattern. In order to study variability, our study estimated the coefficient of variation around the trend line as suggested by Nadakarni (1969)[5]and Cuddy and Della (1978)[6] instead of simple coefficient of variation. India's performance in area, production and productivity of natural rubber during the pre and post liberalization periods is being analyzed with the help of Cuddy Della Valle Index and is presented in table 4.8.

Table.4.8

Instability indices of area, production and productivity of natural rubber

Period	Area	Production	Productivity
Pre- liberalization period (1985-86 to 1994-95)	0.3514	0.1174	0.3514
Post-liberalization period (1995-96 to 2004-05)	0.1888	0.7725	0.7262
Overall period (1985-86 to 2004-05)	1.0564	1.8926	1.2431

Source: Computed from 'Indian Rubber Statistics' (various issues), published by Rubber Board of India, Kottayam

The area under rubber cultivation showed high instability of 0.3514 during pre liberalization period. However, instability has declined to 0.1888 during the post liberalization period. Regarding production and productivity of natural rubber, the instability increased during the post liberalization period compared to pre liberalization period. In case of rubber production the instability was found to be

more during post liberalization period i.e., 0.7725 when compared to low instability of 0.1174 during the pre liberalization period. Yield instability was also presented the same trend. That is to say, it increased from 0.3514 during pre liberalization period to 0.7262 during the post liberalization period.

From the instability analysis, we derive the following conclusion:

- Instability in area under rubber cultivation declined during post liberalization period while production and yield instability increased during the post liberalization period.
- The instability in area, production and productivity of rubber for the overall period was worked out to be very high.

4.3 Origin and development of tea industry in India

Tea of commerce is derived from a plant called *Camellia sinensis.* Tea is a shrub of Eastern Asia having fragrant white flowers and evergreen leaves, extensively cultivated in China, India and Japan etc. The dried leaves of this plant, prepared by various processes and various stages of growth, an aromatic slightly bitter drink made by steeping tea leaves in boiling water, often served with milk or lemon, and sugar served hot or cold.[7]

Tea is one of the oldest industries in India and today it enjoys the status of one of the best-organized industries in the country. Even though tea has been known since 2737 B.C and consumed as a beverage for over 1200 years,[8] its cultivation in India commenced very recently. The weakening of trade relations between China and Britain during 1780 led to the initiative of East India Company to raise the commodity in India. In 1778, Sir Joseph Banks was asked to prepare a series of

notes for the company. He recommended tea cultivation in India. He gave priority to tea as an article of greatest national importance to Britain.

The inception of tea industry in India can be associated with the refusal of the Chinese government in 1833 to renew the agreement as granting the East India Company the rights of monopoly of British trade with China. This removal of monopoly of the China trade in 1833 quickened their perceptions to the advantages likely to accrue to India by the establishment of a new industry. Subsequently, in 1834, lord William Bentinck, the then Governor General appointed a committee called Tea Committee with Dr. N Wallich as head to study a plan for the establishment of their introduction of tea culture in India and for the superintendence of its execution.

The committee recommended that G J Gardon should be directed to proceed to China to obtain more knowledge about the cultivation. In 1835, the secretary of the committee dispatched the seed from China that reached Calcutta later in the same year. A governmental experimental area was opened at Sudiya with seeds from China.

It was reported, "there was a frenzied rush for opening up tea gardens and in fact, tea became a favorite topic"[9]. Tea was first planted in Darjeeling (W. Bengal) in 1839, in Sylhet and Cachar (Assam) in 1855, in the Terai (W. Bengal) in 1862 and in the Dooars (W. Bengal) in 1874.The foundation of the present tea industry was laid between 1856 and 1859[10]

In 1850, a private garden was started and then the number of gardens began to increase. From the later date, the rate of growth was amazing, both in the

number of estates and the area under cultivation. The following table will demonstrate this clearly.

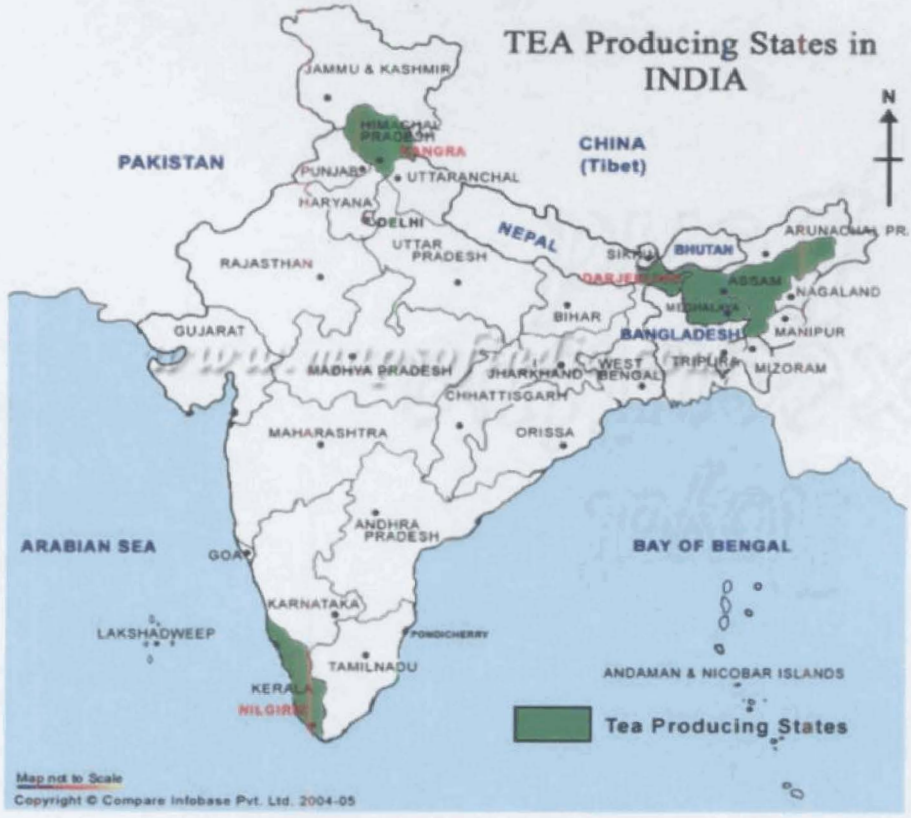
Table 4.9

Tea industry in progress (period: 1850-2001)

Year	No. of estates	Area under tea cultivation (hectares)
1850	1	759
1853	3	981
1871	295	12668
1951	6214	316840
1981	13410	383629
1990	13860	416269
2000	112010	504366
2001	115264	509770

Source: Computed from different issues of 'Tea Statistics', Published by Tea Board, Calcutta

Tea Production Map of India



4.3 Importance of tea industry in the national economy

The tea industry has been of considerable importance in the national economy of India. India remains the world's largest producer and consumer of tea. Tea production in India in 2003 reached the record level of 857 million Kg. However, it is noticed that India's share in the world production has remained constant for the last two decades. Table 4.10 shows the percentage share of different countries in world tea production.

Table 4.10

Share of different countries in world tea production (in percentage)

Year	India	China	Sri Lanka	Kenya
1982	29.32	N.A.	9.82	N.A
1989	27.49	21.37	8.31	7.21
1991	28.58	20.53	9.15	7.72
1999	27.78	22.73	9.56	8.37
2001	27.62	22.70	9.59	9.53
2003	27.31	24.48	9.66	9.36

Source: Computed from different issues of 'Tea Statistics' published by Tea Board, Calcutta

India's domestic consumption has risen steadily over the last two decades. In 1985, 63.3% of the total production of tea was consumed at home, whereas in 2004, 88.5% of tea produced in India was domestically consumed. India is one of the major tea exporters accounting for about 12.51 per cent in total world tea export. As the data reveals (table 4.11), India is the fourth largest exporter of tea next to Sri Lanka, Kenya and China. The quantum of export was 205.8 million kg in the year

2004. The table shows a declining trend in the share of India's export of tea during last two decades.

Table 4.11

Share of different countries in total world export of tea (in percentage)

Year	India	Sri Lanka	China	Kenya
1982	23.32	22.24	N.A	N.A
1989	18.90	18.11	18.18	14.50
1991	18.81	19.54	17.14	16.27
1999	15.15	20.78	15.78	19.11
2001	13.09	20.61	17.90	18.50
2003	12.51	21.03	18.73	19.40

Source: Computed from different issues of 'Tea Statistics' published by Tea Board, Calcutta

It has been observed that while Kenya registered a continuous improvement in tea exports, India's share reduced by one half within a period of two decades i.e., from 23.32 per cent in 1982 to 12.51 per cent in 2003. Major reasons for this reduced contribution are low net balance in output after meeting the domestic consumption needs and declining trend in production and productivity of tea. At the same time, Sri Lanka and China, maintained the first and third positions respectively in the world tea exports with constant share over the past two decades.

Besides, tea industry makes significant contribution to the national revenue by way of excise duty, import duty, and a cess under the Tea Act. As it is a highly labor intensive industry, it is a good source of employment. More than a million workers in India are directly employed in the tea plantations and manufacturing industries (to

be more precise, the estimated total number of laborers as on December 2000 was 1209721[11]). Similarly, tea industry influences the growth of many other industries and provides a stimulus to the development of means of transport and communication and forestry.

4.5 Growth and instability of area, production and productivity of tea

The impact of New Economic Policy on growth and instability of area, production and productivity of tea is examined in this section. Several methods of computation of growth rates such as annual growth rates, kinked exponential growth rates[12] etc. are available and used in the following section. Similarly, the instability analysis was done by using Cuddy-Della Valle index.

4.5.1 Growth rate analysis

The growth rates of area, production and productivity of tea are worked out and given in the following section.

4.5.1.1 Growth rate of area under tea cultivation

In India, tea cultivation is mainly concentrated in the states of Assam, W. Bengal, Himachal Pradesh and Kerala[13]. Total area under tea cultivation was 398966 hectares in 1985. By the end of pre-liberalization period, i.e., in 1994, the total area registered an increase of 27000 hectares to reach 425966 hectors, resulting in an overall growth rate of 6.77% over the years. The post-liberalization period showed a far better performance in terms of area under cultivation. The area under tea cultivation increased from 427065 hectares in 1995 to 500000 hectares in 2004. During these 10 years, there was an increase of 72935 hectares of tea, showing an overall growth rate of 17.08 per cent.

A comparative study of the annual growth rates reveals that there has been slow but continuous increase in the area under tea cultivation. Ten years of pre liberalization period showed only a marginal growth of 0.73% per year and this however, is increased to an average of 1.66% per annum during the post liberalization period.

Table 4.12

Area under tea cultivation

Year	Area in hectares	3 year moving average	Annual growth rate
1985	398966	---------	------
1986	407647	405982	2.18
1987	411335	411109	0.90
1988	414374	413545	0.73
1989	414953	415189	0.15
1990	416269	417230	0.32
1991	420470	419009	0.96
1992	420289	4419707	-0.05
1993	418363	421539	-0.46
1994	425966	423798	1.82
1995	427065	428078	0.26
1996	431204	430854	0.97
1997	434294	446508	0.72
1998	474027	466173	9.15
1999	490200	489531	3.41
2000	504360	501445	2.89
2001	509770	508692	1.07
2002	511940	507237	0.43
2003	500000	503980	-2.33
2004	500000	-------	0.00
1.Growth between 1985 and 1994 : 27000 hectors Overall growth rate: 6.77%, Annual average growth rate: 0.73% 2.Growth between 1995 and 2002 : 72935 hectors Overall growth rate: 17.08%, Annual average growth rate: 1.66%			

Source: Computed from different issues of 'Tea Statistics', published by Tea Board of India

The result of kinked exponential growth shows that during pre-liberalization period, growth rate of tea under cultivation had been statistically significant and positive i.e., 0.67 per cent. However, during the post-liberalization period the rate of growth of area under tea cultivation increased i.e., 2.22 per cent growth in area under tea cultivation.

Table 4.13

Growth rate of area under tea cultivation

Sub - Periods	Growth rates
Pre liberalization period (1985 to 1994)	0.67** (3.09)
Post liberalization period (1995 to 2004)	2.22* (9.11)

Source: Computed from different issues of 'Tea Statistics' Published by Tea Board of India

Note: 1.*Growth rates are statistically Significant at 1 per cent level

2. **Growth rates are statistically Significant at 10 per cent level

3. Figures in the parenthesis denotes the t values

4.5.1.2 Growth rate of tea production

The production of tea in India has been increasing at a steady rate over the years. During the pre-liberalization period, the production increased from 656162 Th. kg in 1985 to 752895 Th. kg in 1994. However, the performance of tea industry in terms of production is comparatively weaker in the post liberalization period. Between 1995 and 2004, the production increased from 756016 Th. kg to 830700 Th. kg (i.e., an increased amount of 74684 Th. Kg). Tea production further increased to 866800 Th. kg in the year 2005 showing an annual growth rate of 4.34 per cent.

The annual growth rate of tea production in India shows frequent fluctuations over the years of study. The annual average growth rate for post liberalization period was 1.06 per cent as against 1.62 per cent of the pre liberalization period.

Table 4.14

Production of tea in India

Year	Production (Th. kg)	3 year moving average	Annual growth rate
1985	656162	--------	-----
1986	620803	647405	-5.39
1987	665251	662022	7.16
1988	700014	684456	5.23
1989	688105	702819	-1.71
1990	720338	720878	4.68
1991	754192	735617	4.69
1992	732322	749113	-2.90
1993	760826	748681	3.89
1994	752895	756579	-1.05
1995	756016	763017	0.41
1996	780140	782062	3.20
1997	810031	821426	3.83
1998	874108	836691	7.91
1999	825935	848988	-5.52
2000	846922	842260	2.54
2001	853923	842336	0.83
2002	826165	845696	-3.26
2003	857000	837955	3.73
2004	830700*	851500	-3.07
2005	866800*	------	4.34
1. Growth between 1985 to 1994: 96733 Th. kg Overall growth rate: 14.74%, Annual average growth rate: 1.62% 2. Growth between 1995 to 2004: 74684 Th. kg Overall growth rate: 9.88%, Annual average growth rate: 1.06% * preliminary estimate			

Source: Computed from different issues of 'Tea Statistics', published by Tea Board of India

The result of kinked exponential growth is shown in table 4.15. It can be noted that the growth rates of tea production during pre and post liberalization periods had been significant and positive. The rate of growth of tea production during the post liberalization period is estimated to be 0.97 per cent as against a growth rate of 2.09 per cent of the pre liberalization period. Thus, the reform changes have adversely affected the growth rate of tea production in the country.

Table 4.15

Growth rate of tea production

Sub - Periods	Growth rates
Pre liberalization period (1985 to 1994)	2.09* (8.11)
Post liberalization period (1995 to 2004)	0.97** (3.32)

Source: Computed from different issues of 'Tea Statistics', published by Tea Board of India

Note: 1.*Growth rates are statistically Significant at 1 per cent level

2 ** Growth rates are statistically Significant at 5 per cent level

3. Figures in the parenthesis denotes the t values

4.5.1.3 Growth rate of productivity of tea

The productivity of tea has been undergone severe changes during the reference period. The productivity in terms of yield increased from 1645 Kg/ha in 1985 to 1768 kg/ha in 1994. However, during the post liberalization period, the yield rate decreased from 1770Kg/ha in 1995 to 1701 Kg/ha 2004. Thus, the post liberalization period witnessed a negative overall growth rate of -8.82 per cent. The

yield of Indian tea has been going on improving until 1997 during when we produced 1865 kg/ha and thereafter, it started to decline.

Table 4.16

Productivity of tea in India

Year	Yield Kg/ha	3 year moving average	Annual growth rate
1985	1645	---------	-----
1986	1523	1595	-7.42
1987	1617	1610	6.17
1988	1689	1655	4.45
1989	1658	1692	-1.84
1990	1730	1727	4.34
1991	1794	1755	3.70
1992	1742	1785	-2.90
1993	1819	1776	4.42
1994	1768	1786	-2.80
1995	1770	1782	0.11
1996	1809	1814	2.20
1997	1865	1839	3.10
1998	1844	1798	-1.13
1999	1685	1736	-8.62
2000	1679	1680	-0.36
2001	1675	1656	-0.24
2002	1614	1655	-3.65
2003	1675	1663	3.78
2004	1701	---	1.55
1. Growth between 1985 and 1994 : 123 Kg/ha Overall growth rate: 7.48%, Annual average growth rate: 0.9% 2. Growth between 1995 and 2004 : -69 Kg/ha Overall growth rate: - 3.90% , Annual average growth rate: - 0.33%			

Source: Computed from different issues of 'Tea Statistics', published by Tea Board of India

The annual growth rate shows frequent fluctuations in the yield of tea during the period of study. During the pre liberalization period, the annual average growth rate of yield was only 0.9 per cent. The post liberalization period, on the other hand,

showed negative rate of growth i.e., -0.33 percent average growth rate per annum. It can be seen that from 1998 onwards, the yield rate registered negative growth through out the years except during 2003 and 2004.

The results of kinked exponential growth rate also reveal the same trend. During the pre-liberalization period, the growth rate was significantly positive and was estimated to be 1.42 per cent. At the same time, the post liberalization series shows a perceptible negative rate of growth i.e., -1.23 percent, which is statistically significant. Thus, the growth rate of productivity of Indian tea was adversely affected during the reform period.

Table 4.17

Growth rate of productivity of tea

Sub - Periods	Growth rates
Pre liberalization period (1985 to 1994)	1.42* (5.40)
Post liberalization period (1995 to 2004)	-1.23** (4.17)

Source: Computed from different issues of 'Tea Statistics', published by Tea Board of India

Note: 1.*Growth rates are statistically Significant at 1 per cent level

2. **Growth rates are statistically Significant at 5 percent level

3. Figures in the parenthesis denotes the t value

4.5.2 Instability analysis

The sustainability in area, production and productivity of tea was estimated by computing the coefficient of variation across the trend line as suggested by

Nadakarni (1969)[14]and Cuddy and Della (1978)[15]. The Cuddy Della coefficients worked out for the study are given in table 4.18.

Table 4.18

Instability indices of area, production and productivity of tea

Period	Area	Production	Productivity
Pre- liberalization period (1985-86 to 1994-95)	0.2639	1.0618	1.5109
Post-liberalization period (1995-96 to 2004-05)	1.6632	2.5667	2.3035
Overall period (1985-86 to 2004-05)	1.3362	1.1664	4.8121

Source: Computed from different issues of 'Tea Statistics', published by Tea Board of India

A common feature of the result of instability analysis presented in the table is that the instability of area, production and productivity of tea in India has increased during the post liberalization period. It can be observed that the area instability has increased from 0.2639 during pre liberalization period to 1.6632 during the post liberalization period. Similarly, the production instability increased from 1.0618 to 2.5667 and the yield instability increased from 1.5109 to 2.3035.

4.6 Index numbers of agricultural production and productivity

A brief analysis of the production and productivity index of natural rubber and tea along with cash crops and food grains in general is made in this section. The index numbers of production of major crops are calculated by taking the triennium ending 1981-82 as the base and is presented in table 4.19. The results show a better index of growth for cash crops compared to the food grains and all crops in general.

However, index numbers of rubber and tea production provide an interesting picture. The index number of rubber production has been much above the average of cash crops production and has been increasing at a faster rate especially since early 1990's. On the contrary, the index number of tea production has been much below the average of cash crops production and registered a very slow rate of growth.

Table 4.19

Index number of agricultural production (Base: triennium ending 1981-82=100)

Year	Rubber	Tea	Cash crops	Food grains	All crops
1981-82	100	100	100.0	100.0	100.0
1985-96	132.3	117.0	114.0	123.4	119.6
1990-91	217.6	132.3	144.9	143.7	148.4
1994-95	311.5	134.4	163.6	155.9	165.2
2000-01	416.2	151.3	209.0	158.4	165.7
2003-04	469.8	151.1	208.9	171.0	179.5

Source: Directorate of Economics & Statistics, Department of agriculture & Cooperation

The index numbers of productivity in case of cash crops, food crops and agricultural crops in general do present slow growing figures since 1981-82. In case of cash crops, the index number has been much below the average index of all agricultural crops. The index number of tea productivity was very disappointing that the figure has been showing a diminishing trend since 1994-95. However, the index number of rubber productivity is moving much above the index of all other crops and provides very optimistic picture in the post reform period.

Table 4.20

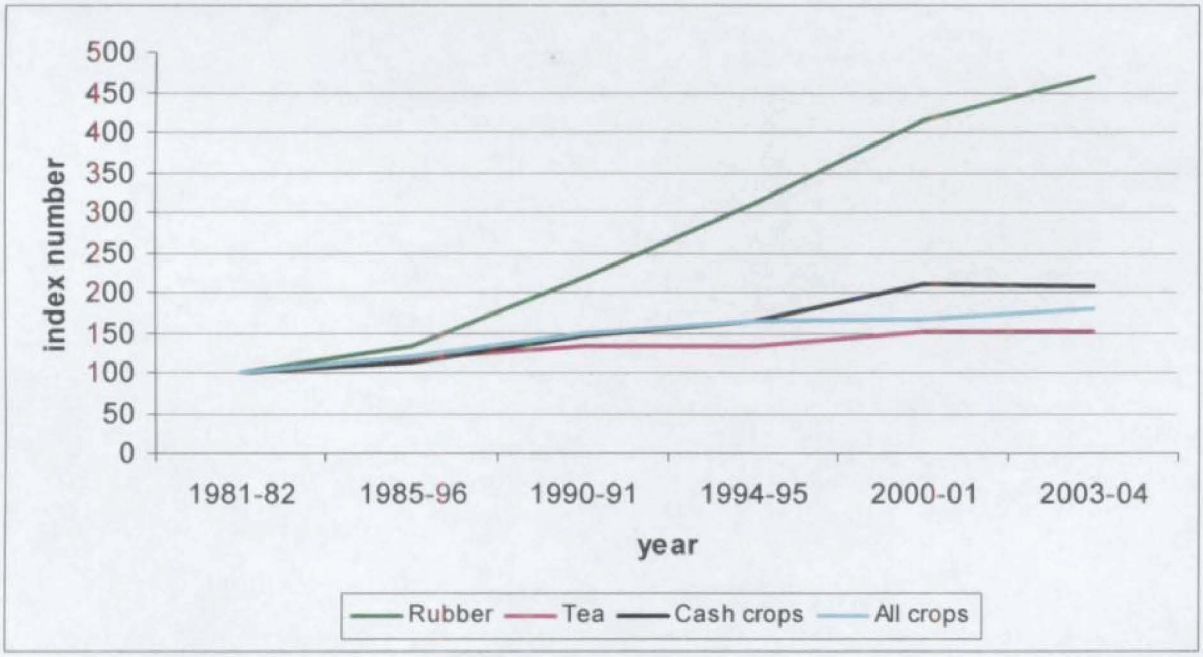
Index number of agricultural productivity (Base: triennium ending 1981-82=100)

Year	Rubber	Tea	Cash crops	Food grains	All crops
1981-82	100	100	100.0	100.0	100.0
1985-96	115.3	111.2	102.8	122.3	117.6
1990-91	138.1	119.9	122.2	137.8	133.8
1994-95	174.8	121.0	127.6	150.4	145.5
2000-01	202.3	113.3	137.3	152.8	144.4
2003-04	213.5	112.7	136.7	163.9	156.4

Source: Directorate of Economics & Statistics, Department of agriculture & Cooperation

Figure 4.1

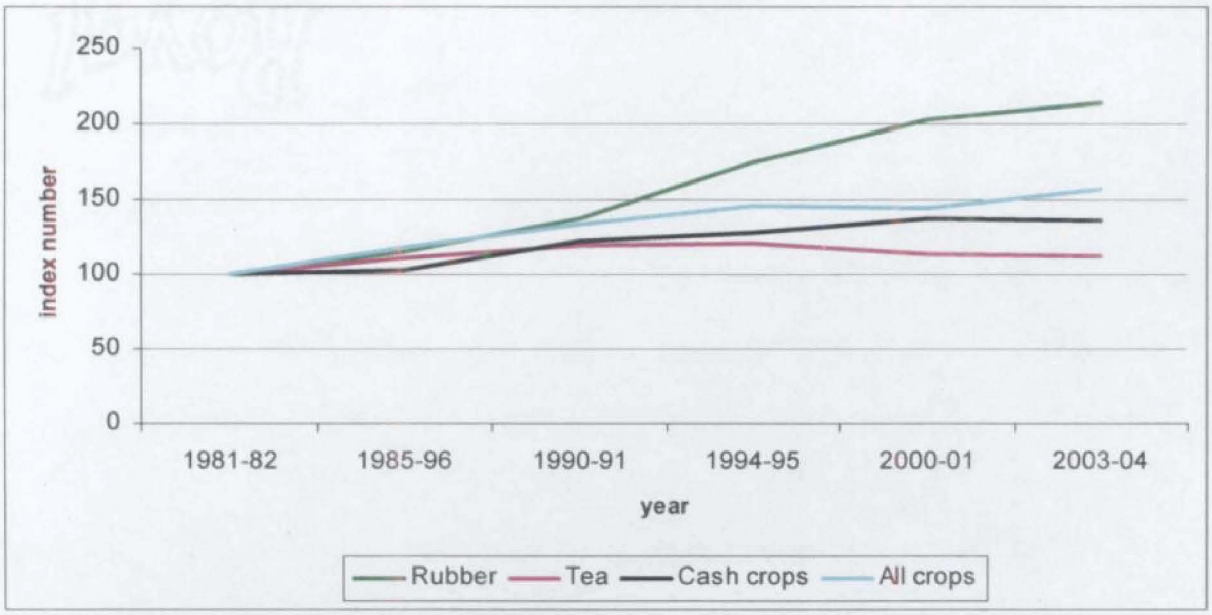
Index number of agricultural production (Base: triennium ending 1981-82=100)



Source: Based on data from Directorate of Economics & Statistics, Department of agriculture & Cooperation

Figure 4.2

Index number of agricultural productivity (Base: triennium ending 1981-82=100)



Source: Based on data from Directorate of Economics & Statistics, Department of agriculture & Cooperation

4.7 Summing up

The objective of this chapter was to analyze the impact of new economic policy on the growth and instability of area, production and productivity of rubber and tea in India. In case of natural rubber, though the rate of growth of area, production and productivity showed a declining trend during the post liberalization period, the index numbers of natural rubber production and productivity increased significantly through out the period of analysis. It is further estimated that the instability in area under rubber cultivation declined while that of Production and productivity increased during the post liberalization period.

In case of tea, the rate of growth of area under tea cultivation increased during the post liberalization period. Regarding the production and the productivity of tea, the post liberalization period witnessed lower rate of growth compared to the pre

liberalization period. Index numbers of tea production and productivity indicated very slow growth during the period of analysis. Further, the productivity index registered a declining trend during the post liberalization period. The analysis of Cuddy-Della Valle Index revealed high-level instability in area, production and productivity of tea. Thus, it can be concluded that the economic reforms affected the rubber and tea sector significantly, though there are many other influencing factors like climatic conditions, unstable prices, changes in cropping pattern etc.

References:

1. Rubber Board, Kottayam (2005), "*Indian Rubber Statistics*", Vol. 28.
2. Ibid.
3. Boyce, James K (1986): "Kinked Exponential Model for Growth rate Estimation", *Oxford Bulletin of Economics and Statistics*, Vol.48, pp. 385-391.
4. Rubber Board, Kottayam (2005), "*Indian Rubber Statistics*", Vol. 28.
5. Nadakarni, M. V., (1969) "Yield Certainty in Maharashtra Agriculture", *Indian Journal of Agricultural economics* 24:327-333.
6. Cuddy and V. Della (1978), "Measuring the Instability of Time Series Data", *Oxford Bulletin of Economics and Statistics*, February issue.
7. Random House Dictionary
8. Ukers, W A - All About Tea. P.1 and P.4- Vol. 1, *The Tea and Coffee Trade Journal Co.*, New York, 1935.
9. Nanporia, J J. (Ed) - The Times of India directory and Year Book Including Who's Who, 1965-66, P.393
10. Edgar.., "Note on the Tea Industry in Bengal "- papers regarding the tea industry in Bengal (1873), P.7.
11. Tea Board of India, "*Tea Statistics*", 2000-2001.
12. Boyce, James K (1986): op. cit.
13. Tea Board of India, "*Tea Statistics*", 2000-2001.
14. Nadakarni, M. V, (1969): op .cit.
15. Cuddy and V. Della, (1978): op. cit.

Price movement and market integration analysis with respect to natural rubber and tea

Jomon Mathew “The impact of new economic policy on Indian agriculture: A study of selected cash crops ” Thesis. Department of Economics, Dr. John Matthai Centre , University of Calicut, 2006

5 *Price movement and market integration analysis with respect to natural rubber and tea*

Chapter 5

PRICE MOVEMENT AND MARKET INTEGRATION ANALYSIS WITH RESPECT TO NATURAL RUBBER AND TEA

5.1 Introduction

The performance of any sector depends on the degree of market efficiency. Efficiency of market can be judged based on prevailing price in the whole market system. Existence of uniform price through out the markets can be considered as a situation of efficient market system. In other words, a uniform price resembles an integrated market. Excess or deficient demand or supply will be compensated by the integrated market through price mechanism. Therefore, the concept of market integration becomes an integral part of efficient marketing system or long run equilibrium. It is believed that any policy or activity that hinders market forces to act freely will adversely affect the attainment of market efficiency. In order to attain optimum efficiency, the best way is to liberate the economy from all sorts of controls.

Early thinkers were of the opinion that agriculture is the only productive sector of the economy. Though it is a contradictory statement, it can be argued that a more efficient agriculture sector will be able to make a strong foundation for both secondary and tertiary sectors. Attempts are made to know the efficiency of agricultural sector by relying on studies of market integration of several commodities. However, studies on validity of market integration relating to cash crops are limited. The selected cash crops such as natural rubber and tea are of great significance and having remarkable export exposure. Thus, being globally consumed

products, the recent globalization and economic reforms might have in some way or other affected the natural rubber and tea prices. In this perspective, it is imperative to believe that economic reforms have made some sweeping changes in the rubber and tea markets of India. It is in this context, the present chapter attempts to analyze the price movement and market integration of natural rubber and tea in the light of economic reforms.

5.2 Methodology and database

The motivation behind market integration tests is to see how far the markets are integrated in the era of economic reforms. The market integration tests we adopted consist of two stages. They are (i) data series have to be tested for stationarity and (ii) verification of co integration between market prices.

The first step is to test each index series for the presence of unit roots, which will show whether the series are stationary or not. In our study, Augmented Dickey-Fuller (Dickey, D A, Fuller, W A, 1981)[1] test was conducted to know the stationarity of the variables. The second step is the well-known methodology of co integration analysis to test the presence of long run relationship between markets. In our analysis, we use the Johansen-Juselius[2] testing procedure of co integration among the natural rubber and tea prices.

The market integration analysis has been conducted for selected cash crops like natural rubber and tea. Monthly price prevailed in different markets were collected for the study. In case of natural rubber, Kottayam and Cochin prices (which are the only recognized Indian rubber markets from where data was available) pertaining from January 1995 to December 2004 were collected from Indian Rubber Statistics[3]. Due to non-availability of pre reform prices, the study

depends on afore-said ten-year monthly data. However, we conducted a comparative study by sub dividing the period into early reform (January 1995 to December 1999) and later reform (January 2000 to December 2004) periods. Further, the monthly prices of Kuala Lumpur rubber market during the period from January 1995 to December 2004 has been collected to make a comparative study of the domestic and the international markets. Regarding tea, monthly prices of four important Indian tea markets such as Kolkatta, Cochin, Guwahati and Siliguri were collected from the Tea Statistics[4]. The data ranging from January 1987 to December 2004 were sub divided into pre reform (January 1987 to December 1994) and post reform (January 1995 to December 2004) periods. Due to non-availability of monthly data of international tea prices, the study give up the task of testing integration between domestic and international market prices.

5.3 Price movement and market integration analysis of natural rubber

Rubber price had been determined in isolation from international markets for a number of years through government interventions. It was the responsibility of rubber regulating authority. Apart from the determination of prices, the government used to have other regulatory controls. These regulatory controls can be divided into two broad categories, namely, (a) qualitative controls and (b) quantitative controls. The qualitative controls were in the form of imposition of minimum and maximum prices and monopoly procurement of rubber by the government* and the payment of price differential of imported NR and the domestic NR to the government. The

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* *(the system of government procurement was in operation from 1947 to 1964.)*

quantitative controls were in the form of compulsory return of stock returns by the manufactures, dealers, estates, and quota restriction on import**

These set of policies aim at protecting the domestic production from the competition from the world market. As part of controlling import, in 1956 the government announced that the manufacturers should pay the price difference of imported and indigenous rubber to the government. During the sixties, the imports were controlled through frequent enhancement of import duties. The system of minimum statutory price notified by the Tariff Commission had been in existence until 1981. However, the statutory maximum price was abolished in 1969 in response to the representation from the rubber growers indicating that the maximum prices were not remunerative. Along with the abolishment of maximum prices, rubber imports were permitted through government agencies. A buffer-stocking scheme introduced in 1986 had specified lower and upper 'indicator prices' for entering the market through additions or depletion of stocks. Further, the conditions imposed on the imports from time to time had an impact on domestic prices. These measures were expected to control the speculative tendencies in the market and to ensure remunerative prices to the rubber growers. Many of these measures were modified or abolished subsequent to the liberalization regime and their impact was reflected in the price situation.

The behavior of price movement and stabilization mechanism has been changed when the economy was opened up in 1991. The changes in the export import policy in respect of rubber in the 1990's could be divided into intervention

** *(in order to avoid dampening effect of stock piling on price and for proper estimate of demand supply gap, the promulgation of Government of India stock (Control)Order of 1942 made it mandatory for all the manufactures, dealers and estates to submit the stock returns)*

for reduction of import tariffs and intervention for removal of restriction of imports and exports. The gap between domestic and international prices of rubber was high in the pre-reform period. The import tariff on rubber reduced from 60% in 1983 to 30% in 1992 and again the rate was reduced to 25% in 1995 and 20% in 1997 (Veeraputran, 1999)[5]. The export of rubber was also allowed since 1992 (Indian Rubber Statistics 2000). Moreover, there was no import of rubber through STC since 1991-92 and the proportion of imports through other channels increased. A low bound rate influences the manufacturers to resort to imports when the gap between domestic price and world price widens. These imports were likely to trigger a collapse of domestic price due to excess supply as in the case of price fall. Massive import was attributed to be the major factor contributing to the drastic fall in rubber price (P S George, 2005)[6]. All these policy shifts may have resulted in the domestic price to move almost on par with the world prices.

5.3.1 Price trend of Natural Rubber

In order to examine the performance of natural rubber prices the study depends on time series data published by Rubber Board, a statutory body under the Ministry of Commerce. Among the various grades of natural rubber like RSS 1, RSS 2, RSS 3, RSS 4, RSS 5, EBC 2X, LATEX and ISNR[7], the present study uses the price of RSS 4 that accounts for the bulk of domestic production (Varma, 2001)[8]. Kottayam market price for RSS 4 is taken as the domestic market price and Kuala Lumpur price for RSS 3 is considered international price. In the context of natural rubber, we define the pre reform period as 1985 to 1994 and the post reform period as 1995 to 2004.

As discussed above, the natural rubber prices in the world markets have been more volatile than Indian prices. It can be observed in table 5.1 that until 1991, the Indian NR price was more or less stable compared to the international price. It can also be noted that during this period the NR price in India had been higher than the international price in almost all the years

Table 5.1

Domestic and World prices of Natural Rubber (Average price per 100 kg)

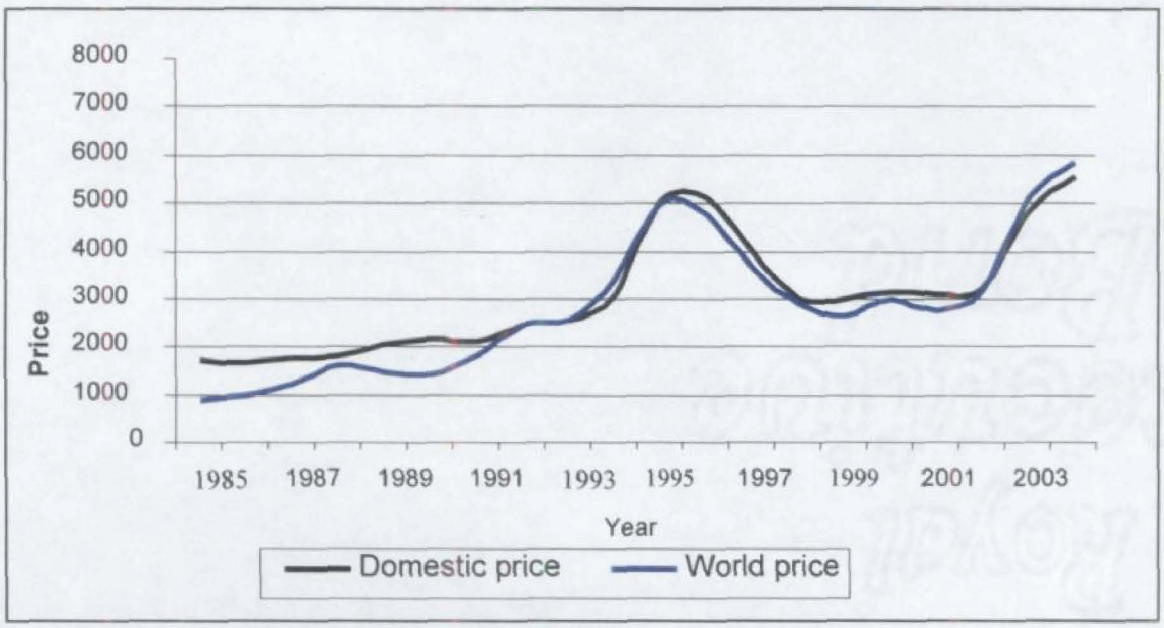
Year	India (Kottayam)	World (Kuala Lumpur)	Price ratio (India/world)
1985	1694 ------	890 -----	190.33
1986	1670 (-1.42)	988 (11.01)	169.02
1987	1766 (5.74)	1217 (23.18)	145.11
1988	1811 (2.55)	1600 (31.47)	113.18
1989	2040 (12.64)	1482 (-07.37)	137.65
1990	2147 (5.25)	1425 (-03.85)	150.66
1991	2128 (-0.82)	1796 (26.03)	118.48
1992	2463 (15.74)	2457 (36.80)	100.24
1993	2546 (3.37)	2538 (02.89)	100.31
1994	3107 (22.03)	3455 (36.13)	89.92
1995	5054 (62.66)	5030 (45.58)	100.47
1996	5122 (1.35)	4764 (-05.31)	107.51
1997	3988 (22.14)	3614 (-24.14)	110.34
1998	3013 (24.45)	2884 (-20.20)	104.47
1999	2997 (-0.53)	2644 (-08.33)	113.35
2000	3125 (4.27)	3007 (13.72)	103.92
2001	3109 (-0.51)	2732 (-09.15)	113.79
2002	3228 (3.83)	3200 (17.13)	100.87
2003	4814 (49.13)	5102 (59.43)	94.35
2004	5560 (15.5)	5840 (14.46)	95.20

Source: Rubber Statistical Bulletin of the International Rubber Study Group

Note: figures in the parenthesis denote annual growth rate

Figure 5.1

Price trend of natural rubber (Rs/100 Kg)



Source: Based on Rubber Statistical Bulletin of the International Rubber Study Group

The average price of RSS 4 grade at Kottayam market, which is the biggest natural rubber market in India, during the second half of 1980's was Rs.1796/100 kg. , and it experienced an upward trend over the years though there had been annual fluctuations. In 1994, the domestic price had increased to Rs.3107/100 kg. The average price during 10 years of pre reform period was Rs.2137, which had almost doubled to Rs.4001/100 kg during 10 years from 1995. The doubling of prices was mainly because of increased demand for rubber attributed to the recovery of the world automobile sector (Veeraputran 1999)[9]. However, the drastic decline in price between 1996 and 1998 was attributed to the South- East Asian crisis during this period (Harilal and Joseph 1998)[10]

The annual growth rate of rubber price was worked out to analyze the trend in price movements during the period of study. In case of domestic rubber price, the

annual average growth during the pre- reform period was 7.23 per cent. However, there was a slight improvement in the growth rate during the post- reform period i.e., 8.91 per cent growth. Contrary to this, the world price of rubber showed declining trend in growth. The annual average growth rate of world rubber price declined from 17.33 per cent during the pre- reform period to 8.32 per cent during the post- reform period. The post- reform period shows almost same level of annual growth rate of Indian and world prices i.e., 8.91 per cent and 8.32 per cent respectively. These figures were 7.23 per cent and 17.33 per cent during the pre- reform period. It shows greater integration of the Indian and the world rubber markets during the post-reform period.

Comparison of the domestic and international prices of natural rubber is an interesting task. It can be observed that the domestic price of rubber during the pre reform period was maintaining an upward trend. However, at the Kuala Lumpur market we observe recurring fluctuations in price. The price of rubber in the domestic market was an average of 31.49 per cent above the world market price during the pre reform period and the range had gone down in the latter half of our analysis period. However, during the 90's the gap had narrowed down so that the domestic price moved closer with the international prices. Since 1992 onwards, the Indian NR price began to move with the international price. During ten years of post reform period, price at Kottayam market was only 4.43 per cent above the world market price. It can also be observed that the world market price dominated the domestic price during 2003 and 2004 that too by about 5 per cent (Table 5.1). Thus there has been a substantial integration of the Indian rubber market with the international market to bring about price parity (George, 2005)[11]

Table 5.2

Coefficient of correlation between domestic and International prices of natural rubber

Period of analysis	Pearson's correlation coefficient
Pre- reform period (From 1985 to 1994)	0.970
Post- reform period (From 1995 to 2004)	0.982

Source: Computed from Rubber Statistical Bulletin of the International Rubber Study Group

Results of Pearson's co-efficient of correlation between the domestic and international prices of NR reveal that the prices are highly correlated throughout the period of analysis. The correlation coefficient increased from 0.97 during pre reform period to 0.982 during the post reform period. The synchronization of domestic price with the world price is also evident in the annual variations of prices. The annual variations in the price levels indicate that the gap between the two prices has narrowed down and the range has decreased. Here we observe that due to liberalization of the agricultural sector, India's rubber economy became more and more linked to the world markets.

5.3.2 Empirical results of market integration analysis

In order to analyze the market integration of natural rubber, we use the co integration test procedure. Before examining the existence of integration between markets, it is necessary to determine the order of integration of the selected data series. Stationarity tests were conducted to identify whether the series have finite

variance and a tendency to return to the mean. To check stationarity of the data series, unit root tests have been employed. Augmented Dickey-Fuller (ADF) test was conducted for early reform period (January 1995 to December 1999), later reform period (January 2000 to December 2004) and the whole period (1995 January to 2004 December). The necessary tests were carried out on the log of monthly wholesale prices of the selected rubber markets of India.

Results of unit root tests are presented in tables 5.3, 5.4 and 5.5. Initially, test has been conducted on the price series in levels, then on difference. Test results of price in levels of the selected markets with and without trend revealed that Augmented Dickey Fuller test does not reject the null hypothesis of no integration during the post reform period.

Table 5.3

Result of Augmented Dickey-Fuller (ADF) test—early reform period

Unit root test- in levels

	Market price	Time period	t - value (trend included)	t- value (no trend)
1	Kottayam	1995:1-1999:12	-2.9887 (1) [0.0335]	-1.4190 (1) [0.1895]
2	Cochin	1995:1-1999:12	-3.0432 (1) [0.0066]	- 1.3730 (1) [0.0527]
			unit root test- in difference	
	Market price	Time period	t- value (trend included)	t- value (no trend)
1	Kottayam	1995:1-1999:12	-5.9913* (1) [0.1070]	-6.0845* (1) [0.1064]
2	Cochin	1995:1-1999:12	-5.8444* (1) [0.0650]	-5.9509* (1) [0.0627]

Note: Optimal number of time lag determined with Akaike Information Criterion and is presented in parenthesis; p-value in brackets; * shows significance at 1% level

This is true in case of early reform, later reform and the pooled period. However, the null hypothesis was rejected at one percent level in case of the first difference of the price series of the selected rubber markets of India during the post reform period. This holds true in case of international rubber price too. It implies that the conditions for market integration pertaining to the selected market prices of natural rubber were satisfied in the ADF tests. Thus, we can move on to further co integration testing.

Table 5.4

Result of Augmented Dickey-Fuller (ADF) test-- later reform period

Unit root test- in levels

	Market price	Time period	t - value (trend included)	t- value (no trend)
1	Kottayam	2000:1-2004:12	-3.3015 (1) [0.0985]	- 0.84932 (1) [0.4434]
2	Cochin	2000:1-2004:12	-3.2818 (1) [0.1065]	-0.85121 (1) [0.4692]
			unit root test- in difference	
	Market price	Time period	t- value (trend included)	t- value (no trend)
1	Kottayam	2000:1-2004:12	-5.0467* (1) [0.6353]	-5.0958* (1) [0.6404]
2	Cochin	2000:1-2004:12	-5.0385* (1) [0.6610]	-5.0885* (1) [0.6656]

Note: Optimal number of time lag determined with Akaike Information Criterion and is presented in parenthesis; p-value in brackets; * shows significance at 1% level

Table 5.5

Result of Augmented Dickey-Fuller (ADF) test – pooled period

Unit root test- in levels

	Market price	Time period	t - value (trend included)	t- value (no trend)
1	Kottayam	1995:1-2004:12	-2.2209 (1) [0.1504]	-2.0871 (1) [0.0886]
2	Cochin	1995:1-2004:12	-2.1798 (1) [0.0499]	-2.0550 (1) [0.0258]
3	Kuala Lumpur	1995:1-2004:12	-1.4648 (1) [0.2219]	-1.1881 (1) [0.1333]
			unit root test- in difference	
	Market price	Time period	t- value (trend included)	t- value (no trend)
1	Kottayam	1995:1-2004:12	-8.6070* (1) [0.0382]	-8.4525* (1) [0.0620]
2	Cochin	1995:1-2004:12	-8.3752* (1) [0.0330]	-8.2348* (1) [0.0526]
3	Kuala Lumpur	1995:1-2004:12	7.4655** (1) [0.5193]	-7.4445** (1) [0.6510]

Note: Optimal number of time lag determined with Akaike Information Criterion and is presented in parenthesis; p-value in brackets; * shows significance at 1% level

Since it was confirmed that the price series of the selected rubber markets of India satisfy the conditions for market integration, the next step is to make co integration analysis. Co integration analysis is helpful to examine the behavior of two or more than two data series. In our analysis, the Johansen-Juselius method of

multiple co integration tests was conducted and the results are presented in the following tables.

Table 5.6 presents the test results of Johansen-Juselius method of multiple co integration between Kottayam, Cochin and Kuala Lumpur markets. It indicates the presence of two co integrating vectors at five per cent level of significance for the pooled period. It implies that the selected rubber markets are in fact integrated and they share the market information on price changes.

Table.5.6

Testing the integration between Kottayam, Cochin and Kuala Lumpur markets

Null hypothesis (rank = p)	λ trace	5 % critical value	Null Hypothesis (rank = p)	λ max	5 % critical value	Eigen Value
P = 0	82.3*	21.0	P = 0	113.6*	29.7	0.508104
P < 1	29.81*	14.1	P = 1	31.31*	15.4	0.226628
P < 2	1.495	3.8	P = 2	1.495	3.8	0.0128046

Note: * null hypothesis rejected at 5 per cent level.

Table 5.7

Testing the integration between Kottayam and Kuala Lumpur markets

Null hypothesis (rank = p)	λ trace	5 % critical value	Null hypothesis (rank = p)	λ max	5 % critical value	Eigen Value
P = 0	80.75*	14.1	P = 0	82.4*	15.4	0.498498
P < 1	1.677	3.8	P = 1	1.649	3.8	0.0139977

Note: * null hypothesis rejected at 5 per cent level.

Analysis of integration test between Kottayam and Kuala Lumpur markets also reveals the presence of one co integrating vector at five per cent level of significance for the pooled period. It shows that the domestic and international rubber markets do exhibit a long run relationship and there is sharing of market information during the post-reform period

5.4 Price movement and market integration analysis of tea

Tea auctions were set up in the seventeenth century. There are in all twelve-auction centers for tea. India has as many auction centers as the rest of the world. Until about a decade ago, London was the most important centre that established a benchmark for world tea prices but it ceased to operate from 29 June 1998. Given below a list of world auction centers, citing their relative importance in trade.[12]

Table 5.8

Tea auction centers of the world

Country	Auction center	Year of establishment	Volume handled in 1999 (million kg)
India	Calcutta	1861	89.10
	Cochin	1947	52.31
	Coonor	1963	79.28
	Guwahati	1970	145.01
	Siliguri	1976	86.79
	Coimbatore	1980	20.26
Bangladesh	Chittagong	1949	38.62
Sri Lanka	Colombo	1883	260.45
Indonesia	Jakarta	1972	24.17
Africa	Nairobi	1957	
	Mombasa	1970	210.79
Malawi	Limbe	1970	12.97

Source: 'Tea International- the Journal of the World Tea Trade', November 1993

The Indian tea industry has been in crisis since early 1990's. Officials associated with the industry say that the beginning of the downturn was in the mid-1998 when the rupee-ruble trading arrangement, which governed Indian trade with the countries of the erstwhile Soviet Union, came under stress after the collapse of the rouble. Tea exports, an important component of this arrangement, were an immediate casualty. Although India's tea exports to the Commonwealth of Independent States (CIS) countries fell by only 3.72 million kg between January and April 2000 compared to the same period of 1999, the decline in value terms had a severe impact. Although the volume of exports shrank only marginally, the value of Indian tea exports to CIS countries fell by Rs. 89 crores in January-April compared to the corresponding period in 1999. This meant that the exports were being made to the CIS markets at highly lowered price levels.

When the Russian market collapsed, Indian tea could not gain access to "emerging markets" such as the West Asian and North African (WANA) markets. Indian tea lost the opportunity to other competitors such as Kenya, Sri Lanka, China and Indonesia. The crisis in the tea industry began in the early nineties due to the collapse of former Soviet Union and the shift from rupee to hard currency payments. The industry in the past did not place as much emphasis on quality, variety and value addition as has become necessary under a competitive trade regime. Indian tea fetches lower price even in the home market due to poor quality

5.4.1 Price trend of tea

In order to analyze the movement of tea prices during pre and post reform periods, we consider the time series data ranging from 1985 to 2004. The domestic price of tea is taken from various issues of 'Tea Statistics' published by the Tea

Board of India. Tea price in the London auction represented the world tea price until 1998 and it ceased to operate since 1998. Therefore, we consider the Colombo auction as proxy for world price in our empirical analysis. Colombo auction is selected deliberately by taking in to account the relative importance and the volume of business done through this centre (see table 5.8). The data on world tea price are collected from 'Tea International- the journal of the World Tea Trade'.

The price trend of tea in the domestic and international markets is given in table 5.9. In order to analyze the trend in the tea price movements, we have worked out the annual average growth rate and the price ratio between domestic and international prices.

Table 5.9

Domestic and World prices of tea (Rs. /100Kgs)

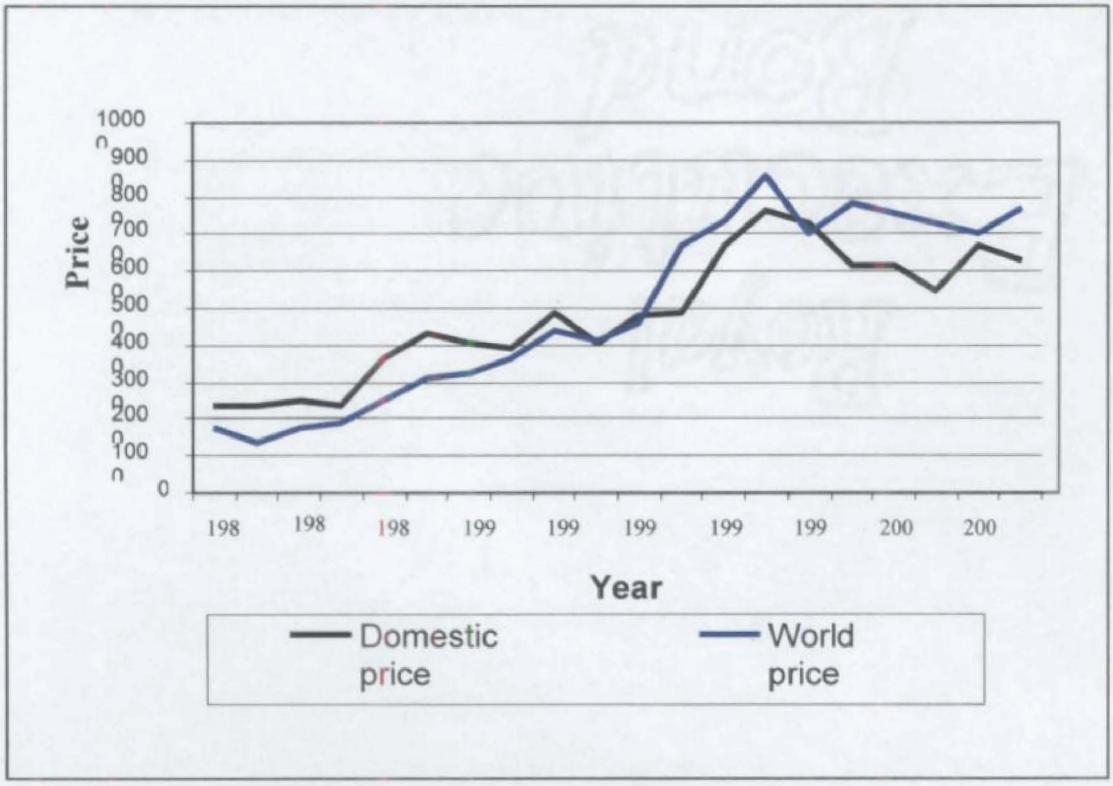
Year	Domestic price	World price	Price ratio India/world
1985	2334 ----	1781 -----	131.04
1986	2345 (0.47)	1374 (-22.86)	170.06
1987	2512 (7.12)	1736 (26.34)	144.70
1988	2436 (-3.03)	1878 (8.17)	129.71
1989	3662 (50.32)	2504 (33.33)	146.24
1990	4323 (18.05)	3133 (25.12)	137.98
1991	4031 (-6.76)	3229 (3.06)	124.83
1992	3888 (-3.55)	3680 (13.97)	105.65
1993	4893 (25.84)	4360 (18.48)	112.24
1994	4061 (-17.00)	4141 (-5.03)	98.06
1995	4799 (18.17)	4572 (10.40)	104.97
1996	4877 (1.62)	6661 (45.69)	73.22
1997	6689 (37.15)	7360 (10.49)	90.88
1998	7643 (14.26)	8584 (16.63)	85.04
1999	7279 (-4.76)	7017 (-18.26)	103.73
2000	6171 (-15.33)	7864 (12.07)	78.47
2001	6181 (0.16)	7596 (-3.41)	81.37
2002	5452 (-11.8)	7285 (-4.10)	74.84
2003	6675 (22.43)	7025 (-3.57)	95.02
2004	6311 (-5.46)	7717 (9.85)	81.78

Source: "Tea Statistics", Published by Tea Board of India

Note: figures in the parentheses denote annual growth rate.

Figure 5.2

Price trend of tea (Rs/100 Kg)



Source: Based on "Tea Statistics", Published by Tea Board of India.

The world price of tea dominated the domestic price until 1993. As shown in the table, the price ratio between domestic and the world prices declined gradually until finally the world price dominated the domestic price in the year 1994 for the first time since 1985. After reaching an all-time peak in 1998, tea prices registered a steady decline from mid 1999 onwards. The average prices of tea in 2002 were the lowest during the last four years. The drop in the prices of tea in 2002 from the peak level price of 7643 per 100 kg in 1998 is about 40 per cent. Significant increase in the production of coffee and tea in the main producing countries, emergence of new producers, and slowdown in the economies of importing countries, have led to this decline in the prices of these two commodities.

The annual growth rate of both domestic and world prices of tea was worked out to compare the price trends. In case of domestic price, the annual average growth rate was 7.94% during the pre- reform period. However, during the post reform period, the growth rate declined to 5.69%. Similar declining trend could be witnessed in case of world tea price too. It counts 11.58% and 7.58% for pre- and post reform periods respectively. The world tea price started dominating the domestic tea price from the very beginning of the post reform period.

Comparison of domestic and world price of tea provides an interesting result. Price fluctuation in both markets is a common feature. The domestic price of tea, as evident from table 5.9, was maintaining an upward trend during the pre reform period, but frequent fluctuations in several years, say in 1988, 1991, 1992 and 1994 the price fluctuated downwards. The Colombo auction that we consider as proxy for world price too was showing upward trend in price during the same period. The upward trend in price movement continues in both markets during the post reform period too. The prices in both markets reached their ever time peak in the year 1998 and then started declining. The post reform period showed the dominance of the world price over the domestic price. Except in 1995 and 1999, the Colombo price dominated Indian price and the range was too large.

The analysis of the price movement in both the domestic and international markets during the period of analysis is made possible with the help of coefficient of correlation between the two prices. Pearson's co-efficient of correlation between the domestic and international prices of tea reveals that the prices were highly correlated during the pre- reform period. However, during the post reform period the correlation between the two prices seemed to be lower.

Table 5.10

Coefficient of correlation between domestic and international price of tea

Period of analysis	Pearson correlation coefficient
Pre- reform period (From 1985 to 1994)	0.929
Post- reform period (From 1995 to 2004)	0.686

Source: Computed from different issues of 'Tea Statistics', Published by Tea Board of India

5.4.2 Empirical results of market integration analysis

Four major tea markets of India such as Kolkatta, Cochin, Guwahati and Siliguri were selected for the present analysis of market integration. The selection of markets is judiciously made in accordance with their respective significance in the national tea economy of India. Monthly prices of tea pertaining from January 1987 to December 2004 were collected for examining the objective of our study and then the price series was sub divided into pre-reform (January 1987 to December 1994) and post-reform (January 1995 to December 2004) periods. In order to determine whether the time series data are stationary or not, the Augmented Dickey-Fuller (ADF) test was conducted for the pooled, pre-reform and post-reform periods.

The ADF test (with and without trend) results for the monthly price series of the selected markets for the pooled, pre-reform and post-reform periods are presented in tables 5.11, 5.12 and 5.13 respectively. It is evident from the results that the pre condition for market integration was not satisfied in the unit root test in levels during the pooled, pre-reform and the post-reform periods. However, the null hypothesis of

no integration was rejected during pre-reform, post-reform and pooled periods in case of first difference of price series of the selected tea markets of India. In addition, it is worth noting that this result applies to both time series of indices with or without trend variable included in test specification. Hence, it can be concluded that price series of selected tea markets of India satisfied the conditions for market integration tests.

Table 5.11

Result of Augmented Dickey-Fuller (ADF) test- pooled period

Unit root test- in levels

	Market price	Time period	t - value (trend included)	t- value (no trend)
1	Kolkatta	1987:1-2004:12	-3.0343 (4) [0.0172]	-2.7045 (1) [0.9159]
2	Cochin	1987:1-2004:12	-2.4567 (1) [0.0807]	-2.1914 (1) [0.1130]
3	Guwahati	1987:1-2004:12	-3.2660 (2) [0.0047]	-2.6921 (1) [0.7568]
4	Siliguri	1987:1-2004:12	-3.0715 (2) [0.0296]	-2.5238 (1) [0.3539]
			unit root test- in difference	
	Market price	Time period	t - value (trend included)	t- value (no trend)
1	Kolkatta	1987:1-2004:12	-11.274* (1) [0.2460]	-11.296* (1) [0.2458]
2	Cochin	1987:1-2004:12	-10.770* (1) [0.0815]	-10.775* (1) [0.0837]
3	Guwahati	1987:1-2004:12	-12.862* (1) [0.0006]	-12.885* (1) [0.0006]
4	Siliguri	1987:1-2004:12	-13.029* (1) [0.0035]	-13.051* (1) [0.0035]

Note: Optimal number of time lag determined with Akaike Information Criterion and is presented in parenthesis; p-value in brackets; * shows significance at 1% level

Table 5.12

Result of Augmented Dickey-Fuller (ADF) test (Pre-reform period)

Unit root test- in levels

	Market price	Time period	t - value (trend included)	t- value (no trend)
1	Kolkatta	1987:1-1994:12	-2.9537 (1) [0.5935]	-2.1152 (1) [0.9667]
2	Cochin	1987:1-1994:12	-1.7638 (1) [0.0710]	-1.7735 (1) [0.0865]
3	Guwahati	1987:1-1994:12	-3.1965 (1) [0.2225]	-2.0921 (1) [0.5684]
4	Siliguri	1987:1-1994:12	-2.6260 (1) [0.9843]	-2.0650 (1) [0.6748]
			Unit root test- in difference	
	Market price	Time period	t - value (trend included)	t- value (no trend)
1	Kolkatta	1987:1-1994:12	-6.6148* (1) [0.8140]	-6.6435* (1) [0.8022]
2	Cochin	1987:1-1994:12	-6.8686* (1) [0.4102]	-6.8350* (1) [0.4400]
3	Guwahati	1987:1-1994:12	-9.0365* (1) [0.0019]	-9.0684* (1) [0.0019]
4	Siliguri	1987:1-1994:12	-8.2231* (1) [0.0639]	-8.2412* (1) [0.0673

Note: Optimal number of time lag determined with Akaike Information Criterion and is presented in parenthesis; p-value in brackets; * shows significance at 1% level

Table 5.13

Result of Augmented Dickey-Fuller (ADF) test - (Post-reform period)

Unit root test- in levels

	Market price	Time period	t - value (trend included)	t- value (no trend)
1	Kolkatta	1995:1-2004:12	-2.8920 (4) [0.0890]	-2.9086 (5) [0.7763]
2	Cochin	1995:1-2004:12	-2.5680 (1) [0.3229]	-2.4566 (1) [0.2988]
3	Guwahati	1995:1-2004:12	-3.1280 (2) [0.2864]	-2.7961 (3) [0.0930]
4	Siliguri	1995:1-2004:12	-3.3460 (1) [0.9741	-2.5554 (3) [.0690]
			unit root test- in difference	
	Market price	Time period	t - value (trend included)	t- value (no trend)
1	Kolkatta	1995:1-2004:12	-8.3644* (1) [0.2969]	-8.3985* (1) [0.2955]
2	Cochin	1995:1-2004:12	-7.9281* (1) [0.1452]	-7.9214* (1) [0.1539]
3	Guwahati	1995:1-2004:12	-9.1448* (1) [0.0312]	-9.1739* (1) [0.0311]
4	Siliguri	1995:1-2004:12	-9.4724* (1) [0.0408]	-9.5049* (1) [0.0407]

Note: Optimal number of time lag determined with Akaike Information Criterion and is presented in parenthesis; p-value in brackets; * shows significance at 1% level

After confirming that the selected tea markets of India satisfy the conditions of integration, the next procedure is to examine the rank of 'p' or the co integrating vectors. Generally, integrated markets must share a common trend and will have common integrating vector. For examining this issue, Johansen-Juselius method of co integration tests were conducted and the results are presented in tables 5.14, 5.15 and 5.16 for the period of our study. The results indicate the presence of three co integrating vectors at five per cent level of significance for the pooled or whole period. This implies that the tea markets of India are in fact integrated and share market information on price changes. Thus, the empirical evidence suggests that the selected tea markets in India do exhibit a long run relationship during the period of our analysis.

Table 5.14

Testing the integration between Kolkatta, Cochin, Guwahati and Siliguri markets – (Pooled period)

Null hypothesis (rank = p)	λ trace	5 % critical value	Null Hypothesis (rank = p)	λ max	5 % critical value	Eigen Value
P = 0	145.0*	27.1	P = 0	290.1*	47.2	0.497067
P < 1	96.61*	21.0	P = 1	145.1*	29.7	0.367359
P < 2	44.99*	14.1	P = 2	48.48*	15.4	0.192028
P < 3	3.49	3.8	P = 3	3.49	3.8	0.0163827

Note: * null hypothesis rejected at 5 per cent level.

Table 5.15

Testing the integration between Kolkatta, Cochin, Guwahati and Siliguri markets (Pre- reform period)

Null hypothesis (rank =p)	λ trace	5 % critical value	Null Hypothesis (rank = p)	λ max	5 % critical value	Eigen Value
P = 0	99.27*	27.1	P = 0	186.3*	47.2	0.664076
P < 1	56.44*	21.0	P = 1	87.06*	29.7	0.462148
P < 2	28.59*	14.1	P = 2	30.63*	15.4	0.269627
P < 3	2.035	3.8	P = 3	2.035	3.8	0.0221193

Note: * null hypothesis rejected at 5 per cent level.

Once the data are sub divided into pre and post reform periods, co integration results are not in parity with the pooled data results. During the pre reform period, the results are in parity with the pooled period results i.e., there are three co integrating vectors. However, the post-reform data results indicate the presence of four co integrating vectors showing high-level integration between all the four selected tea markets in India during the post reform period. Therefore, it implies that there is significant sharing of market information among the tea markets during pooled, pre-reform and post-reform periods in the long run.

Table 5.16

Testing the integration between Kolkatta, Cochin, Guwahati and Siliguri markets (post-reform period)

Null hypothesis (rank = p)	λ trace	5 % critical value	Null Hypothesis (rank = p)	λ max	5 % critical value	Eigen Value
P = 0	59.19*	27.1	P = 0	135.4*	47.2	0.405029
P < 1	45.14*	21.0	P = 1	76.17*	29.7	0.326976
P < 2	26.1*	14.1	P = 2	31.03*	15.4	0.204656
P < 3	4.93*	3.8	P = 3	4.93*	3.8	0.0422979

Note: * null hypothesis rejected at 5 per cent level.

5.5 Summing up

The present chapter attempted to analyze the price movement and made an empirical test of market integration of natural rubber and tea in the light of the economic reforms. Price ratio, the percentages and coefficient of correlation were used to verify the trends of domestic and world prices. Market integration analysis was done by using Augmented Dickey-Fuller test and Johansen-Juselius method of multiple co integration tests.

Natural rubber sector responded seriously to the reform changes and that the price ratio between domestic and world prices declined significantly during the post reform period. The world price, after moving close with the domestic price through out the 90s dominated the domestic price since 2003. The same trend was visualized in case of tea. Indian tea price crashed below the world price through out the post reform period.

The market integration tests revealed that the selected rubber markets of India are integrated during the post-reform period. It also indicated integration and long run relationship between domestic and international rubber markets. Similarly, Augmented Dickey-Fuller test revealed that all the selected tea markets of India satisfied the conditions for market integration during pooled, pre-reform and post-reform periods. Johansen-Juselius multiple co integration test results exhibit a long run relation between the selected tea markets of India during the period of our analysis.

References:

1. Dickey, D A, Fuller, W A (1981), Likelihood ratio tests for autoregressive time series with a unit root, *Econometrica,* Vol.49, pp 1057-1072

2. Johansen, S and K. Juselius (1990), "Maximum Likelihood Estimation and Inference on Co integration with Application to the Demand for Money", *Oxford Bulletin of Economics and Statistics*, Vol. 52, pp. 169-210

3. Indian Rubber Statistics (various issues)

4. Indian tea statistics, 2001-2002

5. *Veeraputran (1999), 'Trends and Fluctuations in Indian Natural Rubber Prices: 1968-69 to 1997-98', M. Phil Thesis, Centre for Development Studies, Trivandrum*

6. George P S, (2005), *"Globalization and Agricultural Transition in Kerala",* Centre for Development Studies, Trivandrum, P: 145

7. Rubber Board (2002) *Previously the different grades were known as RMA 1,RMA2, RMA3, RMA4 and RMA5,and changed to RSS1, RSS2, RSS3, RSS4 as per vide Gazette Notification No. G.S.R.5612(E) dated July 1994 , Ministry of Commerce, India.*

8. Varma, Poornima (2001), *Impact of Trade Liberalization on Rubber and coconut,* M.Phil dissertation submitted to the Jawaharlal Nehru University. Centre for Development Studies, Trivandrum.

9. Veeraputran (1999), *op. cit*

10. Harilal K N and Joseph k J (1998) , India Sri Lanka Free Trade, Economic and Political Weekly, 34(13) pp. 750.

11. George P S, (2005), op. cit

12. 'Storm in Tea Country', The *Frontline*, vol.17, Aug-Sept 2000

The Trade Performance of Natural Rubber and Tea

Jomon Mathew “The impact of new economic policy on Indian agriculture: A study of selected cash crops ” Thesis. Department of Economics, Dr. John Matthai Centre , University of Calicut, 2006

6 *The Trade Performance of Natural Rubber and Tea*

Chapter 6

THE TRADE PERFORMANCE OF NATURAL RUBBER AND TEA

For almost half a century, India maintained one of the restrictive trade regimes in the world. It imposed a system of high tariffs and stiff non-tariff barriers such as licensing and quotas, which virtually closed the economy from the international trade arena. India implemented economic reforms in the agricultural sector with the beginning of 1995, and has made drastic changes in trade policy to reorient itself to integrate with the global economy.

Trade policy reforms over the last decade have aimed at creating an environment for achieving rapid increase in exports, raising India's share in world exports and making exports an engine for achieving higher economic growth. The focus of these reforms have been on liberalization, openness, transparency and globalization with a basic thrust on outward orientation focusing on export promotion activity, moving away from quantitative restrictions and improving competitiveness of Indian industry to meet global market requirements.

The objective of this chapter is to assess the trade performance of natural rubber and tea in the WTO regime.

6.1 Agreement on Agriculture and India's natural rubber sector

The natural rubber is categorized as an industrial raw material under the WTO Agreement. Therefore, the WTO Agreement on Agriculture (AoA) is not applicable to natural rubber. While most of the other plantation crops such as tea ,coffee and cardamom are treated as agricultural commodities, natural rubber which is grown as a plantation crop is treated differently. The GOI had adopted different

norms in fixing the bound rates for industrial and agricultural products. With regard to industrial products, the norm was to fix the bound rate at 40 per cent for those tariff lines for which the base duty was at or above 40 per cent and 25 per cent for the tariff lines with base duty below 40 per cent. The norms for agricultural products have been more liberal with ceiling bindings at higher levels such as 100 per cent for primary products, 150 per cent for processed products and 300 per cent for edible oils (Tom Joseph and Tharian George K, 2000).[1]

Table 6.1

Bound rates for natural rubber committed by major NR producing countries

(in percentage)

Country	RSS	TSR	Latex	SR*	RR
Thailand	UB	UB	UB	30	UB
Indonesia	40	40	40	40	40
India	25	25	UB	40	40
Malaysia	5	5	5	5-30	30
China	UB	UB	UB	20-35	35
Sri Lanka	UB	UB	UB	UB	UB
Brazil	35	35	35	22-35	35

Source: Original schedules of concessions of the respective countries in GATT (1994)

Note: * the range pertains to bound rates for different tariff lines of SR., UB-Unbound

Table 6.1 provides a comparison of the bound rates for NR, SR and RR committed by major rubber producing countries. In order to ensure maximum

flexibility in fixing import tariffs for the protection of the domestic rubber sector, three major rubber producing countries viz., China, Thailand and Sri Lanka kept all the processed forms of rubber unbound. The lowest bound rate of five per cent for NR in Malaysia is beneficial to that country, as it has been importing rubber in bulk quantities for processing and re-exports. The bound rates committed by Brazil and Indonesia for NR at 35 and 40 per cent respectively are higher than that of India. India is the only major rubber producing country, which treated NR in dry forms and latex differently in fixation of bound rates. With the removal of Quantitative restrictions on imports, natural rubber can be imported into India and this is the most important impact of WTO on natural rubber sector in India

According to the export-import policy for the period 1997-2002 announced by GOI, NR was included in the negative list. However, import was being allowed against the license issued by the government or in accordance with public notice. By using Quantity Based Advance License (QBAL), NR could be imported free of duty. The import was also allowed by using Special Import License (SIL) given to big exporters. SIL has been discontinued since 2000-01.

A comparison of base duty existed on January 1, 1990 and the bound rates show that the tariff cut effected in the area of rubber and rubber products were quite deep. The picture does not change significantly even when the comparison is between base rate of 1990 and total applied rate of 2001-02. Incidentally, total applied rate includes in addition to basic rates, additional and special additional duties. It must be mentioned that the tariff reductions were effected through a gradual process beginning in the early 1990s (Veeraputran, 1999)[2]

Table 6.2

Import tariff and import policy status of rubber (tariff in per cent)

Rubber	Product description	Base duty As on 1-1-1990	Bound rate as on 2000-01	Applied rate as on 2000-01	Import policy as on 2000-01
400110	Latex pre- vulcanized and not	---	UB	40.4	Restricted/SIL/Bop
40012100	Smoked sheets(RSS)	85	25	30	Restricted/SIL/Bop
400122	Technically Specified natural rubber (TSNR)	85	25	30	Restricted/SIL/Bop
400129	Other NR, except latex	145	25	30	Restricted/SIL/Bop
40013000	Balata, gutta-percha etc and similar natural gums	85	40	40.4	Restricted/SIL/Bop
40021100	Latex (SBR/XSBR)	145	40	62.864	Free
400219	Other SBR/XSBR	105	40	62.864	Free
40022000	Butadiene Rubber (BR)	105	40	62.864	Free
40023100	Isobutene- Isoprene butyl rubber (IIR)	105	40	62.864	Free
40023900	Halo-Isobutene-isoprene	145	40	62.864	Free
40024100	Latex, chloroprene rubber	85	40	62.864	Free
40024900	Acrylonitrile-butadiene rubber (NBR)	105	40	62.864	Free
40025100	Acrylonitrile-butadiene rubber latex	85	40	62.864	Free
40025900	Other Acrylonitrile-butadiene rubber	105	40	62.864	Free
40026000	Isoprene rubber (IR)	105	40	62.864	Free
400270	Ethylene-propylene non-conjugated diene rubber	105	40	62.864	Free
400280	Mixtures of NR with any other SRs	105	40	62.864	Free
40029100	Other rubber latex	85	40	62.864	Free
400299	Other synthetic factice rubber derived from oils	105	40	62.864	Free
4003	Reclaimed rubber	85	40	62.864	-----
4004	Waste, parings and scrap of rubber and powers and granules obtained there from	85	40	62.864	-----
4005	Compounded rubber, unvulcanised, in primary forms or in plates, shets or strip	145	40	62.864	Free
4006	Other forms and articles of unvulcanised rubber	145	40	62.864	Free
4007	Vulaunised rubber thread and cord	145	40	62.864	Free
4008	Plates, sheets, strip, rod,and profileshapes of Vulcanised rubber	145	40	62.864	Free
4009	Tubes, pipes and hoses, of vulcanized rubber other than hard rubber	145	40	62.864	----
4010	Conveyor or transmissions belts or belting, of vulcanized rubber	70	40	62.864	Free
4011	New pneumatic tyres of rubber	NA	UB	35(Basic duty)	Free
4012	Reteaded or used pneumatic tyres of rubber	NA	UB	35(Basic duty)	-----
4013	Inner tubes of rubber	NA	UB	35(Basic duty)	Free
4015	Articles of apparel and clothing accessories of vulcanized rubber	NA	UB	62.864	Free
4016	Other articles of vulcanized rubber	NA	UB	62.864	Free
4017	Hard rubber	NA	UB		Free

Source: Commerce Ministry (2001)

Note: Applied rate consists of basic duty plus additional duty plus special additional duty

Restricted/SIL/Bop: Restricted under Special Import License or Balance of Payment considerations, UB: Unbound, NA: Not available.

The preferential trading agreement signed by India has also been a major source of liberalization of trade (Harilal and Joseph, 1999)[3]. Among them the SAARC Preferential Trading Agreement (SAPTA) and India-Sri Lanka Free Trade Agreement have special implications as far as Indian rubber economy is concerned.

6.1.1 Initiatives taken to boost the Rubber sector[4]

- The Government through Rubber Board is implementing seven Plan Schemes for development of rubber plantations during the 10th plan period with an outlay of Rs.415 crores.
- The objective of the Price Stabilization Fund is to provide relief to the growers of tea, coffee and rubber when the prices of these commodities fall below a specified level, without resorting to the practice of procurement operations by the government agencies. The Price Stabilization Fund was established with a corpus of Rs.500 crores, which includes Rs.482.88 crores by the Central Government and Rs. 17.12 crores as a non refundable initial contribution by the participating growers @ Rs. 500 per grower.
- An Expert Committee has been constituted by the Department for reviewing the PSF Scheme for making it more useful and attractive to the growers. The Committee has submitted its report and action has already been initiated on the modified scheme.

6.2 WTO and the trade performance of natural rubber

Rubber imports to India were permitted under the following provisions from time to time.

- Against a licence issued by the Government of India or in accordance with a public notice on this behalf with the rate of duty as fixed by the government.

- Advance licence, a facility available to exporters of rubber products who can bring in rubber equivalent of the quantity of rubber in the products exported.
- Special import licence
- Import in the Export Promotion Zone by export oriented units
- Under OGL in accordance with the SAARC agreement, and
- Under the Bangkok Agreement with a duty concession of 5 per cent

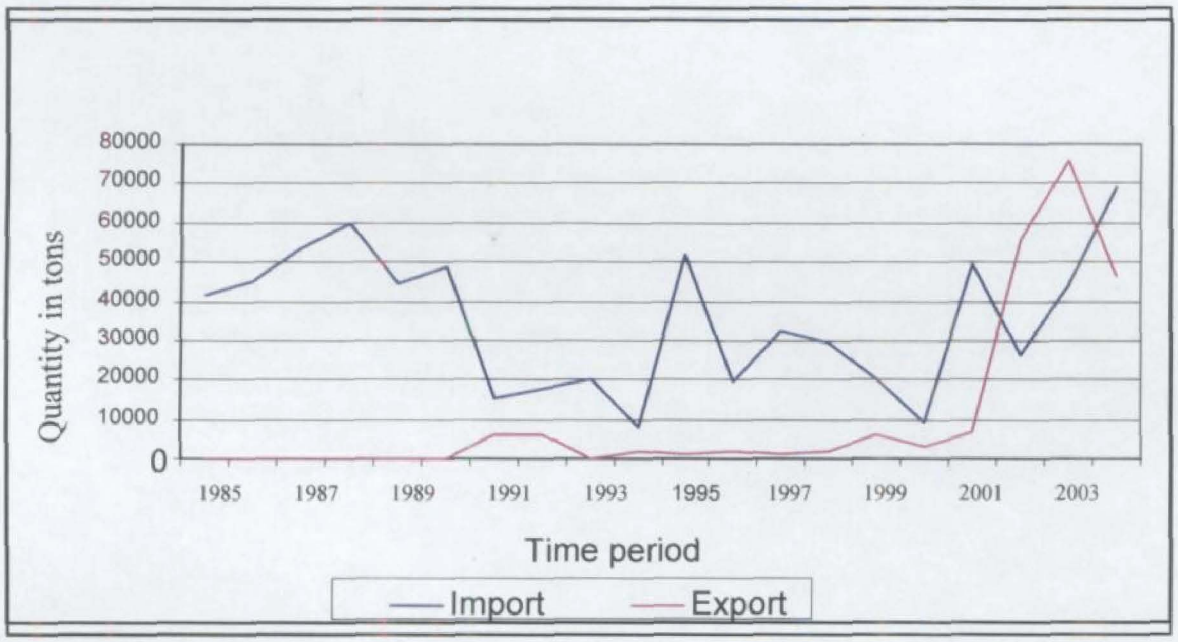
Among these alternative channels, item 2 was banned from February 1999 but the ban was removed from July 2003 with the condition that the imports should be through the ports of Kolkatta and Visakapatanam. Item 3 is not available now. With the removal of quantitative restrictions, rubber can be freely imported under OGL. The import tariff on rubber was also gradually reduced from 60 per cent in 1983 to 30 per cent in 1991 , and to 25 per cent in 1995 (Veeraputran, 1999)[5]. The basic customs duty on rubber was reduced from 25 per cent to 20 per cent and the Special Additional Duty of four per cent was abolished with effect from January 9, 2004.

India imported 41431 tons of NR during 1985-86. Consumption of NR increased at faster rate than the production and the imports had reached a maximum level of 59835 tons during 1988-89. There had been a fall in the average volume of imports in the early 90s and this tendency continued until 1994-95. In response to a reduction of customs duty to 25 per cent during 1995-96, India imported 51635 tons of NR in the same year. However, the next few years registered lower quantity of imports. During the 2000's quantities of production and consumption maintained more or less balanced. Further, in three years of the current century exports had exceeded the imports for the first time in history so that the net import was negative.

It can be because of the fact that the domestic prices remained below the international prices for most of the periods and that imports were uneconomical even after lowering the tariff rates. However, during 2004-05, imports have gone again up about 68718 tons, which were about 22000 tons above the exports. This may be in response to the lowering of customs duty on sheet rubber from 25 per cent to 20 per cent and abolishing the Special additional Duty levied at four per cent with effect from January 2004. Figure 6.1 presents a better reflection of export-import movements since 1985.

Figure: 6.1

Export and import of natural rubber



Source: Based on different issues of "Indian Rubber Statistics", published by Rubber Board of India, Kottayam

India has not been a traditional rubber exporting country. Even though, there was no export of NR from India between 1985-86 and 1990-91, we exported 5834 tons of rubber during 1991-92, which further increased to 5999 tons during the next year. However, exports did not rise beyond this level until 2000-01. The wide gap

between domestic demand and consumption of rubber along with the huge price advantage in the domestic market can be the possible reasons of the poor export performance of natural rubber during this period. The best year in terms of India's rubber export was 2003-04 and even during this year India's export accounted for only one per cent of the world export of rubber (George PS, 2005)[6]. Export from India remained buoyant during 2003-04 to reach a record of 75905 tons due to the favorable price advantage in the international market and the financial incentives provided for quality improvement, certification, packaging and transportation (Rubber Board, 2004)[7]. However, export had declined to 46169 tons during 2004-05. Thus the export performance of rubber in the post WTO period presents quite an optimistic picture with regard to the rubber economy of India is concerned.

6.2.1 Import Penetration Ratio of Natural Rubber

It is often assumed that liberalization of import barriers would lead to a surge in imports. However, the experience of natural rubber sector appears to contradict this popularly held view. As our analysis shows the import of natural rubber has tended to decline in the 90's.

We have attempted to see the trends in the ratios of import to consumption, import to production and import to apparent consumption of natural rubber. The results indicate that all these three ratios, viz., import to consumption, import to production and import to apparent consumption (import penetration ratio) show similar declining trend. During pre-reform period, these ratios tended to stagnate signifying the importance of imports. Interestingly, this was a period of highly restrictive import regime. Paradoxically, when trade regime changed and import barriers liberalized, the imports of natural rubber appeared to have declined or

stagnated. In fact, this period was also characterised by some but increasing quantity of export of natural rubber from India. Compared to pre- reform period, the import-consumption ratio, import-production ratio and the import penetration ratio declined considerably during the post-globalization period.

Table 6.3

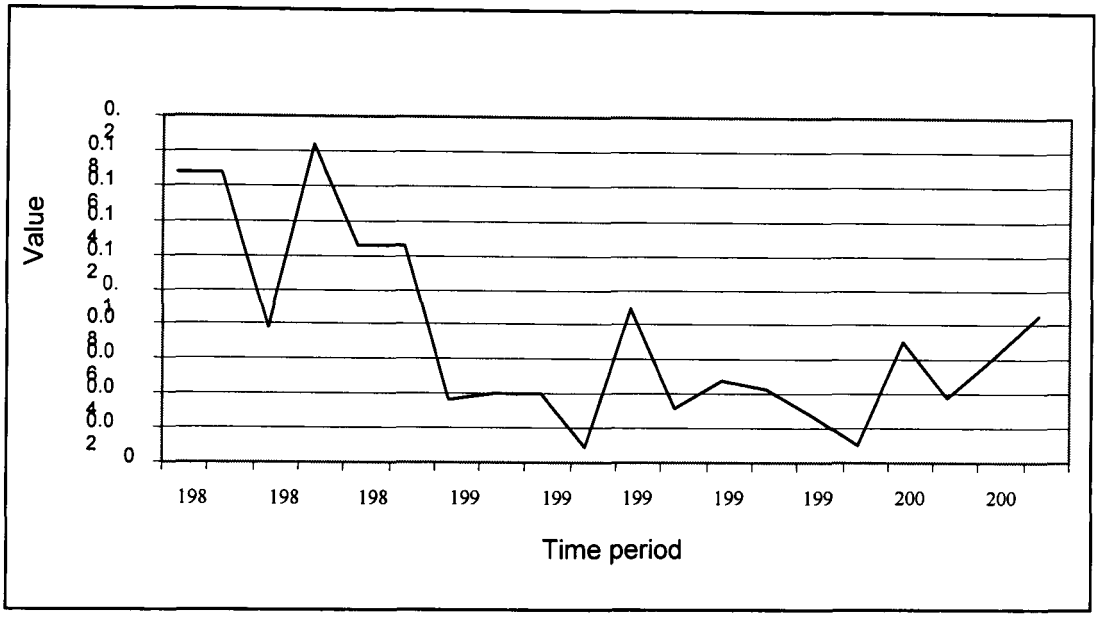
Trade performance of natural rubber (Quantity in tons)

Year	Import	Export	Consumption	Production	Import/ consumption	Import/ production	Import Penetration Ratio
1985-86	41431	0	237440	200465	0.17	0.207	0.171
1986-87	45356	0	257305	219520	0.17	0.21	0.171
1987-88	53685	0	287480	235197	0.18	0.22	0.082
1988-89	59835	0	313830	259172	0.19	0.23	0.188
1989-90	44445	0	341840	297300	0.13	0.14	0.130
1990-91	49013	0	364310	329615	0.13	0.14	0.129
1991-92	15070	5834	380150	366745	0.03	0.04	0.040
1992-93	17884	5999	414105	393490	0.04	0.04	0.044
1993-94	19940	186	450480	435160	0.04	0.04	0.044
1994-95	8093	1961	485850	471815	0.01	0.02	0.012
1995-96	51635	1130	525465	506910	0.09	0.01	0.093
1996-97	19770	1598	561765	549425	0.03	0.03	0.035
1997-98	32070	1415	571820	583830	0.05	0.05	0.052
1998-99	29534	1840	591545	605045	0.05	0.04	0.047
1999-00	20213	5989	628110	622265	0.03	0.03	0.032
2000-01	8970	3356	631475	630405	0.01	0.01	0.014
2001-02	49769	6995	638000	631000	0.07	0.07	0.074
2002-03	26217	55311	695000	649000	0.03	0.04	0.042
2003-04	44199	75905	719000	711000	0.06	0.06	0.065
2004-05	68718	46169	755000	749000	0.09	0.09	0.089

Source: Computed from different issues of 'Indian Rubber Statistics', published by Rubber Board of India, Kottayam

Figure 6.2

Import penetration ratio of natural rubber.



Source: Based on different issues of 'Indian Rubber Statistics', published by Rubber Board of India, Kottayam

6.2.2 Export –import ratio of natural rubber

This section assesses the export-import ratio of natural rubber of India during the post WTO period. We do not consider the pre-WTO period because India did not export natural rubber during that period. It can be read from table 6.4, that until 1998-99 the export value of rubber was very meager, which was a responsible factor for the low export import ratio. However, in the following years, India exported huge amount of rubber and at the same time, the import value did not improve correspondingly. Therefore, the value of exports dominated the value of imports in the second half of the post WTO period except for 2001-02 and 2004-05. Predominance of world price over the domestic price is the key factor responsible for this optimistic trend of India's rubber economy.

Table 6.4

Export –import ratio of natural rubber

Year	Value of Imports (Rs. in crores)	Value of exports (Rs. in crores)	Export/import
1995-96	278.44	6.67	0.02
1996-97	100.44	7.98	0.08
1997-98	121.66	5.12	0.04
1998-99	91.17	5.59	0.06
1999-00	57.32	16.20	0.28
2000-01	30.38	37.36	1.23
2001-02	144.46	16.91	0.12
2002-03	99.30	185.27	1.87
2003-04	220.14	346.88	1.58
2004-05	406.25	225.34	0.55
2005-06	281.10	458.29	1.63

Source: 'Indian Rubber Statistics' published by Rubber Board of India, Kottayam

Attempts are also made to analyze the destination wise export of natural rubber from India. It shows that during last few years, there happened significant changes in the direction and magnitude of natural rubber exports from India. Until 1998-99, India exported a lion's share of its total rubber exports to Nepal and thereafter the quantity of rubber exported to that country declined drastically. During 2004-05, Nepal accounted only for 3.43 % of our total rubber exports. Similarly, the share of Singapore and Indonesia also presented a diminishing trend. On the contrary, the share of China, Sri Lanka and Malaysia increased considerably during last few

years. A major factor responsible for these changes can be the commitments undertaken by the rubber importing countries related to the bound rates. In China and Sri Lanka, rubber imports are unbound of tariffs and Malaysia imposes only 5 per cent tariff whereas in Indonesia the tariff rate is 40 per cent. Thus is evident that India's export destinations vary in close connection with the tariff variations of other countries.

Table 6.5

Destination wise export of natural rubber from India (% share)

Destination	1993-94	1995-96	1998-99	2000-01	2003-04	2004-05
China	00	00	00	10.11	41.14	35.71
Indonesia	0	0	0	26.82	1.90	0
Nepal	68.28	93.27	81.03	6.94	2.37	3.43
Singapore	21.5	0	1.03	15.33	2.55	2.40
Sri Lanka	0	0	0	4.72	13.17	22.19
Turkey	0	0	0	5.93	5.71	3.01
U K	0	0	0	0	1.63	0.72
Malaysia	0	0	0	2.57	10.24	9.50
Germany	0	6.28	0	0	3.25	6.02
Spain	0	0	0	4.93	4.24	4.66
Other countries	10.22	0.45	17.94	22.65	13.8	12.36
Total	100	100	100	100	100	100

Source: 'Indian Rubber Statistics' published by Rubber Board of India, Kottayam (various issues)

Similarly, India imports natural rubber mainly from two major rubber-producing countries such as Thailand and Malaysia. Though there are some fluctuations in the share of these two countries, they really dominate India's import basket of natural rubber. Another significant feature is that the share of Indonesia in the total import of natural rubber has been going on increasing. Vietnam made a recent entry and their share increased from 0.4 per cent during 1997-98 to 3.8 per cent during 2003-04. At the same time, the share of Sri Lanka was dropped from 2.6 per cent during 1994-95 to 0.9 per cent during 2003-04. Thus, our assessment reveals that the recent economic reforms had influenced the export and import destinations quite significantly showing that the Indian economy is viable to take advantages from the global changes.

Table 6.6

Country wise import of NR into India (% share)

Countries	1994-95	1997-98	2000-01	2003-04
Indonesia	9.1	9.8	9.2	15.0
Malaysia	46.1	34.8	29.7	48.3
Thailand	31.0	43.1	29.0	28.7
Vietnam	---	0.4	10.1	3.8
Sri Lanka	2.6	7.2	4.5	0.9
Other countries	11.2	5.1	17.5	3.3
Total	100	100	100	100

Source: 'Indian Rubber Statistics' published by Rubber Board of India, Kottayam (various issues)

6.3 Growth and instability of trade in natural rubber

This section attempts to analyze the performance of natural rubber trade in terms of its growth and instability in the light of reforms initiated in India. In order to study the growth performance of export and import, kinked exponential growth model was used. To study variability, the coefficient of variation was used as an index of instability.

6.3.1 Growth rates of export and import

Boyce'[8] kinked exponential growth rate was used to estimate the growth rates of export and import of NR during pre-and post WTO periods, the results of which are presented in table 6.7. Earlier analysis shows that the production of NR in India increased in both the periods, though the rate of growth was more during the pre-liberalization period (9.78 per cent) compared to the post-liberalization period (3.59 per cent) (see chapter 4).

Table 6.7

Kinked exponential growth rates of export and import of NR

Sub - Periods	Growth rate of export	Growth rate of import
Pre-WTO period (1985-86 to 1994-95)	86.81* (5.56)	-11.59** (2.57)
Post- WTO period (1995-96 to 2004-05)	34.39** (1.95)	10.21** (2.01)

Source: FAO Statistical database

Note: Figures in the parentheses indicate't' values

*indicate significant at 1% level, ** indicate significance at 20 % level,

Regarding the export of NR, India experienced positive and very high growth during both the periods of study. However, it is to be noticed that the growth rate in quantity terms had decreased from 86.81 per cent during the pre-WTO period to 34.39 per cent during the post-WTO period. An important factor is that India did not go for export of NR until 1990-91 and started exporting natural rubber only from 1991-92 and our analysis was based only on the four-year data, which might have contributed to such a huge figure of growth. Therefore, the declining trend may be neglected while making a comparative study. The export really has gone up in the post-WTO period especially since 2002-03 during when the world market price dominated the domestic price of natural rubber.

In case of import of NR, India experienced a negative growth rate during the pre-WTO period in quantitative terms i.e., -11.59 percent. However, India recovered in the post-WTO period with a modest growth rate of 10.21 per cent.

6.3.2 Instability of export and import

Instability in the export and import performance of Natural Rubber during the pre-and post- WTO periods is estimated using coefficient of variation. A comparative study is also made possible with the estimation of average, the results of which are given in table 6.8. The data given in the table shows that India exported on an average of 4006.3 tons of NR during the pre-WTO period. This, however, has increased considerably to an average quantity of 19970.8 tons (to be precise a percentage growth of 498.48) during the post-WTO period. India thus exported a comparatively larger quantity of NR in the post globalization era.

The result of the coefficient of variation in the export of NR in quantity terms was found to be 82.61 per cent during the pre-WTO period and a comparatively

higher rate of 140.34 per cent during the post-WTO period. Thus, during both the periods there existed high level of instability in the export of NR from India, though it has increased during the post-WTO period.

Table 6.8

Variability in export and import of NR

Period	CV of NR export	CV of NR import	Average Qty of export (in tons)	Average Qty of import (in tons)
Pre-WTO period (1985-86 to1994-95)	82.61	51.80	4006.3	35475.2
Post –WTO period (1995-96 to 2004-05)	140.34	51.65	19970.8 (498.48) *	35108.5 (-1.04) *
Overall period (1985-86 to 2004-05)	161.20	50.35	15263.4	35292.4

Source: Based on Indian Rubber Statistics, published by Rubber Board of India, Kottayam

Note: * denotes percentage growth

India's import of NR during the pre-WTO period was an average of 35475.2 tons that stagnated during the post-WTO period too (i.e., 35108.5 tons every year showing a marginal decline of -1.04 per cent). The coefficient of variation for the NR import of India in quantity terms was found to be 51.80 per cent during the pre-WTO period and almost equal level of 51.65 per cent during the post-WTO period. It shows same level of instability in import of NR during the period of analysis.

6.4 WTO implications on the tea trade of India

Tea along with coffee has been brought under the purview of AoA of the WTO. From April 2001, quantitative restrictions on the import of tea were removed. The bound rate for tea is 150%. The applied rate is increased to 100% (as on 01.03.2002). Prior to that import duty including surcharge was 44.13% plus Rs. 2.30 per kg. Provisions of PFA (Prevention of Food Adulteration) Act are being imposed on imports. Import of tea is restricted through the two designated ports (Kolkatta and Cochin) under FTA (Free Trade Agreement) with Sri Lanka.

Table 6.9

Actual and bound rates on imports of tea and other tariffs in India

Tea CODE (HS)	Product description	Green tea	Green Tea	Black Tea	Black Tea	Other Taxes
		Actual Rate %	Bound Rate %	Actual Rate %	Bound Rate %	
0902.10	Green Tea not fern. In immediate pickings of a content not exceeding 3 Kg	10	150			Basic duty plus 10% surcharge on basic duty plus special additional duty of 4%.
0902.20	Other Green Tea not fern	10	150			-do-
0902.30	Black Tea fern and partly fern. Tea in immediate packing of a content not exceeding 3 Kg			10	150	-do
0902.40	Other Black Tea fern. And other partly fern. Tea			10	150	-do-

Source: website, http:// indiabudget.nic.in

6.4.1 Initiatives taken to boost the tea sector[9]

- Withdrawal of the additional excise duty of Re.1 per kg on tea in the Union Budget 2005-06
- Sanctioning of two schemes viz. grant of subsidy for production of orthodox teas and assistance to the two R&D Institutions viz. Tea Research Association at Tocklai (Assam) and United Planters' Association for Southern India – Tea Research Foundation (UPASI-TRF) with an estimated outlay of Rs.93crore for financing from the special fund created with the additional duty of excise of Re.1 per kg on tea collected during 2003-05
- Issue of a new Tea (Distribution and Export) Control Order, 2005 on 1stApril 2005 under the provisions of the Tea Act,1953 in super session of the Tea (Distribution and Export) Control Order, 1957 to maintain quality and retain the brand equity of Indian teas

6.5 WTO and the trade performance of tea

In order to analyze India's trade performance of tea before and after WTO Agreement on Agriculture, we used the data published by the FAO, Rome and the Tea Board of India. The following section gives an overview of India's export and import performance, the import penetration ratio, the export-import ratio and the destination wise exports and imports to enrich our studies.

In case of export, India had a practice of exporting huge quantity of tea for long before. Excess of production over consumption was exported even before the globalization of Indian tea economy. Our export of tea was 214021 tons in 1985 and

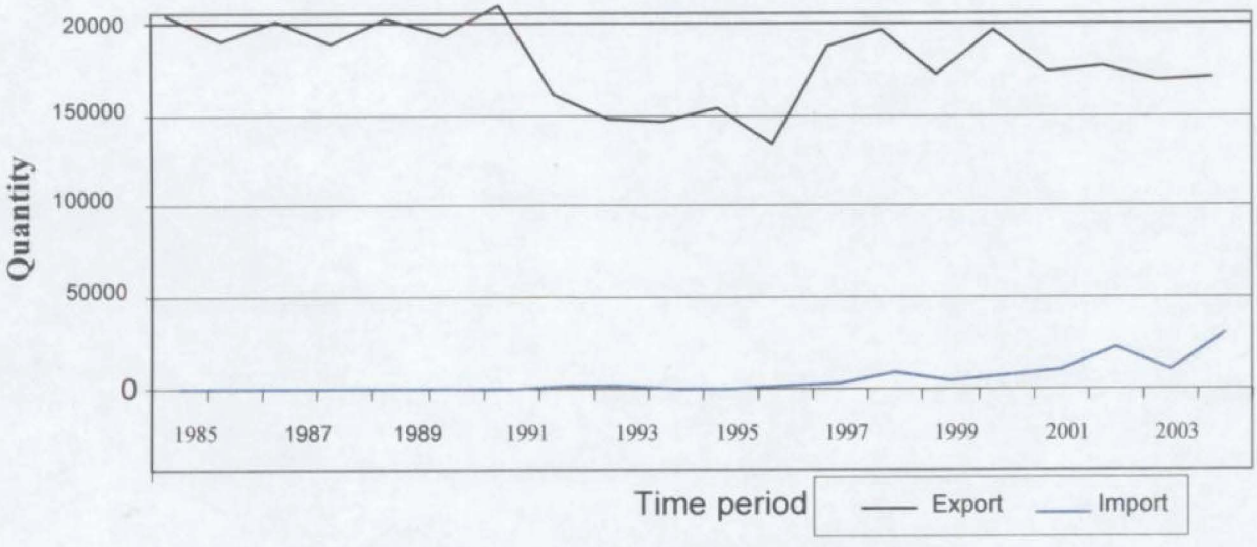
stagnating up to 1991, it started declining in the early 90s. A comparatively lower price in the international market can be a reason responsible for this diminishing trend. However, during the post globalization period, export increased from 167143 tons in 1995 to 205800 tons in 2004, showing fluctuations in 1999, 2001 and 2003. The world price of tea dominated the domestic price during the post globalization period except in 1995 and 1999 thereby inspiring the export from our country.

Historically, India used to produce tea far beyond its consumption needs. This can be a major justification for the poor import performance of tea into India.

During the second half of 1980s where starts our analysis period, we have not imported tea and it was from 1992, import got its momentum. India imported 558 tons of tea in the year 1995, which gradually increased in the following years. After ten years of globalization, India imported 31061 tons of tea in 2004 that is the record high during the post globalization period.

Figure: 6.3

Export and import of tea



Source: Based on FAO Statistical Database, http:// apps.fao.org

6.5.1 Import penetration Ratio of tea

The assumption that liberalization of import barriers would lead to a surge in imports holds true in case of tea sector of India. The analysis shows, the import of tea has tended to increase during the 90s. It is observed that opening up of the economy and the liberalization of import barriers led to increasing quantity of import of tea into our country. At the same time, the export of tea from India stagnated or slightly declined. Analysis of the import-consumption, import-production and the import penetration ratios shows that all these three ratios indicated an increasing trend during the post reform period. As there was no import of tea from 1985 to 1991, all the three ratios give no results. During 1990s, the ratios tended to move up signifying increasing importance of imports. With the removal of quantitative restrictions on tea imports from April 2001, the imports started to increase by huge amount, resulting to an increase in import-consumption, import-production and import penetration ratios.

Table 6.10

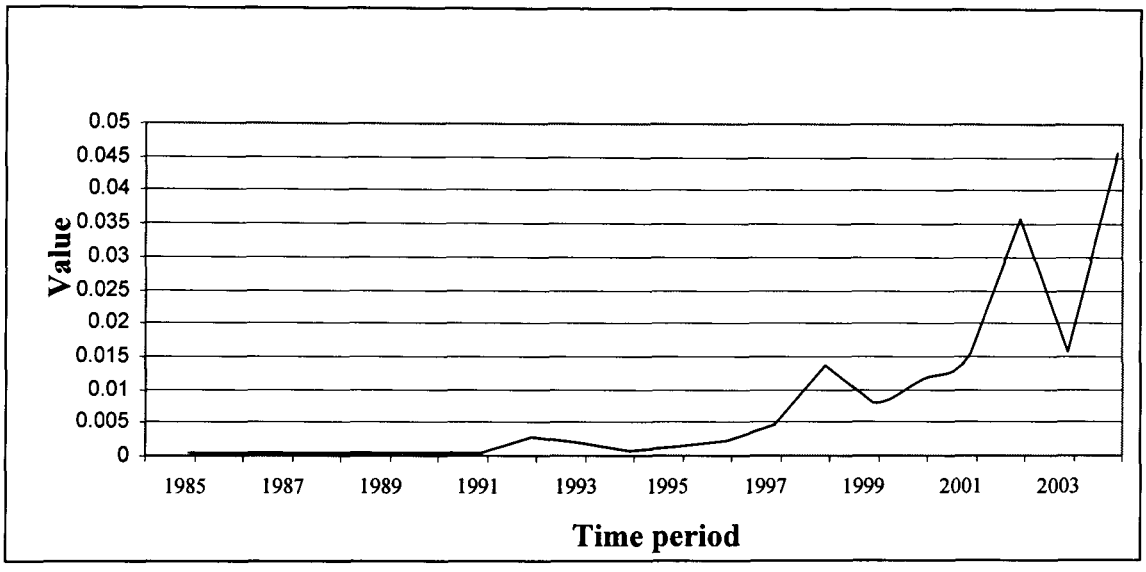
Trade performance of tea (Quantity in tons)

Year	Import	Export	Consumption	Production	Import/ consumption	Import/ production	Import Penetration Ratio
1985	0	208379	415000	656162	0	0	0
1986	0	195520	431000	620803	0	0	0
1987	0	205246	446000	665251	0	0	0
1988	0	193012	462000	700014	0	0	0
1989	0	208043	480000	688105	0	0	0
1990	0	198136	500000	720338	0	0	0
1991	0	215144	511000	754192	0	0	0
1992	1371	166359	524000	732322	0.003	0.002	0.002
1993	874	153159	537000	760826	0.002	0.001	0.001
1994	199	150874	550000	752895	0.0004	0.0003	0.0003
1995	558	158333	562000	756016	0.001	0.0007	0.0009
1996	1228	138360	580000	780140	0.002	0.002	0.002
1997	2608	191472	597000	810031	0.004	0.003	0.004
1998	9058	201798	615000	874108	0.015	0.010	0.013
1999	4910	177507	633000	825935	0.008	0.006	0.008
2000	7158	200868	653000	846922	0.011	0.008	0.011
2001	10275	177603	673000	853923	0.015	0.012	0.015
2002	23606	181617	693000	826165	0.034	0.029	0.035
2003	10661	174246	714000	857000	0.015	0.012	0.015
2004	31061	174728	735000	830700	0.042	0.037	0.045

Source: FAO Statistical Database, http:// apps.fao.org

Figure: 6.4

Import penetration ratio of tea



Source: Based on FAO Statistical Database, http:// apps.fao.org

6.5.2 Export–import ratio of tea

Table 6.11 shows the export import ratio of tea. In the case of tea, India started import only in the 1990s and therefore, during the pre-reform period we had huge earnings from the tea exports. In 1994, our export earning from tea was $30.84 crores whereas, our expenditure for tea import was only $3.51 lakhs showing export 878.63 times to that of the imports. However, the tea economy of India has undergone drastic changes during the post-reform period. India started importing huge quantity of tea since the second half of the 1990s. This has resulted in the sharp decline in the export-import ratio of tea, which has reached a lowest level of 12.06 in the year 2004. Thus, it is clear from the analysis that our ability to finance imports by our own exports, though it is positive, has been reducing significantly during the post-reform period.

Table 6.11

Export–import ratio of tea (Value: 1000$)

Year	Import	Export	Export/Import
1985	0	552,078	---
1986	0	452,765	---
1987	0	457,530	---
1988	0	415,898	---
1989	0	543,408	---
1990	0	594,191	---
1991	0	490,292	---
1992	1,954	360,933	184.71
1993	1,278	331,845	259.66
1994	351	308,399	878.63
1995	856	359,054	419.56
1996	1,738	282,579	162.59
1997	4,803	497,239	103.53
1998	15,559	518,258	33.31
1999	5,933	406,106	68.45
2000	9,446	431,596	45.69
2001	14,722	367,207	24.94
2002	25,393	326,629	12.86
2003	13,535	333,408	24.63
2004	31,327	377,742	12.06

Source: FAO Statistical Database, http:// apps.fao.org

We have attempted to analyze the destination wise export of tea from India. The results indicate that India's exports to Commonwealth of Independent States which accounted for almost half of its total export of tea until 2000, declined significantly to reach 27.01 per cent during the year 2004. Among non-CIS countries, the export of tea from India to U A E, Australia, Germany and Afghanistan registered an increase whereas the export to Poland, Iran and Saudi Arabia registered a decline during the post reform period. A notable change is

that our export to Iraq which was very meager in 1990 increased by huge amount i.e., 13.05 per cent of its total exports according to 2004 figure. Regarding the origin wise import of tea into India, Vietnam and Indonesia are two important contributors in the 2000's having a share of 54.91% and 19.41% respectively as per 2002 data. Other major countries from where India imports tea are Kenya, Turkey Sri Lanka and Iran.

Table 6.12

Destination wise export of tea from India (percentage share)

Destination	1990	1995	2000	2004
U K	10.37	12.65	10.12	10.01
CIS	61.51	48.84	45.95	27.01
Iraq	0.001	0.03	5.25	13.05
Poland	3.33	9.42	6.06	2.64
Iran	5.20	0.99	1.66	1.30
Saudi Arabia	1.86	0.63	0.42	0.39
U A E	2.28	8.19	10.70	12.95
Australia	0.24	0.46	0.33	2.48
Germany	1.95	4.08	2.21	2.64
USA	0.80	1.65	3.61	3.94
Afghanistan	0.40	0.43	0.11	1.05
Other countries	14.01	12.95	13.58	22.54
Total	100	100	100	100

Source: Computed from different issues of 'Tea Statistics' published by Tea Board, Calcutta

6.6 Growth and instability of trade in tea

The growth and instability of export and import of tea are assessed with the help of kinked exponential growth models and the coefficient of variation, the results of which are explained in the following section.

6.6.1 Growth rates of export and import of tea

The kinked exponential growth rates (Boyce,1986) for export and import of tea during pre-and post-WTO periods are presented in table 6.13.The data analyzed earlier (in chapter 4) indicated that tea production in India increased during both the periods, but the proportionate increase was more during the pre-liberalization period than post-liberalization period.

Table 6.13

Kinked exponential growth rates of export and import of tea

Sub - Periods	Growth rate of export	Growth rate of import
Pre-WTO period (1985 to 1994)	-2.40** (3.67)	84.79* (6.83)
Post- WTO period (1995 to 2004)	2.06** (2.79)	42.75** (3.05)

Source: FAO Statistical database, http:// apps.fao.org

Note: Figures in the parentheses indicate't' values

*indicate significant at 1% level, ** indicate significance at 10 % level,

India experienced a negative growth rate of tea export (-2.41 per cent) during the pre-WTO period. This negative growth may be due to a decline in the price of tea in the world market. During the pre-WTO period, the domestic price of tea dominated the world price except for the year 1994. This can be a possible reason for the negative growth in export of tea from India. However, during the post-WTO era, India experienced fairly better growth rate of 2.06 per cent in quantity terms. Interestingly, the world price of tea dominated the domestic price during the post-WTO period except for 1995 and 1999. This might have contributed to the growth in export from India. After all, the poor performance of tea production and productivity

were among the other responsible factors for slow growth rate of tea export from India.

In the case of import of tea, India experienced a positive and high rate of growth in quantitative terms during both pre-and post WTO periods but comparatively a lower rate of growth during the post-WTO period i.e., 84.79 per cent during pre-WTO period and 42.75 per cent during post-WTO period. The pre-WTO import growth estimation was based only on three observations beginning from 1992 and 1994 and prior to 1992, there was no import of tea into India. It can be a possible reason for such a very high figure of growth rate. Thus, the tea economy of India was severely affected with increased quantity and higher growth rate of imports in the post WTO period as compared to the exports from the country.

6.6.2 Instability of export and import of tea

The instability indices give the degree of fluctuations around the trend and are zero when there is perfect stability or changing at constant rate. Values above zero would indicate the extent of instability around the trend pattern. To know India's performance in export and import of tea during pre-and post WTO period, arithmetic mean and coefficient of variation were estimated for quantitative as well as value terms and are presented in table 6.14. The results indicated that on an average, India exported about 189387 tons of tea and earned about 450734 thousand US$ every year during pre-WTO period. However, during the post-WTO period, it exported 177653 tons of tea and earned about 389982 thousand US $. The average quantity as well as value of tea export has declined during the post-WTO period.

The coefficient of variation in the export of tea in quantity terms from India was found to be 12.54 per cent during the pre-WTO period and 10.72 per cent

during the post-WTO period. In value terms, the coefficient of variation was estimated to be 21.53 per cent and 19.17 per cent for pre and post WTO periods respectively. It shows that the instability in export of tea from India has slightly declined during the post-WTO period.

Table 6.14

Variability in export and import of tea

Period	Export		Import		Average Qty and value of export		Average Qty and value of import	
	Quantity	Value	Quantity	Value	Quantity	value	Quantity	value
Pre-WTO period (1985 - 1994)	12.54	21.53	72.21	67.38	189387	450734	815	1194
Post- WTO period (1995-2004)	10.72	19.17	98.04	81.04	177653	389982	10112	12331
Overall period (1985-2004)	11.88	21.38	119.35	101.86	183520	420357	7967	9761

Source: FAO Statistical Database

Note: Quantity in tons and value in 1000'US $

Regarding the import of tea, our study reveals that India imported on an average of about 815 tons of tea and earned about 1194 thousand US $ during the pre-WTO period. However, country imported 10112 tons of tea and earned about 12331 thousand US $ per year during the post-WTO period. The results of coefficient of variation of import of tea reveal the existence of high level of instability in tea import into India during both the periods. The coefficient of variation of import in quantity terms was found to be 72.21 per cent during the pre-WTO period and 98.04 per cent during the post-WTO period. In value terms, the figures were 67.38 per cent and 81.04 per cent for pre-and post-WTO periods

respectively. It is evident from the analysis that the import instability was very high during the period of analysis.

6.7 Summing up

The purpose of the present chapter was to assess the trade performance of natural rubber and tea in the light of WTO Agreement on Agriculture. For the purpose of analysis, the tools like import penetration ratio, export-import ratio, kinked exponential growth model, coefficient of variation etc were used in the study.

The Natural Rubber being an industrial raw material has a bound rate of 25 per cent in India. With the removal of quantitative restrictions, the import of NR fluctuated during 1990s. However, the exports increased at a faster rate during the post-WTO period. The import penetration ratio showed a declining trend in the post-reform period and the export-import ratio showed an increasing trend. Similarly, the destination wise export and import of natural rubber had undergone serious changes in the post reform period. Regarding the growth rate of NR trade, the export growth was very high during both the periods. However, the import of NR from India, showed a positive but slow rate of growth in the post- reform period as against the negative growth in the pre-reform period. A study of variability revealed that the instability in export of NR was higher as compared to that of import during the period of analysis.

In the case of tea, the export remained almost stagnant but import increased by huge quantity during the period of analysis. Removal of quantitative restrictions caused increased quantity of import, thereby contributing to increasing trend in the import penetration ratio and a declining tendency in export–import ratio in the post-reform period. India also witnessed remarkable changes in the destination wise

export of tea. Analysis of growth rates revealed that export growth was positive but smaller percentage in the post-WTO period as against a negative rate of growth in the pre-WTO period. Import, however, showed very high rate of growth during both the periods. Analysis of instability showed higher import instability than that of export during pre-and post-WTO periods.

References:

1. Tom Joseph and Tharian George K(2002), "*WTO and Natural Rubber Sector in India*", Economic Research Division, Rubber Research Institute of India, Vol.2.
2. Veeraputran (1999), '*Trends and Fluctuations in Indian Natural Rubber Prices: 1968-69 to 1997-98*', M. Phil Thesis, Centre for Development Studies, Trivandrum
3. Harilal K N and Joseph k J (1998) , *India Sri Lanka Free Trade*, Economic and Political Weekly, 34(13) pp. 750.
4. website: http:/indiabudget.nic.in
5. Veeraputran (1999): op. cit.
6. George P S, (2005), "*Globalization and Agricultural Transition in Kerala*", Centre for Development Studies, Trivandrum, P: 145.
7. Rubber Board, kottayam (2004), *Indian Rubber Statistics*, Volume 27
8. Boyce, James K (1986): "*Kinked Exponential Model for Growth rate Estimation*", Oxford Bulletin of Economics and Statistics, Vol.48, pp. 385-391.
9. website: http:/indiabudget.nic.in

Summary and Conclusion

Jomon Mathew “The impact of new economic policy on Indian agriculture: A study of selected cash crops ” Thesis. Department of Economics, Dr. John Matthai Centre , University of Calicut, 2006

7 *Summary and conclusion*

Chapter 7

SUMMARY AND CONCLUSION

The beginning of 1990s witnessed the initiation of far reaching changes in the Indian economic policy framework with the introduction of macro economic stabilization and structural adjustment policies. The New Economic Policy announced by the Government of India since July 1991 has put entirely fresh and new approach to its management and correction of its various distortions. This new policy has left particularly no sector of the economy unaffected. The reforms initiated are expected to have serious implications as far as Indian agricultural sector is concerned. The liberalization process in the agricultural sector received further impetus with the establishment of the World Trade Organization (WTO). The WTO, which replaced GATT originating from the 1947 Geneva trade conference, came into existence on January 1, 1995 with the stated objective of creating a *fair and equitable system of global trade* among the member countries.

This study was an attempt to analyze the impact of New Economic Policy on India's agricultural sector especially on cash crops. For the purpose of analysis, we selected two cash crops, which are of high national significance say, natural rubber and tea. The period of study was ranging from 1985 to 2004 and this period was sub-divided into pre-reform period (1985 to 1994) and post reform period (1995 to 2004). Such a classification is made deliberately because the reform process in the agricultural sector was initiated with the signing up of World Trade Agreement in the year 1994 and the introduction of WTO on 1 January 1995. Further, the implementation period of AoA was starting from 1995. In this chapter, we shall

attempt to summarize the major findings of the study, which was based on the following objectives.

- *To examine the impact of New Economic Policy on growth and instability of area, production and productivity of natural rubber and tea*
- *To analyze the price movement and market integration of natural rubber and tea in the light of economic reforms*
- *To assess the trade performance of natural rubber and tea in the WTO regime*

A review of earlier studies presented in the second chapter revealed that for the last few years, a series of studies had been conducted to verify the impact of the New Economic Policy on the agricultural sector of India. It could be noted that most of those studies were conducted on the regional basis and several of them concentrated on the food crops. Though a few studies were made on cash crops focusing on prices, export performance, marketing and the like, a major limitation that could be traced out is that they lack national nature and coverage. The above limitations of the existing studies call for further research on cash crops especially on natural rubber and tea as they are of high national importance in the era of the fast globalizing world. Hence, the present study was an attempt to fill this gap.

The third chapter provided an overview of India's agricultural sector. Agriculture still plays an important role in the national economy by way of providing huge employment opportunities and contributing a significant share to its GDP and total export earnings. However, the investment in the form of capital formation has not increased in the agricultural sector and growth rate of agriculture and allied activities was not improved as was expected.

The WTO Agreement on Agriculture (AoA) as a key to globalization of agricultural sector calls for reduction commitments in the areas relating to market access (Tariffication), domestic support and export competition. Market access for agricultural products is governed by a tariff only regime. Non-tariff boarder measures are replaced by tariffs that provide equivalent levels of protection with access opportunities being maintained or expanded through current and minimum access tariff quotas. Domestic support measures are aimed at identifying acceptable measures that support farmers and prohibit unacceptable trade distorting support to farmers. It requires reduction of domestic support, which is quantified through the mechanism of total Aggregate Measure of Support (AMS). In the area of export competition, the agreement calls for reducing direct export subsidies to a level of 36 per cent below 1986-88 level over a period of six in case of developed countries and 24 per cent in case of developing countries over a period of ten years.

The purpose of the fourth chapter was to examine the impact of New Economic Policy on growth and instability of area, production and productivity of natural rubber and tea, thereby verifying the *first objective* of the study. The major findings of the study are:

- The area under cultivation, production and productivity of natural rubber showed an increasing trend during the period of study, though their rate of growth slightly declined during the post reform period.
- The index numbers of rubber production and productivity has been increasing at faster rate so that they are much above the production and productivity index of the cash crops in general.

- Even though instability in area under natural rubber cultivation declined, the production and yield instability increased during the post liberalization period.
- In case of tea, the rate of growth of area under tea cultivation increased during the post liberalization period. Regarding the production and the productivity of tea, the post liberalization period showed lower rate of growth compared to the pre liberalization period.
- The index numbers of production and productivity of tea indicated very slow growth during the period of analysis. Further, the productivity index registered a declining trend during the post liberalization period.
- Instability in area, production and productivity of tea increased considerably during the post liberalization period.

The fifth chapter attempts to analyze the price movement and market integration of natural rubber and tea in the light of economic reforms. It could be found that natural rubber sector responded seriously to the reform changes and that the price ratio between domestic and world prices declined significantly during the post reform period. The world price, after moving close with the domestic price through out the 90s dominated the domestic price since 2003. The same trend was visualized in case of tea. Indian tea price crashed below the world price during the post reform period. Market integration analysis, done by using Augmented Dickey-Fuller test and Johansen-Juselius method of multiple co integration tests brings out the following findings:

- The market integration tests revealed that the selected rubber markets of India are significantly integrated during the post-reform period.

- The study also indicated integration and long run relationship between domestic and international rubber markets
- The results of market integration test exhibit a long run relation between the selected tea markets of India during the period of our study.

The purpose of the sixth chapter was to evaluate the *third objective* of our study. That is to say, it assessed the trade performance of natural rubber and tea in the WTO regime. We shall summarize the observations of the study as follows:

- Though it was assumed that liberalization of import barriers would lead to a surge in imports, the experience of natural rubber sector appeared to contradict this popularly held view. As our analysis shows, the import of rubber has tended to decline in the 90's. At the same time, the exports increased at a faster rate during the post-WTO period. The import penetration ratio, therefore, showed a declining trend and the export import ratio indicated an increasing trend during the post-reform period.
- Regarding the growth rate of NR trade, the export growth was very high during the period of analysis. However, the import of NR from India showed a positive but modest growth rate in the post- reform period as against the negative growth in the pre-reform period.
- Estimates of instability showed that the instability in export of NR was higher as compared to that of import in both periods.
- In case of tea, the export remained almost stagnant throughout the period with slight fluctuations. However, India started importing huge amount of tea in the post-reform period. Removal of quantitative restrictions caused

increased quantity of import thereby contributing to increasing trend in the import penetration ratio and declining trend in export-import ratio during the post-reform period.

- The results of kinked exponential growth rates revealed that export growth was positive but smaller percentage in the post-WTO period as against a negative growth rate in the pre-WTO period. At the same time, import increased at a high rate of growth during both periods.
- The instability analysis of tea showed high import instability and low exports instability during pre-and post-WTO periods.
- The destinations of export and import of both commodities have undergone fundamental changes during the post reform period.

Thus, economic liberalization brought dramatic changes in the agricultural sector of the Indian economy, particularly the cash crop sector. In case of area, production and productivity of natural rubber, the post reform period marked increasing actual values but lower rate of growth and higher instability. It could be observed that the selected rubber markets of India are integrated during the post-reform period. The study also revealed integration and long run relationship between domestic and international rubber markets. Further, as against expectations the import liberalization did not lead to a surge in imports of rubber into India. On the other hand, country took advantage of higher world prices through increased quantum of exports. In short, it can be concluded that the New Economic Policy produced positive impact as far as our rubber economy is concerned.

Similarly, in case of tea, the rate of growth of production and productivity declined and the instability in area, production and productivity increased during the

post-reform period. It could be analyzed that the domestic tea markets were significantly integrated during the reform period. Further, the world price dominated the domestic price through out the post reform period and that the gap was ever widening. However, India failed to take advantage of increased world prices through exports. Contrary to this, we started importing huge amount of tea, thereby producing increasing trend in import penetration ratio and declining trend in export import ratio. Hence, the study revealed almost negative influence of economic reforms on the tea economy of India.

Thus, it can be concluded that the impact of New Economic Policy and economic liberalization on India's agricultural sector varies significantly across crops. There are, mixed implications as far as our cash crop sector is concerned in the new scenario.

Bibliography

Bibliography

BOOKS

1. *Asopa, V N*, "Competitiveness in Global Tea Trade", *oxford and IBH Publishing Co. Pvt. Ltd., New Delhi, pp.20-21*

2. Bernard, H and K, Michel (1995*), The Political Economy of the World Trading System: From GATT to WTO, Oxford University Press, Oxford*

3. Bhalla, G.S. (1994), *Economic Liberalization and Indian Agriculture*, Institute of Industrial Development, New Delhi

4. Brajesh Jha (2001*). Indian Agriculture and the Multilateral trading System'*, Rajeev Gandhi Institute for contemporary Studies, Rajiv Gandhi Foundation, New Delhi.,pp.207-212.

5. Chand, R.and Jha, D. (2001*), Trade Liberalization, Agricultural Prices and Social welfare,* in Acharya, S.S. and Chaudhri, D.P (eds), Indian Agricultural Policy at the Crossroads, Rawat Publications.

6. Dohlman, E., Persaud, S. and Landes, R. (2003), *India's Edible Oil Sector: Imports Fill Rising Demand*, US Economic Research Service, Electronic Outlook Report, OCS-0903-01,US Department of Agriculture, Washington, November,2003.

7. George P S, (2005), *"Globalization and Agricultural Transition in Kerala"*, Centre for Development Studies, Trivandrum, P: 145.

8. Goyal, A (2000), *Customs Tariff 2000-2001*, 18th Budget Edition, Academy of Business Studies, New Delhi

9. Gulati A (1998), *Indian Agriculture in an open economy: will it prosper? In Economic Reforms and Development (Ed) Isher Alhuwalia and IMD Little,* Oxford University press, Delhi, pp.122-146

10. Gulati, A (2001), *"Indian Agriculture and The WTO : preparing for New Millennium, in Chadha, G.K (ed), WTO and the Indian Economy,* Deep and Deep publications.

11. Gulati, A. and Mullen, K. (2003), *Responding to Policy Reform: Indian Agriculture in the1990s and After*, Stanford Centre for International Development Working Paper no. 189, Stanford, California. *Washington DC, pp. 327–66.*

12. Joseph T and T George (2002), *WTO and natural Rubber Sector in India (vol.2),* Economic Research Division, Rubber Research Institute of India

13. Mani S (1983*),'Analysis of Indian Natural Rubber Market'*, M. Phil Thesis, Centre for Development Studies, Trivandrum.

14. Mattoo, A. and Subramanian, A. (2003*), 'India and the multilateral trading system post-Doha: defensive or proactive?'* in Mattoo, A. and Stern, R.M. (eds), *India and the WTO,* World Bank and Oxford University Press,

15. Nanporia, J J. (Ed) - *The Times of India directory and Year Book Including Who's Who,* 1965-66, P.393.

16. Parikh Kirit et. al (1995),Strategies for Agricultural Liberalization : Consequences for growth, Welfare and Distribution , Indira Gandhi institute of development Research, Mumbai.

17. Parikh, Kirit S; N S S Narayana; Manoj Panda and A Ganesh kumar (1995), *Strategies for Agricultural Liberalization: consequences for Growth, Welfare and Distribution* , Indira Gandhi Institute of Development Research, Mumbay.

18. Ruddar Datt and K P M Sundharam (2003) .*Indian Economy* , forty Eighth Revised Edition, S Chand & Company Ltd. New Delhi, p. 514

19. Savithri T M (1999), "Production, Productivity and Prices- A Study on Agricultural Commodities in Kerala", Ph.D Thesis, University of Calicut, Kerala

20. Sen Abhijit and M.S. Bhatia (2004). *Cost of Production and Farm Income, Millennium Study on State of India's Farmers,* Academic Foundation, New Delhi

21. Shukla S P (2002), *"From the GATT to the WTO and Beyond", Governing Globalization: issues and Institutions,* Edited by Deepak Nayyar, Oxford University press, p.268

22. Subramanian S (1993) Agricultural Trade Liberalization in India, Development centres of OECD, Paris.

23. Tom Joseph and Tharian George K(2002), *"WTO and Natural Rubber Sector in India",* economic Research Division, Rubber Research Institute of India, Vol.2.

24. Varma, Poornima (2001), *Impact of Trade Liberalization on Rubber and coconut,* M.phil dissertation submitted to the Jawaharlal Nehru University. Centre For Development Studies,

25. Veeraputhran (1999), *'Trends and Fluctuations in Indian Natural Rubber Prices: 1968-69 to 1997-98',* M. Phil Thesis, Centre for Development Studies, Trivandrum

26. Zant, W (1998), *Stock holding, Price Stabilization and Future Trading: Some Empirical Investigation of Indian Natural Rubber Market,* International Books, The Netherlands

JOURNALS / PERIODICALS

1. Ashok Gulati (1996), "New Economic Policy and Indian Agriculture", *Indian Journal* of *Agricultural Economics, Vol.51, No.1 & 2, January-June, pp.35-37.*

2. Ashok Gulati and Anil Sharma (1994), "Agriculture under GATT: what it holds for India", *Economic and Political Weekly,* July 16, pp.1857-1863

3. Banerjee, Amalesh (1995). "Reforming Agriculture-Real and Financial", *Indian Journal of Agricultural economics,* Vol.50, No.3, July-Sept

4. Bhatia, M.S (1994),"Agriculture Pricing, Marketing and International Trade Under New economic Environment", *Indian Journal of Agricultural Economics,* vol.49,no.3

5. Bhole B D (1995). "Prospects of Indian Agriculture in New Economic Environment", *Indian journal of Agricultural Economics*, Vol.50, No.3, July- Sept

6. Boyce, James K (1986*): "*Kinked Exponential Model for Growth rate Estimation*", Oxford Bulletin of Economics and Statistics*, Vol.48, pp. 385-391.

7. Brahm prakash, Sushila Srivastava and S Lal (1995), "Impact of New Economic policy on Export of Agricultural Commodities from India", Indian *Journal of Agricultural Economics*, Vol.50, No.3, July- September, p.534

8. Chadra, R. (2001), "Trade and balance of payments' in Economic and Policy Reforms in India", *National Council of Applied Economic Research*, New Delhi, pp. 89–128

9. Chand Ramesh (1997), "Removal of Import Restriction and Indian Agriculture: The Challenge and strategy", *Economic and Political Weekly,* Vol. 33 No.15,pp 850.854.

10. Chand Ramesh (2004), "Agriculture Growth during the Reforms and Liberalization: Issues and Concerns, Policy Brief", *National Centre for Agricultural Economics and Policy Research*, New Delhi.

11. Chand, R (1998), "Removal of Import Restrictions on Indian Agriculture: the Challenges and Strategy", *Economic and Political Weekly,* 33(15), pp: 850-854.

12. Cuddy and V. Della (1978), "Measuring the Instability of Time Series Data", *Oxford Bulletin of Economics and Statistics*, February issue.

13. Dhawan BD and SS Yadav (1997), "Public Investment in Indian Agriculture", *Economic and Political Weekly*, Vol. XXXII, No. 14

14. Dickey, D A, Fuller, W A (1981), Likelihood ratio tests for autoregressive time series with a unit root, *Econometrica,* Vol.49, pp 1057-1072

15. Edgar..., "Note on the Tea Industry in Bengal "- papers regarding the *tea industry in Bengal* (1873), P.7.

16. Gulati, Ashok and Sharma, Anil (1994) "Agriculture under GATT: What it holds for India", *Economic and Political Weekly*, Vol . xxxix, No.29, July 16, pp 1857-1863.

17. Hanumantha Rao C.H (1998)."Raise real public expenditure", *Business Line,* 15/7/98.

18. Harilal K N and Joseph k J (1998) , *India Sri Lanka Free Trade*, Economic and Political Weekly, 34(13) pp. 750.

19. Ipe Viju (1988), "Seasonal Fluctuations in the Price of Natural Rubber in India", *Indian Journal of Natural Rubber Research,* vol.1; No.1, pp.31-34

20. Johansen, S and K. Juselius (1990), "Maximum Likelihood Estimation and Inference on Co integration with Application to the Demand for Money", *Oxford Bulletin of Economics and Statistics*, Vol. 52, pp. 169-210

21. *Lakshmi N, Mohankumar, S and T George (1996), "The Trend and Pattern of Natural Rubber Prices in India : An exploratory Analysis"*, Indian Journal of Natural Rubber Research, *9(2), 82-92.*

22. Montek Singh Ahluwalia (1996). "New Economic Policy and Agriculture: Some Reflections", *Indian journal of Agricultural Economics*, Vol.51, No.3, July-Sept

23. Nadakarni, M. V., (1969), "Yield Certainty in Maharashtra Agriculture", *Indian Journal of Agricultural economics* 24:327-333

24. Nasarudeen P and R Sunderasan: "Impact of economic Liberalization on agricultural exports", *Indian Journal of agricultural Marketing* ,(comp-spi), 13(2), pp:129-136

25. Pursell,Garry,(1996), "Indian Trade Policies since 1991/92 Reform", *World Bank, Mimeo.*

26. R K Khatkar (1995), "Indian Agriculture in the new economic Era", *Indian Journal* of *Agricultural Economics,* Vol.50, No3, July-September

27. R K Grover, K N Rai and D B Yadav (1995), "Liberalization and the potential Commodity Groups for India's Agricultural Export" *Indian Journal of Agricultural Economics,* Vol.50, No.3, July-September.

28. R K Singh, G M Rather and S K Singh (1995), "Structural change: Implications for Agricultural Production Environment in India", *Indian Journal* of *Agricultural Economics*, Vol.50, No3, July-September.

29. R KS Kushwaha, G N Singh, C P Singh and R N Yadav(1995), "New Economic Policy and Subsidized Agricultural loaning", *Indian Journal of Agricultural Economics, Vol.50, No3,July-September.*

30. R Mukherji (1995), "The impact of New Economic Policy on Indian Agriculture", *Indian Journal* of *Agricultural Economics,* Vol.50, No3, July-September, pp.536-37

31. Ramesh Chand, "India's Agricultural Trade Policies and its stand in the Doha Round of WTO Negotiations", *National Centre for Agricultural economics and Policy Research,* New Delhi.

32. S K Goyal and Satnam Kaur (1995), "New Economic Policy and its impact on Indian Agricultural Exports", *Indian Journal* of *Agricultural Economics, Vol.50, No.3, July- September*

33. Sen, Abhijit (1997). "The Wages of Neglect", *Frontline*, April 4.

34. Singh R K , Rather G M and Singh S K(1995). "Structural Change: Implications for agricultural Production Environment in India", *Indian Journal of Agricultural Economics*, Vol.50, No.3, July-Sept

35. Sukhpal Singh (1995), "Structural Adjustment Program and Indian agriculture-towards an assessment of implications" , *Indian Journal of Agricultural Economics*, Vol.50, No3,July-September

36. Ukers, W A., (1935), "All About Tea", *The Tea and Coffee Trade Journal Co.*, Vol. 1, New York.

37. Usha Tuteja (1995). "Implications of new Economic Policy on Agricultural Exports in India", *Indian journal of Agricultural Economics*, Vol.50, No.3, July- Sept

38. Viju Ipe and Prabhakaran (1988), "Price responses of a perennial crop- a case study of Indian Natural Rubber", *IJAE* Vol.No.4 oct-Dec-1988

39. Vyas V S (1999*),* "Agricultural Trade Policy and Export Strategy" , *The Indian Economic journal,* Vol.34, No.13, march-April ,pp:27-33.

REPORTS

1. *Draft Dunkal Proposals, Rajya Sabha Secretariat, New Delhi, Dec. 1993*

2. *Economic Review, volume 1, Report on Currency and Finance, RBI, 1992-93*

3. Economic Survey (1998-99), p.120; Economic Survey 2001-02, p.202

4. EPW Research Foundation, (2002) *National Accounts Statistics of India (1950- 51 to 2000-01)*

5. FAO (Food and Agriculture Organization of the United Nations) (2003), *WTO Agreement on Agriculture: The Implementation Experience– Developing Country Case Studies*, Rome, 2004, FAOSTAT database, Rome (http://faostat.fao.org).

6. Government of India, *First Report of the National Income Committee*, April 1951, p.6

7. *Rubber Board (2002) Previously the different grades were known as RMA 1, RMA2, RMA3, RMA4 and RMA5,and changed to RSS1, RSS2, RSS3, RSS4 as per vide Gazette Notification No. G.S.R.5612 (E) dated July 1994, Ministry of Commerce, India.*

8. *Rubber Board, Kottayam, "Indian Rubber Statistics" (various issues*

9. Tea Board of India, "Tea Statistics" (various issues)

10. *Trade Policy Review, GATT, 1994.*

11. WTO (2002a), *Trade Policy Review, India*, Report by Secretariat, WT/TPR/S/100, Geneva.

OTHERS

1. "Meter's down for cash crops", Times News Network, March 3, 2006.

2. Random House Dictionary

3. *The Statesman, Calcutta, July 15, 1982.*

4. Uma Devi, "Plantation economy of the third world" (1988)

5. Uma Devi, short run and long run responses to the price in the case of natural rubber in India (1981)

6. Web site: agriculture-industry-India, Agro Export Import Statistics at a Glance.

7. Website: indiabudget.nic.in

8. Website: teaindia.org

Appendices

- *Appendix-I : Articles of Agreement on Agriculture (AoA)*
- *Appendix-II : Growth rate analysis of Natural Rubber*
- *Appendix-III : Growth rate analysis of tea*

Appendix-I

Articles of Agreement on Agriculture(AoA)

Part I

Article 1: Definition of Terms

In this Agreement, unless the context otherwise requires:

(a) "Aggregate Measurement of Support" or "AMS" means the annual level of support expressed in monetary terms, provided for an agricultural production favor of the producers of the basic agricultural product or non-product specific support provided in favor of agricultural producers in general, other than support provided under programs that qualify as exempt from reduction under Annex 2 to this Agreement, which is:

(i) with respect to support provided during the base period, specified in the relevant tables of supporting material in Part IV of a Member's Schedule; and

(ii) with respect to support provided during any year of the implementation period and thereafter, calculated in accordance with the provisions of Annex 3 of this Agreement and taking into account the constituent data and methodology used in the tables of supporting material incorporated by reference in Part IV of the Member's Schedule;

(b) "Basic agricultural product" in relation to domestic support commitments is defined as the product as close as practicable to the point of first sale as specified in a Member's Schedule and in the related supporting material;

(c) "Budgetary outlays" or "outlays" include revenue foregone;

(d) "Equivalent Measurement of Support" means the annual level of support, expressed in monetary terms, provided to producers of a basic agricultural product through the application of one or more measures, the calculation of which in accordance with the AMS methodology is impracticable, other than support provided under programs that qualify as exempt from reduction under Annex 2 to this Agreement, and which is:

(i) With respect to support provided during the base period, specified in the relevant tables of supporting material incorporated by reference in Part IV of a Member's Schedule; and

(ii) With respect to support provided during any year of the implementation period and thereafter, calculated in accordance with the provisions of Annex 4 of this Agreement and taking into account the constituent data and methodology used in the tables of supporting material incorporated by reference in Part IV of the Member's Schedule;

(e) "Export subsidies" refers to subsidies contingent upon export performance, including the export subsidies listed in Article 9 of this Agreement;

(f) "Implementation period" means the six-year period commencing in the year1995, except that, for the purposes of Article 13, it means the nine-year period commencing in 1995

(g) "Market access concessions" includes all market access commitments undertaken pursuant to this Agreement;

(h) "Total Aggregate Measurement of Support" and "Total AMS" mean the sum of all domestic support provided in favor of agricultural producers, calculated as the sum of all aggregate measurements of support for basic agricultural products, all non-product-specific aggregate measurements of support and all equivalent measurements of support for agricultural products, and which is:

(i) With respect to support provided during the base period (i.e. the "Base Total AMS") and the maximum support permitted to be provided during any year of the implementation period or thereafter (i.e. the "Annual and Final Bound Commitment Levels"), as specified in Part IV of a Member's Schedule; and

(ii) with respect to the level of support actually provided during any year of the implementation period and thereafter (i.e. the "Current Total AMS"), calculated in accordance with the provisions of this Agreement, including Article 6, and with the constituent data and methodology used in the tables of supporting material incorporated by reference in Part IV of the Member's Schedule;

(i) "Year" in paragraph (f) above and in relation to the specific commitments of a Member refers to the calendar, financial or marketing year specified in the Schedule relating to that Member.

Article 2: Product Coverage

This Agreement applies to the products listed in Annex 1 to this Agreement, hereafter referred to as agricultural products.

Part II

Article 3: Incorporation of Concessions and Commitments

1. The domestic support and export subsidy commitments in Part IV of each Member's Schedule constitute

commitments limiting subsidization and are hereby made an integral part of GATT 1994.
2. Subject to the provisions of Article 6, a Member shall not provide support in favor of domestic producers in excess of the commitment levels specified in Section I of Part IV of its Schedule.
3. Subject to the provisions of paragraphs 2(b) and 4 of Article 9, a Member shall not provide export subsidies listed in paragraph 1 of Article 9 in respect of the agricultural products or groups of products specified in Section II of Part IV of its Schedule in excess of the budgetary outlay and quantity commitment levels specified therein and shall not provide such subsidies in respect of any agricultural product not specified in that Section of its Schedule.

Part III

Article 4: Market Access

1. Market access concessions contained in Schedules relate to bindings and reductions of tariffs, and to other market access commitments as specified therein.
2. Members shall not maintain, resort to, or revert to any measures of the kind which have been required to be converted into ordinary customs duties, except as otherwise provided for in Article 5 and Annex 5.

Article 5: Special Safeguard Provisions

1. Notwithstanding the provisions of paragraph 1(b) of Article II of GATT 1994, any Member may take recourse to the provisions of paragraphs 4 and 5 below in connection with the importation of an agricultural product, in respect of which measures referred to in paragraph 2 of Article 4 of this Agreement have been converted into an ordinary customs duty and which is designated in its Schedule with the symbol "SSG" as being the subject of a concession in respect of which the provisions of this Article may be invoked, if:

(a) the volume of imports of that product entering the customs territory of the Member granting the concession during any year exceeds a trigger level which relates to the existing market access opportunity as set out in paragraph 4;or, but not concurrently:

(b) The price at which imports of that product may enter the customs territory of the Member granting the concession, as determined on the basis of the c.i.f. import price of the shipment concerned expressed in terms of its domestic currency, falls below a trigger price equal to the average 1986 to 1988 reference price for the product concerned.

2. Imports under current and minimum access commitments established as part of concession referred to in paragraph 1 above shall be counted for the purpose of determining the volume of imports required for invoking the provisions of subparagraph 1(a) and paragraph 4. However, imports under such commitments shall not be affected by any additional duty imposed under either subparagraph 1(a) and paragraph 4 or subparagraph 1(b) and paragraph 5 below.
3. Any supplies of the product in question which were *en route* on the basis of a contract settled before the additional duty is imposed under subparagraph 1(a) and paragraph 4 shall be exempted from any such additional duty, provided that they may be counted in the volume of imports of the product in question during the following year for the purposes of triggering the provisions of subparagraph 1(a) in that year.
4. Any additional duty imposed under subparagraph 1(a) shall only be maintained until the end of the year in which it has been imposed, and may only be levied at a level, which shall not exceed one third of the level of the ordinary customs duty in effect in the year in which the action is taken. The trigger level shall be set according to the following schedule based on market access opportunities defined as imports as a percentage of the corresponding domestic consumption during the three preceding years for which data are available:

(a) Where such market access opportunities for a product are less than or equal to 10 per cent, the base trigger level shall equal 125 per cent;

(b) Where such market access opportunities for a product are greater than 10 percent but less than or equal to 30 per cent, the base trigger level shall equal 110 per cent;

(c) Where such market access opportunities for a product are greater than 30 per cent, the base trigger level shall equal 105 per cent.

In all cases, the additional duty may be imposed in any year where the absolute volume of imports of the product concerned entering the customs territory of the Member granting the concession exceeds the sum of (x) the base trigger level set out above multiplied by the average quantity of imports during the three preceding years for which data are available and (y) the absolute volume change in domestic consumption of the product. Recent year for which data are available compared to the preceding year, provided that the trigger level shall not be less than 105 per cent of the average quantity of imports in (x) above.
5. The additional duty imposed under subparagraph 1(b) shall be set according to the following schedule:

(a) if the difference between the c.i.f. import price of the shipment expressed in terms of the domestic currency (hereinafter referred to as the "import price") and the trigger price as defined under that subparagraph is less than or equal to 10 per cent of the trigger price, no additional duty shall be imposed;

(b) if the difference between the import price and the trigger price (hereinafter referred to

as the "difference") is greater than 10 per cent but less than or equal to 40 per cent of the trigger price, the additional duty shall equal 30 per cent of the amount by which the difference exceeds 10 per cent;

(c) If the difference is greater than 40 per cent but less than or equal to 60 per cent of the trigger price, the additional duty shall equal 50 per cent of the amount by which the difference exceeds 40 per cent, plus the additional duty allowed under (b);

(d) if the difference is greater than 60 per cent but less than or equal to 75 percent, the additional duty shall equal 70 per cent of the amount by which the difference exceeds 60 per cent of the trigger price, plus the additional duties allowed under (b) and (c);

(e) If the difference is greater than 75 per cent of the trigger price, the additional duty shall equal 90 per cent of the amount by which the difference exceeds 75 per cent, plus the additional duties allowed under (b), (c) and (d)

6. For perishable and seasonal products, the conditions set out above shall be applied in such a manner as to take into account of the specific characteristics of such products. In particular, shorter periods under subparagraph 1(a) and paragraph 4 may be used in reference to the corresponding periods in the base period and different reference prices for different periods may be used under subparagraph 1(b).

7. The operation of the special safeguard shall be carried out in a transparent manner.

Any Member taking action under subparagraph 1(a) above shall give notice in writing, including relevant data, to the Committee on Agriculture as far in advance as may be practicable and in any event within 10 days of the implementation of such action. In cases where changes in consumption volumes must be allocated to individual tariff lines subject to action under paragraph 4, relevant data shall include the information and methods used to allocate these changes. A Member taking action under paragraph 4 shall afford any interested Members the opportunity to consult with it in respect of the conditions of application of such action. Any Member taking action under subparagraph 1(b) above shall give notice in writing, including relevant data, to the Committee on Agriculture within10 days of the implementation of the first such action or, for perishable and seasonal products, the first action in any period. Members undertake, as far as practicable, not to take recourse to the provisions of subparagraph 1(b) where the volume of imports of the products concerned are declining. In either case, a Member taking such action shall afford any interested Members the opportunity to consult with it in respect of the conditions of application of such action.

8. Where measures are taken in conformity with paragraphs 1 through 7 above, Members undertake not to have recourse, in respect of such measures, to the provisions of paragraphs 1(a) and 3 of Article XIX of GATT 1994 or paragraph 2 of Article 8 of the Agreement on Safeguards.

9. The provisions of this Article shall remain in force for the duration of the reform process as determined under Article 20.

Part IV

Article 6: Domestic Support Commitments

1. The domestic support reduction commitments of each Member contained in Part IV of its Schedule shall apply to all of its domestic support measures in favor of agricultural producers with the exception of domestic measures that are not subject to reduction in terms of the criteria set out in this Article and in Annex 2 to this Agreement. The commitments are expressed in terms of Total Aggregate Measurement of Support and" Annual and Final Bound Commitment Levels".

2. In accordance with the Mid-Term Review Agreement that government measures of assistance, whether direct or indirect, to encourage agricultural and rural development are an integral part of the development programs of developing countries. Investment subsidies which are generally available to agriculture in developing country Members and agricultural input subsidies generally available to low-income or resource-poor producers in developing country Members shall be exempt from domestic support reduction commitments that would otherwise be applicable to such measures, as shall domestic support to producers in developing country Members to encourage diversification from growing illicit narcotic crops. Domestic support meeting the criteria of this paragraph shall not be required to be included in a Member's calculation of its Current Total AMS.

3. A Member shall be considered to be in compliance with its domestic support reduction commitments in any year in which its domestic support in favor of agricultural producers expressed in terms of Current Total AMS does not exceed the corresponding annual or final bound commitment level specified in Part IV of the Member's Schedule.

4. (a) A Member shall not be required to include in the calculation of its Current Total AMS and shall not be required to reduce:

(i) product-specific domestic support which would otherwise be required to be included in a Member's calculation of its Current AMS where such support does not exceed 5 per cent of that Member's total value of production of a basic agricultural product during the relevant year; and

(ii) non-product-specific domestic support which would otherwise be required to be included in a Member's calculation of its Current AMS where such support does not exceed 5 per cent of the value of that Member's total agricultural production.

(b) For developing country Members, the *de minimis* percentage under this paragraph shall be 10 per cent.

5. (a) Direct payments under production-limiting programs shall not be subject to the commitment to reduce domestic support if:

(i) Such payments are based on fixed area and yields; or

(ii) Such payments are made on 85 per cent or less of the base level of production; or

(iii) Livestock payments are made on a fixed number of head.

(b) The exemption from the reduction commitment for direct payments meeting the above criteria shall be reflected by the exclusion of the value of those direct payments in a Member's calculation of its Current Total AMS.

Article 7: General Disciplines on Domestic Support

1. Each Member shall ensure that any domestic support measures in favor of agricultural producers, which are not subject to reduction commitments because they qualify under the criteria set out in Annex 2 to this Agreement are maintained in conformity herewith.

2. (a) Any domestic support measure in favor of agricultural producers, including any modification to such measure, and any measure that is subsequently introduced that cannot be shown to satisfy the criteria in Annex 2 to this Agreement or to be exempt from reduction by reason of any other provision of this Agreement shall be included in the Member's calculation of its Current Total AMS.

(b) Where no Total AMS commitment exists in Part IV of a Member's Schedule, the Member shall not provide support to agricultural producers in excess of the relevant *de minimis* level set out in paragraph 4 of Article 6.

Part V

Article 8: Export Competition Commitments

Each Member undertakes not to provide export subsidies otherwise than in conformity with this Agreement and with the commitments as specified in that Member's Schedule.

Article 9: Export Subsidy Commitments

1. The following export subsidies are subject to reduction commitments under this Agreement:

(a) the provision by governments or their agencies of direct subsidies, including payments-in-kind, to a firm, to an industry, to producers of an agricultural product, to a cooperative or other association of such producers, or to a marketing board, contingent on export performance.

(b) The sale or disposal for export by governments or their agencies of noncommercial stocks of agricultural products at a price lower than the comparable price charged for the like product to buyers in the domestic market;

(c) payments on the export of an agricultural product that are financed by virtue of governmental action, whether or not a charge on the public account is involved, including payments that are financed from the proceeds of a levy imposed on the agricultural product concerned or on an agricultural product from which the exported product is derived;

(d) the provision of subsidies to reduce the costs of marketing exports of agricultural products (other than widely available export promotion and advisory services) including handling, upgrading and other processing costs, and the costs of international transport and freight;

(e) Internal transport and freight charges on export shipments, provided or mandated by governments, on terms more favorable than for domestic shipments;

(f) Subsidies on agricultural products contingent on their incorporation in exported products.

2. (a) Except as provided in subparagraph (b), the export subsidy commitment levels for each year of the implementation period, as specified in a Member's Schedule, represent with respect to the export subsidies listed in paragraph

(i) in the case of budgetary outlay reduction commitments, the maximum level of expenditure for such subsidies that may be allocated or incurred in that year in respect of the agricultural product, or group of products, concerned; and

(ii) In the case of export quantity reduction commitments, the maximum quantity of an agricultural product, or group of products, in respect of which such export subsidies may be granted in that year.

(b) In any of the second through fifth years of the implementation period, a Member may provide export subsidies listed in paragraph 1 above in a given year in excess of the corresponding annual commitment levels in respect of the products or groups of products specified in Part IV of the Member's Schedule, provided that:

(i) The cumulative amounts of budgetary outlays for such subsidies, from the beginning of the implementation period through the year in question, does not exceed the cumulative amounts that would have resulted from full compliance with the relevant annual outlay commitment levels

specified in the Member's Schedule by more than 3 per cent of the base period level of such budgetary outlays;

(ii) The cumulative quantities exported with the benefit of such export subsidies, from the beginning of the implementation period through the year in question, does not exceed the cumulative quantities that would have resulted from full compliance with the relevant annual quantity commitment levels specified in the Member's Schedule by more than 1.75 per cent of the base period quantities;

(iii) The total cumulative amounts of budgetary outlays for such export subsidies and the quantities benefiting from such export subsidies over the entire implementation period are no greater than the totals that would have resulted from full compliance with the relevant annual commitment levels specified in the Member's Schedule; and

(iv) The Member's budgetary outlays for export subsidies and the quantities benefiting from such subsidies, at the conclusion of the implementation period, are no greater than 64 per cent and 79 per cent of the 1986-1990 base period levels, respectively. For developing country, Members these percentages shall be 76 and 86 per cent, respectively.

3. Commitments relating to limitations on the extension of the scope of export subsidization are as specified in Schedules.

4. During the implementation period, developing country Members shall not be required to undertake commitments in respect of the export subsidies listed in subparagraphs (d)and (e) of paragraph 1 above, provided that these are not applied in a manner that would circumvent reduction commitments.

Article 10: Prevention of Circumvention of Export Subsidy Commitments

1. Export subsidies not listed in paragraph 1 of Article 9 shall not be applied in a manner which results in, or which threatens to lead to, circumvention of export subsidy commitments; nor shall non-commercial transactions be used to circumvent such commitments.

2. Members undertake to work toward the development of internationally agreed disciplines to govern the provision of export credits, export credit guarantees or insurance programs and, after agreement on such disciplines, to provide export credits, export credit guarantees or insurance programs only in conformity therewith.

3. Any Member which claims that any quantity exported in excess of a reduction commitment level is not subsidized must establish that no export subsidy, whether listed in Article 9 or not, has been granted in respect of the quantity of exports in question.

4. Members donors of international food aid shall ensure:

(a) that the provision of international food aid is not tied directly or indirectly to commercial exports of agricultural products to recipient countries;

(b) that international food aid transactions, including bilateral food aid which is monetized, shall be carried out in accordance with the FAO "Principles of Surplus Disposal and Consultative Obligations", including, where appropriate, the system of Usual Marketing Requirements (UMRs); and

(c) that such aid shall be provided to the extent possible in fully grant form or on terms no less concessional than those provided for in Article IV of the Food Aid Convention 1986.

Article 11: Incorporated Products

In no case may the per-unit subsidy paid on an incorporated agricultural primary product exceed the per-unit export subsidy that would be payable on exports of the primary product as such.

Part VI

Article 12: Disciplines on Export Prohibitions and Restrictions

1. Where any Member institutes any new export prohibition or restriction on foodstuffs in accordance with paragraph 2(a) of Article XI of GATT 1994, the Member shall observe the following provisions:

(a) The Member instituting the export prohibition or restriction shall give due consideration to the effects of such prohibition or restriction on importing Members' food security;

(b) Before any Member institutes an export prohibition or restriction, it shall give notice in writing, as far in advance as practicable, to the Committee on Agriculture comprising such information as the nature and the duration of such measure, and shall consult, upon request, with any other Member having a substantial interest as an importer with respect to any matter related to the measure in question. The Member instituting such export prohibition or restriction shall provide, upon request, such a Member with necessary information.

2. The provisions of this Article shall not apply to any developing country Member, unless the measure is taken by a developing country Member which is a net-food exporter of the specific foodstuff concerned.

During the implementation period, notwithstanding the provisions of GATT 1994 and the Agreement on

Part VII

Article 13: Due Restraint

Subsidies and Countervailing Measures (referred to in this Article as the "Subsidies Agreement"):

(a) Domestic support measures that conform fully to the provisions of Annex 2 to this Agreement shall be:

(i) Non-actionable subsidies for purposes of countervailing duties;

(ii) Exempt from actions based on Article XVI of GATT 1994 and Part III of the Subsidies Agreement; and

(iii) Exempt from actions based on non-violation nullification or impairment of the benefits of tariff concessions accruing to another Member under Article II of GATT 1994, in the sense of paragraph 1(b) of Article XXIII of GATT 1994;

(b) Domestic support measures that conform fully to the provisions of Article 6 of this Agreement including direct payments that conform to the requirements of paragraph 5 thereof, as reflected in each Member's Schedule, as well as domestic support within *de minimis* levels and in conformity with paragraph 2 of Article 6, shall be:

(i) exempt from the imposition of countervailing duties unless a determination of injury or threat thereof is made in accordance with Article VI of GATT 1994 and Part V of the Subsidies Agreement, and due restraint shall be shown in initiating any countervailing duty investigations;

(ii) exempt from actions based on paragraph 1 of Article XVI of GATT1994 or Articles 5 and 6 of the Subsidies Agreement, provided that such measures do not grant support to a specific commodity in excess of that decided during the 1992 marketing year; and

(iii) exempt from actions based on non-violation nullification or impairment of the benefits of tariff concessions accruing to another Member under Article II of GATT 1994, in the sense of paragraph 1(b) of Article XXIII of GATT 1994, provided that such measures do not grant support to a specific commodity in excess of that decided during the 1992marketing year;

(c) Export subsidies that conform fully to the provisions of Part V of this Agreement, as reflected in each Member's Schedule, shall be:

(i) subject to countervailing duties only upon a determination of injuryor threat thereof based on volume, effect on prices, or consequent impact in accordance with Article VI of GATT 1994 and Part V of the Subsidies Agreement, and due restraint shall be shown in initiating any countervailing duty investigations; and

(ii) Exempt from actions based on Article XVI of GATT 1994 or Articles 3, 5 and 6 of the Subsidies Agreement.

Part VIII

Article 14: Sanitary and Phytosanitary Measures

Members agree to give effect to the Agreement on the Application of Sanitary and Phytosanitary Measures.

Part IX

Article 15: Special and Differential Treatment

1. In keeping with the recognition that differential and more favorable treatment for developing country Members is an integral part of the negotiation, special and differential treatment in respect of commitments shall be provided as set out in the relevant provisions of this Agreement and embodied in the Schedules of concessions and commitments.

2. Developing country Members shall have the flexibility to implement reduction commitments over a period of up to 10 years. Least-developed country Members shall not be required to undertake reduction commitments.

Part X

Article 16: Least-Developed and Net Food-Importing Developing Countries

1. Developed country Members shall take such action as is provided for within the framework of the Decision on Measures Concerning the Possible Negative Effects of the Reform Program on Least-Developed and Net Food-Importing Developing Countries.

2. The Committee on Agriculture shall monitor, as appropriate, the follow-up to this Decision.

Part XI

Article 17: Committee on Agriculture

A Committee on Agriculture is hereby established.

Article 18: Review of the Implementation of Commitments

1. Progress in the implementation of commitments negotiated under the Uruguay Round reform program shall be reviewed by the Committee on Agriculture.

2. The review process shall be undertaken on the basis of notifications submitted by Members in relation to such matters and at such intervals as shall be determined, as well as on the basis of such documentation as the

Secretariat may be requested to prepare in order to facilitate the review process.
3. In addition to the notifications to be submitted under paragraph 2, any new domestic support measure, or modification of an existing measure, for which exemption from reduction is claimed shall be notified promptly. This notification shall contain details of the new or modified measure and its conformity with the agreed criteria as set out either in Article 6 or in Annex 2.
4. In the review process Members shall give due consideration to the influence of excessive rates of inflation on the ability of any Member to abide by its domestic support commitments.
5. Members agree to consult annually in the Committee on Agriculture with respect to their participation in the normal growth of world trade in agricultural products within the framework of the commitments on export subsidies under this Agreement.
6. The review process shall provide an opportunity for Members to raise any matter relevant to the implementation of commitments under the reform program as set out in this Agreement.
7. Any Member may bring to the attention of the Committee on Agriculture any measure, which it considers, ought to have been notified by another Member.

Article 19: Consultation and Dispute Settlement

The provisions of Articles XXII and XXIII of GATT 1994, as elaborated and applied by the Dispute Settlement Understanding, shall apply to consultations and the settlement of disputes under this Agreement.

Part XII

Article 20: Continuation of the Reform Process

Recognizing that the long-term objective of substantial progressive reductions in support and protection resulting in fundamental reform is an ongoing process, Members agree that negotiations for continuing the process will be initiated one year before the end of the implementation period, taking into account:
(a) The experience to that date from implementing the reduction commitments;
(b) The effects of the reduction commitments on world trade in agriculture;
(c) Non-trade concerns, special and differential treatment to developing country Members, and the objective to establish a fair and market-oriented agricultural trading system, and the other objectives and concerns mentioned in the preamble to this Agreement; and
(d) What further commitments are necessary to achieve the above-mentioned long-term objectives.

Part XIII

Article 21: Final Provisions

1. The provisions of GATT 1994 and of other Multilateral Trade Agreements in Annex1A to the WTO Agreement shall apply subject to the provisions of this Agreement.
2. The Annexes to this Agreement are hereby made an integral part of this Agreement.

Appendix II
Growth rate analysis of Natural Rubber

Area:

```
      reg  area one two

   Source |       SS       df       MS              Number of obs =      2(
----------+------------------------------           F(  2,    17) =  461.0(
    Model |  .291080453     2  .145540226           Prob > F      =  0.000(
 Residual |   .00536695    17  .000315703           R-squared     =  0.981(
----------+------------------------------           Adj R-squared =  0.979(
    Total |  .296447403    19  .015602495           Root MSE      =  .0177(

------------------------------------------------------------------------------
     area |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
----------+-------------------------------------------------------------------
      one |   .0305596   .0014488    21.09   0.000     .0275029    .0336162
      two |   .0080491   .0016341     4.93   0.000     .0046016    .0114967
    _cons |   12.86082     .01094  1175.57   0.000     12.83774     12.883(
------------------------------------------------------------------------------
```

Production:

```
reg  prod one two
```

Source	SS	df	MS		
Model	3.34467278	2	1.67233639	Number of obs =	2(
Residual	.010889648	17	.000640568	F(2, 17) =	2610.71
Total	3.35556243	19	.176608549	Prob > F =	0.000(
				R-squared =	0.996{
				Adj R-squared =	0.996{
				Root MSE =	.0253]

prod	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
one	.0978307	.0020637	47.41	0.000	.0934767	.102184{
two	.0359379	.0023276	15.44	0.000	.031027	.040848]
_cons	12.10053	.0155834	776.50	0.000	12.06765	12.133{

yield:

```
reg  yield one two
```

Source	SS	df	MS		
Model	.926015067	2	.463007533	Number of obs =	2(
Residual	.011833061	17	.000696062	F(2, 17) =	665.1
Total	.937848128	19	.049360428	Prob > F =	0.000(
				R-squared =	0.987{
				Adj R-squared =	0.985{
				Root MSE =	.0263{

yield	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
one	.0513782	.0021512	23.88	0.000	.0468395	.055917
two	.0190528	.0024263	7.85	0.000	.0139336	.024171{
_cons	6.701302	.0162444	412.53	0.000	6.667029	6.735575

export:

```
reg  export one two
```

Source	SS	df	MS		
Model	271.767051	2	135.883526	Number of obs =	2(
Residual	62.3887964	17	3.6699292	F(2, 17) =	37.03
Total	334.155847	19	17.5871499	Prob > F =	0.000(
				R-squared =	0.813{
				Adj R-squared =	0.791{
				Root MSE =	1.915]

export	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
one	.868105	.1562044	5.56	0.000	.5385426	1.19766]
two	.3438736	.1761795	1.95	0.018	-.0278325	.715579{
_cons	-2.039391	1.179528	-1.73	0.102	-4.527978	.449195{

import:

```
      reg  import one two
  Source |       SS       df       MS              Number of obs =      2(
---------+------------------------------           F(  2,    17) =    3.4
   Model |  2.12563177     2  1.06281588            Prob > F      =  0.053
Residual |  5.18290764    17   .30487692            R-squared     =  0.290
---------+------------------------------           Adj R-squared =  0.207
   Total |  7.30853941    19  .384659969            Root MSE      =  .5521

------------------------------------------------------------------------------
  import |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
---------+--------------------------------------------------------------------
     one |  -.1158788   .0450222    -2.57   0.020    -.2108673   -.020890
     two |   .1020551   .0507795     2.01   0.018    -.0050804    .209190
   _cons |   11.04186   .3399709    32.48   0.000     10.32458    11.7591
------------------------------------------------------------------------------
```

Appendix III
Growth rate analysis of tea

Area:

```
.         reg  area one two

      Source |       SS       df       MS              Number of obs =
-------------+------------------------------           F(  2,    17) =   9
       Model |  .138025979     2  .06901299            Prob > F      =  0.
    Residual |  .011967849    17  .000703991           R-squared     =  0.
-------------+------------------------------           Adj R-squared =  0.
       Total |  .149993828    19  .007894412           Root MSE      =  .0

------------------------------------------------------------------------------
        area |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interv
-------------+----------------------------------------------------------------
         one |   .0066797   .0021635     3.09   0.007     .0021152    .011
         two |   .0222342   .0024401     9.11   0.000      .017086    .027
       _cons |   12.90042   .0163367   789.66   0.000     12.86595    12.9
------------------------------------------------------------------------------
```

Production:

```
.         reg  prod one two

      Source |       SS       df       MS              Number of obs =
-------------+------------------------------           F(  2,    17) =   8
       Model |  .169930733     2  .084965367           Prob > F      =  0.
    Residual |  .017072916    17  .001004289           R-squared     =  0.
-------------+------------------------------           Adj R-squared =  0.
       Total |  .187003649    19  .009842297           Root MSE      =  .0

------------------------------------------------------------------------------
        prod |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interv
-------------+----------------------------------------------------------------
         one |    .020948    .002584     8.11   0.000     .0154962    .026
         two |   .0096745   .0029144     3.32   0.004     .0035256    .015
       _cons |   13.34921   .0195123   684.14   0.000     13.30804    13.3
------------------------------------------------------------------------------
```

Yield:

```
.          reg  yeild one two

      Source |       SS       df       MS              Number of obs =
-------------+------------------------------           F(  2,    17) =   15
       Model |  .031592856     2  .015796428           Prob > F      =  0.0
    Residual |   .01755304    17  .001032532           R-squared     =  0.6
-------------+------------------------------           Adj R-squared =  0.6
       Total |  .049145896    19  .002586626           Root MSE      =  .03

------------------------------------------------------------------------------
       yeild |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interv
-------------+----------------------------------------------------------------
         one |   .0141585   .0026201     5.40   0.000     .0086306    .019
         two |  -.0123362   .0029551    -4.17   0.001     -.018571   -.006
       _cons |   7.356952   .0197848   371.85   0.000     7.315209    7.39
------------------------------------------------------------------------------
```

Export: NB 4994

```
.
.          reg  export one two

      Source |       SS       df       MS              Number of obs =
-------------+------------------------------           F(  2,    17) =    7
       Model |   .09036612     2   .04518306           Prob > F      =  0.0
    Residual |  .109549544    17  .006444091           R-squared     =  0.4
-------------+------------------------------           Adj R-squared =  0.3
       Total |  .199915664    19  .010521877           Root MSE      =  .08

------------------------------------------------------------------------------
      export |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interv
-------------+----------------------------------------------------------------
         one |  -.0240195   .0065455    -3.67   0.002    -.0378294   -.010
         two |   .0205966   .0073826     2.79   0.009     .0050207    .036
       _cons |   12.31159   .0494265   249.09   0.000     12.20731    12.41
------------------------------------------------------------------------------
```

Import:

```
.          reg  import one two

      Source |       SS       df       MS              Number of obs =
-------------+------------------------------           F(  2,    17) =   62
       Model |  291.342539     2  145.671269           Prob > F      =  0.0
    Residual |  39.4637666    17  2.32139803           R-squared     =  0.8
-------------+------------------------------           Adj R-squared =  0.8
       Total |  330.806305    19  17.4108582           Root MSE      =  1.5

------------------------------------------------------------------------------
      import |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interv
-------------+----------------------------------------------------------------
         one |    .847909   .1242336     6.83   0.000      .585799    1.11
         two |   .4274797   .1401204     3.05   0.007     .1318516    .723
       _cons |  -2.655102   .9381111    -2.83   0.012    -4.634344   -.675
------------------------------------------------------------------------------
```