EXPORT PERFORMANCE AND PROSPECTS OF MAJOR FRUITS OF INDIA

THESIS

by

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Dedicated to
My Revered Parents

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Certificate - I

This is to certify that the thesis entitled "**Export performance and prospects of major fruits of India**" submitted in partial fulfilment of the requirements for the degree of **MASTER OF SCIENCE** in **AGRICULTURAL ECONOMICS** of Dr. Y.S. Parmar University of Horticulture and Forestry, Solan is a faithful record of bonafide research work carried out by **Mr. Sachin Sharma** under my supervision and that no part of this thesis has been submitted for any other degree or diploma.

The assistance and help received during the course of the investigation has been fully acknowledged.

Dated: 28 November, 2002
Place : Nauni, Solan

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CERTIFICATE - II

This is to certify that thesis entitled "**Export performance and prospects of major fruits of India**" by **Mr. Sachin Sharma** to Dr. Y.S. Parmar University of Horticulture and Forestry, Solan, in partial fulfilment of the requirements for the degree of **MASTER OF SCIENCE** in **AGRICULTURAL ECONOMICS** has been approved by the Student's Advisory Committee after an oral examination on the same in collaboration with the External Examiner.

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CHAPTER I

INTRODUCTION

Introduction

International trade is considered to be the major macro-economic activity for accelerating the pace of development of a nation. In the sphere of agro-exports, development planners and trade analysts in India identify horticulture as an extreme focus segment for promoting exports and rejuvenating the stagnating rural economy. Further, the ongoing economic reforms in India, international trade reforms and attempts to integrate the Indian economy with the global economy are likely to result in structural changes in India's farm economy. These measures alongwith other government incentives are proving instrumental in creating favourable conditions for faster growth in production and exports of horticulture products.

Identification and enhancement of competitiveness is an essential ingredient of a successful trade strategy (James et. al., 1987). There are evidences to suggest that a country whose trade strategy has been guided by the principle of comparative advantage prospered by trade. Thus, for exhibiting export performance, it is important that, emphasis be given on international competitiveness.

The WTO Agreement on Agriculture strives to establish free and fair trade in agricultural commodities. It is believed that once the implementation phase (1995-2004) is over countries having comparative advantage in producing a commodity will dominate trade in that commodity. India, has tremendous scope for expanding the export basket by promoting a wide variety of fresh fruits for which there exists large production base. Export potentials in this sector are likely to flourish with greater velocity, for reasons of existence of varied natural resources like land, water and climate. Abundance of labour provides further opportunity to produce these commodities at low cost.

When India embarked on process of liberalisation in 1991, agricultural sector came into centre stage for promoting exports. The process resulted in identifying select band of

products in this sector and horticulture sub-sector was accorded the "extreme focus status" in 8th Five Year Plan (1992-97). Within horticulture sector, apple, banana, grapes and mango has made significant advances in terms of area, production, and employment generation and possess tremendous potentials for the future as well. These fruits are fast assuming the position of vibrant commercial venture with great export potentials. The growth in the exports of these fruits depends not only on domestic production and distribution situation but on many factors such as world market size, relative export prices, per capita income, level of domestic demand, exchange and inflation rates in the competing countries, taxes and subsidies on exports etc.

With a view to promote growth and augment foreign exchange resources, India's export pattern has been undergoing a significant change both in composition and in its direction. Moreover, in the wake of liberalisation policies of the Indian government and affecting WTO treaty, exports of horticultural products requires a fresh look. The fresh fruits like apple, banana, grapes and mango were chosen for conducting the present study on export performance and prospects as they constitute the major part of the horticultural sector's output and account for largest share of exports followed by processed fruits. Keeping in view the above facts, the present study has been designed to study the temporal changes in the composition of major exportable fresh fruits, their growth performance, identifying export competitiveness, examining the market prospects and eventually formulating strategies to make out export more competitive. More specifically the objectives of the study are as under:

1. To examine growth in the area, production and exports of major exportable fresh fruits such as apple, banana, grapes and mango.
2. To study the changes in the regional distribution in respect of these fruits.
3. To analyse the export prospects of these fruits.

CHAPTER II

REVIEW OF LITERATURE

Review of Literature

Keeping the objectives of the research in consideration, the literature related to the performance and prospects of various agricultural commodities has been reviewed.

Sakiya Khan (1994) reviewed the economic growth in India. The economic results indicate that in the Indian context, favourable export growth affects the rate of economic growth over and above the contribution of domestic production. The estimates provided in this paper presents evidence of the benefits of export orientation policies. Though the literature explains that export-led growth strategy cannot be helpful in the context of countries like India (Clive, 1982), the econometric analysis does not support this contention. At the same time, expirical results tend to underestimate the effects of export growth on the growth of GDP, since the method applied does not take into account the implications of export growth for the other variables included in the equation. Yet, there is evidence that exports and domestic saving are positively correlated (Weiss Kopf, 1972). Also, the improved balance of payments situation attendant on the expansion of export may increase the attractiveness of the country concerned for foreign capital.

Singh and Singh (1991) analysed the India's agricultural exports, its problems and performance. The performance of the Indian economy on the agricultural export front has been rather poor. This could be attributed to a blend of internal and external factors. On the internal front the inefficient cost structure, the pressure of domestic demands, infrastructural or supply bottlenecks coupled with non-price factor such as, quality have adversely affected the competitiveness of our exports. On the external front, the protectionist policies, non-tariff barriers, heavy subsidies to the farmers in developed countries, inappropriate exchange rate policies, stranglehold of the transnational and the recent advances in the biotechnology in developed countries have acted as a critical constraint on the development of exports of agricultural commodities from developing countries and tilted the terms of trade against them. So a multi-pronged attack is needed to ensure quality production of agricultural products at costs competitive with other countries and to contain the pressure of demand on the internal front and for

rationalisation of the trade and tariff policies in such a manner that international trade does not result in perverse flow of resources from poor to rich countries, due to the movement of terms of trade against the poor countries.

Dadgoster (1998) analysed the Canada's wheat export which is the dominant agriculture export produce of the country, with other grains being of much lesser magnitude. Dadgoster studied the effect of exchange rate influence on the export of wheat by using three stage least squares (3 SLS) estimation procedure and observed that the significance of the exchange rate in wheat exports is confirmed by the fact that Canada exports three quarters of its total wheat production which represents approximately 20 per cent of world wheat exports. The exchange rate and the differential in exchange rates between major wheat exporting nations are assuming greater role in the purchase decision process of importing nations. The implications of this variable for Canada are far-reaching especially when considering the instability of the global wheat market, the volatile nature of wheat prices and the recent transition towards a "buyers" market.

Singh (1994) analysed the problems of India's export promotion. He says that crux of the entire problem lies in raising our production for export as well as for meeting the gap created by cessation of imports. As a matter of fact, no nation is fully self-sufficient and can meet all its requirements from her indigenous resources. In this complexity of modern technological and scientific development, progress through foreign trade has become interdependent. It is true that we have received abundant measures of economic and technical assistance from many foreign countries, but we can neither depend upon that source for a long time nor can it ever be adequate to meet our ever growing needs of more and more basic essential imports for maintenance and development. The need to earn foreign exchange through export is, therefore, of paramount importance. In the context of present circumstances, it is immensely important to boost up export to meet the challenges of deficit. Hence, export promotion is a vital necessity in India and this has to be welcome all the time.

Srivastva, Lal and Prakash (1996) observed that although share of fruit exports of India in global market is only 0.4 per cent in terms of value but there is a vast potential for India to emerge as a major exporter of fruits and processed products. India's share of mango in global trade is less than 10 per cent although Asia accounts for 70 per cent of world mango production, the domination is not translated into International trade. The total quantity of grapes exported from India has increased by more than 5 times from 2187 metric tonnes in 1982-83 to 11190 metric tonnes in 1992-93. Grapes has a vast potential for exports to the UK along with Middle-East and Gulf countries. India ranks second in world banana production after Brazil. In spite of producing 70 lakh metric tonnes, India' exports only 100 metric tonnes, contributing only 4.09 per cent of global banana trade. India has recorded a significant progress in the production of apples during last two decades but India's share in world export trade of apples is as low as 0.14 per cent. India has been exporting apples mainly to various south Asian countries.

Shende *et al.* (1998) examined the trends in production, export and import of Indian rice. Time series data for the period of 1970-71 to 1993-94 were used to compute the index numbers. Compound growth rates were calculated by fitting the exponential function to production, quantity and values of export as well as import in respect of India and world. The export growth rates for Indian rice worked out to be 18.11 per cent in quantity terms and 21.74 per cent in value terms which is considerably higher than that of the world whose subsequent growth estimates were 2.41 per cent in quantity and 5.9 per cent in value terms. India's rice import growth rate was found out to be negative. The results of this study led to a conclusion that in rice, export is expected to rise very significantly and hence production of scented fine quality rice varieties should be encouraged since they are in great demand in the international markets.

Vandana (1998) analysed the comparative advantage status of Indian agricultural economies. The issue of comparative advantage in agriculture is addressed in the context of trade liberalisation and developing countries. It is argued that comparative advantage in terms of market forces can lead to total disadvantage in terms of food security and food

rights and that the theory of comparative advantage is misspelled in a situation of international capital mobility.

Goyal, Pandey and Singh (2000) analysed the Indian exports. The composition of Indian exports indicates the rising share of manufactured exports and the decline of agricultural exports. The export earnings from agro - based commodities have increased substantially during 1980-95 but its share in the total Indian exports has declined during this period. Among the agro-based items, exports has declined during 1980s with substantial year to year variations, but during 90s, its share remained fairly stable for the various items, tea and mate and coffee were the dominant exportable items during 1970s but their share later on declined. Further, it was found that during the 90s, marine products, oil cake, rice, fresh and processed fruits have potential for export earnings. The total agricultural exports increased at the annual compound growth rate during 1991-98. The compound growth rate of all the agricultural and allied items except tea and mate and sugar and honey were higher during 90s (1991-98) than in 70s and 80s. During the period (1991-98), coffee, oil cakes, tobacco, raw cotton, rice, spices and fish and products exhibited high volatility in exports. The share of Indian agricultural exports in world exports although is very low yet it is increasing over the years. For competing with other countries and, therefore, to raise its share in world exports, sustained higher rate of growth of Indian exports is of paramount importance. The study indicated that the prospects of agricultural exports have improved after the liberalisation.

Chinnappa *et al.*. (1993) analysed the components of change contributing to the growth and production as well as export revenue of coffee and tea during 1975-76 to 1983-84. The period 1962-63 to 1974-75 showed that the output of tea and coffee increased significantly. The increase in output of tea was largely due to higher productivity. Export revenue of both tea and coffee witnessed tremendous growth of over 243.05 and 1025.49 per cent, respectively during the second period. Much of the increase in export value of tea was accounted for by change in price and interaction between export price and quality. An examination of stability of production and export revenue indicates that during the second period the instability in coffee export was largely on

account of the interaction effects between changes in mean export price and mean export quantity.

Nayana (1992) discussed the export subsidies and various strategies to promote India's exports. The persisting trade imbalances, mounting external debt and its servicing burden, depleting foreign exchange reserves etc. have often led to considering export promotion as a policy alternative for India. However, our continuing reliance on industrial market economies for exports underline the importance of competition (imperfect) in product quality and price. The analytical results show that if the underlying imperfect market structure of India's export trading is characterised by Cournot's duopoly, the impact of export subsidies can be favourable in terms of larger market share for home exporting firms. This short term advantage is mainly attributed to rent, or profit sharing of home firms initially earned by foreign firms in home market. These results offer strong economic support for strategic export policy, yet to be formulated in India, or justification for the current export policy if only the subsidised exporting domestic firms behaviour is strategic and provide the economic basis for empirical estimation of export earnings by a strategic export subsidisation policy as compared to the existing non-strategic policy.

Raju (2000) examined the pepper exports from India. Examining total exports of spices from India, it was found that pepper is the largest commodity which is being exported among the spices. In 1980-81, share of pepper in the total spices export stood at 28.50 per cent in quantity and 33.36 per cent in value term. Pepper contributed 16 per cent in quantity and 34.6 per cent in value in the total spices export from India during 1997-98. Regression estimates revealed that production of pepper has got a significant influence on the export of pepper from India. Domestic price negatively influences the pepper exports. Export of pepper from India showed a fluctuating trend over the years. Instability indices showed that instability in export prices and earnings were high during the period 1980-81 to 1989-90. The problems faced by Indian exports are : (i) majority of pepper growers in India is small and marginal farmers for whom better prices are the best incentives . Un-remunerative prices may lead to a fall in production (ii) the absence of an

integrated approach has proved to be major constraint in maximising the efforts on development of production and exports of pepper. Measures to improve the productivity and diversification may tend to provide a long term solution to the fluctuating pepper export performance of India. The international market is adopting to the use of value added pepper products like oil and oleoresin, curry powder, dehydrated green pepper, pepper in brine, pepper in consumer packs, pepper powder etc. Decisions should be taken regarding production, processing and marketing to boost Indian pepper exports.

Joginder Singh (1997) concluded that exports of Indian agricultural commodities are rising steadily. India has a distinct comparative advantage in grapes, sapota, litchi, banana, tomato and mushrooms and moderate advantage in mango and potato. The export of grapes is now made through refrigerated containers, a technology accrued by APEDA from Europe. Fresh fruits and vegetables accounted for Rs. 544 crore of export in 1995-96 as compared to Rs. 294 crore in 1991-92. The author suggested that in order to enhance the exports, grading and packing should be in proper form, and the products should be properly processed in ready to eat form. The export directly from the production centre by quick and cheap transportation is of paramount importance. The salesmanship through advertisement, participation in trade fairs and demonstrating the product from time to time are essential feature of good marketing.

Nawadkar and Birari (2000) made an assessment of the Indian share in the production and exports of fruits and vegetables. Data used was both time series and cross sectional on the production, productivity, exports and imports. The study revealed that, during the year 1995-96, area, production and productivity of fruits were 34.57 lakh ha, 415.07 MT and 12.36 MT/ha respectively. The export situation of fruits and vegetable showed that it valued at Rs. 772.48 crore at the end of 1997-98 of which 60 per cent was shared by fruits and remaining 40 per cent by vegetables. The data also revealed that the mangoes, grapes and walnuts have good potential for exports. Inspite of the potentialities in production base, India's export of fruits and vegetables is not encouraging due to higher taxation, poor quality, lack of infrastructure, export promotion activities and research and development.

Kumar and Raju (1996) addressed some of the issues related to the agricultural trade and prices in the context of globalization of Indian agriculture. Globalization would positively benefit agriculture through a massive increase in exports, especially export of high value labour intensive allied agricultural products. A large agricultural surplus should be generated which would require intensification of public and private investment in infrastructure, modern technology, research and development and involvement of peasantry in the development process. It is considered that liberalisation paves the way for Indian agriculture to become a leading sector in economic development.

Nasurudeen and Balakrishanan (1996) discussed the problems and prospects confronting Indian agriculture in light of liberalisation. The production performance of various agricultural commodities in India are studied vis-à-vis other countries and commodities that have substantial scope for exports, are identified. Some of the problems facing agricultural exports are inadequate surplus, developments in the field of biotechnology in developed countries and weak post harvest infrastructural facilities in India.

Wedderburn and Carlson (1998) analysed export performance of table grapes in USA. Grape production and exports from selected countries in 1997 are estimated at 1.7 million tons, down marginally from 1996. Chilean table grapes exports declined 12 per cent because of a late spring drought, which reduced exportable supplies. US table grapes exports in 1997 reached 268,846 tons up 25 per cent from 1996, based on higher production and the opening of new markets, such as China and Chile; Canada, Hong Kong and Mexico were the top three markets for US grapes. However, US export gains slowed at the end of 1997 as currency devastation in Southern Asia made US export more expensive. Southern hemisphere grapes export in 1998 are forecasted to decrease by 3 per cent because of unfavourable weather caused by El Nino in Chile. Chile's 1998 grape export are forecasted at 430, 000 tons, down 5 per cent.

Jain, Kumar and Garg (1995) examined the pattern of growth of agricultural trade in India and globally, the differential in agricultural prices between those in India and the world, and India's share of world's exports and its price efficiency for agricultural commodities. Indian agricultural products have generally fetched lower prices than the world average export price, with the exception of tea, pepper, pimento and rice. Authors suggested the need to develop overseas markets by means of improving the quality of goods, cost efficiency in production, standardising packaging and producing more value added products.

Thomas and Sundarsesan (1996) analysed the export performance of cardamom, the reasons for changing price trends and the scope for integration of cardamom markets in India. The data set covers the period 1970/71-1992/93. The study reveals a high level of export instability. Production is found to be a significant factor in determining exports along with domestic and export prices. Price analysis using a market integration model revealed the integration of Tamil Nadu market with Kerla market and found that, the prices in Kerla market influences the prices in both Tamil Nadu and Karnatka markets.

Kumar and Kumar (1996) analysed Indian tea exports from 1971 to 1992, divided into two period (1971-80 and 1981-92) to allow for the impact of the disintegration of the USSR. It is concluded that Indian tea is losing its market share as a result of supply constraints. Production is unable to keep pace with rising domestic as well as external demand.

Kainth (1995) examined trends in the growth of Indian tea production and exports in the light of the emerging trade policy environment. Since the early 1990s, Indian tea export have been adversely affected by several developments in world markets such as cash crisis faced by Iran and Russia, Sri Lankan inroads into CIS markets, Poland's move to buying cheaper Kenyan tea, and over supply of inferior teas leading to a price fall. It is concluded that Indian tea export will decline in the future.

Veena *et al.*. (1995) examined the growth in coffee production and exports from India between 1967 and 1990. Arabica, Robusta and instant coffee are considered in analysis. The main importers of Indian coffee are: USA, West Germany, USSR, Italy, Netherlands and Yugoslavia. It is noted that, all types of coffee have experienced increase in unit price and in growth rates. Instant coffee, due to bilateral agreement experienced a slower growth rate.

Das (1995) made an assessment of the new global economic environment and market accessibility in the context of developing countries like India. Author provides projections of India's farm exports for the year 2005-2006. The largest contributions to the value of agricultural exports have been made by tea and mate, followed by fish and fish preparations and oil cakes. The lowest contributions have been made by cashew kernels. The projections of quantities and value of principal items of farm export for 2000/01-2004/05 shows that except tea and mate, the quantities and values of all other items of farm exports are positive.

Gangawar and Rai (1995) examined the composition and performance of Indian agricultural trade using time series data for the period 1970-92. Domestic production and world trade have had a significant positive effect on rice, potatoes, onions and bananas. The effect of relative export prices was not significant for any of these commodities. Export of traditional commodities like cotton, groundnuts and sugar have declined whereas those of basmati rice, oil seed cake, fruits and vegetables have shown an upward trend.

Patil *et al.* (1994) examined trends in the export of fresh mangoes from India. identified major countries importing Indian mangoes, studied varieties and quality preferences for export purposes and suggested measures for improving mango export. India mainly export mangoes to Middle-East countries, UK, Singapore and Bangladesh. The constraints include: a short production season for some types of mangoes; the non-availability of adequate air cargo space in the mango season; the lack of direct links with all mango importing countries; insufficient cold chains and high cost of consignments.

Air freights should be brought at par with air freights of the countries competing with India for mango exports. Adequate cold storage facilities need to be extended and packaging should be developed to prevent losses during transit.

Attari and Puran Chand (1994) analysed the horticultural exports in the light of pre and post liberalisation behaviour and examined the share and impact of liberalisation. Time series data for the period 1976-77 to 1992-93 was used. The study revealed that the share of agricultural export in the total exports in value terms declined from 35 per cent in 1976-77 to 17 per cent in 1990-91 but showed an increase by about 22-23 per cent in 1992-93. The share of horticultural export in total agricultural export rose from 2.33 per cent to 4 per cent but rose at a rapid rate in 1990-91. The fresh fruits, vegetables and preserved products increased in the post-liberalisation period. Supply elasticities for various commodities showed that there is an immense potential for export of fresh fruits and vegetables.

Gadre, Ingle and Wahile (1994) examined the trends of export of vegetables and fruits in India and its share in world exports. Time series data for the period 1982-92 was used. India's share rose in fruit and vegetable exports in volume term which is 1.22 per cent and 1.44 per cent respectively. In terms of quantity, exports of fruits rose from 760 MT to 38140 MT and in case of vegetables exports rose from 1.97 lakh MT to 3.31 lakh MT respectively. Mango, orange, lemon, banana, coconut and fresh pineapple in the fruit category and potato and tomato in the vegetable category are identified to have substantial scope for exports.

Arora and Tewari (1994) analysed the composition, performance and growth of India's agriculture during the period 1960-89. India's export of agricultural commodities, in value terms has increased by 202.5 per cent during the last 3 decades. India's export earnings have grown at double the annual rate (6.68 per cent) at which country's import expenditure on agricultural items is found growing (3.3 per cent). Live animals, meat and meat preparations, cereals, miscellaneous food beverages and tobacco alongwith fruits and vegetables are the commodities in which India enjoys comparative advantage in the

global market. Authors suggested that value addition to the primary products is the key to capture a larger market share.

Sachdev (1993) examined India's comparative advantage in agriculture trade in a static and dynamic context using the commodity version of Hecksher-Ohlin model. Dynamic comparative advantage is examined for the period 1975-85 using the estimates of relative changes in factor endowments in India as compared to a group of four newly industrialised countries. The performance of India's agricultural exports has been poor in comparison with the other countries studied, industrial exports and world agricultural exports. This is attributed to the slow growth in the agricultural production.

Vashsiht and Singh (1994) examined the growth performance of India's agricultural exports in terms of quantity and value. Time series data for 1975-76 to 1992-93 were used in the analysis of export trends. Export earnings from agricultural commodities have declined over the period. During the 1980s the domestic prices of major exportable commodities were generally lower than world market prices, thereby, increasing demand for Indian exports in the world market. In recent years, processed food, fruits and vegetables, meat and meat products have emerged as new export products.

Negi, Parashar and Tewari (1994) analysed the status of India's horticultural export and drawn some conclusions for horticultural export development. Compound growth rates of horticultural export volumes and values were calculated using data for the period 1976/77-1990/91. Export earnings from processed fruits and vegetables increased over the period. Growth analysis by crop showed that grapes, bananas, mangoes and apples occupied an important place in increased export earnings.

Bansal (1994) analysed that India produces nearly 100 million tonnes of fruits and vegetables, 18 per cent of the gross value of agricultural output. However, approximately one per cent of this is exported. The constraints for Indian fruits and vegetable export are: poor post-harvest management; inadequate cold storage facilities; inadequate processing

facilities; inadequate market infrastructure; inadequate market information; low levels of productivity and fragmented holdings. Prospects for increasing exports include the comparative advantage that India has in the production of many fruits and the increased importance that India has in the production and export of many fruits and the under the new agricultural policy.

Balakrishnana and Selvraj (1993) examined the Indian cardamom industry which is an important earner of foreign exchange and provides a livelihood for over 2500 small and marginal households. India exports cardamom to more than 60 countries, with a major share directed to Middle East. However, India receives less income from the export of cardamoms due to reduction in India's share and an increased share from Guatemala in the world market. As cardamom has narrow market base, any change in consumer habit or alternative source of supply would affect the cardamom industry. It is suggested that the efforts should be made to improve cardamom production by maintenance of steady prices in the domestic market. To improve productivity, special attention is needed for small and marginal farmers who accounts for about 95 per cent of cardamom growers.

Naik and Pandit (2001) examined the status of fruits and vegetables in India. The study revealed that the growth rate in yield for fruits and vegetables on an average is higher in India than world. Analysis further suggested that, the potential for exports is very high in the case of fruits and vegetables. India's export of fruits have shown increasing trend in the recent years whereas the vegetables exports have been stagnant and for some crops decreasing as well.

Sharma and Tiwari (2001) analysed the export demand and supply of Indian tea export. Time series data for the period 1960-1989 was used for the study. The results suggested that the export price and world price affect the export demand of tea significantly. The results on supply function for tea exports showed that the export supply of tea from India is affected significantly by fluctuations in the production of tea and pressure of domestic demand.

Sundaravaradarajan, Rajesh Kumar and Vasanthkumar (2001) analysed the instability in cashew production and trade. The study revealed that there is a desirable instability in terms of quantity of kernels exported and production of raw cashew, while there is undesirable instability in the quantity of raw cashew imported. The authors suggested that, suitable action should be taken to increase the domestic production of raw cashew nut through development of high yielding varieties and infrastructure for post harvest operations and diversifying the non-traditional markets will help in achieving stability.

Ali (2000) studied the export potential of Indian mint oil industry. The annual compound growth rate of mint oil export is 35.33 per cent in terms of quantity and 46.31 per cent in terms of value during 1997-98. The highest growth rate was recorded in case of spearmint oil followed by peppermint and menthol. India is the net exporter of mint oil and menthol but export trend is highly fluctuating mainly because of unorganised sector and absence of any export promotion body/board, specially for essential oils. Net foreign exchange earnings from mint trade was Rs. 232.10 lakh in 1988-89 which increased to Rs. 13566.72 lakh in 1996-97 i.e. an increase of 98.29 per cent and further slipped down to Rs. 9346.57 lakh in 1997-98. Agency for promoting essential oil export should be established for diversifying the export markets as suggested by the author.

Kaushik and Paras (2000) analysed the post-liberalisation performance of Indian international trade. The findings were: (i) export of Indian agriculture and allied products and of manufactured have increased significantly since the initiation of trade liberalisation; (ii) export earnings instability is mainly due to volume in stability rather than price volatility; (iii) export instability showed a negative and a statistically significant impact on economic performance of the economy.

Lal, Srivastva and Janaih (1996) examined the export potential of Indian agriculture keeping in view the constraints of the agricultural exports. The results revealed that (i) quantum jump in fruit export is mainly due to increased demand for Indian fruits in global market for reason of attractive quality of exported fruits; (ii) the

share of farm sector in the country's total exports has started steadily declining especially since 1970-71 onwards; (iii) the share of fruits, fruit products and vegetables to the total farm export is increasing at higher rates (8.9%) with less instability index (0.06); (iv) comparative advantage in prices allows India to enhance exports quantity; (v) constraints are: wide gap between potential and realised yield of fruit crops, lack of cold storage at farms and ports, lack of processing units, and lack of proper post harvest handling facilities etc.

Singh and Vashisht (1996) analysed the export performance of Indian agriculture. Time series data on export quantum, value and average unit value of selected commodities (coffee, tea and mate, tobacco, spices, cashew kernels, oil cakes, sugar, rice raw cotton, fish and fish preparations, meat and meat preparations, fruits and vegetables and processed food) was used. Annual growth rates in value, quantum and unit values of the selected commodities were estimated. Results shows that (i) the share of agricultural exports in total exports is declining; (ii) the exports of oilcakes, marine products and rice had increased over the years and their relative shares in the total value of export were higher than other exportable agricultural commodities; (iii) the export earnings from most of the exportable commodities increased with an annual growth rate of 12 - 88 per cent. The highest growth was noted in oilcakes; (iv) the newly emerged commodity group is fish and fish preparations.

Nasurudeen and Sundaresan (1999) analysed the performance of agricultural exports and study revealed that the percentage of agricultural exports had declined drastically overtime. During 1960-61, the share of agricultural exports in total export was 39.24 per cent with Rs. 284 crore out of the total Rs. 660 crore of Indian exports. It had declined to 29.86 per cent during 1970-71 and oscillated to 30.66 per cent in 1980-81. During 1990-91, the share of agricultural export in total export further slipped down to 21.82 per cent. After the liberalisation of trade, the share of agricultural export had ranged between 14.56 per cent during 1993-94 and 22.07 per cent in 1996-97. During the period between 1990-91 and 1996-97 the growth rate of agricultural export was found to be 22.31 per cent. Agricultural sector is responding to the changes in the economic order

but its ability to adjust to and take advantage of liberalising economic environment are constrained by distortions in the agricultural input-output markets which is leading to inefficiency in input use and restricting agricultural production choices and frontiers. Authors suggested drastic market reforms which should receive precedence over other sets of reforms so that both efficiency and equity improves after reforms.

Praduman Kumar and Surbhi Mittal (1998) discussed the market prospects for horticultural products in India. The domestic demand for fruit and vegetables during 1995-2000 AD, is expected to grow at an average annual rate of 4.1 per cent and 3.6 per cent, respectively, owing to the rapid urbanisation, changing lifestyles, increasing incomes, population and growing export demand potential. India's share in the world mango market is less than 15 per cent, but mango accounts for around 39 per cent of the total fruit exports from India. Indian mangoes are moderately export competitive. The quantum of grapes exports has witnessed an annual growth rate of over 23 per cent in the recent past. Indian grapes are highly export competitive and India has been able to achieve a good market penetration with grapes currently being exported to about 30 markets. India accounts for about 2.7 per cent of the world apple production. India has not been very successful in the exports of apples and its contribution to the world trade is hardly about 0.15 per cent. Onion form 87 per cent of the country's exports of fresh vegetables and 33 per cent of the exports of horticultural products. India is world's second largest exporter of onion with a market share of 13.6 per cent in 1992-93. Since 1980, India's onion exports have grown at an annual rate of 4.9 per cent. India is the major supplier of mango pulp which is estimated at 40 thousand tons. Mango pulp constitutes about 10 per cent of the total exports of horticultural products from India. Future exports of mango pulp are expected to grow at an annual rate of 6.6 per cent and by 2000 AD the exports are likely to reach 44 thousand tons. Major constraints identified in the exports of horticultural products are : poor infrastructure; insufficient institutional support; low research and development efforts etc. Authors suggested measures to increase the exports of horticultural commodities which are: increasing productivity; adequate marketing support; the cost of transportation has to be subsidised: special handling facilities for the export of perishable crops; proper branding of products needs

to be encouraged; efforts must be made to tap larger international markets and export promotion should be undertaken by the private sector.

Anil Kumar and Gupta (2000) studied the comparative advatnage of agricultural commodities in India. The study revealed that the comparative advantage is high for commercial items like, cotton, tobacco, jute, spices, tea and coffee. The country has also advantage in producing labour intensive crops like rice. The country has, however, no comparative advantage in producing coarse cereals like maize and sorghum. In wheat, the country is at the margin though the country has revealed comparative advantage in most of the horticultural items. Study also revealed significant amount of inefficiency in the post harvest operations of the commodities owing to poor infrastructure and government restrictions in the domestic market.

Tamanna and Chaurasia (1999) identified the markets for some export competitive Indian fruits. Secondary data (1980-90 to 1991-96) was used for the study in addition to the primary data. The export competitiveness was assessed by using nominal protection coefficients (NPC). The average NPC for mango turned out to be 0.87 for the period 1990-91/1991-92 indicating that Indian mango prices were about 13 per cent lower than the world prices depicting moderate competitiveness of fruit in the international market. Export of Indian mango was found most profitable to Australia, Sweden, France, Japan, Switzerland, Belgium and Singapore. Grapes exhibited moderate competitiveness in the international market. Seychelles, France and Mauritius are the countries where Indian grapes possess high export potential. Banana was found highly competitive export commodity and is routed mainly to USA, Russia, Jordan and UAE. Litchi emerged as a promising fruit in context of international trade. Countries categorised as highly competitive ones where major share of litchi is exported are Switzerland, Kuwait, Kenya and Korea Republic.

Ramesh Chand (1996) analysed the Indian agriculture in the light of WTO. The study revealed that behaviour of international prices and efficiency of domestic production are the most crucial factors for future of Indian agriculture in a liberalising

world. Long run series of international prices for grain, sugar and edible oils showed cyclical movement devoid of any secular trend. It seems that trade agreements would not alter behaviour of international prices in a significant way and therefore, India should embark on a trade policy and strategy that takes cognisance of the cyclical nature of international prices devoid of trend. Author suggested two approaches to deal with such a situation. One, encourage establishment of big export houses having long run interest in export. Two, country should develop some mechanism to help export in the years of depressed prices. Author also suggested that there is a need to develop mechanism to regulate unwanted imports and exports. Other suggestions by the author are: innovation and technological development in agricultural field; infrastructure development like road, power supply, processing, communication, storage etc. and reduction in intra-country transport cost; healthy competition between private and public sector.

Ajjan et al., (1998) analysed the export performance of senna and periwinkle in India. Importing countries were identified and export performance was studied using (i) compound growth rate, (ii) Coppock's instability index, (iii) Markov chain analysis. The study revealed that the senna and periwinkle exports grew at a compound growth rate of 1.55 per cent and -7.61 per cent, respectively. However in case of value of exports, the growth was 14.46 per cent and 2.16 per cent, respectively. Using Markov chain model projections were made upto 2005 AD for product share of senna and periwinkle. The export of senna and periwinkle were found very unstable. The authors opined that the future prospects of exports depend upon the demand pattern of importing countries only. They suggested that there is an urgent need to explore new markets in order to augment the foreign exchange earnings.

CHAPTER III

METHODOLOGY

Methodology

In this chapter the procedure for selection of fruits, data collection and detailed description of analytical framework has been discussed.

3.1 Selection of Fruits

India has natural advantage in producing a large number of horticultural products. Four fruits viz., apple, banana, grapes and mango were chosen for studying the export performance and potential in the present study. These fruits were selected because of large share in the world production and exports and the fact that they are newly emerging export products. Moreover, in the wake of liberalisation policies of Indian government and WTO treaty, exports of horticultural products requires a fresh look. In addition to this, within horticultural sector these fruits can play a significant role in diversification and modernisation of Indian agriculture.

3.2 Data Collection

Time series data has been used in the present study. To study the changes in the regional distribution in respect of the selected fruits under study, the statewise data on area and production was available from 1987-89 to 1999-2000 and the same has been used for analysing the regional distribution. Time series data covering a period 1981-2000 is used for the purpose of studying the compound growth rates of production, productivity, export quantity, value and unit value, terms of trade, instability indices, yield and price analysis, direction of trade, computing export performance ratios, for regression analysis and in the for the future projections of exports. To analyse the components of export growth, the constant-market-share model used the data for 1989-90/1998-99. The data on production, yield, exports and imports was downloaded from FAO website (http://www.fao.org/). The other sources of secondary data include Indian horticultural database (NHB), FAO production and trade yearbooks, monthly statistics of foreign trade

in India, Indian Economic Review, Statistical outline of India and Himachal Pradesh, India database: the economy (various issues), economic survey, government of India etc. Wherever data was not available, the missing gaps were filled using trend method.

3.3 Analytical Framework

3.3.1 Tabular Analysis

Tabular analysis was used to study the regional distribution of production of selected fruits, direction of trade, yield and price analysis to study comparative advantage. The inferences were drawn by working out the averages and percentages.

3.3.2 Compound Growth Rates

For analysing growth in production, productivity and exports of major fruits, the compound growth (C.G.R.) have been calculated by fitting function of the type given herein.

$$Y = a\, b^{t}$$

Where:

Y = Production/productivity/export of fruits

a = Constant

b = 1 + r (where r = compound growth rate)

t = time variable in years

The growth rates worked out were tested for their significance with the help of 't' values.

$$\text{Where } t = \frac{r}{\text{Standard Error of } r}$$

$$S.E._{R.} = \frac{100b \; SE \ln^{b}\_}{\log_{10}{}^{c}}$$

$$S.E \ln b = \sqrt{\frac{\sum_{i=1}^{n} \log Y^2 - \frac{(\sum_{i=1}^{n} \log Y)^2}{N} - (\log_{10} b)^2 . \sum_{i=1}^{n} t^2}{(n-k) \sum_{i=1}^{n} t^2}}$$

3.3.3 Instability Indices

The instability index (I) in exports was constructed based on residuals:

$$I = \sqrt{\frac{\sum_{i=1}^{n} e_i^2}{n-k}}$$

where:

e_i = Value of residual of i^{th} observation

n = Number of observations and

k = Number of variables.

In order to further assess the nature of instability in fruit trade in India, the export quantity data for twenty years was further divided into two classes, one above the predicted and one below the predicted values using the normal trend equation. The following growth model was fitted:

$$E = a + b\,t$$

Where E= Export quantity in the year 't'.

From the estimated trend, the upper and lower point was examined and two separate regressions were fitted (Kumar and Kaul, 1991).

$E_1 = a_1 + b_1 t$ (lower trend)

$E_2 = a_2 + b_2 t$ (upper trend)

The upper and lower points show upper and lower fluctuations in fruit exports over the period. The distance between the upper and lower curves showed the nature of instability over the entire period. By comparing the slope coefficients of these curves, the nature of instability is determined based on the following showing desirable/undesirable instability conditions.

Desirable Conditions	Undesirable Conditions
1. $b_2 < b < b_1$	5. $b_2 > b > b_1$
2. $b_2 > b < b_1$	6. $b_2 < b > b_1$
3. $b_2 > b = b_1$	7. $b_2 < b = b_1$
4. $b_2 = b < b_1$	8. $b_2 = b > b_1$

If $b_2 = b = b_1$, there will be stable growth. The conditions 1 to 4 show the desirable conditions and 5 to 8 shows the undesirable trends of instability of growth.

3.3.4 Terms of Trade

Net terms of trade (Nt) and purchasing capacity (It) of exports of major fruits under study for the t^{th} year are defined as follows:

Nt = Ut/Umt

It = Nt x Qt

Where:

Ut = Unit value of fruit exports for t^{th} year

Umt = Unit value index of general imports for the t^{th} year

Qt = Quantum index of fruit exports for t^{th} year

3.3.5 Market Share Analysis

The Constant-Market-Share model (CMS) was employed to describe the components of export growth for the major fruits under present study. For this, the model is defined as follows:

The total change (ΔE) in exports of selected fruits from India is given by:

$$\Delta E = \sum_{i=1}^{n} (E_i^1 - E_i^0)$$

This can be written as:

$$\Delta E = \sum_{i=1}^{n} r E_i^0 + \{\sum_{i=1}^{n}(r_i E_i^0 - r E_i^0)\} + \{\sum_{i=1}^{n}\sum_{j=1}^{m} r_{ij} E_{ij} - \sum_{i=1}^{n} ri E_i^0 \} + \{\sum_{i=1}^{n} (Ei^1 - E_i^0) - \sum_{i=1}^{n}\sum_{j=1}^{m} r_{ij} E_{ij} \}$$

Where:

E_{ij}^0, E_{ij}^1 = Export of the i^{th} country to j^{th} market in the base and terminal year respectively. (i= 1.....n); (j = 1.....m).

E^0_i, E^1_i = Total exports from India in the base and terminal year respectively.

r = Proportionate change in total world exports.

r_i = Proportionate change in world exports of the i^{th} country.

r_{ij} = Proportionate change in world exports of the i^{th} fruit to the j^{th} market.

Therefore, the total change in exports was decomposed into four components as follows:

1. World Trade Effect = $\sum_{i=1}^{n} r E_i^0$
2. Commodity Composition Effect = $\sum_{i=1}^{n} (r_i E_i^0 - r E_i^0)$
3. Market Distribution Effect = $\sum_{i=1}^{n}\sum_{j=1}^{m} r_{ij} E_{ij}^0 - \sum_{i=1}^{n} r_i E_i^0$
4. Competitive Effect = $\sum_{i=1}^{n} (E_i^1 - E_i^0) - \sum_{i=1}^{n}\sum_{j=1}^{m} r_{ij} E_{ij}^0$

3.3.6 Yield and Price Analysis

On the basis of yield/ha. and unit values realised per kg of exports of selected fruits, attempt has been made to study the India's comparative advantage/disadvantage in relation to the other major selected fruit exporting countries of the world.

3.3.7 Price Competitiveness

Price competitiveness was tested by relative method where relative price was used as explanatory variable on the relative export performance of the two competing countries. This bilateral approach involves analysis of relative movement in quantum or value of exports of two competing countries. It was derived from the following equation:

$$\left| \frac{q_1}{q_2} \right| = a \left| \frac{P_1}{P_2} \right|^b$$

This equation was transformed to a logarithmic form to yield:

$$\ln \left| \frac{q_1}{q_2} \right| = \ln a + b \ln \left| \frac{P_1}{P_2} \right|$$

Where, q_1/q_2 indicate relative quantity, P_1/P_2 indicate relative price and 'b' represent the elasticity of substitution. In a normal demand-price relationship, a priori 'b' will have negative sign. In other words, a higher increase in price of one country against another would lead to decline in relative quantum of export of former. Time series data from 1981 to 2000 was used to estimate elasticities of market share with regard to price

relatives and for competing countries to look into the impact of relative prices on competitiveness.

3.3.8 Export Performance Ratio (EPR)

EPR defined as the ratio of the share of a given product in total exports of a country under consideration to the corresponding share of the trading world as a whole.

A given country may have comparative advantage (disadvantage) in a product if the ratio is greater (less) than unity.

3.3.9 Nominal Protection Coefficient (NPC)

NPC defined as ratio of domestic prices (P^d) to its border prices (P^b). NPC less than unity indicates that the country has comparative advantage in the commodity in question. If the magnitude of NPC is less than 0.5 the commodity in question is considered highly competitive, if NPC ranges between 0.5 - 1.0, moderately competitive and if NPC is greater than unity then commodity is non-competitive.

3.3.10 Export Surplus Function

To determine the factors affecting exportable surplus, the following functional form was fitted to the data for the period 1981 to 2000 by the method of Ordinary Least Square (OLS)

$$E_t = A\, Q_t^{b1}\, Y_t^{b2}\, RPI_t^{b3}\, T_t^{b4}\, e_t$$

where:

E_t = Exportable surplus of the fruit under study for t^{th} year.

Q_t = Domestic production of fruit under study for t^{th} year.

Y_t = Productivity of fruit under study for t^{th} year.

RPI_t = Relative price index of fruit for the t^{th} year.

T_t = Time as an index for catchall of other factors affecting exports.

e_t = Stochastic term

b1, b2,b3 and b4 are export elasticities with respect to domestic production, yield, relative price index and time respectively.

3.3.11 Export Projections

Export projections of selected fruits were made using the following trade models:

Model I: $\ln E = a + b\ Year + e_1$

Model II: $\ln E = A + B\ Year + C \ln UV + e_2$

Where:

E = exports in thousand tonnes from India.

Year = Year (1981-2000).

UV = Unit value in US dollars per tonne.

ln = log at the base 'e'

e_1 and e_2 are error terms of the model.

Base year for projections was triennium year ending 2000.

CHAPTER IV

RESULTS AND DISCUSSION

Results and Discussions

4.1 Production Trends

India ranks second in the production of fruits next to China. The annual fruit production was around 44 million tonnes accounting for 10.1 per cent of total world production in 1998-99. India's production growth of total fruits between 1981-2000 period worked out to be 4.32 per cent per annum, apple, banana grapes and mango being the important fruits, together occupied 58.7 per cent of the total area under fruits in the country, contributing 61.1 per cent of total fruit production in 1998-99. Among these fruits, mango occupied the major proportion of the total fruits area, followed by banana, apple and grapes (Table -4.1). The production trends of fruits selected under the present study are shown in the figures 4.1-4.4. In the matter of production, banana could be ranked at the top followed by mango, apple and then grapes. While the share of banana and grapes in total fruit basket of the country, exhibited a rising trend, mango's share registered a decline and apple production share stagnated around 3 per cent between 1987-88 to 1998-99 period. The compound growth rate for production and productivity of selected fruits has been presented in Table-4.2

A cursory glance on the table revealed that, India's production growth rate is higher than the World's growth rate for banana and grapes while in case of mango India's growth rate is less than half the growth rate of the world production. In apple production India's growth rate was 15.50 per cent less than the world production growth rates. Himachal Pradesh experienced 21.55 per cent growth rate in case of mango while it was negative for apple production. As far as growth in the yield is concerned, India's growth rate is higher for banana and apple as compared to world yield growth in these crops. Though world is experiencing a negative growth in mango yield, yet the situation is more disturbing for India which registered the negative growth rate of 1.49 per cent per annum between

1981-2000 period. The average share of production (based on TE-2000) of Indian apple, banana, grapes and mango was 2.38, 23.46, 1.82 and 42.67 per cent respectively in the total world production. Himachal Pradesh contributed 29.83 per cent in case of apple and only 0.10 per cent in mango towards country's total production of respective fruits.

4.2 Fruit Output Growth And Role In Agricultural Diversification

Diversification of agriculture here means a shift from foodgrain to non-foodgrain based enterprises. The shift may be accompanied by "the use of resources in diverse but complementary activities", usually occurring together with a tendency towards concentration of some kinds of activities in specific region. One of the arguments in favour of this kind of regionally identified diversification is that it results in a more sustainable use of natural resources associated with it. In a regional specialisation where resource endowments are effectively taken into account, better use of land and water is expected to follow. In this section, two aspects of diversification in relation to fruit crops within agriculture were examined : output diversification through a change in the sources of growth of agriculture and concentration of horticultural crops in certain regions, the latter working as a factor reinforcing the regional diversification of agriculture.

4.2.1 Diversification in sources of output growth and fruit crops

One way of looking into the diversification within agricultural sector, is whether there has been movement away from crop production to fruit production or not. The rate of growth in output of fruit crops vis-à-vis other non-horticultural crops can provide evidence of shift towards more significant fruit and vegetable crops. These growth rates also reveal the 'extreme focus status' attached to horticulture sector in 8th five year plan (1992-97). Growth rates of output obtained from different sources of agricultural growth are presented in Table-4.3

Table 4.1 - Share of Area and Production of Selected Fruits in their Respective Totals

(Percent)

	Mango		Apple		Banana		Grapes	
Year	% of total Area	% of total Production	% of total Area	% of total Production	% of total Area	% of total Production	% of total Area	% of total Production
1987-88	43.5	37.4	6.3	3.1	10.2	17.2	0.5	0.9
1991-92	37.5	30.4	6.8	4.0	13.4	27.2	1.1	2.3
1992-93	35.5	28.0	6.0	3.5	12.4	31.7	1.1	2.0
1993-94	38.2	27.1	6.4	3.5	13.6	31.9	1.2	1.9
1994-95	28.5	28.5	4.9	3.1	10.3	34.1	1.0	1.7
1995-96	38.2	26.0	6.5	2.9	12.9	31.5	1.1	1.5
1996-97	37.6	24.7	6.2	3.2	11.9	30.7	1.2	2.8
1997-98	37.5	23.7	6.2	3.1	12.1	30.8	1.1	2.2
1998-99	37.6	21.4	6.2	3.1	12.5	34.2	1.1	2.4

Source:- Indian Horticulture Database (NHB, various issues)

Table-4.2 : Compound Growth Rate of production, Yield of Selected Fruits: World, India and Himachal Pradesh

Particulars	Fruits			
	Apple	**Banana**	**Grapes**	**Mango**
1. Growth rate of production in world	2.75	3.17	-0.64	2.81
	(0.014)	(0.005)	(0.014)	(0.014)
2. Growth rate of production in India	2.38	7.04	9.574	1.08
	(0.013)	(0.032)	(0.046)	(0.008)
3. Growth rate of production in Himachal Pradesh	-0.026	@	@	21.55
	(0.043)			(3.479)*
4. Average share of production of India in the world (per cent)	2.38	23.46	1.82	42.65
5. Average share of production of Himachal Pradesh in India (per cent)	29.85	@	@	0.10
6. Growth rate of yield in world	-0.15	0.51	0.67	-0.63
	(0.010)	(0.005)	(0.006)	(0.012)
7. Growth rate of yield in India	0.03	3.79	0.50	-1.487
	(0.007)	(0.012)	(0.017)	(0.012)
8. Growth rate of yield in Himachal Pradesh	-3.85	@	@	17.66
	(0.045)			(3.256)*

- Figures in parenthesis indicates the standard errors.

* Indicates the data for Himachal Pradesh for eight years (1993-2000)

@ The data is not available for the crops.

Table- 4.3 : Growth Rate of Output for Selected Horticultural and Non-Horticultural Crops in India

Sr. No.	Crop	Time Period		
		1981-1990	1991-2000	1981-2000
1	Rice	3.66	1.93	2.95
		(0.136)	(0.063)	(0.014)
2	Wheat	3.56	3.04	3.48
		(0.120)	(0.094)	(0.016)
3	Kharif Foodgrains	2.28	0.92	1.80
		(0.117)	(0.044)	(0.010)
4	Rabi Foodgrains	3.33	3.18	3.35
		(0.106)	(0.100)	(0.016)
5	Total Foodgrains	2.50	2.72	1.98
		(0.100)	(0.065)	(0.012)
6	Total Vegetables	3.02	3.52	2.91
		(0.088)	(0.105)	(0.013)
7	Total Fruits	2.76	5.76	4.32
		(0.100)	(0.172)	(0.021)
8	Apple	2.23	2.11	2.38
		(0.127)	(0.068)	(0.012)
9	Banana	5.36	7.23	7.04
		(0.164)	(0.224)	(0.033)
10	Grapes	7.17	8.66	9.57
		(0.251)	(0.289)	(0.046)
11	Mango	-0.11	0.98	1.08
		(0.077)	(0.084)	(0.008)

Note: - Figures in parenthesis are standard errors. All growth rates are significant at 1 per cent level of significance.

Fig-4.1: Production Trends of Apple in India

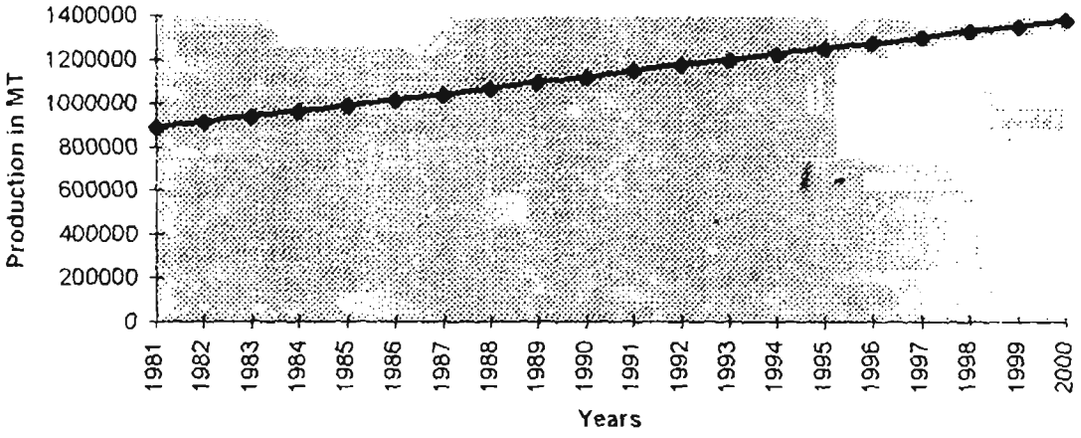


Fig-4.2: Production Trends of Banana in India

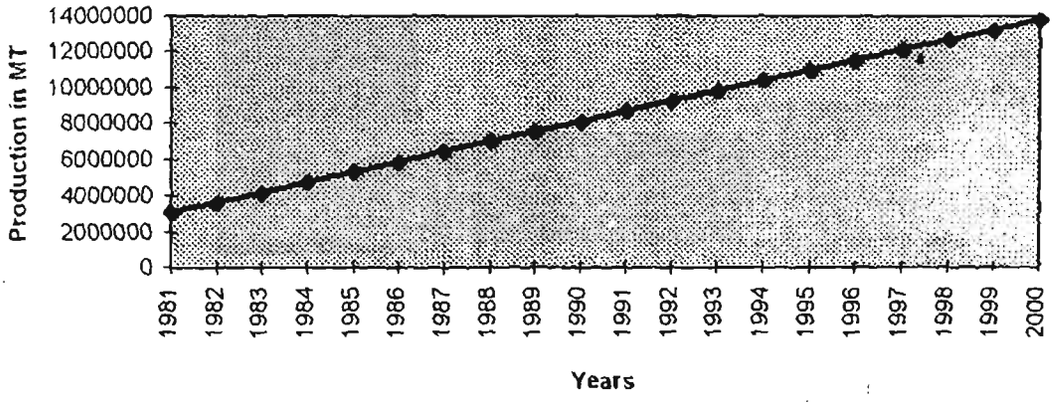


Fig-4.3: Production Trends of Grapes in India

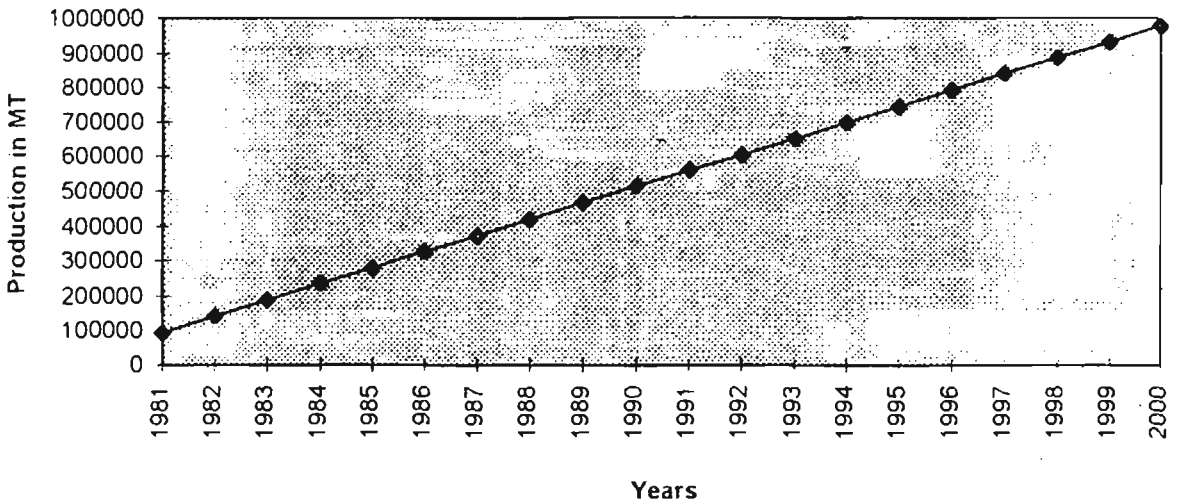
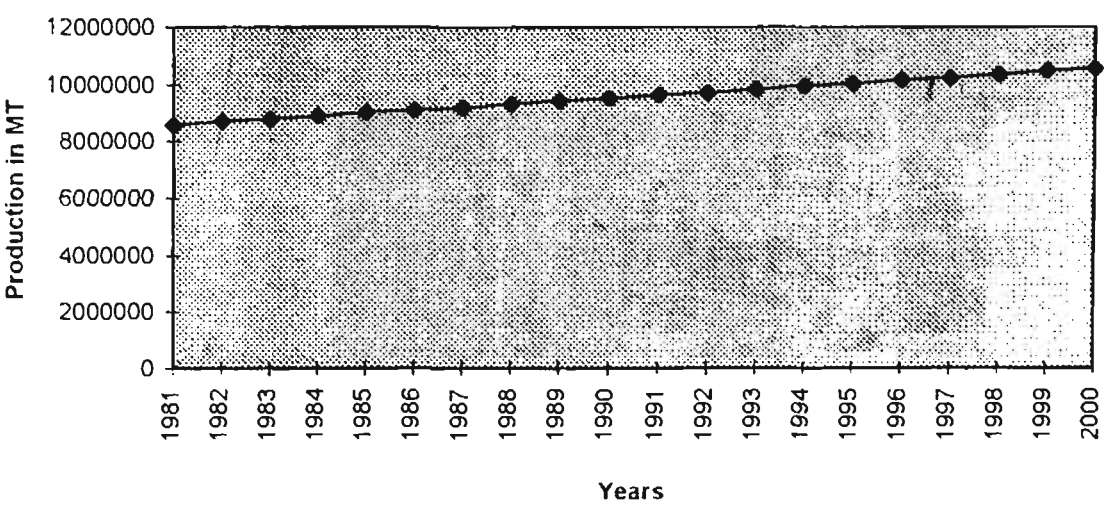


Fig-4.4: Production Trends of Mango In India



A cursory glance on the table revealed that, growth estimates varied as expected, for different sources and time periods being considered. The important conclusion that can be drawn from the table is that the output growth rates of fruits and vegetables have increased in 1991-2000 period compared to what they were in 1981-90 period. In contrast to this, it is interesting to note that, output growth rates of major foodgrains of the country has declined during 1991-2000 period as compared to 1981-90 period. During the period 1981-2000, a compound growth rate of 1.98 per cent per annum was observed for total foodgrains which was relatively too low when compared to the growth rates of total vegetables (2 91 per cent) and total fruits (4.32 per cent). Of the major export fruit crops, grapes registered the highest growth rate of 9.57 per cent followed by banana 7 04 per cent in their production between 1981 and 2000. The growth rates of these fruits were higher in latter period as compared to former period. In case of mango, the average growth rate was negative (-0.11 per cent) in the time period from 1981-1990 which rose 0.98 per cent in 1991-2000 period. However, growth rate for the entire 20 years was estimated at 1.08 per cent per annum. During this period apple production recorded a growth of 2.38 per cent per annum. Apple production registered almost constant rate of growth of 2.2 and 2.1 per cent in former and latter period respectively.

Thus, while the rates of growth in foodgrains and its important components did not change substantially rather declined between two time periods, the vegetable group and fruits witnessed large changes in the rates of growth during the same time period. For the total study period of twenty years, fruits in general recorded higher growth as compared to foodgrains in the country. This change in the sources of growth constitutes one aspect of diversification in Indian agriculture.

4.2.2 Regional distribution of fruit crops

The above variations in the rates of growth of individual crops occur together with changes in the regional distribution of area and production. While a part of this regional

specialisation may be attributed to climate-related factors, a tendency towards the emergence of some states as specialising in horticulture is clearly discernible (Table-4.4 to 4.7).

Apples are grown mainly in Jammu & Kashmir and Himachal Pradesh with the former retaining its major share ranging between 54 to 88 per cent of production in different years from almost the same area as available in Himachal Pradesh. In terms of growth rate in production, this crop is growing nearly at par with the world growth rate.

Banana is one of the fast growing crops of India, its production is mainly concentrated in Maharashtra and Tamil Nadu. These two states together have accounted for nearly 45-50 per cent total production during 1990s. The share of Karnatka hovers around 11 per cent in the matter of production and 10-15 per cent in the case of acreage in the country. The state of Gujrat and Andhra Pradesh are almost equal contributors. While the remaining share is distributed all over the country, some states such as Gujrat is indicating a decline.

Nearly 51 to 68 per cent of the total grape production in nineties came from Maharashtra. Nearly 20-24 per cent is contributed by Karnatka during the last decade of 20th century. Simultaneously, the share of Andhra Pradesh and Tamil Nadu in grape production has shown a declining trend (Table 4.6)

Mango, one of the important horticultural crop of the country, has exhibited almost static production levels in last few years. Andhra Pradesh seems to be the major mango grower, which contributed about 22 to 28 per cent of total production in various years, during the last decade. Uttar Pradesh and Bihar together also account for a significant amount of total production in the country. Next in importance is Karnatka, followed by Maharshtra. The contribution of remaining states comes nearly 40-60 per cent of total production in the country. The pattern does not seem to have undergone any significant change.

Table-4.4 : Regional Distribution of Apple Area and Production

(Percentage)

Year	Himachal Pradesh	Jammu & Kashmir	Others	Total production/Area ('000 MT/'000 Ha.)
1987-1988	30.07	49.57	20.36	861.40
	(30.85)	(37.80)	(31.35)	(178.30)
1991-1992	26.29	54.41	19.30	1147.74
	(34.32)	(35.70)	(29.98)	(194.50)
1992-1993	23.89	57.29	19.30	1168.25
	(32.54)	(36.79)	(30.67)	(191.20)
1993-1994	22.70	61.06	16.24	1298.33
	(35.32)	(35.66)	(29.02)	(205.00)
1994-1995	24.91	56.97	18.12	1183.14
	(35.81)	(35.59)	(28.60)	(210.70)
1995-1996	22.84	59.01	18.15	1214.60
	(36.06)	(35.93)	(28.01)	(217.10)
1996-1997	22.06	62.34	15.60	1308.40
	(36.07)	(36.09)	(27.84)	(222.70)
1997-1998	17.74	67.73	14.53	1320.60
	(36.49)	(36.19)	(27.32)	(227.70)
1998-1999	28.51	57.35	14.14	1380.40
	(36.99)	(36.00)	(27.01)	(231.40)
1999-2000	4.69	88.70	6.61	1047.40
	(31.30)	(30.59)	(38.11)	(283.30)

Source: Indian Horticultural Database (NHB) various issues

- Figures in parenthesis indicates the per cent area under respective states.

Table-4.5: Regional Distribution of Banana Area and Production

(Percentage)

Year	Andhra Pradesh	Gujrat	Karnaka	Maharashtra	Tamil Nadu	Others	Total Production/Area ('000 MT/ '000 Ha.)
1987-1988	5.66	10.76	6.19	27.99	22.14	27.26	4767.10
	(7.60)	(5.46)	(6.28)	(18.23)	(15.19)	(47.24)	(289.60)
1991-1992	6.93	12.84	11.57	26.71	20.06	21.89	7790.00
	(8.79)	(6.51)	(10.77)	(14.71)	(14.82)	(44.40)	(383.90)
1992-1993	9.49	10.71	11.25	26.05	16.00	26.50	10460.00
	(10.02)	(7.07)	(10.03)	(13.18)	(14.90)	(44.8)	(396.20)
1993-1994	7.00	9.59	12.60	23.76	23.38	23.67	11900.00
	(7.71)	(6.61)	(10.53)	(13.24)	(19.30)	(42.61)	(431.70)
1994-1995	6.65	9.26	12.77	23.33	28.04	19.95	13168.00
	(7.88)	(6.86)	(11.46)	(14.11)	(18.73)	(40.96)	(444.40)
1995-1996	7.87	8.14	11.27	23.36	27.38	21.98	13095.10
	(9.56)	(6.36)	(11.69)	(14.48)	(18.74)	(39.17)	(433.00)
1996-1997	8.89	7.26	14.85	21.66	25.06	22.28	12439.60
	(10.41)	(5.67)	(13.19)	(11.26)	(18.68)	(40.79)	(424.60)
1997-1998	8.48	8.35	15.07	23.46	23.57	21.07	13339.50
	(10.08)	(6 94)	(13.56)	(11.84)	(18.33)	(39.25)	(449.10)
1998-1999	6.11	7.28	13.34	22.92	29.33	21.02	15072.70
	(7.95)	(7.04)	(13.12)	(12.70)	(18.97)	(40.22)	(464.30)
1999-2000	7.21	6.60	11.98	25.75	28.88	19.58	16813.50
	(9.88)	(6.97)	(12.44)	(14.71)	(18.78)	(37.22)	(490.70)

Source: Indian Horticultural Database (NHB) various issues

Figures in parenthesis indicates the per cent area under respective states.

Table-4.6 : Regional Distribution of Grapes Area and Production

(Percentage)

Year	Andhra Pradesh	Karnatka	Maharashtra	Tamil Nadu	Others	Total production/ Area ('000 MT/ '000Ha.)
1987-1988	16.02	45.78	19.60	11.15	7.45	251.00
	(10.39)	(37.01)	(29.22)	(11.04)	(22.34)	(15.40)
1991-1992	8.43	21.2	51.11	7.00	12.26	668.20
	(6.96)	(20.05)	(52.89)	(7.00)	(13.10)	(32.40)
1992-1993	8.63	19.67	51.54	7.17	12.99	653.10
	(6.63)	(17.17)	(55.01)	(6.38)	(14.81)	(34.00)
1993-1994	8.04	24.71	49.68	5.54	12.03	702.50
	(5.81)	(14.90)	(61.66)	(6.07)	(11.56)	(38.80)
1994-1995	6.79	23.35	52.08	4.61	13.17	672.90
	(5.42)	(12.43)	(66.60)	(5.87)	(9.68)	(42.10)
1995-1996	6.84	23.93	51.76	4.31	13.16	603.60
	(5.38)	(12.55)	(65.23)	(5.40)	(11.44)	(35.60)
1996-1997	4.51	17.27	66.18	4.18	7.86	1134.60
	(4.77)	(15.22)	(64.77)	(5.14)	(10.10)	(42.90)
1997-1998	3.64	23.38	58.62	4.95	9.41	969.30
	(4.41)	(18.38)	(60.54)	(5.88)	(10.79)	(40.80)
1998-1999	4.15	20.93	63.03	4.63	7.26	1082.70
	(4.22)	(17.61)	(63.38)	(5.40)	(9.39)	(42.60)
1999-2000	2.82	20.05	68.46	4.54	4.13	1137.80
	(3.62)	(17.16)	(67.17)	(5.30)	(6.75)	(44.30)

Source: Indian Horticultural Database (NHB) various issues

- Figures in parenthesis indicates the per cent area under respective states.

Table-4.7: Regional Distribution of Mango Area and Production

(Percentage)

Year	Andhra Pradesh	Karnatka	Maharashtra	Utter Pradesh	Others	Total production/ Area ('000 MT / '000 Ha.)
1987-1988	19.09	5.70	0.87	34.68	40.06	1035.40
	(13.36)	(4.99)	(1.14)	(42.18)	(38.33)	(1232.9)
1991-1992	28.47	7.79	3.21	19.68	40.90	8715.60
	(19.26)	(7.50)	(4.63)	(22.31)	(46.30)	(1077.60)
1992-1993	22.29	7.57	3.55	19.16	40.03	9923.30
	(19.81)	(7.23)	(4.80)	(20.98)	(47.82)	(1136.70)
1993-1994	28.70	8.34	3.74	18.29	40.93	10113.30
	(19.87)	(7.30)	(7.94)	(19.43)	(45.46)	(1217.40)
1994-1995	27.94	8.33	3.29	20.99	39.45	10998.30
	(20.84)	(7.84)	(5.29)	(19.95)	(46.08)	(1228.30)
1995-1996	28.87	9.07	3.30	18.18	40.58	10810.90
	(20.61)	(8.17)	(5.08)	(18.89)	(47.25)	(1283.10)
1996-1997	16.01	5.44	0.97	11.89	65.69	9981.20
	(20.18)	(8.66)	(4.87)	(19.05)	(47.24)	(1344.90)
1997-1998	32.28	11.49	0.64	16.22	39.27	.10234.20
	(19.94)	(8.95)	(4.73)	(18.68)	(47.7)	(1384.90)
1998-1999	23.20	12.03	2.01	18.11	44.61	9781.80
	(17.98)	(8.63)	(7.85)	(17.16)	(48.38)	(1401.60)
1999-2000	22.65	11.23	4.76	0.61	60.75	10503.50
	(20.00)	(8.35)	(9.90)	(1.48)	(60.37)	(1486.90)

Source: Indian Horticultural Database (NHB) various issues

- Figures in parenthesis indicates the per cent area under respective states.

It is interesting to note that the fast growing fruits such as banana and grapes are marked by a concentration in production in the semi-arid parts of the country Apple production is mainly concentrated in the Himalayan region of the country where there exists niche advantages for its production. Mango production almost exists in plains of the country, with Andhra Pradesh and Uttar Pradesh having some concentration in production sphere. The above developments can be put in perspective when seen from the view point of trends in diversification emerging within Indian Agriculture. The important observation that emerges from the analysis is that, Indian Agricultural sector have improved upon the overall output growth rate by shifting away from foodgrains to high value horticultural activities. A geographical pattern has emerged from the new trends that have surfaced in different states cropping pattern in nineties. Fruits have definitely played a special role in the above trend towards regional consolidation. Fruit have experienced higher rates of growth in output than those of the foodgrain sector, though not as high as those of oilseeds.

4.3 Sources of demand for fruits

This section views the sources of demand for fruits with a view to understand whether the high rates of growth of output of the fruits under study are due to rising export demand or rising domestic demand. Further, can expected increase in production cater to domestic and export demands? If not, then how the situation can be remedied?

The horticultural sector has been the focus of major policy initiatives with regard to export potential, simply because of relative price advantage existing in this sector. The exports of some of the important fruits have risen over the last twenty years, of course at different rates. Table - 4.8 gives export demand as a percentage of total production for the fruit taken under study for the period 1981-2000. The most significant feature of the table is that excepting the case of grapes, the share of exports in total production of apple, banana and mango has been less than 1 per cent throughout the study period of 20 years (figure 4.5-4.8) . The share of exports in case of grapes increased from 0.27 per cent in

1981 to about 3 per cent in 1995 and about 2 per cent in 2000. While during this period there has been five times increase in production of grapes, the export has increase nearly 36 times during the same period. In case of mango, during the span of 20 years the production increased by nearly 15 lakh tonnes whereas the export of mango increased by nearly six times in the same period. Banana experienced 3.3 times increase between 1981-2000 period in the production front and in the export front, exports rose to 8629 MT in 2000 from a meagre amount of 122 MT in 1981. It is interesting to note that, banana, mango and grapes are picking up very fast as an export earning crop after 1996. Further, the rate of growth in export has been much higher than that of production in all the crops under study between the period 1981-2000. The growth in the output during this period worked out to 2.38, 7.04, 9.57 and 1.08 in apple, banana, grapes and mango respectively. The corresponding export growth estimates worked out to 3.89, 27.90, 18.29 and 8.01 per cent per annum. The spurt in the exports of these fruits has been possible due to conducive environment made available to the exporters by recent favourable trade liberalisation policy and increased investment on horticultural development.

Domestic demand for fruits within the country is also expected to rise in future. Rapid urbanisation, changing life styles, diversified consumption pattern, increasing income and population are the important factors responsible for growing domestic demand of these fruits. There is a need for commoditywise estimation of both production and domestic demand. Praduman Kumar (1996) predicted the demand estimates for total fruits on the basis of income elasticity of demand for India. These estimates are presented in the Table - 4.9. According to this study, the domestic demand for fruits during 1995-2020 AD is expected to grow at an average annual rate of 2.77, 3.20 and 4.05 per cent at 4, 5 and 7 per cent growth rates of GDP respectively. It may be prudent to keep this in mind in particular for the crops under present study, in which case the exports are rising at a faster rate The rate of growth of production needs to be stepped up. Introduction of new technology, strengthening of institutional infrastructure and suitable pricing policy are some of the interventions that needs to be reviewed in this context.

Table-4.8 Export as a Percentage Share of Production for Major Fruits of India

(Metric tonnes)

	Apple			Banana			Grapes			Mango		
Years	Production	Export	Share of export in production	Production	Export	Share of export in production	Production	Export	Share of export in production	Production	Export	Share of export in production
1981	821790	1778	0.216	4580000	122	0.003	208000	573	0.275	8515710	6296	0.074
1982	926980	2929	0.316	4221300	64	0.002	250000	1526	0.610	8662810	13026	0.150
1983	966600	5023	0.520	4647700	99	0.002	237020	1932	0.815	8833800	13170	0.149
1984	985900	8102	0.822	5247700	62	0.001	270390	1974	0.730	9154460	10802	0.118
1985	1005560	5444	0.541	5389800	118	0.002	275660	3462	1.256	9337520	16835	0.180
1986	1258000	5324	0.423	5714000	190	0.003	260000	2561	0.985	9871000	15425	0.156
1987	861404	4077	0.473	5917900	854	0.014	251035	3297	1.313	10113330	20316	0.201
1988	995296	4855	0.488	5989900	1369	0.023	416253	4738	1.138	7927000	16876	0.213
1989	1084117	6241	0.576	6409200	69	0.001	374535	6933	1.851	8504000	22999	0.270
1990	1093900	3077	0.281	7153000	290	0.004	408170	5348	1.310	8645405	19380	0.224
1991	1175005	10455	0.890	7853100	656	0.008	412530	11143	2.701	8752134	23105	0.264
1992	1147743	8626	0.752	8523000	1353	0.016	653163	10770	1.649	9223256	25850	0.280
1993	1168252	5988	0.513	9945000	1086	0.011	700000	15928	2.275	10110000	23405	0.232
1994	1300000	6508	0.501	10686000	966	0.009	700000	16813	2.402	10990000	27320	0.249
1995	1200000	9271	0.773	10182000	1744	0.017	700000	22151	3.164	11000000	23275	0.212
1996	1300000	13216	1.017	10299000	303	0.003	800000	20958	2.620	11000000	26780	0.243
1997	1308390	11094	0.848	12642000	7018	0.056	810000	23680	2.923	11000000	44862	0.408
1998	1320590	7442	0.564	12425000	8111	0.065	840000	11382	1.355	9800000	47149	0.481
1999	1380000	5477	0.397	15100000	6290	0.042	1083000	14006	1.293	10000000	37822	0.378
2000	1380000	2847	0.206	15100000	8629	0.057	1083000	20646	1.906	10000000	37110	0.371

Source http://www.fao.org/

Table - 4.9: Domestic Demand for Fruits in India at Different Rates of Growth in GDP

Year	GDP growth rate		
	4%	5%	7%
		(Million Tonnes)	
1991 (Base year)	30.8	30.8	30.8
1995	34.5	35.0	36.2
2000	39.6	41.1	44.3
2010	52.1	56.3	65.8
2020	68.3	77.0	97.6
Per cent growth ((1995-2020)	2.77	3.20	4.05

Source: Praduman Kumar (1996)

Fig-4.5:Per Cent Share of Apple Export in the Total Agricultural Export of India

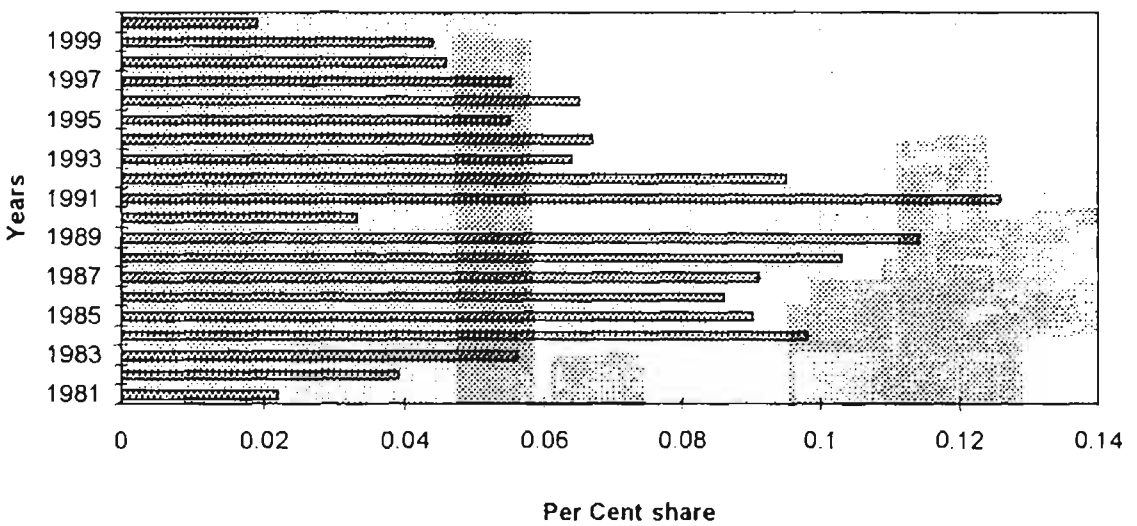


Fig-4.6: Per Cent Share of Banana Export in Total Agricultural Export of India

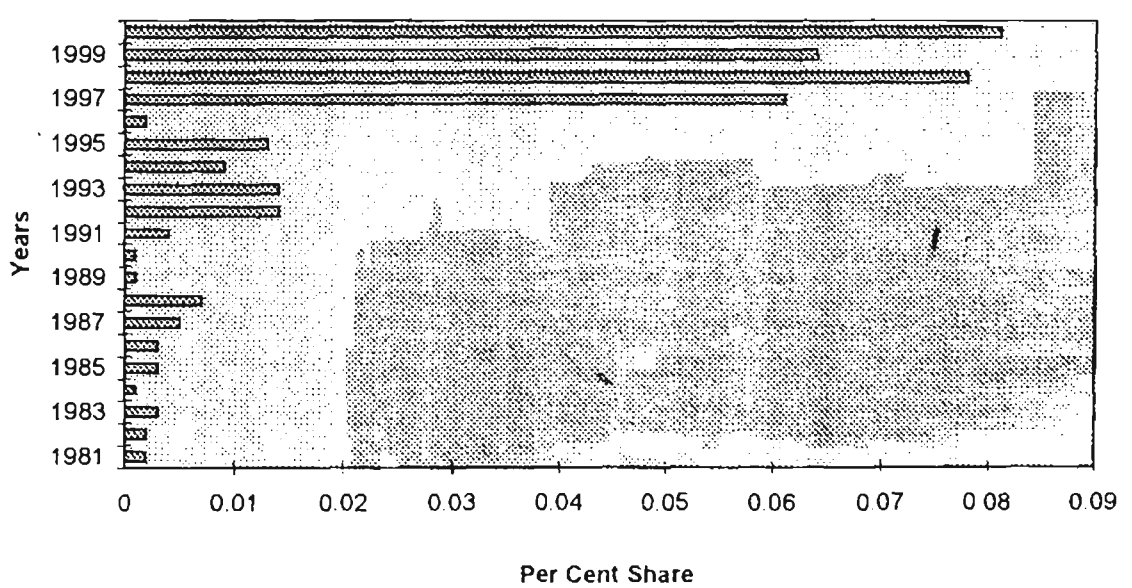


Fig-4.7: Per Cent of Grape Export in the Total Agricultural Export of India

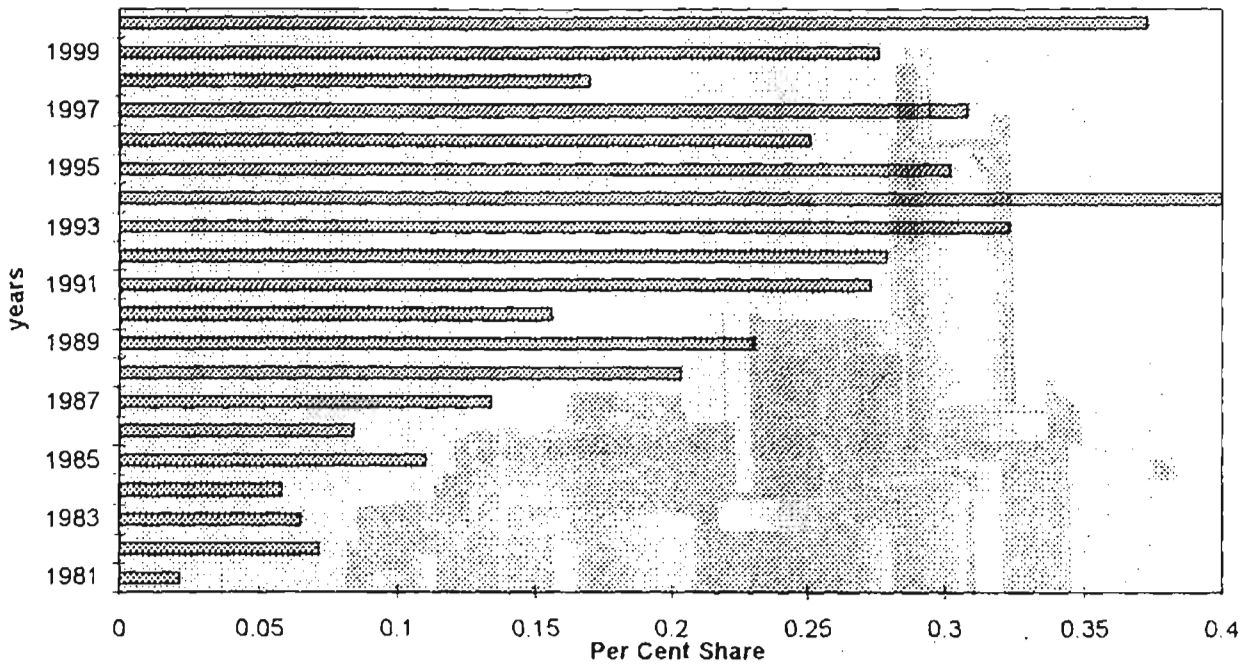
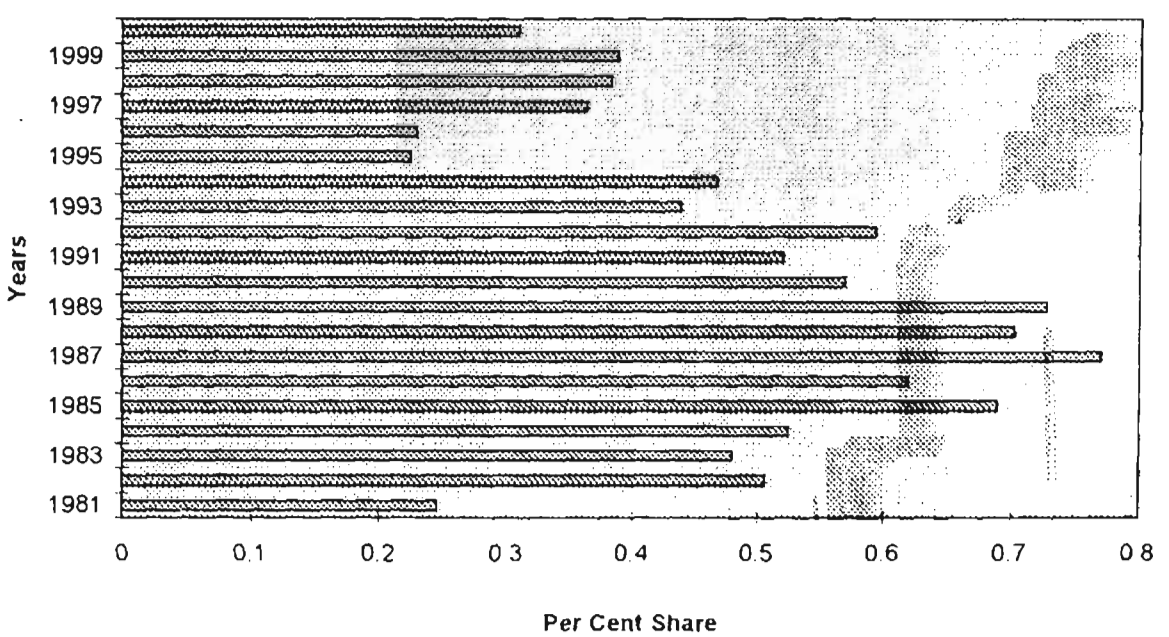


Fig-4.8: Per Cent Share of Mango Export in Total Agricultural Export of India



4.4 Share of agricultural exports

Agricultural exports play dual role in our economy. On one hand, it clears off all surpluses and on the other, it earns foreign exchange. The analysis of performance of Indian agricultural exports and exports of major fruits of India during the period 1981-2000 is presented in the Table - 4.10. The table revealed that the share of total Indian exports in world total exports has been steadily increasing from 0.42 per cent (1981) to 0.74 per cent in the year 2000. During the span of 20 years while the world total exports has increased more than three times, the Indian total exports has increased more than five times. The table further revealed that the percentage of agricultural exports has declined drastically overtime both in case of World total and Indian total exports. The share of agricultural exports in total exports (figure 4.9) in the Indian context was much higher when we compare it with the share of world agricultural exports in the total world exports. During 1981 the share of Indian agricultural exports in total exports was 32.22 per cent with $269.8 crore out of the total of $8373 crore of our total exports. It had declined to 12.24 per cent during 1994 and oscillated to 17.59 per cent in 1996 and again slipped down to 11.03 per cent in the year 2000. After the liberalisation of trade, the share of agricultural exports has dwindled in per cent terms. However, in monetary terms, the share of agricultural exports exhibited an up-trend exhibiting an increase of 83.50 per cent in the year 2000 over the year 1981. Though India has historically been a net exporter of agricultural products, yet its share in the world agricultural exports hovered around 1.00 per cent throughout the 20 years span. If we look into the pre-liberalisation period, the tea and mate contributed the maximum towards agricultural export earnings. But after the liberalisation the importance of tea and mate has gone down as a foreign exchange earner. As such the importance of the commodity group is changing from traditional commodities to other emerging produces like fruits and vegetables.

4.5 Fresh fruit exports

A glance on Table-4.10 revealed that the share of apple exports in total Indian agricultural exports showed a rising trend uptill 1989 and then slipped down to 0.03 per cent in 1990 and again rose to 0.13 per cent in 1991 and then declined throughout and reached at the bare lowest of 0.02 per cent in 2000.

In case of banana, the export share was negligible in pre-liberalisation period but picked up strongly in the post-liberalisation period contributing maximum of 0.08 per cent towards total Indian agricultural exports in the year 2000.

It is very encouraging to note that the contribution of grapes export has shown an almost rising trend during the study period.

In case of mango the exports share in the post-liberalisation period has further gone down when we compare it with the pre-liberalisation period.

4.6 Export trends

The annual compound growth rates of fruits and related variables is given in Table - 4.11. Export of apple increased from 1778 MT in 1980-81 to 2847 MT in 1999-2000 showing an increase of 3.89 per cent per annum. In terms of value, apple exports registered a growth rate of 3.64 per cent per annum. However, during the same period i.e. 1981-2000, the unit values indicated negative growth of 0.25 per cent per annum. It is very interesting to note that the growth rate of export quantity, value and unit value were observed to be negative in the post-liberalisation period whereas in pre-liberalisation period, these growth rates were positive.

There was a phenomenal growth in the exports of banana which increased from 122MT in 1980-81 to 8629MT in 1999-2000 registering a growth rate of 27.90 per cent

Table-4.10: Share of Total World and Indian Agricultural Exports in their Respective Totals and Share of Major Fruit Export in Total Indian Agricultural Exports

(Per Cent)

Years	Share of Indian total exports in world total exports	Share of world agricultural exports in total world exports	Share of total Indian Agricultural Exports in total Indian exports	Share of total Indian agricultural exports in World agricultural exports	Shares in Total Indian Agricultural Exports			
					Apple	Banana	Grapes	Mangoes
1981	0.42	11.73	32.22	1.16	0.022	0.002	0.021	0.246
1982	0.47	11.46	26.22	1.08	0.039	0.002	0.071	0.505
1983	0.50	11.46	25.41	1.11	0.056	0.003	0.065	0.479
1984	0.49	11.49	23.75	1.02	0.098	0.001	0.058	0.524
1985	0.46	10.68	25.27	1.08	0.090	0.003	0.110	0.688
1986	0.43	10.68	25.57	1.04	0.086	0.003	0.084	0.618
1987	0.48	10.08	19.35	0.92	0.091	0.005	0.134	0.770
1988	0.49	10.06	15.61	0.76	0.103	0.007	0.203	0.702
1989	0.54	9.81	16.00	0.88	0.114	0.001	0.230	0.727
1990	0.52	9.33	16.88	0.94	0.033	0.001	0.156	0.569
1991	0.52	9.41	15.49	0.85	0.126	0.004	0.273	0.520
1992	0.54	9.54	14.45	0.82	0.095	0.014	0.279	0.593
1993	0.60	9.05	15.04	0.99	0.064	0.014	0.323	0.438
1994	0.62	9.09	12.24	0.83	0.067	0.009	0.400	0.467
1995	0.65	8.68	16.66	1.24	0.055	0.013	0.302	0.225
1996	0.62	8.72	17.59	1.26	0.065	0.002	0.251	0.229
1997	0.64	8.27	16.00	1.24	0.055	0.061	0.308	0.364
1998	0.62	8.00	15.38	1.19	0.046	0.078	0.170	0.383
1999	0.66	7.38	12.53	1.11	0.044	0.064	0.276	0.388
2000	0.74	6.75	11.03	1.21	0.019	0.081	0.373	0.309

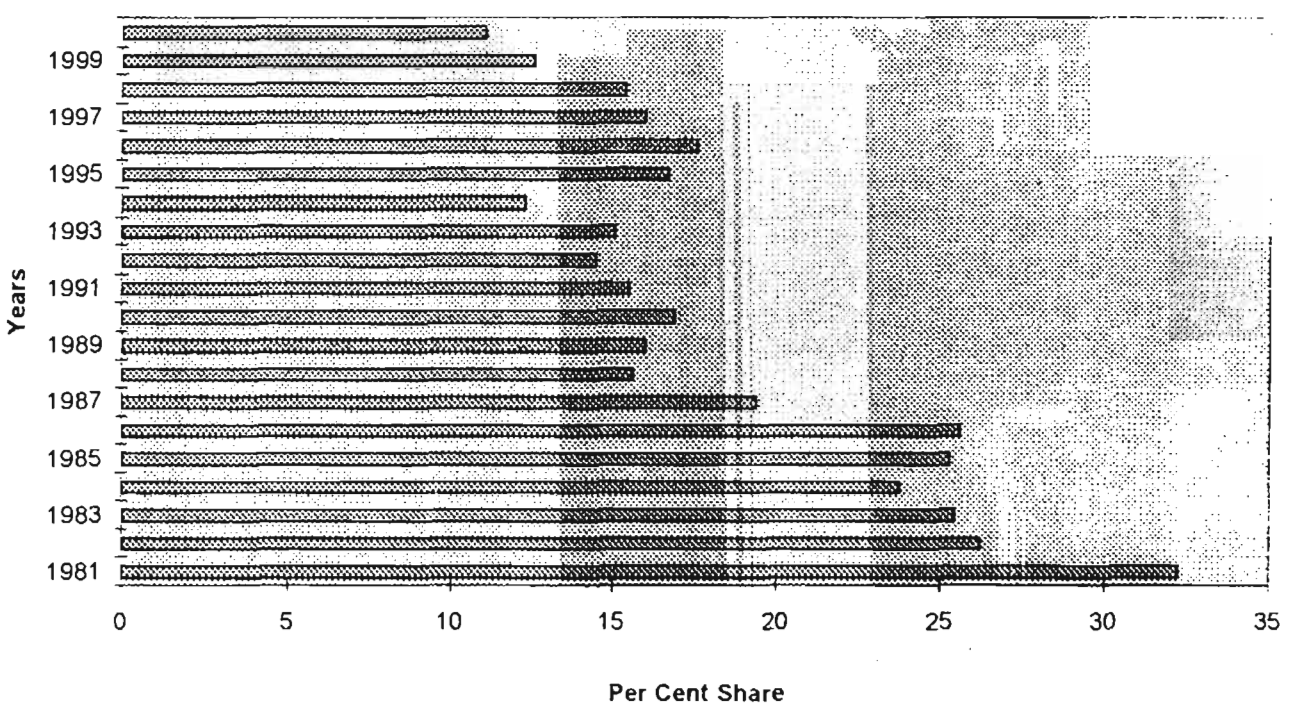
Source: http://www.fao.org/

Table-4.11: Annual compound Growth Rates of Exports and Related Variables

Fruit	Variable	1981-1990	1991-2000	1981-2000
Apple	Export Value	10.22	-7.19	3.64
		(0.5729)	(0.3764)	(0.0428)
	Export Quantity	4.954	-6.928	3.89
		(0.4737)	(0.09196)	(0.0437)
	Unit value	5.0178	-0.28	-0.25
		(0.2522)	(0.0916)	(0.0154)
	Net terms of trade	-0.07	-4.42	-7.23
		(0.258)	(0.165)	(0.0126)
	Income terms of trade	4.88	-11.04	-3.6157
		(0.565)	(0.432)	(0.0418)
Banana	Export Value	1.63	46.27	28.34
		(0.564)	(2.0577)	(0.173)
	Export Quantity	19.79	33.92	27.9
		(1.326)	(1.585)	(0.168)
	Unit value	-15.16	9.22	0.43
		(0.584)	(0.363)	(0.045)
	Net terms of trade	-19.27	4.68	-6.6003
		(0.632)	(0.237)	(0.0495)
	Income terms of trade	-3.30	40.20	19.3656
		(0.598)	(1.873)	(0.1301)
Grapes	Export Value	24.54	6.78	17.61
		(0.855)	(0.345)	(0.092)
	Export Quantity	24.69	4.13	18.29
		(0.865)	(0.324)	(0.097)
	Unit value	-0.125	2.55	-0.58
		(0.157)	(0.103)	(0.011)
	Net terms of trade	-4.97	-1.71	-7.509
		(0.218)	(0.103)	(0.0344)
	Income terms of trade	18.50	2.31	7.77
		(0.684)	(0.270)	(0.0406)
Mango	Export Value	9.526	1.96	2.59
		(0.334)	(0.178)	(0.0215)
	Export Quantity	10.95	7.58	8.01
		(0.404)	(0.294)	(0.041)
	Unit value	-1.29	-5.224	-5.02
		(0.089)	(0.155)	(0.0235)
	Net terms of trade	-4.13	-2.80	-7.17
		(0.217)	(0.138)	(0.0345)
	Income terms of trade	6.37	4.57	0.2782
		(0.317)	(0.238)	(0.0224)
Per Capita Income at 1980-81 Prices		2.84	3.51	3.19
		(0.085)	(0.107)	(0.0147)

Note: All the growth rates are significant at 1 per cent level of significance except net terms of trade for apple and unit value of grapes during 1981-1990 period.

Fig-4.9: Per Cent Share of Agricultural Export in the Total Export of India



per annum. The growth rate of export value was more than the quantity which worked out to 28 34 per cent per annum Positive growth of 0.43 per cent was observed with regard to the unit value of banana export. A perusal of Table - 4.11 clearly revealed the significant increase in the growth rates of export value, quantity and unit value in the post-liberalisation period when compared with the growth rates of pre-liberalisation period. A perusal of the data on banana exports clearly discern two trends on the exports i.e. second period being the period of high growth and first being the period of low growth.

During the span of 20 years of study period, the export in grapes rose from 573 MT in 1980-81 to 20646 MT in 1999-2000 thus recording a growth rate of 18.29 per cent per annum. During the same period, the growth in the export value worked out to 17.61 per cent per annum. However, a negative growth of 0.58 per cent per annum was observed for the unit value of grape export. In the case of grapes, the export value and quantity exhibited higher growths in the former period as compared to the growths attained in the second period. the growth in the unit value was found positive in the second period while in the first period it worked out to be negative.

The exports of quantity of mango increased nearly 6 times during 1981-2000 period showing an annual growth of 8.01 per cent. In value terms, the annual compound growth rate was estimated at 2.59 per cent during the same period. The decline in the growth rate of export value could be attributed to decline in the growth of unit value which was estimated at -5.02 per cent per annum. A cursory glance on the Table-4.11, depicted two trends on exports of mango; one pertaining to first period (1981-1990) - a period of high growth both in value and quantity and the second period (1991-2000) - a period of low growth.

When the annual growth rates of unit values of an export commodity is higher than that of unit values of general imports, terms of trade of export commodity improves i.e. we can get more imports for a given quantity of exports of that commodity on the basis of price relation alone and vice-versa. In case of apples the net terms of trade deteriorated

substantially at 7.23 per cent between the period 1981-2000. Terms of trade for apple (1981-2000) is shown in the figure 4.10. The deterioration in the net terms of trade was more in the second period (4.42 per cent per annum) in comparison to the first period (0.07 per cent per annum). The purchasing capacity of apple exports decreased @ 3.62 per cent annually between 1981-2000. This implies that international trade of apple is not profitable. However, the analysis of two time periods revealed that in the first period the income terms of trade was favourable mainly because of increase in the unit value. However, income terms of trade turned out to be highly unfavourable during the second period because of the decrease in quantum as well as unit value of the fruit.

In case of banana net terms of trade exhibited a negative growth of -19.27 per cent during the period 1981-1990 which improved to 4.68 per cent during 1991-2000. The purchasing capacity of banana also showed a negative growth of -3.30 percent during 1981-1990. Income terms of trade were found out to be positive (19.36) for the study period (1981-2000) because of high growth during 1991-2000 period when income terms of trade registered a growth rate of 40.20 per cent. Terms of trade for banana for the period 1981-2000 is presented in figure 4.11.

The net terms of trade in grapes exhibited a negative growth of 7.51 per cent during 1981-2000. However, the purchasing capacity of grape exports increased substantially at 7.77 per cent annually during the same period. Increase in the purchasing capacity of grape exports was moderate during the second period while it was quite significant in the first period. Terms of trade for grapes are shown in the figure 4.12 for the period 1981-2000.

In case of mango, the growth in the net terms of trade declined to 7.17 per cent per annum during 1981-2000. The rate of decline (4.13 per cent per annum) was more in the first period as compared to in the second period (2.81 per cent per annum). Purchasing capacity of mango exports indicated a growth of 0.28 per cent per annum simply because of increase in quantum of exports. The growth in the purchasing capacity was found more

Fig-4.10: Terms of Trade of Apple (ToT)

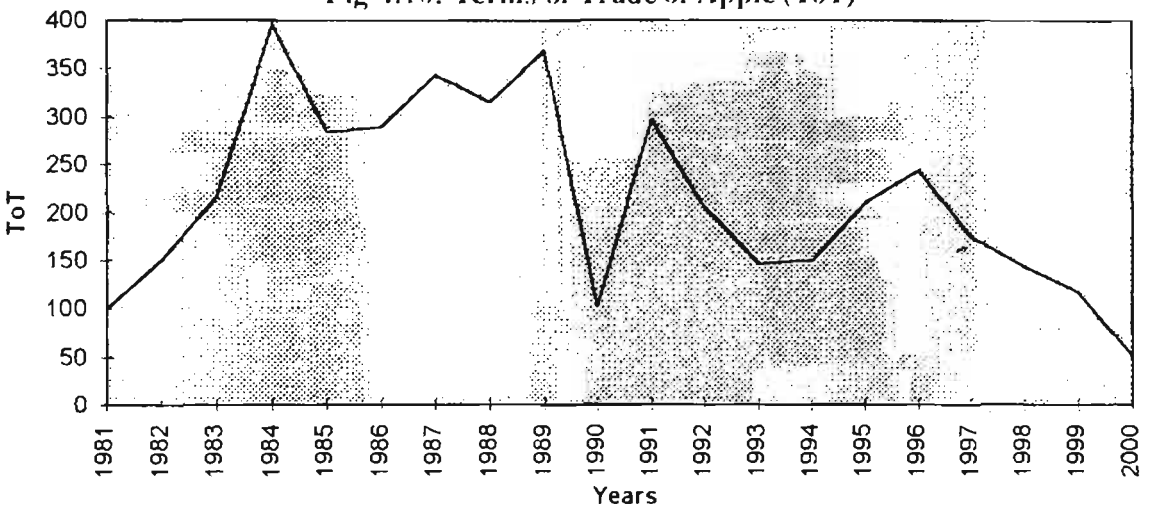


Fig-4.11: Terms of Trade of Banana (ToT)

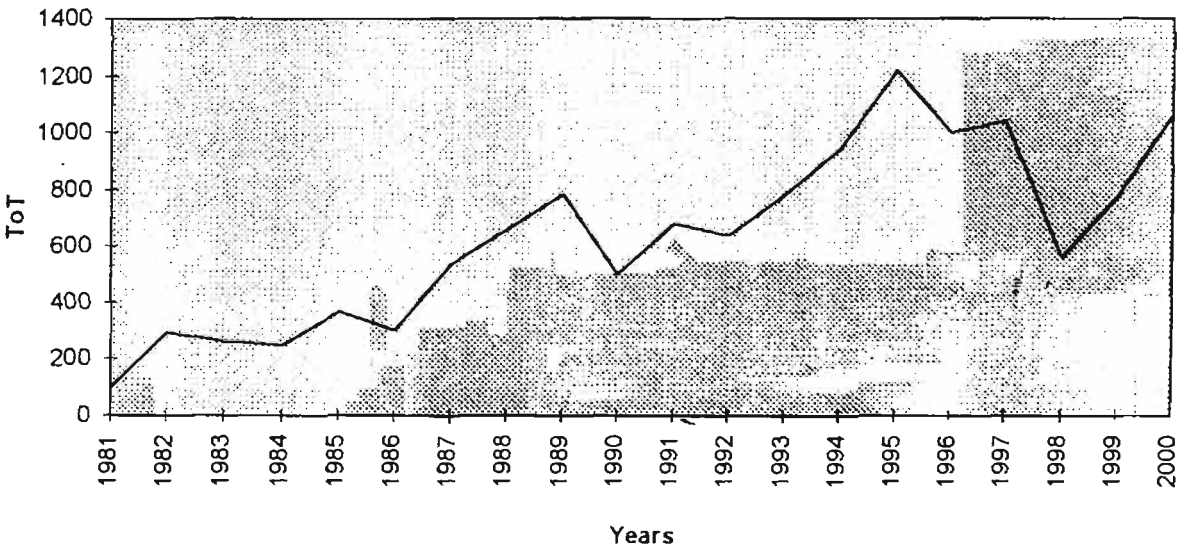


Fig-4.12: Terms of Trade of Grapes (ToT)

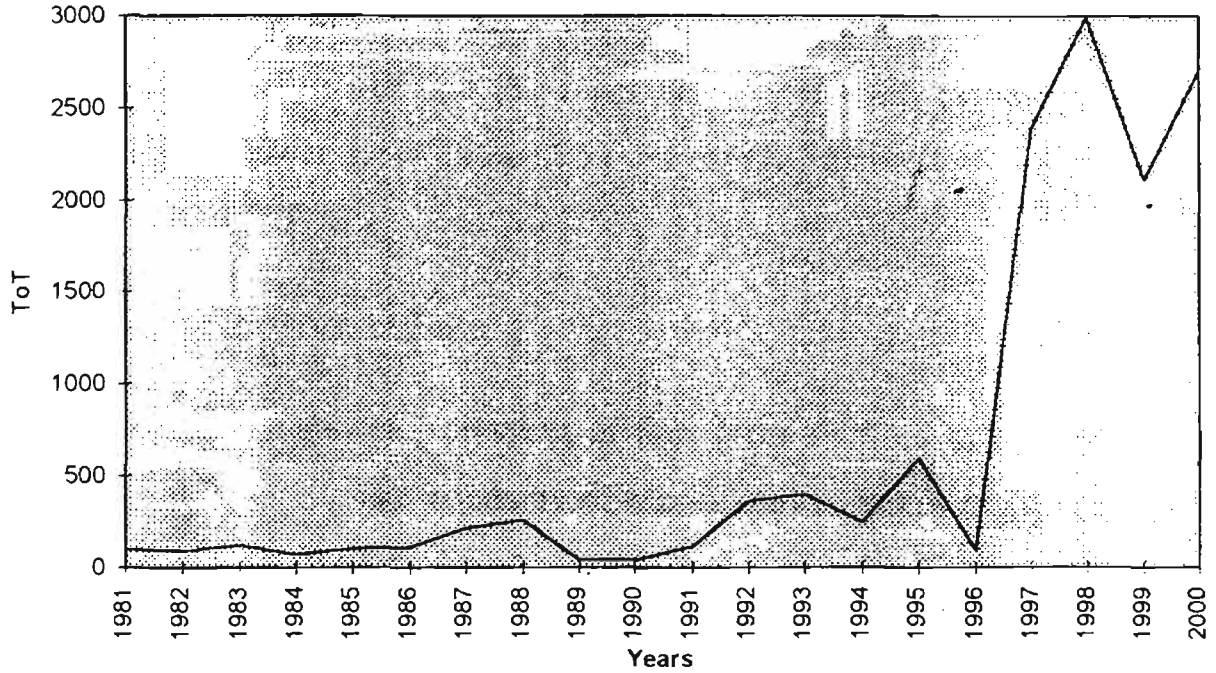
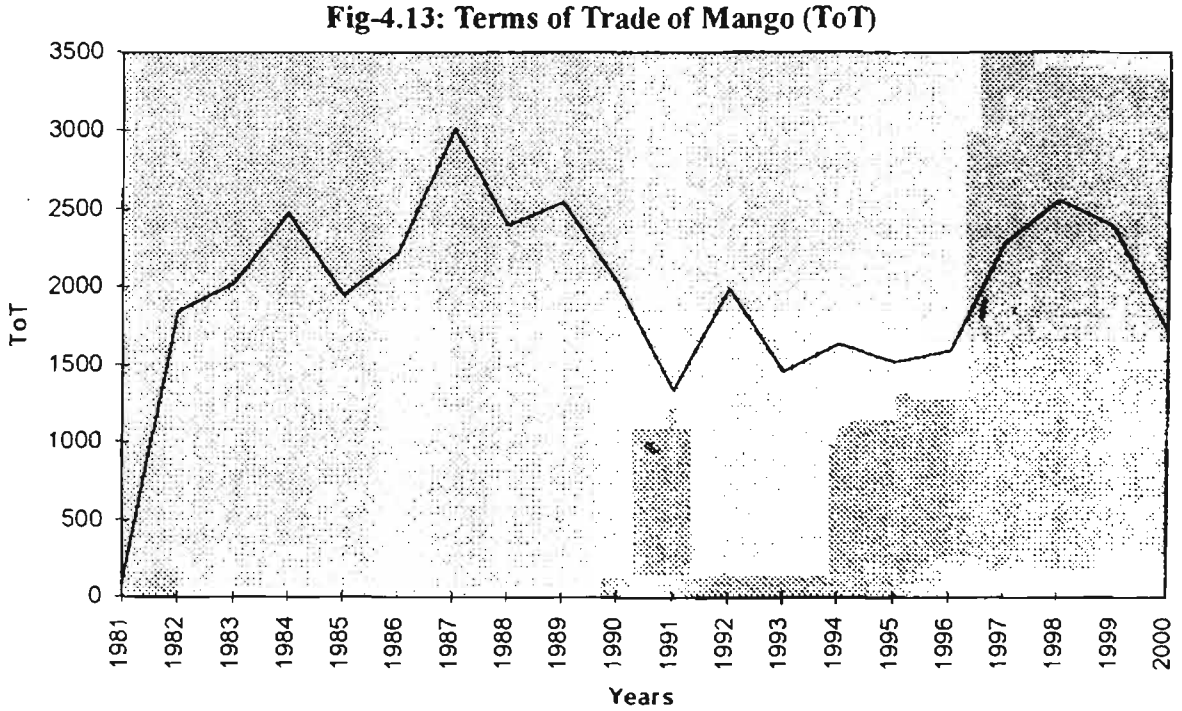


Fig-4.13: Terms of Trade of Mango (ToT)



in the first period (6.37 per cent per annum) as compared to (4.57 per cent per annum) in second period. Terms of trade for mango are shown in the figure 4.13 for the period 1981-2000. The per capita income of the country at 1981-2000 prices exhibited a significant growth rate of 3.19 per cent between the period 1981-2000. The second period experienced a higher growth rate (3.51 per cent per annum) as compared to the first period exhibiting a lower growth rate (2.84 per cent per annum) per capita income of the country.

4.7 Instability in the fruit exports

The instability indices in respect of four fruits selected in the present study are presented in Table - 4.12. The instability of export market makes any steady development policy difficult. It discourages investments in the production of commodity, limits the economic horizons and destroys the sense of continuity which is necessary for planning the production. The table revealed that, the export in the quantity of banana indicated the highest instability (88.88 per cent) followed by apple (47.16 per cent), grapes (40.99 per cent) and mango (19.80 per cent). The instability in the exports may be attributed to the variation in export demand, fluctuations in production and domestic consumption. It is interesting to note that the fruits in which the output growth is relatively higher, the volatility is also higher. Whereas the fastest horticultural activities such as banana and grapes witnessed high growth and high volatility, apple and mango showed a fairly high and stable growth in exports.

Table - 4.12 Instability Indices of Export Quantity, Value and Unit Value of Important Fruits of India (1981-2000)

Fruits	Export Value	Export Quantity	Unit Value
Apple	46.69	47.16	18.82
Banana	91.72	88.88	55.27
Grapes	35.60	40.99	13.74
Mango	21.62	19.80	11.10

Using the estimated trend lines of lower and upper points, the nature of instability, such as favourable or unfavourable was estimated based on the eight conditions as

discussed in the chapter of methodology. The results of the linear growth model has been summarised in Table-4.13 and 4.14.

The condition II was satisfied for export quantity of apple, grapes and mango, while condition V was satisfied for banana exports. Quantity exported of apple, grapes and mango showed desirable instability while banana exports exhibited undesirable instability.

It can be inferred from the above, that the instability in growth in export quantities of apple, grapes and mango has decreased. The upper and lower curve seems to be parallel, but the rate gap between lower and middle line was decreasing, which showed that the upper fluctuations had contributed to the growth of these fruits negatively during the study period. In case of banana, instability in growth increased during 1981-2000. It was observed that the gap between upper and lower lines increased with time and rate of this increasing gap between lower and middle line was higher than the rate of gap between upper and middle lines

4.9 Direction of Trade of Major Indian Fruits

Identification of potential buyers for individual products is very important from the point of view of promoting agricultural export trade in the near future. In the past, price and cost advantages, geographical location happened to be important considerations to tap different international markets. Of the total quantities of export of major fruits from India, how much has gone to particular country in 1980-81, 1989-90, 1997-98, 1998-99, 1999-2000 to particular country has been compiled and presented in Table-4.15 to 4.18.

It could be seen from Table-4.15 that major buyer of Indian apple is Bangladesh, where more than 90 per cent of the India's total apple export goes. Sri Lanka is next important buyer of Indian apple but its imports are not regular. Though Saudi Arabia and

Table-4.13: Nature of Instability in Export Quantity of Major Fruits of India (1981-2000)

Exports (Mt)	b_1	b_2	b
Apple	253.87***	827.75*	223.34**
	(156.69)	(212.40)	(107.69)
Banana	120.98***	969.44*	374.20*
	(66.00)	(176.71)	(75.72)
Grapes	1614.10*	3280.50*	1168.5*
	(236.07)	(344.96)	(145.54)
Mango	2137.40*	6139.9*	1679.3*
	(284.53)	(1206.7)	(186.44)

Note: Figures in parenthesis are standard errors.

* Significant at 1 per cent level of significance
** Significant at 5 per cent level of significance
*** Significant at 10 per cent level of significance

Table-4.14: Conditions Showing Desirable and Undesirable Instability

Fruits	Conditions satisfied	Result
Apple	$b_2 > b < b_1$	Desirable
Banana	$b2 > b > b_1$	Undesirable
Grapes	$b_2 > b < b_1$	Desirable
Mango	$b_2 > b < b_1$	Desirable

Table-4.15: Direction of Exports of Apple from India

(Quantum = Metric Tonnes)
(value = Rs. Lakh)

Importing Countries	1980-81		1989-90		1997-98		1998-99		1999-2000	
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
Bangladesh	3560.85	104.77	6124.67	492.57	10546.87	10639.99	6662.79	904.14	5399.49	860.18
	(96.74)	(96.58)	(98.14)	(97.61)	(95.08)	(99.24)	(89.53)	(90.30)	(98.59)	(97.27)
Sri Lanka	-	-	-	-	184.24	26.02	498.00	51.30	-	-
					(1.66)	(0.24)	(6.69)	(5.12)		
Nepal	23.00	0.89	-	-	65.00	7.42	66.86	0.06	3.22	0.69
	(0.62)	(0.82)			(0.59)	(0.07)	(0.90)	(0.01)	(0.06)	(0.08)
Saudi Arabia	-	-	8.31	0.84	12.26	1.53	2.27	0.64	2.45	0.40
			(0.13)	(0.17)	(0.11)	(0.01)	(0.03)	(0.06)	(0.04)	(0.05)
UAE	49.38	0.29	19.69	1.01	7.08	1.06	5.99	1.06	5.15	1.78
	(1.34)	(0.27)	(0.32)	(0.20)	(0.06)	(0.01)	(0.08)	(0.11)	(0.09)	(0.20)
Others	47.58	2.53	88.82	10.22	277.44	45.70	206.21	44.11	66.26	21.29
	(1.29)	(2.33)	(1.43)	(2.03)	(2.50)	(0.43)	(2.77)	(4.41)	(1.21)	(2.41)
Total	3680.81	108.48	6240.89	504.64	11092.89	10721.72	7442.12	1001.31	5476.57	884.34
	(100.00)	(100.00)	(100.00)	(100.00)	(100.00)	(100.00)	(100.00)	(100.00)	(100.00)	(100.00)

Note: Figures in parenthesis are the respective shares.
Source: Monthly statistics of Foreign Trade of India (DGCIS, Calcutta)

Table-4.16: Direction of Exports of Banana from India

(Quantum = Metric Tonnes)
(value = Rs. Lakh)

Importing Countries	1980-81		1989-90		1997-98		1998-99		1999-2000	
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
Bahrain	16.89	1.43	13.10	0.91	617.81	104.00	602.86	134.03	-	-
	(5.82)	(122.56)	(18.96)	(20.00)	(8.80)	(8.30)	(7.43)	(7.93)		
Germany	0.70	0.10	-	-	1.33	0.25	6.60	1.26	5.91	1.16
	(0.24)	(1.58)			(0.02)	(0.02)	(0.08)	(0.07)	(0.12)	(0.13)
Nepal	251.63	3.05	-	-	134.56	4.06	226.21	37.16	326.56	17.14
	(86.70)	(48.11)			(1.92)	(0.32)	(2.79)	(2.20)	(6.50)	(1.91)
Qatar	2.55	0.19	1.74	0.21	488.24	35.39	768.68	154.15	-	-
	(0.88)	(3.0)	(2.52)	(4.62)	(6.96)	(2.82)	(9.48)	(9.12)		
Saudi Arabia	15.10	1.24	22.09	2.09	1409.54	262.40	1249.33	276.58	-	-
	(5.20)	(19.56)	(32.01)	(45.93)	(20.09)	(20.93)	(15.40)	(16.37)		
UAE	3.32	0.33	1.93	0.11	2905.73	548.73	3664.58	758.01	461.47	74.08
	(1.14)	(5.21)	(2.80)	(2.42)	(41.41)	(43.78)	(45.18)	(44.87)	(9.18)	(8.25)
UK	0.03	0.01	0.04	0.0027	9.35	2.50	18.87	4.34	0.75	0.23
	(0.01)	(0.06)	(0.05)	(0.06)	(0.13)	(0.20)	(0.23)	(0.26)	(0.01)	(0.03)
Others	0.01	0.01	30.12	1.23	1450.09	246.15	1574.19	323.87	4233.75	805.39
	(0.001)	(0.06)	(43.64)	(27.03)	(20.67)	(19.64)	(19.41)	(19.17)	(84.21)	(89.61)
Total	290.22	6.34	69.02	4.55	7016.65	1253.48	8111.32	1689.40	5027.44	898.00
	(100.00)	(100.00)	(100.00)	(100.00)	(100.00)	(100.00)	(100.00)	(100.00)	(100.00)	(100.00)

Note: Figures in parenthesis are the respective shares.

Source. Monthly statistics of foreign trade in India (DGCIS, Calcutta)

Table: 4.17 Direction of Exports of Grapes from India.

(Quantum = Metric Tonnes)
(value = Rs. Lakh)

Importing Countries	1980-81		1989-90		1997-98		1998-99		1999-2000	
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
Bahrain	1.56	0.15	309.15	42.19	144.89	36.75	221.47	53.20	122.94	47.60
	(0.31)	(0.39)	(4.46)	(4.14)	(0.61)	(0.56)	(1.92)	(1.40)	(1.60)	(0.77)
Bangladesh	176.69	8.28	1448.77	147.03	5248.75	424.65	2029.96	274.09	807.27	149.59
	(35.13)	(21.73)	(20.90)	(14.44)	(22.05)	(6.43)	(17.61)	(7.23)	(10.50)	(2.43)
Germany	-	-	0.21	0.47	430.02	166.54	77.73	33.96	344.64	155.17
			(0.003)	(0.05)	(1.81)	(2.52)	(0.67)	(0.90)	(4.48)	(2.52)
Kuwait	37.07	3.49	209.32	31.30	195.80	42.79	156.73	44.13	103.64	47.94
	(7.37)	(9.16)	(3.02)	(3.07)	(0.82)	(0.65)	(1.36)	(1.16)	(1.35)	(0.78)
Saudi Arabia	6.29	0.51	1247.36	207.00	34.14	7.11	241.52	52.82	274.09	76.68
	(1.25)	(1.34)	(17.99)	(20.32)	(0.14)	(0.11)	(2.10)	(1.39)	(3.57)	(1.24)
UAE	270.81	24.70	3478.85	556.24	1.40	0.29	1976.68	753.38	3821.49	1401.10
	(53.85)	(64.81)	(50.18)	(54.61)	(0.01)	(0.004)	(17.15)	(19.89)	(49.71)	(22.74)
Sri Lanka	-	-	-	-	-	-	192.22	44.30	338.05	92.35
							(1.67)	(1.17)	(4.40)	(1.50)
UK	3.39	0.28	7.49	1.03	9870.74	3253.94	4584.84	1907.31	710.85	311.18
	(0.67)	(0.73)	(0.11)	(0.10)	(41.46)	(49.29)	(39.78)	(50.34)	(9.25)	(5.05)
Others	7.08	0.70	231.84	33.30	7882.38	2669.19	2043.26	625.40	1164.60	2338.47
	(1.41)	(1.84)	(3.34)	(3.27)	(33.11)	(40.43)	(17.73)	(16.51)	(15.15)	(37.96)
Total	502.89	38.11	6932.99	1018.56	23808.12	6601.26	11525.41	3788.59	7687.57	6160.68
	(100.00)	(100.00)	(100.00)	(100.00)	(100.00)	(100.00)	(100.00)	(100.00)	(100.00)	(100.00)

Note Figures in parenthesis are respective shares.
Source Monthly statistics of foreign trade in India (DGCIS)

Table: 4.18 Direction of Exports of Mangoes from India.

Quantum = MT
Value = Rs lakh

Importing Countries	1980-81		1989-90		1997-98		1998-99		1999-2000	
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
Bahrain	171.36	18.50	1238.72	185.70	1615.26	215.76	1842.10	337.28	1063.53	228.27
	(2.56)	(2.92)	(5.39)	(5.77)	(4.49)	(2.93)	(4.06)	(4.26)	(3.07)	(3.19)
Bangladesh	193.57	4.53	-	-	769.84	577.47	15069.28	928.40	9623.92	952.93
	(2.89)	(0.72)			(2.14)	(7.85)	(33.19)	(11.73)	(27.99)	(13.32)
Kuwait	1054.57	110.86	1877.21	322.82	2469.97	509.56	2362.21	525.69	1420.87	375.86
	(15.76)	(17.52)	(8.16)	(10.03)	(6.86)	(6.92)	(5.20)	(6.64)	(4.10)	(5.25)
Netherlands	43.78	3.99	86.21	13.84	690.62	187.77	284.54	128.84	982.36	349.09
	(0.65)	(0.63)	(0.37)	(0.43)	(1.92)	(2.55)	(0.63)	(1.63)	(2.84)	(4.88)
Israel	-	-	0.005	0.001	355.31	72.24	361.83	58.75	295.79	103.53
			(0.00002)	(0.00003)	(0.99)	(0.98)	(0.80)	(0.74)	(0.85)	(1.45)
Qatar	146.38	16.04	894.39	128.33	1014.46	121.63	1.89	0.30	1036.96	155.48
	(2.19)	(2.54)	(3.89)	(3.99)	(2.82)	(1.65)	(0.004)	(0.004)	(2.99)	(2.17)
Saudi Arabia	579.96	52.44	4198.17	674.53	7956.76	1034.59	-	-	5374.75	882.86
	(8.67)	(8.29)	(18.25)	(20.96)	(22.11)	(14.06)			(15.52)	(12.34)
Singapore	401.07	9.61	72.86	17.76	248.99	87.01	5.47	1.49	-	-
	(5.99)	(1.52)	(0.32)	(0.55)	(0.69)	(1.18)	(0.01)	(0.02)		
UAE	3561.19	356.49	975.20	200.19	12200.98	2814.31	29.56	11.53	-	-
	(53.21)	(56.35)	(4.24)	(6.22)	(33.90)	(38.24)	(0.07)	(0.15)		
UK	389.28	43.09	10.20	1.98	2060.14	548.29	1652.56	587.94	2297.23	754.55
	(5.82)	(6.81)	(0.04)	(0.06)	(5.72)	(7.45)	(3.64)	(7.43)	(6.63)	(10.55)
USA	2.89	0.42	4.73	1.09	-	-	-	-	10021.00	2553.53
	(0.04)	(0.07)	(0.02)	(0.03)					(28.94)	(35.69)
Others	248.12	16.66	13641.46	1671.69	6610.21	2681.52	23800.46	533.44	2514.74	798.82
	(3.71)	(2.63)	(59.31)	(51.95)	(18.37)	(36.44)	(52.41)	(6.74)	(7.26)	(11.16)
Total	6692.17	632.63	22999.16	3217.94	35992.54	7359.59	45409.90	7913.66	3463.15	7154.92
	(100.00)	(100.00)	(100.00)	(100.00)	(100.00)	(100.00)	(100.00)	(100.00)	(100.00)	(100.00)

Note: Figures in the parenthesis are the respective shares.

Source Monthly statistics of foreign trade in India (DGCIS)

UAE are regular buyers of Indian apple but their share in total Indian export had been too meagre in the past. It is interesting to note that the export markets which were seven in number in 1980-81 grew to 26 in 1998-99.

Table-4.16 presents quantum and value of exports of banana to different importing countries for five years. Bahrain, Germany, Nepal, Qatar, Saudi Arabia, UAE and UK has been the traditional buyers of Indian banana. Now the horizon of banana exports is expanding very fast and the product was being exported to as many as 59 countries in 1998-99 in comparison to six in 1980-81. This implies that pattern of banana trade is changing and more and more countries are importing Indian banana. During 1980-81, the middle east countries viz., Bahrain, Qatar, Saudi Arabia and UAE together accounted for 45.38 per cent of India's total banana exports which rose to 56.29 per cent in 1989-90and 77.50 per cent in 1998-99. In 1999-2000 imports of banana by the countries declined drastically and this loss was compensated by other emerging remunerative markets such as Bulgaria, Korea Republic, Malaysia and Thailand.

Grapes occupy an important position in the exports of fresh fruits from India after mangoes. India has been able to achieve good market penetration in respect of grape being exported to about 48 markets (1998-99) in comparison to 11 in 1980-81. Currently, the Middle East, UK and South Asian countries are the main importers of Indian grapes. During 1980-81, Bahrain, Kuwait, Saudi Arabia, UAE together shared 62.79 per cent of total grape exports which rose to 75.65 per cent in 1989-90, and declined to 56.23 per cent during 1999-2000 (Table-4.17). The loss of market in Middle East has been duly compensated by South and South East Asian and other markets during 1999-2000. In the post-WTO era, the other markets are coming up very fast for Indian grapes.

The export quantity and value of India's mango for different years and importing countries has been given in Table-4.18. Major exports of India's mango is routed to the Middle East countries. Among the European countries UK and Netherlands have been the regular buyers of Indian mango. In South and South East Asia Bangladesh, Singapore.

Malaysia, Sri Lanka, are the important and consistent importers of Indian mango. The market access has increased significantly during the period 1981-2000. During 1980-81, India used to export mango to nearly 24 countries and in the year 1999-2000 the number of importing markets have gone to about 55. The access to the markets is increasing in the post-WTO period. The major Middle East countries such as Bahrain, Kuwait, Israel, Qatar, Saudi Arabia, UAE together accounted for 82.39 per cent of India's mango export in 1980-81, which dwindled to 39.94 per cent in 1989-90, further rose to 71.17 per cent during 1997-98 and declined to 26.53 per cent during 1999-2000. The decline in imports by Middle East countries was compensated by exports to erstwhile USSR, Switzerland, Germany, Belgium and Malaysia who were infrequent importers of Indian mango. During 1999-2000, this loss in the imports by Middle East countries was covered up by exports mainly routed to USA, Switzerland, Canada, Malaysia and Belgium. Amongst the European countries UK and Netherlands are the regular buyers and consistently increasing the imports of mango from India.

4.10 Competitiveness of India's Major Fresh Fruits

If India has to become a major exporter of fresh fruits, increasing shares in export markets would be a key requirement. Increasing shares of fresh fruits would require India to focus on increasing the productivity and quality maintenance. As competitiveness will increasingly play a major role in trade, we need to access competitiveness in fruits. Competitiveness of the countries in the long run is influenced by comparative advantage, ability to develop comparative advantage and competitive advantage. Comparative advantage refers to the resource positions of a country, which enable it to produce goods cost effectively. Ability to develop comparative advantage is determined by the quickness with which the production system adopts and adjusts to the new technological advances so as to improve the comparative advantage. A country's ability to develop competitive advantage is determined by the quickness with which the systems and institutions in the value chain adjusts themselves to cater to the emerging requirements of the international market

In the present study the export competitiveness for the major fruits has been analysed using important measures such as (a) market share analysis; (b) price competitiveness; (c) the relative land productivity and (d) export performance ratio.

4.10.1 Market Share Analysis

Constant-Market-Share (CMS) model was applied to explain the relative role of external vis-à-vis internal factors on the export performance of selected fruits. Analysis covers the more recent periods from 1989/1990 to 1998/1999, using export value statistics for India alone. The results of the analysis using CMS model has been summarised in Table-4.19. It can be seen from the table that, the total change in exports have been decomposed into four components. The first component 'the world trade effect' indicates what change in exports would have been if the country had just maintained its share of world exports. A positive/negative sign of the 'commodity composition effect' suggests that the country's exports are concentrated in commodity markets which have grown relatively fast/slow. Similarly, the positive/negative sign of a 'market distribution effect' indicates that exports of the country are concentrated in relatively fast/slow growing markets. The positive/negative sign of 'the general competitiveness effect' implies an improvement/deterioration in the competitiveness of exports. This effect is influenced by supply and demand considerations. Both price and non-price factors play a role with domestic factors being the major determinants.

The Table-4.19 showed that Indian apple had 173.83 per cent export growth during 1989/90 to 1998/99 period of which 70 per cent was world trade effect, 470.51 per cent market distribution effect, and the commodity composition and competitiveness effect contributed negatively suggesting thereby, that the export performance in apples has deteriorated on account of unfavourable competitiveness effect. Banana experienced tremendous export growth of 31915.60 per cent during 1989/90 to 1998/99 period. The results suggest that, the export performance of Indian banana has improved significantly on account of highly favourable competitiveness effect. The other effects contributed

negatively in the export growth of this commodity. Grapes registered export growth of 545.03 per cent during the study period This performance was mainly due to favourable competitiveness effect (483.40 per cent) followed by favourable world trade effect (70 per cent) and market distribution effect (20.63 per cent). Commodity composition effect was unfavourable by 29 per cent indicating that countries exports were concentrated in commodity markets which have grown relatively slow. The export growth of Indian mango during 1989/90 to 1998/99 has been to the extent of 133.04 per cent. The country obtained the positive world trade effect, commodity composition effect and competitiveness effect in respect of mango trade. The respective shares of these effects in total export growth were 70 per cent, 84 per cent and 66.58 per cent. Market distribution effect was unfavourable by 87.54 per cent in mango. The whole analysis brought out that in respect of banana, grapes and mango favourable competitiveness effect were more spectacular while apple export performance deteriorated on account of unfavourable competitiveness effect.

4.10.2 Productivity and Relative Price Analysis

Land productivity and price competitiveness are considered as important indicators of export competitiveness. In order to study the comparative advantage, the estimates of productivity and unit values of major fruits under study for the important producer exporters of those fruits were used.

The apple yield of important exporting countries of the world is given in the Table-4.20. The average annual yield per hectare for the period 1981-2000 was found highest for Italy (29.41MT) followed by France (28.73 MT), Germany (26.87 MT),'USA (24.11MT), Turkey (19.36 MT), Iran (11.15 MT), Poland (10.99 MT), India (5.97 MT) and China (4.53 MT). Thus, adjudged on the basis of yield, the country has the comparative disadvantage in relation to all the major exporters except China. When we look into triennium averages ending 2000, India has gone in a disadvantageous position in relation to China as well.

Table - 4.19: Components of Export Growth of Major Fruits of India for 1989/90-1998/99

(lakh Rupees)

Fruit	Export Growth (Value)	World Trade Effect	Commodity Composition Effect	Market Distribution Effect	Competitiveness Effect
Apple	598.51	241.02	-175.60	1620.01	-1086.91
	(173.83)	(70.00)	(-51.00)	(470.51)	(-315.68)
Banana	1739.40	3.82	-0.44	-3.34	1739.36
	(31925.60)	(70.00)	(-8.00)	(-61.28)	(31914.88)
Grapes	5104.51	655.59	-271.60	193.21	4527.31
	(545.03)	(70.00)	(-29.00)	(20.63)	(483.40)
Mango	4217.24	2218.96	2662.75	2774.81	2110.34
	(133.04)	(70.00)	(84.00)	(-87.54)	(66.58)

Note: Figures in parentheses are in terms of percentages.

Table-4.20: Countrywise Apple Yield

(Yield: Mt/ha.)

Years	India	China	USA	France	Turkey	Italy	Germany	Poland	Iran
1981	5.633	4.147	20.909	19.658	15.536	24.987	NR	NR	6.942
1982	6.029	3.379	21.763	27.650	16.842	36.813	NR	NR	9.721
1983	5.977	4.887	22.122	28.071	18.103	27.041	NR	NR	9.476
1984	5.977	3.894	22.062	41.229	19.224	29.209	NR	NR	8.425
1985	5.977	4.781	20.597	24.726	18.890	26.339	18.889	8.722	9.169
1986	7.624	2.851	19.912	24.556	18.526	25.710	29.888	15.610	9.393
1987	4.831	2.963	26.620	28.599	16.336	28.442	15.679	6.637	9.800
1988	5.378	2.620	22.068	27.468	18.750	29.256	31.644	13.792	10.147
1989	5.808	2.669	23.222	27.692	17.788	24.632	24.981	12.738	9.580
1990	5.844	2.649	22.860	28.366	18.095	26.279	26.327	8.878	10.841
1991	6.068	2.739	24.370	18.693	17.902	23.602	14.578	10.228	9.558
1992	5.899	3.427	26.030	35.951	20.019	31.650	42.018	12.360	10.774
1993	6.108	4.032	26.057	30.402	19.685	29.116	23.530	13.643	11.519
1994	6.500	4.138	28.057	31.503	19.897	31.341	28.924	10.443	13.880
1995	5.714	4.745	25.630	33.325	19.367	28.906	20.874	8.885	13.674
1996	5.909	5.710	24.889	31.359	20.538	28.951	32.507	12.046	13.663
1997	5.875	6.068	24.722	31.705	23.814	30.261	24.572	12.717	14.167
1998	5.800	7.432	27.916	28.332	23.013	33.368	25.513	10.692	13.705
1999	5.974	8.529	25.797	27.767	23.403	36.853	25.204	9.709	14.813
2000	6.494	9.064	26.684	27.653	21.576	35.480	44.811	8.785	13.793
Annual average for the period 1981-2000	**5.971**	**4.536**	**24.114**	**28.735**	**19.365**	**29.412**	**26.871**	**10.993**	**11.152**
Annual average for triennium ending 2000	**6.089**	**8.342**	**26.799**	**27.917**	**22.664**	**35.234**	**31.843**	**9.729**	**14.104**

Source: http://www.fao.org/

The unit values realised by India for apple for the annual averages for the year 1981-2000 was more than Poland and Iran but less than the other exporting countries (Table-4.21). Thus, evaluated on the basis of unit values realised, India has a comparative advantage in exporting apple in relation to Poland and Iran only. The gap in the unit values of apple between India and other major exporters reveals that the country has the comparative disadvantage as far as unit values are concerned.

Countrywise yield of banana has been presented in the Table-4.22. A cursory glance on table revealed that India occupies a place of pride in the matter of banana yield in comparison to other major exporting countries. The average annual yield of banana per hectare for the period 1981-2000 was 21.70 MT for India, 25.71 MT for Ecuador, 11.46 MT for Brazil, 13.47 MT for Indonesia, 11.24 MT for Philippines, 16.52 MT for China, 48.07 MT for Costa Rica, 25.26 MT for Mexico, 37.72 MT for Colombia and 12.44 MT for Thailand. However, banana yield is picking up since 1999 and is coming out to be more than Ecuador and Mexico. Thus, seen on the basis of yield India has the comparative advantage in exporting banana in relation to all the major exporters except Costa Rica and Colombia.

The unit value of banana exports for the period 1981-2000 has been given in Table -4.23. The unit values realised for banana on annual average for the 20 years for India was $0.38/kg as against $0.29/kg for Thailand, $0.25/kg for Colombia, $0.25/kg for Mexico, $0.26/kg for Costa Rica, $0.51/kg for China, $0.17/kg for Philippines, $0.72/kg for Indonesia, $0.17/kg for Brazil and $0.2/kg for Ecuador. Thus, on the basis of unit values realised, India has a comparative advantage in exporting banana in relation to the major exporters except China and Indonesia. However, on the basis of triennium average ending 2000, India has an edge over the other countries except China.

The yield of major world producers of grapes is given in Table-4.24. The average annual yield of grape per hectare for the period 1981-2000 was found 19.84 MT for India, 3.85 MT for Spain, 9.83 MT for Italy, 8.54 MT for France, 5.90 MT for Turkey, 16.79

MT for USA, 7.06 MT for Iran, 10.76 MT for Argentina, 8.48 MT for China and 12.69 MT for South Africa. Thus viewed from the yield angle, India has the comparative advantage in exporting grapes in relation to all the major producer/exporters.

The unit values expressed in dollar per kg received by major grape exporting countries is given in Table-4.25. It can be seen from the table that the unit values realised for grapes, both on annual average basis for 20 years and triennium average (ending 2000) basis, was highest at $0.82/kg for Indian grapes as against $0.44/kg for South Africa, $0.40/kg for China, $0.44/kg for Argentina, $0.19/kg for Iran, $0.38/kg for Turkey, $0.58/kg for France, $0.52/kg for Italy and $0.37/kg for Spain. These figures amply suggests that India has a comparative advantage in exporting grapes in relation to the other major exporters, as far as the price realisation is concerned.

Countrywise yield of fresh mango is given in Table-4.26. The average yield computed at 20 years average basis worked out to 9.17 MT for India, 8.39 MT for China, 7.88 MT for Thailand, 10.35 MT for Mexico, 4.5 MT for Indonesia, 9.63 MT for Pakistan, 5.57 MT for Nigeria, 7.01MT for Philippines, 11.78 MT for Brazil and 8.70 MT for Egypt. Thus, adjudged on the basis of yield the country has comparative advantage of exporting mango in relation to China, Thailand, Indonesia, Nigeria, Philippines and Egypt. However, when we look into triennium averages (ending 200) India has further slipped down to a disadvantageous position in relation to China, Egypt and Thailand but acquired comparative advantage in relation to Brazil.

The unit values of mango exports on the basis of major exporting countries is summarised in Table-4.27. The unit values realised for mango on triennium average basis (ending 2000) were $0.44/kg for India, $0.35/kg for Egypt, $0.65/kg for Brazil, $0.93/kg for Philippines, $0.64/kg for Nigeria, $0.23/kg for Pakistan, $0.88/kg for Indonesia, $0.61/kg for Mexico, $0.45/kg for Thailand and $0.47/kg for China. Thus, if we take into account the unit values realised, we find that India has a comparative disadvantage in exporting mango in relation to Brazil, Philippines, Nigeria, Indonesia, Mexico, Thailand

Table-4.21: Countrywise Unit Values of Apple Exports

(Dollars/Kg)

Years	China	USA	France	Turkey	Italy	Germany	Poland	Iran	India
1981	0.41	0.56	0.45	0.46	0.37	0.37	NR	NR	0.33
1982	0.34	0.57	0.46	0.39	0.51	0.37	0.23	NR	0.31
1983	0.35	0.52	0.41	0.29	0.32	0.33	0.19	0.43	0.26
1984	0.34	0.56	0.34	0.25	0.34	0.35	0.13	0.49	0.27
1985	0.36	0.53	0.35	0.24	0.32	0.32	0.16	0.53	0.37
1986	0.44	0.57	0.50	0.23	0.49	0.37	0.17	0.34	0.38
1987	0.44	0.47	0.51	0.22	0.47	0.44	0.15	0.18	0.52
1988	0.45	0.48	0.53	0.25	0.49	0.50	0.17	0.11	0.46
1989	0.39	0.50	0.54	0.32	0.47	0.40	0.15	0.10	0.49
1990	0.41	0.58	0.74	0.36	0.77	0.56	0.13	0.10	0.33
1991	0.41	0.65	0.93	0.44	0.89	0.57	0.32	0.11	0.34
1992	0.53	0.65	0.77	0.39	0.83	0.69	0.34	0.10	0.33
1993	0.40	0.61	0.55	0.41	0.42	0.46	0.23	0.11	0.36
1994	0.38	0.61	0.68	0.42	0.54	0.49	0.28	0.10	0.33
1995	0.42	0.65	0.68	0.43	0.60	0.63	0.40	0.16	0.33
1996	0.42	0.67	0.74	0.61	0.69	0.76	0.28	0.16	0.29
1997	0.41	0.62	0.65	0.57	0.53	0.57	0.19	0.10	0.28
1998	0.38	0.60	0.64	0.53	0.48	0.61	0.21	0.11	0.32
1999	0.35	0.58	0.58	0.39	0.48	0.54	0.20	0.11	0.38
2000	0.32	0.59	0.50	0.42	0.42	0.42	0.15	0.11	0.33
Annual average for the period 1981-2000	**0.40**	**0.58**	**0.58**	**0.38**	**0.52**	**0.49**	**0.21**	**0.19**	**0.35**
Annual average for triennium ending 2000	**0.35**	**0.59**	**0.57**	**0.45**	**0.46**	**0.52**	**0.19**	**0.11**	**0.34**

Source: http://www.fao.org/

Table -4.22: Countrywise Banana Yield

(Yield: Mt/ha.)

Years	India	Ecuador	Brazil	Indonesia	Philippines	China	Costa Rica	Mexico	Colombia	Thailand
1981	15.744	31.404	11.996	11.693	12.815	17.526	42.705	17.829	50.208	12.308
1982	14.817	30.746	11.944	10.658	12.275	18.657	42.095	22.497	52.839	11.923
1983	16.429	27.688	11.482	10.442	11.304	18.210	46.501	22.566	42.810	11.769
1984	17.388	27.662	12.371	10.615	12.124	17.621	46.773	28.010	47.855	11.885
1985	17.706	30.214	11.984	11.959	11.560	15.004	50.440	25.228	42.857	12.154
1986	19.034	20.715	12.200	16.188	13.090	17.625	54.220	22.412	43.689	12.279
1987	19.283	19.971	11.956	13.964	12.646	13.821	53.770	24.133	33.695	12.340
1988	18.140	20.248	11.497	13.607	12.372	13.555	52.402	23.727	34.950	12.354
1989	19.258	19.719	11.852	17.146	10.793	13.298	61.160	22.469	34.345	12.197
1990	19.597	21.326	11.736	18.203	9.704	14.015	54.688	26.607	31.861	12.220
1991	20.743	20.922	11.745	18.301	9.478	15.310	51.497	25.668	34.996	12.273
1992	20.054	21.602	11.338	16.066	9.349	13.816	50.369	28.410	34.016	12.349
1993	22.968	21.720	11.159	13.558	9.428	14.188	30.368	28.057	35.251	12.500
1994	24.231	22.985	11.539	11.636	9.887	19.379	37.946	30.531	35.429	12.782
1995	23.790	23.708	11.389	13.579	10.867	16.649	44.091	27.626	29.597	12.963
1996	23.514	25.347	10.391	12.302	10.131	14.706	46.154	32.298	29.193	12.963
1997	28.282	35.479	10.159	11.594	11.155	16.385	46.757	25.287	30.895	13.077
1998	27.859	26.402	10.266	12.292	10.658	19.941	53.228	22.965	30.714	12.836
1999	32.543	33.017	10.614	12.513	12.282	20.816	49.561	23.055	38.964	12.836
2000	32.653	33.344	11.662	13.147	12.858	19.902	46.797	25.897	40.187	12.836
Annual average for the period 1981-2000	**21.702**	**25.711**	**11.464**	**13.473**	**11.239**	**16.521**	**48.076**	**25.264**	**37.718**	**12.442**
Annual average for triennium ending 2000	**31.018**	**30.921**	**10.847**	**12.651**	**11.933**	**20.220**	**49.862**	**23.972**	**36.622**	**12.836**

Source: http //www fao org/

Table-4.23: Countrywise Unit Values of Banana Exports

(Dollars/Kg)

Years	Ecuador	Brazil	Indonesia	Philippines	China	Costa Rica	Mexico	Colombia	Thailand	India
1981	0.17	0.19	NR	0.14	0.28	0.22	0.07	0.15	0.12	0.39
1982	0.17	0.18	NR	0.16	0.41	0.22	0.27	0.19	0.12	0.66
1983	0.17	0.12	NR	0.16	0.27	0.21	0.16	0.19	0.11	0.60
1984	0.15	0.16	NR	0.15	0.32	0.25	0.10	0.19	0.22	0.52
1985	0.17	0.16	0.50	0.14	0.32	0.23	0.11	0.20	0.21	0.49
1986	0.19	0.14	NR	0.15	0.37	0.25	0.11	0.20	0.20	0.33
1987	0.19	0.15	1.63	0.16	0.45	0.23	0.11	0.21	0.21	0.13
1988	0.19	0.15	1.18	0.17	0.44	0.24	0.15	0.26	0.24	0.11
1989	0.21	0.15	1.80	0.17	0.53	0.24	0.16	0.26	0.26	0.39
1990	0.21	0.16	1.81	0.18	0.56	0.22	0.26	0.28	0.30	0.12
1991	0.26	0.20	1.04	0.18	0.67	0.25	0.34	0.27	0.31	0.17
1992	0.25	0.18	1.50	0.19	0.58	0.28	0.47	0.29	0.27	0.30
1993	0.21	0.17	0.13	0.20	0.61	0.28	0.31	0.27	0.23	0.43
1994	0.23	0.21	0.18	0.19	0.68	0.29	0.39	0.29	0.56	0.30
1995	0.23	0.31	0.16	0.18	0.69	0.34	0.48	0.32	0.46	0.39
1996	0.25	0.21	0.19	0.19	0.70	0.30	0.44	0.31	0.43	0.39
1997	0.29	0.21	0.19	0.19	0.57	0.30	0.28	0.32	0.40	0.49
1998	0.27	0.17	0.18	0.19	0.49	0.30	0.30	0.32	0.41	0.50
1999	0.24	0.15	0.15	0.18	0.66	0.29	0.22	0.30	0.35	0.47
2000	0.20	0.17	0.20	0.18	0.66	0.26	0.25	0.28	0.40	0.46
Annual average for the period 1981-2000	**0.21**	**0.18**	**0.72**	**0.17**	**0.51**	**0.26**	**0.25**	**0.25**	**0.29**	**0.38**
Annual average for *triennium* ending 2000	**0.23**	**0.17**	**0.17**	**0.18**	**0.60**	**0.28**	**0.25**	**0.30**	**0.39**	**0.48**

Source: http://www.fao.org/

Table-4.24: Countrywise Grape Yield

(Yield: Mt/ha.)

Year	India	Spain	Italy	France	Turkey	USA	Iran	Argentina	China	South Africa
1981	19.206	3.260	8.169	7.950	4.625	13.908	7.503	9.187	5.360	10.313
1982	21.872	3.636	8.656	10.793	5.573	19.659	7.627	11.117	4.783	11.761
1983	19.670	3.111	11.722	9.460	5.191	16.586	7.340	10.997	5.320	12.448
1984	21.823	3.548	9.776	9.043	5.280	15.164	7.043	8.623	5.319	12.253
1985	22.000	3.511	8.942	8.791	5.280	16.096	7.482	7.718	4.867	12.092
1986	20.800	3.829	10.875	9.451	5.000	15.208	7.501	9.144	4.258	12.418
1987	16.313	4.204	10.898	9.283	5.593	15.461	7.394	13.632	4.774	12.640
1988	19.492	2.612	9.123	7.638	5.678	17.774	7.579	12.056	5.824	13.025
1989	15.055	3.508	9.111	8.301	5.745	17.844	5.996	11.498	6.831	13.306
1990	16.260	4.617	8.238	9.039	6.035	17.153	6.351	11.370	7.552	13.203
1991	16.620	3.769	9.465	6.061	6.143	16.925	7.021	10.160	8.680	13.209
1992	19.205	4.398	10.893	8.812	5.990	18.181	6.637	10.201	8.710	13.998
1993	20.000	3.699	10.282	7.380	6.526	17.772	8.029	9.568	10.934	12.257
1994	17.500	2.729	10.070	7.727	6.085	16.953	7.903	12.070	10.916	12.531
1995	17.500	2.888	9.396	8.061	6.283	16.964	7.905	13.833	12.019	13.190
1996	20.000	4.431	10.560	8.703	6.607	15.394	8.163	9.923	12.738	13.364
1997	20.250	4.901	9.161	8.189	6.789	19.503	8.425	12.122	13.145	13.265
1998	21.000	4.604	10.587	8.036	6.654	15.238	8.865	9.703	13.438	11.983
1999	25.423	4.835	10.674	9.323	6.355	15.838	8.891	11.757	12.435	13.475
2000	26.761	4.984	10.125	8.731	6.636	18.139	8.462	10.585	11.785	13.104
Annual average for the period 1981-2000	**19.837**	**3.854**	**9.836**	**8.539**	**5.903**	**16.788**	**7.606**	**10.763**	**8.484**	**12.692**
Annual average for triennium ending 2000	**24.394**	**4.808**	**10.462**	**8.697**	**6.548**	**16.405**	**8.739**	**10.682**	**12.552**	**12.854**

Source: http://www.fao.org/

Table-4.25: Countrywise Unit Values of Grape Exports

(Dollars/kg)

Years	Spain	Italy	France	Turkey	Iran	Argentina	China	South Africa	India
1981	0.34	0.37	0.45	0.46	NR	0.51	0.41	0.49	0.98
1982	0.35	0.51	0.46	0.39	NR	0.48	0.34	0.46	1.08
1983	0.31	0.32	0.41	0.29	0.43	0.34	0.35	0.42	0.78
1984	0.25	0.34	0.34	0.25	0.49	0.31	0.34	0.37	0.66
1985	0.23	0.32	0.35	0.24	0.53	0.29	0.36	0.25	0.72
1986	0.25	0.49	0.50	0.23	0.34	0.49	0.44	0.23	0.78
1987	0.33	0.47	0.51	0.22	0.18	0.33	0.44	0.35	0.95
1988	0.47	0.49	0.53	0.25	0.11	0.27	0.45	0.32	0.93
1989	0.44	0.47	0.54	0.32	0.10	0.24	0.39	0.41	0.88
1990	0.86	0.77	0.74	0.36	0.10	0.29	0.41	0.39	0.89
1991	0.73	0.89	0.93	0.44	0.11	0.43	0.41	0.64	0.68
1992	0.72	0.83	0.77	0.39	0.10	0.55	0.53	0.67	0.76
1993	0.42	0.42	0.55	0.41	0.11	0.51	0.40	0.71	0.68
1994	0.58	0.54	0.68	0.42	0.10	0.48	0.38	0.30	0.77
1995	0.65	0.60	0.68	0.43	0.16	0.56	0.42	0.50	0.75
1996	0.64	0.69	0.74	0.61	0.16	0.60	0.42	0.57	0.70
1997	0.53	0.53	0.65	0.57	0.10	0.56	0.41	0.51	0.74
1998	0.59	0.48	0.64	0.53	0.11	0.52	0.38	0.46	0.78
1999	0.53	0.48	0.58	0.39	0.11	0.53	0.35	0.39	0.91
2000	0.37	0.42	0.50	0.42	0.11	0.57	0.32	0.33	0.89
Annual average for the period 1981-2000	**0.48**	**0.52**	**0.58**	**0.38**	**0.19**	**0.44**	**0.40**	**0.44**	**0.82**
Annual average for triennium ending 2000	**0.50**	**0.46**	**0.57**	**0.45**	**0.11**	**0.54**	**0.35**	**0.39**	**0.86**

Source: http://www.fao.org/

Table-4.26: Countrywise Mango Yield

(Yield: Mt/ha.)

Yield	India	China	Thailand	Mexico	Indonesia	Pakistan	Nigeria	Philippines	Brazil	Egypt
1981	8.69	6.71	6.31	17.08	4.18	9.55	5.00	7.51	16.53	10.25
1982	8.65	5.74	6.38	10.57	4.27	9.96	5.00	6.09	15.98	10.40
1983	8.64	5.45	6.45	9.95	5.26	10.06	5.00	5.84	14.30	12.14
1984	8.78	5.55	6.63	10.93	4.95	9.48	5.00	6.43	14.23	10.68
1985	11.75	5.77	6.99	10.54	4.74	9.47	5.00	6.62	14.02	8.85
1986	12.26	6.11	6.92	11.31	4.45	9.47	5.00	6.86	13.49	7.02
1987	12.13	7.07	6.96	10.90	4.26	9.50	5.00	6.62	14.44	6.31
1988	9.30	6.82	7.12	10.53	5.07	8.98	5.00	6.48	12.73	5.24
1989	9.89	6.66	7.26	10.34	3.96	9.16	5.99	6.56	11.98	6.82
1990	10.22	8.12	7.03	9.91	4.08	9.26	5.93	5.95	12.03	7.57
1991	8.12	9.26	7.42	9.72	4.03	9.09	5.91	5.39	11.70	8.13
1992	8.11	8.81	7.66	8.92	3.47	9.15	5.91	5.77	11.48	7.93
1993	8.29	10.36	7.69	9.57	3.65	9.49	5.95	6.82	10.61	8.69
1994	8.94	10.41	8.76	8.73	5.01	9.89	5.95	7.82	10.91	9.17
1995	8.59	10.79	8.70	9.95	4.52	10.01	5.95	7.38	11.30	11.03
1996	8.46	9.45	10.14	8.58	5.26	10.14	5.96	10.23	9.55	9.34
1997	9.17	11.31	10.00	10.04	5.72	10.11	5.99	10.81	7.85	9.94
1998	7.00	10.29	9.12	9.58	4.29	9.88	5.99	8.21	7.01	8.76
1999	8.14	11.62	10.00	9.72	5.01	9.91	5.98	6.55	7.46	7.95
2000	8.21	11.51	10.00	10.11	5.31	9.97	5.98	6.34	7.96	7.69
Annual average for the period 1981-2000	**9.17**	**8.39**	**7.88**	**10.35**	**4.58**	**9.63**	**5.57**	**7.01**	**11.78**	**8.70**
Annual average for triennium ending 2000	7.79	**11.14**	**9.71**	**9.80**	**4.87**	**9.92**	**5.98**	**7.03**	**7.48**	**8.13**

Source: http://www.fao.org/

Table-4.27: Countrywise Unit Values of Mango Exports

(Dollars/Kg)

Years	China	Thailand	Mexico	Indonesia	Pakistan	Nigeria	Philippines	Brazil	Egypt	India
1981	NR	NR	0.18	0.13	0.59	NR	0.90	1.00	1.55	1.06
1982	NR	NR	0.43	0.19	0.56	NR	0.93	1.24	1.60	0.89
1983	NR	NR	0.21	0.43	0.48	NR	1.14	0.84	0.86	0.85
1984	NR	NR	0.28	0.36	0.44	NR	0.99	0.70	0.46	1.10
1985	NR	NR	0.29	0.81	0.39	NR	0.99	0.68	0.42	0.93
1986	NR	NR	0.18	0.36	0.39	NR	0.91	0.65	0.64	0.95
1987	NR	0.29	0.19	0.76	0.33	NR	0.93	0.65	0.97	0.89
1988	NR	0.29	0.29	0.75	0.34	0.24	1.27	0.62	0.70	0.91
1989	3.75	0.28	0.24	1.34	0.34	0.20	1.19	0.61	1.15	0.84
1990	3.27	0.26	0.47	1.01	0.27	0.34	1.18	0.62	0.89	0.90
1991	1.47	0.32	0.89	0.85	0.28	0.50	1.09	0.62	0.81	0.63
1992	3.65	0.32	1.09	0.89	0.25	0.51	1.06	0.76	0.69	0.68
1993	1.22	0.35	0.99	1.37	0.23	NR	0.88	1.09	1.00	0.63
1994	1.59	0.56	0.83	1.06	0.20	NR	1.02	1.33	0.54	0.55
1995	1.08	0.46	0.80	0.77	0.19	0.36	0.98	1.73	0.37	0.53
1996	0.54	0.57	0.83	0.96	0.22	0.36	0.99	1.19	NR	0.50
1997	1.13	0.58	0.68	0.57	0.23	0.36	0.90	0.86	0.36	0.46
1998	0.51	0.48	0.69	0.77	0.16	0.36	0.87	0.83	0.28	0.42
1999	0.36	0.40	0.60	0.94	0.20	0.36	0.92	0.60	0.41	0.48
2000	0.54	0.47	0.54	0.93	0.32	1.20	0.99	0.53	0.35	0.41
Annual average for the period 1981-2000	**1.59**	**0.41**	**0.53**	**0.76**	**0.32**	**0.44**	**1.01**	**0.86**	**0.74**	**0.73**
Annual average for triennium ending 2000	**0.47**	**0.45**	**0.61**	**0.88**	**0.23**	**0.64**	**0.93**	**0.65**	**0.35**	**0.44**

Source: http://www.fao.org/

and China. However, India has a comparative advantage over Pakistan and Egypt as far as unit values are concerned.

4.10.3 Price Competitiveness

Among various measures of export competitiveness, "price competitiveness" is considered to be most useful one as it subsumes the influence of a large number of factors influencing trade flows. It is easily quantifiable as sufficient data is available on prices from international sources. In the present study competitivity was tested by relative method where relative price is used as explanatory variable on the relative export performance of the two competing countries. In this analysis, the impact of relative prices on competitiveness is measured through the concept of elasticity of substitution, which is defined simply as the percentage change in the relative quantities divided by the percentage change in the relative price and is rigorously defined with respect to movement along a single indifference curve. "Competitiveness in the sense of market share may rise or fall as a result of an increase in a country's relative prices, depending upon whether elasticity of substitution between supply country vis-à-vis all other exporters is less or more than one". However, this formulation assumes two basic assumptions:

a) Algebraic sum of cross and direct elasticities of demand and supply for two commodities must be equal.
b) The income and other price elasticities of demand for the two commodities must be equal.

With a view to identify the competing countries, the elasticities of market shares with respect to price relatives were estimated through time series data and the same has been summarised in Table-4.28 to 4.31. The estimates of elasticity of substitution of Indian apple with other competing countries is given in Table-4.28. The important feature of the table is that, the elasticity coefficients bears the negative sign as theoretically expected with respect to all the competing countries in apple trade However, barring the

case of Iran, the value of R^2 for other countries is indicating low explanatory power of the chosen variable. The elasticity of substitution is statistically significant at 1 per cent level for Iran, at 5 per cent level for France, at 10 per cent level for China and is also acquiring the values greater than one indicated that there is a tough competition for Indian apple export from these countries in terms of prices. The elasticity of substitution in respect of Italy and Germany worked out to be less than one and found statistically significant at 10 per cent level of significance, indicated that any upward revision in the relative prices of Indian apple will not lose market share to these countries and hence found less competitive to the Indian apple.

The elasticity of market shares with respect to the price relatives for Indian banana vis-à-vis other competing countries has been presented in Table-4.29. The elasticity of substitution was found negative and statistically significant at 5 per cent level for China, Mexico and Thailand indicating that these countries are not posing any serious competition to Indian banana. The elasticity was found positive and significant with respect to Indonesia which is indicative of absence of competition with Indian banana.

The impact of relative prices on competitiveness in case of grapes is presented in the Table-4.30. The table revealed that the elasticity of substitution is greater than unity and statistically significant at 1 per cent level for Italy, France and at 5 per cent level for China indicating acute competition for Indian grape export in terms of prices. The elasticity of substitution was less than one and negative in respect of Spain, Turkey, Argentina and South Africa at 1 per cent level of significance, signifying the non-competitiveness of the countries vis-à-vis Indian grapes. The positive and significant value of elasticity for substitution with respect to Iran revealed the absence of competition to Indian grapes.

The elasticity of substitution estimates of Indian mango as presented in Table-4.31 exhibited severe competition with China alone. The significant and positive signs of elasticity estimates with regard to Thailand, Mexico, Indonesia, Nigeria, Philippines and

Table-4.28: Estimates of Elasticity of Substitution of Indian Apple vis-à-vis other Important Apple Exporting Countries (1981-2000)

Countries	Constant	Elasticity of Substitution	R^2
China	-2.9411	-1.6246***	0.1073
		(1.1046)	
USA	-4.0523	-0.03423	0.0001
		(0.70238)	
France	-2.7447	-1.1437**	0.1725
		(0.5903)	
Turkey	-2.4068	-0.4343	0.0278
		(0.60549)	
Italy	-4.3285	-0.4895***	0.1134
		(0.3226)	
Germany	-2.3843	-0.6042***	0.0893
		(0.4945)	
Poland	-2.5231	-0.57478	0.0698
Iran	0.5374	-2.6360*	0.6033
		(0.5038)	

* Significant at 1 per cent level of significance
** Significant at 5 per cent level of significance
*** Significant at 10 per cent level of significance

Table-4.29: Estimates of Elasticity of Substitution of Indian Banana vis-à-vis other Important Banana Exporting Countries (1981-2000)

Countries	Constant	Elasticity of Substitution	R^2
Ecuador	-0.5936	-0.1325	0.0821
		(0.1044)	
Brazil	0.3285	-0.07422	0.0602
		(0.0691)	
Indonesia	0.4969	0.2516**	0.1886
		(0.1230)	
Philippines	0.4547	-0.04842	0.0682
		(0.04219)	
China	-1.5995	-0.1672**	0.1440
		(0.09611)	
Costa Rica	-0.0629	-0.06972	0.0650
		(0.06231)	
Mexico	-1.1217	-0.2039**	0.1429
		(0.1177)	
Columbia	0.4926	0.03619	0.0058
		(0.1114)	
Thailand	-1.4559	-0.2248**	0.1977
		(0.1067)	

* Significant at 1 per cent level of significance
** Significant at 5 per cent level of significance
*** Significant at 10 per cent level of significance

Table-4.30: Estimates of Elasticity of Substitution of Indian Grapes vis-à-vis other Important Grapes Exporting Countries (1981-2000)

Countries	Constant	Elasticity of Substitution	R^2
Spain	-0.7455	-0.9809*	0.5884
		(0.1933)	
Italy	-2.1228	-1.2876*	0.4815
		(0.315)	
France	2.2441	-2.2048*	0.6571
		(0.3754)	
Turkey	-0.0020	-0.4869*	0.2840
		(0.1822)	
USA	-3.3768	-0.1588	0.0044
		(0.5635)	
Iran	2.9216	0.1248***	0.0994
		(0.0886)	
Argentina	1.3699	-0.4935*	0.3242
		(0.1679)	
China	4.3978	-1.1735***	0.1297
		(0.7164)	
South Africa	-1.8090	-0.7916**	0.2070
		(0.3652)	

* Significant at 1 per cent level of significance
** Significant at 5 per cent level of significance
*** Significant at 10 per cent level of significance

Table-4.31: Estimates of Elasticity of Substitution of Indian Mango vis-à-vis other Important Mango Exporting Countries (1981-2000)

Countries	Constant	Elasticity of Substitution	R^2
China	0.8053	-4.0666*	0.83
		(0.4258)	
Thailand	0.9457	0.5648***	0.1244
		(0.3534)	
Mexico	-1.3284	0.4483*	0.5529
		(0.0948)	
Indonesia	4.5745	0.5996**	0.1422
		(0.3471)	
Pakistan	0.09317	0.3688	0.0732
		(0.3091)	
Nigeria	2.3078	1.8251**	0.1442
		(1.0480)	
Philippines	0.3510	0.6604*	0.3351
		(0.2192)	
Brazil	1.2662	0.9620**	0.2617
		(0.3803)	
Egypt	3.1482	-0.7812	0.0648
		(0.6998)	

* Significant at 1 per cent level of significance
** Significant at 5 per cent level of significance
*** Significant at 10 per cent level of significance

Brazil showed the absence of competition in the matter of prices with Indian mango. This unique behaviour in international trade flow of mango indicates that quantum of mango exports can be pushed up at prevailing prices, without any threat of competition with the rival mango exporting countries.

4.10.4 Export Performance Ratio

Identification and enhancement of competitiveness is an essential ingredient of a successful trade strategy. A country having comparative advantage in producing a commodity is bound to prosper by trade especially in the light of WTO agreement. Against this backdrop, it becomes essential to identify the selected fruits under study whether they really possess comparative advantage or not. In this section, export performance ratio (EPR) as suggested by Balassa (1965) has been used to measure the revealed comparative advantage in case of the selected fruits under study. According to Balassa, the comparative advantage of a country in trade of a particular commodity can be measured by the ratio of the share of given product in total exports of a country under consideration to the corresponding share of the trading world as a whole. The ratios for the reference years are presented in the Table-4.32.

A cursory glance on the Table-4.32 reveals that India has comparative advantage in exports of mango and partly grapes also. The export performance ratios for apple and banana has been throughout less than one in the entire span of 20 years (figure 4.14-4.15) indicating comparative disadvantage in these commodities. However, the degree of advantage/disadvantage varied between almost all the fruits under study. EPRs remained almost stagnant over the years for apple. Banana witnessed rising trends in the EPRs in the post-WTO period indicating a spurt in export. During earlier years however, banana export was meagre in quantitative terms. The EPRs for grapes have registered a slow increase during the pre-liberalisation years and increased rapidly in the post-liberalisation period (figure 4.16) and again declined in the year 1998 and thereafter started showing again the increasing trends. Therefore, EPRs have been quite fluctuating in grapes. The

comparative advantage as revealed by EPRs have registered a constant decline throughout (figure 4.17) the reference years in case of mango, which was considered to be a star export item in the pre-liberalisation period is witnessing a downward trend in the EPRs in post-liberalisation period. Thus, in spite of all the rhetoric about export potential of mango, the declining trends in EPRs reveals the fact that India is loosing the degree of comparative advantage.

4.11 Factors Affecting the Export Performance

Export performance of a country is influenced by internal supply factors and external demand factors. In turn, there are large number of determinants of demand for and supply of a product. Thus, the demand for country's exportables would depend on the level of development of importing countries, consumption pattern, domestic availability of the product, alternative sources of supply and their relative competitiveness, trade policy of importing country, availability and cost of transport, exchange rates and the nature of political relations between importing and exporting countries.

Similarly, "ability to supply" of an exporting country subsumes a large number of factors of export performance. This would include its ability to generate exportable surplus, which itself depends on the level of domestic demand and production, the cost of production, prices prevailing in the domestic and export markets, relative prices of the competitors, market size, factor productivities, real per capita income of the exporting country, trade policy of the exporting country, quality and design of the product, freight and delivery schedules, standards of packaging and aesthetic appeal etc. The concept of competitiveness is, therefore, is very complex issue which, considering the large number of its determinants many of which are not quantifiable, is not amenable to full explanation.

In the context of fresh fruits exports from India, supply side factors seems to be more predominant. Hence an attempt has been made in the present study to quantify the influence of major determinants of export supply of fruits selected under study. In order to quantify the determinants of exports, log-linear export turnover function were used. The

Table-4.32 : Export Performance Ratios (EPRs) for Important Fruits of India

	EPRs			
Years	Apple	Banana	Grapes	Mango
1981	0.096	0.008	0.199	50.208
1982	0.128	0.006	0.523	50.602
1983	0.217	0.008	0.421	47.534
1984	0.388	0.004	0.360	43.570
1985	0.418	0.008	0.672	52.803
1986	0.347	0.008	0.477	50.608
1987	0.299	0.011	0.625	47.235
1988	0.304	0.014	0.776	42.013
1989	0.388	0.002	0.994	38.897
1990	0.100	0.002	0.571	30.976
1991	0.277	0.007	0.926	14.695
1992	0.208	0.022	0.932	15.235
1993	0.171	0.024	1.096	9.352
1994	0.143	0.011	1.113	9.112
1995	0.155	0.023	1.319	6.546
1996	0.187	0.004	1.144	6.102
1997	0.172	0.105	1.200	8.979
1998	0.146	0.131	0.652	8.425
1999	0.119	0.096	0.843	7.213
2000	0.054	0.125	0.953	5.284

Fig-4.14: Export Performance Ratios (EPRs) for Indian Apple

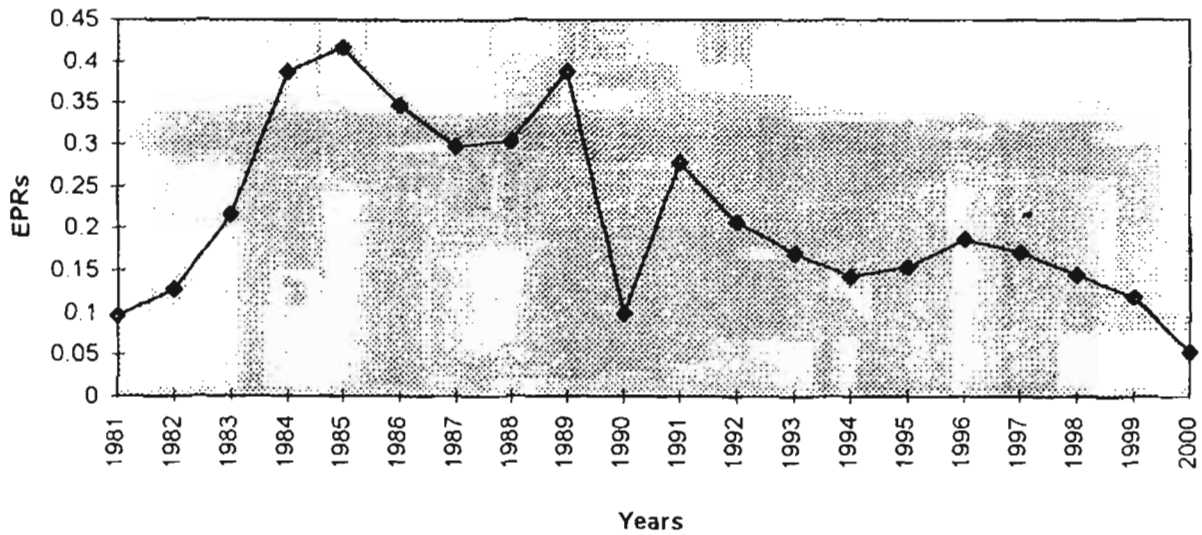


Fig-4.15: Export Performance Ratios (EPRs) for Indian Banana

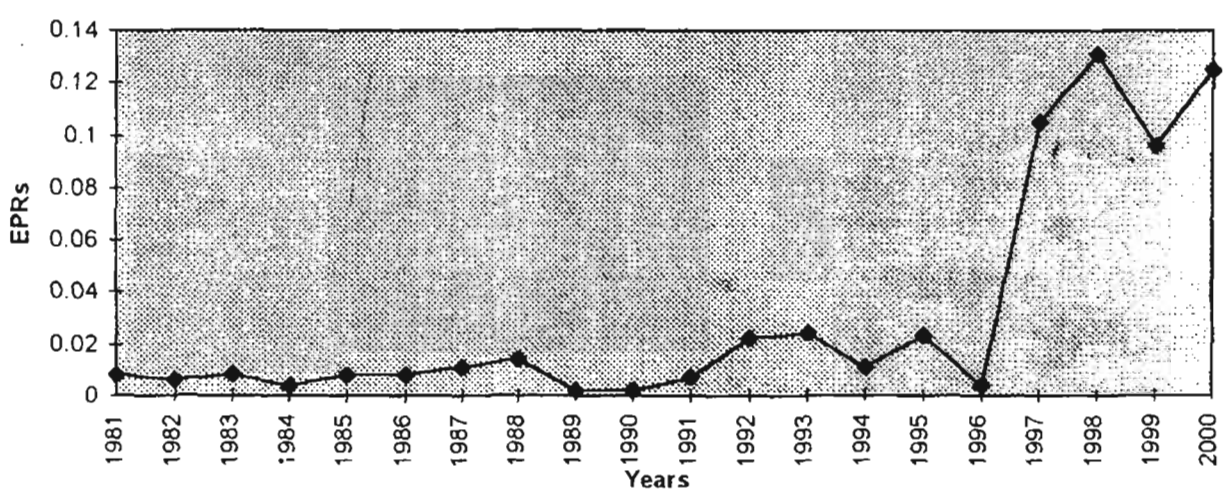


Fig-4.16:Export Performance Ratios (EPRs) for Indian Grapes

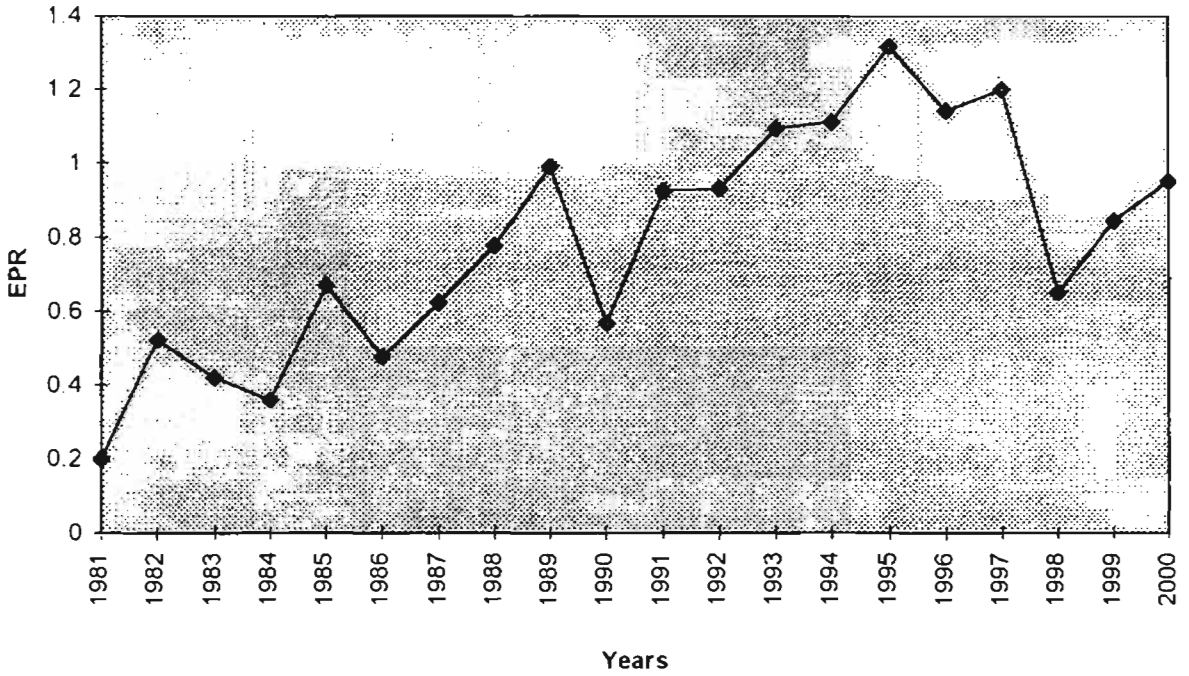
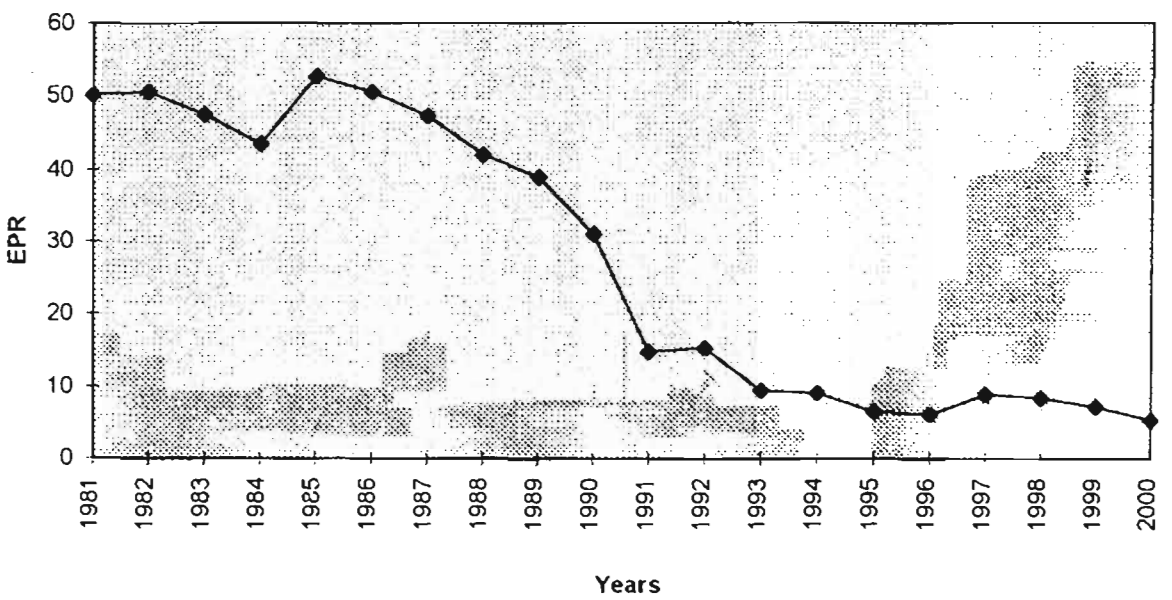


Fig-4.17: Export Performance Ratios (EPRs) for Indian Mango



regression estimates for the various chosen parameter for the selected fruits are given in the Table-4.33. To study the factors affecting the export supply, Cobb-Douglas type of function with export quantity as dependent variable and level of domestic production, productivity, relative export price index, per capita net national product index and time as a catchall of other factors affecting exports was fitted to the data for the period 1981-2000 by OLS method. Multiple linear function was also fitted but the Cobb-Douglas function was found more appropriate because of higher values of R^2 and sign and significance of the estimates. Secondly, step down method of deletion of non-significant independent variable was used to obtain the most suitable function as shown in the Table-4.33.

It is seen from the result that very high values of R^2 were noticed in case of banana (0.79), grapes (0.93) and mango (0.86) which indicate the good fit of the equation. However, in case of apple the chosen variable could explain only 35 per cent of total variation in export from India. The lowest explanatory power in the model, in case of apple may be attributed to the higher fluctuating scenario observed in the exports.

It is very interesting to note that none of the variables turned out to be significant in respect of apple exports except time variable. Time expresses the action of additional factors on which the quantum of apple exports depended. Here the additional factors which had influence on the apple exports were the degree of competition from the other exporting countries of the world and government policies for encouraging exports. The elasticity of time factor is fairly good and statistically significant at 10 per cent level of significance.

The regression equation for banana showed that other things remaining constant, the domestic production of banana had a positive and significant influence on its exports A one per cent increase of banana production would result in the increase of its export by 3.76 per cent, other things being equal. The relative export price (export price index/domestic price index) revealed negative relationship with banana export indicating thereby that relative export price has no effect on increasing banana exports.

In case of grapes the domestic production and time variables had positive and significant effect on its export. A one per cent increase in the banana production would result in the increase of grape export by 0.625 per cent, other things being equal. The time factor proved out to be very strong in influencing exports indicating that other factors has the major influence on the grape export.

The regression coefficients of all the variables except time were non-significant in case of mango. The time variable which expresses the action of other factors affecting the export was found positive and significant at one per cent level of significance. It implied that the other factors like degree of competition, government policies, conditions in major importing countries of the world etc. are influencing the mango exports. For the period as a whole these other factors were found more favourable for mango exports.

4.12 Export Projections

India is gradually emerging as an important exporter of fresh fruits as there has been a sudden spurt in the export of these fruits in recent years. Moreover, the environment has been made conducive by the recent trade liberalisation policy and increased planned investments on horticultural development. The potential and prospects of these products has been worked out and the same is presented in Table –4.34

India has made significant achievement in the production of apple, accounting for about 2.48 per cent of world apple production. However, owing to the existence of a very big domestic market, the country has not been very successful in the export of apples and its contribution to the world trade is negligible. Indian apple is non-competitive and in the last two decades the quantum of apple exports has grown at an average rate of 3.89 per cent per annum. In the near future, apple exports from India are likely to grow annually at a rate of 3.68 to 3.89 per cent and by the year 2005 the exports of fresh apple are projected to reach nearly 6.3 thousand tonnes.

Table-4.33: Export Turnover Function in Respect of Major Fruits of India.

Variables	Fruits			
	Apple	Banana	Grapes	Mango
1. Domestic Production	0.244	3.759*	0.625***	-0330
	(1.230)	(0.470)	(0.367)	(0.760)
2. Productivity	-	-	-	0.112***
				(0.410)
3. Relative Export Price Index	-	-0.581***	0.10	-0.374
		(0.351)	(0.753)	(0.303)
4. Time	0.325**	-	0.878*	0.474*
	(0.240)		(0.185)	(0.80)
Constant	4.565	-53.259	-1.227	-12.860
R^2	0.34	0.79	0.93	0.86

Figures in parenthesis indicate the standard error.
* Significant at 1 per cent level of significance.
*** Significant at 10 per cent level of significance.

Table-4.34: Expected Export of Major Fruits of India in the Year 2005

Fruit	NPC	Export competitiveness	Projected Growth in Export (%)*	Projected export ('000 Tonnes)
Apple	1.05	Non-competitive	<3.9	6.3
Banana	0.40	High	>24.7	23-26
Grapes	0.89	Moderate	>15.9	32-36
Mango	0.84	Moderate	>6.7	56-60

NPC: Nominal Protection Coefficients. (Source: Tamanna Chaturveri and S.P.R. Chaurasia (1999) and Gulati *et al.* (1994))

* Export projection were made based on the trend line method (Appendices 3 & 4)

The NPC value for banana as depicted in Table-4.34 indicated that, the crop is highly competitive as its prices were about 60 per cent lower than the world prices in the international market. During the last two decades the banana exports has grown at an average rate of 27.90 per cent per annum. In the near future its export from India is likely to grow annually at a rate of 24.7-27.9 per cent. It is expected that by the year 2005 the exports of banana may touch a figure of 23-26 thousand tonnes.

Grapes occupy an important position in the exports of fresh fruits from India. In the recent past the quantum of grapes has witnessed an annual growth rate of over 18 per cent. In the future course of time the grape exports from India is expected to grow annually at a rate of 15.9-18.3 per cent and by the year 2005 these exports are projected to reach between 32-36 thousand tonnes. The nominal protection coefficients indicated that Indian grapes are moderately export competitive on an average situation.

India is the largest producer of mango in the world accounting for nearly 43 per cent in the total production. India's share in the world mango market has gone down to 7 per cent in the recent years. Indian mangoes are moderately export competitive and in the last two decades the quantum of mango exports has grown at an average annual rate of 8 per cent. The trade model used in the present study revealed that in the near future the mango export from India are likely to grow at the rate of 6.7-8 per cent per annum. It is projected that by 2005 AD India will be exporting 56-60 thousand metric tonnes of mangoes.

4.13 Constraints

Though Indian horticultural commodities have a substantial support for steady exports, yet there exist many constraints too. The important constraints faced in the export performance growth of the major selected fruits chosen for the present study are given as under:

India could not make much headway in the export of apple as apple industry is not export competitive. The main reasons for the poor performance in the export marketing is the existence of a large domestic market for apple. Moreover, India is lagging behind in matter of quality production and this has to be tackled on several fronts. Varietal improvements and introduction of internationally sought after varieties are needed to be encouraged. As for example, delicious variety of apples are too sweet for European markets where consumers prefer golden, Granny Smith, Elington Pippin and such other varieties. Besides, there does not exists any co-operative marketing organisation involved in marketing of apple except HPMC in Himachal Pradesh. In addition to this the freight structure is another factor inhibiting export of apple on profitable lines. Apple being grown in hilly and inaccessible areas, incur heavy average cost of transportation from producing areas to the point of shipment which makes the produce uncompetitive in international markets besides, incurring heavy losses during transportation. The lack of proper quality control measures also hampers the growth of apple exports from India

Non-uniform coloration and development of blemishes on the fruit surface are the major constraints in exporting banana.

Several varieties of grapes which are currently in demand, are produced and exported from India. The entry of co-operatives like MAHAGRAPE and Nafed into grape export and cultivation has been largely responsible for grape exports from India. In international market there is a great demand for 'Thompson' seedless grapes but it has a limited scope for export due to small berry size and non-uniform size and colour of berries in the bunch. Due to poor pedicel attachment and seeded berries 'Anab-e-Shahi' grapes which have the productivity of 85 tonnes/ha in India could find limited scope in exports.

Although, India is a major producer of a number of delicious varieties of mango but it exports only one or two varieties including Alphanso of Maharashtra on large scale. Many other delicious varieties like Dushehri and Langra of Uttar Pradesh, Malda of West

Bengal and Banganapalli of Andhra Pradesh do not contribute significantly towards exports due to low production. Same is the case with Totapari, Chausa and Badami. The incidence of spongy tissue in Alphanso and fruit fly and nut weevil in Banganapalli and Dushehri also acts as constraints in exporting fresh mango. Lack of uniform size and colour also impede their export. The strict quarantine laws, which requires vapour heat treatment prior to exports followed by major importing countries like USA and Japan restricts scope of exports.

Other constraints like poor infrastructure (in terms of storage, transport, cargo space, facilities at air/sea ports etc.), insufficient institutional support (credit arrangement, promotion of Indian fruits overseas) and low research and development efforts (in terms of quality and productivity comparable to those in other producing and exporting countries) are the major constraints to the export of fresh fruits. The institutional arrangements for (a) widening the production base for exports, (b) efficient post-harvest processing/handling and product promotion technology, (c) provision of adequate and timely credit, (d) creation of strong infrastructure, including uninterrupted power and water supplies, and efficient transportation system, and the provision of technical support and conducive labour legislation are pre-requisite for high export performance and marketing.

4.14 Suggestions

Fresh fruits have been identified as an extreme focus area for India's agricultural exports by Ministry of Commerce. This focus implies recognition of export potential of fruits in changing agro-export markets and product range, a package of multi-pronged export promotional strategy is required to enhance the fruit exports. A range of efforts starting from the farm level onwards needs to be specifically directed to improve quality as well as product quantity with emphasis on creating and sustaining export market niche for our horticultural exports.

On the production front, issues relating to volume, quality and product diversity are important. The issue of volume can be addressed by changing the traditional cropping pattern in line with export promotional strategies, devoting more land area under fruit production. Further, in order to harness the vast export potential of the fruit crops, conventional technology must be supplemented by new and modern technology for raising yield and quality of fruit crops. The areas of efficient production and procurement needs to be demarcated and strategy be devised to ensure efficient cropping system. For meeting foreign market standards and preferences, development efforts should be directed towards the cultivation of internationally preferred varieties of fruits. The promotion of export trade further requires efficient post-harvest handling system for perishable crops. The use of standardised pre-packing treatments such as waxing of apples to preserve crispness and juicy contents, use of ethylene absorbents in banana, use of sulphur-dioxide releasing pads in grape packaging and film wrapping of mangoes needs to be addressed on priority basis. Improved technology like pre-cooling units, use of paper guards in grapes, use of plastic crates and improved packaging replacing wooden boxes should be encouraged. According to National Horticulture Board Ministry of Agriculture for India, the fruit losses have been estimated at 25 per cent of total fruit production during the post-harvest handling. In this regard concerted efforts are needed to reduce the losses so that more exportable surplus is generated. The task can be accomplished by improving the export market infrastructure.

Promotion of export trade also requires suitable infrastructure facilities such as market information, transport and co-operative institutions etc. Cheap and efficient transportation and storage facilities including cold chains must be made available. Increased availability of institutional credit will support both domestic and export marketing. Co-operative export units should be established as a potential alternative to private trade. These co-operatives must also assist in providing the market information to the growers.

Systematic market surveys on seasonal demand and quantum of different varieties of the fruits can help harness export potential of these fruits. The information on consumer

preferences. psychology and consumer power needs to be generated through these surveys to identify the thrust products and thrust markets. This process will assist in brand positioning of our fruit products with a particular quality attached to a brand. Thus, proper branding of product for export market needs to be encouraged, because customers in developed countries prefer branded products.

Export promotion also requires export services like identification of the product with export potential, advice on quality, assistance in adopting new technologies and sale promotion activities. In a competitive market environment, sale promotion efforts constitute an essential requirement for expanding India's fruit market and market share. Currently export promotion is weak and should be undertaken by the private sector.

CHAPTER V

SUMMARY AND CONCLUSIONS

Summary and Conclusions

India is one of the largest and most varied fruit producing nation in the world accounting for 10 per cent of all fruits and nearly 40 per cent of tropical fruits produced globally. Fruit production in India increased at an annual growth rate of 4.32 per cent between the year 1981-2000. The production level increased steadily between 1950-1990 and dramatically over the last decade despite agricultural policies largely focusing on foodgrain sector. Government of India accorded 'extreme focus status' in the 8th five year plan to the horticulture sector and consequently this sector is assuming the position of vibrant commercial venture with great export potential. In order to harness these potentials Indian government has launched special export enhancement programmes for fresh fruits with special emphasis on export market promotion, financial assistance to exporters, transport subsidies, more export oriented high quality production, market development and post-harvest management. Moreover, in the wake of liberalisation policies of Indian government and affecting WTO treaty, exports of horticultural products needs to be investigated especially in the matter of the comparative advantages in exporting fresh fruits. Keeping in view the export prospects of the fresh fruits, the present study was carried out with the following objectives:

1. To examine growth in the area, production and exports of major exportable fresh fruits such as apple, banana, grapes and mango.
2. To study the changes in the regional distribution in respect of these fruits.
3. To analyse the export prospects of these fruits.

In this study four fruits namely apple, banana, grapes and mango were selected for detailed analysis because of their larger share in the total fruit exports of the country. Secondary data were used to fulfil the requirements of the objectives of the study. Statewise data on area and production of the selected fruits for the year 1987-2000 was used to study the regional distribution. Time series data covering a period of 20 years

(1981-2000) were used to accomplish the first and third objectives of the study. The information was collected from various secondary sources as mentioned in the chapter of methodology. Tabular method was used to study the regional distribution of production, direction of trade, yield and price analysis. Compound growth rates were used for analysing growth in production, productivity and exports of major fruits; instability indices were used to study the volatility in the exports; terms of trade were estimated to look into the profitability in international trade of the chosen fruits. Constant-Market-Share (CMS) model was employed to describe components of export growth. Price competitiveness among the competing exporting countries was tested by estimating elasticities of market share with regards to price relatives. In addition to this export performance ratios were also computed To determine the factor affecting exportable surplus of each selected fruits, multiple regression analysis was carried out. Export projections of selected fruits were made by trend line method both at constant and current export price.

The main findings of the study are summarised as under:

i) The fruits selected for studying the export performance, together occupied 58.7 per cent of total fruit area, and shared 61.1 per cent of total production in 1998-99 in India. Mango and banana occupied major proportion of the total country's fruit area and production. While share of banana and grapes in total fruit basket of the country exhibited a rising trend, mango share was found declining and apple share stagnating between 1987-99 period.

ii) The average share of production (based on TE-2000) of Indian apple, banana, grapes and mango worked out to be 2.38, 23.46, 1.82 and 42.67 per cent respectively in total world production. Production growth was found higher in case of Indian banana and grapes as compared to world production growth in these fruits. The growth rates for Indian mangoes and apples were found far less than the world growth rates.

iii) In the post-liberalisation period, fruit crops registered significant increase in production growth while foodgrains posted relatively low growth during this period as compared to pre-liberalisation period.

iv) The analysis revealed that, Indian Agricultural sector have improved upon the overall output growth rate by shifting away from foodgrains to high value horticultural activities.

v) The growth in the exports was found much higher than the growth in the output of the fruits considered in the present study. It is expected that domestic demand for the selected fruits will rise in future, therefore, in order to increase and maintain the export demand, rigorous efforts will be needed to step up rate of growth in production of these fruits.

vi) The share of agricultural exports in total exports in the Indian context was much higher when we compare it with the share of world agricultural exports in total world exports. Between the period 1981-2000, the share of Indian agricultural exports slipped down from 32.22 per cent to 11.03 per cent during the year 2000. However, in value terms this share exhibited an uptrend showing an increase of 83.5 per cent in the year 2000 over the year 1981. The share of banana and grapes showed a rising trend while mangoes and apple exhibited declining trends in their respective shares in total Indian agricultural exports between 1981-2000 period.

vii) In value terms apple, banana, grapes and mango registered a compound growth rate of 3.64, 28.34, 17.61 and 2.5 per cent per annum, respectively. In terms of quantity however, the respective growth rates registered by these fruits were 3.89, 27.90, 18.29 and 8.01 per cent per annum respectively. The purchasing capacity of apple decreased at a rate of 3.62 per cent annually while that of grapes increased by 7.77 per cent annually during 1981-2000. Purchasing capacity of mango and banana indicated a growth of 0.28 per cent and 19.36 per cent per annum respectively.

viii) The highest instability in export quantity was found for banana (88.88%) followed by apple (47.16%), grapes (40.99%) and mango (19.80%). The instability in export quantity was found desirable for all fruits under study except for banana.

ix) Bangladesh was found to be the major importer of Indian apple where more than 90 per cent of India's total export of apple goes. Shares of Saudi Arabia and UAE are, however, quite small. Middle East imports most of Indian banana and grapes. Export of mango is also routed to the Middle East countries. Among European countries UK and Netherlands are the major buyers of Indian mango. New markets such as USA, Switzerland, Canada, Malaysia and Belgium are also importing Indian mango.

x) Constant-Market-Share model, brought out that, apple lacks the general export competitiveness while in case of banana, grapes and mango, competitiveness was found more spectacular and favourable.

xi) The relative productivity analysis of apple indicated that India has the comparative disadvantage in relation to all the major exporters. In terms of unit values realised by Indian apple, the country is in complete comparative disadvantage in exporting apple in relation to all the major exporters except Poland and Iran.

xii) India has a comparative advantage in exporting banana in relation to all major exporters except Costa Rica and Columbia when viewed on the basis of yield. However, on the basis of unit values realised, excepting China and Indonesia, India possess comparative advantage in export of this fruit over the other major competitors.

xiii) India has a distinct comparative advantage in the export of grapes in relation to all major exporters when viewed from both unit value and yield angle.

xiv) The comparative yield analysis of fresh mango indicated that the country has comparative advantage of exporting mangoes in relation to Indonesia, Nigeria and Philippines only. However, when viewed from unit value realised angle, the country has comparative advantage only over Pakistan and Egypt and is in disadvantageous position when compared with other mango exporters.

xv) The estimates of elasticity of substitution of Indian apple with other competing countries indicated a stiff competition for Indian apple export from China, France and Iran.

xvi) The elasticity of market share with regard to price relatives with Indian banana revealed China, Mexico and Thailand posing mild competition while with respect to other countries, absence of competition was noticed.

xvii) In respect of grapes, France, Italy, China and Spain were found the tough competitors while Turkey, Iran, Argentina and South Africa were found less competitive as evidenced by the estimates of elasticity of substitution.

xviii) In case of mango, China seems to be the sole competitor exhibiting severe competition in the international market. The absence of competition, as revealed by the model with the other, competitors suggested that, quantum of mango exports can be pushed up at prevailing prices without any threat of competition. Hence all out effort for boosting the production levels will help in increasing share in the world market.

xix) The estimates of export performance ratio revealed that India has a comparative advantage in the export of mangoes and partly in grapes also. During the span of 20 years (1981-2000), while grapes registered rising trend in EPRs, declining trend in EPRs were noticed in mango indicating thereby, that India is loosing the degree of comparative advantage.

xx) The domestic production was found to be the important determinant of exportable surplus in the case of banana and grapes. Time factor which expresses the action of other factors affecting export turned out to be most significant in the case of apple and mango.

xxi) The trade model using current and constant prices indicated that in the near future, apple exports from India are likely to grow at a rate of 3.68-3.89 per cent and by the year 2005, the exports of fresh apple are projected to reach nearly 6.3 thousand tonnes.

xxii) In case of banana, export from India is likely to grow annually at a rate of 24.7-27.9 per cent per annum. It has been projected that by the year 2005 the export of banana may touch the figure of 23-25 thousand tonnes.

xxiii) In the future course of time, the grape exports from India is expected to grow at a rate of 15.9-18.2 per cent per annum and by the year 2005, these exports are projected to reach between 32-36 thousand tonnes.

xxiv) The trade model used in mango revealed that in the coming future, mango export from India are likely to grow by 6.7-8.0 per cent per annum. It is projected that by 2005AD, India will be exporting 56-60 thousand metric tonnes of fresh mangoes to various destinations.

xxv) The important constraints faced in the export of the selected fruits were : poor infrastructure; inadequate market information; lack of post-harvest handling facilities; lack of cold chains; high cost of transport and inadequate transport facilities; inadequate credit facilities and cultivation of traditional varieties.

xxvi) The important suggestions forwarded to improve the export prospects of selected fruits include: introduction of new production technology; institutional support to the growers; adequate post-harvest facilities; reduced cost of transport; timely availability of credit and cultivation of export oriented varieties.

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APPENDICES

Appendix I

Index Number of Fruit Exports of Major Fruits of India

	Index of Export Quantity			
Year	**Apple**	**Banana**	**Grapes**	**Mango**
1981	100.00	100.00	100.00	100.00
1982	1647.36	52.46	266.32	206.21
1983	2825.08	81.15	337.17	208.49
1984	4556.81	50.82	344.50	171.01
1985	3061.87	96.72	604.19	266.51
1986	2994.38	155.74	446.95	244.19
1987	2293.03	700.00	575.39	321.62
1988	2730.60	1122.13	826.88	267.16
1989	3510.12	56.56	1209.95	364.10
1990	1730.60	237.70	933.33	306.80
1991	5880.20	537.70	1944.68	365.78
1992	4851.52	1109.02	1879.58	409.23
1993	3367.83	890.16	2779.76	370.52
1994	3660.29	791.80	2934.21	432.50
1995	5214.29	1429.51	3865.79	368.47
1996	7433.07	248.36	3657.59	423.95
1997	6239.59	5752.46	4132.64	710.21
1998	4185.60	6648.36	1986.39	746.42
1999	3080.43	5155.74	2444.33	598.76
2000	1601.24	7072.95	3603.14	587.49

Appendix 2

Index of Income Terms of Trade (ToT) for the major fruits of India

	Index of Terms of Trade (ToT)			
Years	**Apple**	**Grapes**	**Banana**	**Mango**
1981	100.00	100.00	100.00	100.00
1982	151.49	88.22	295.30	1840.10
1983	216.28	121.02	264.54	2027.79
1984	396.05	71.12	248.85	2471.76
1985	282.56	100.22	369.11	1949.34
1986	289.03	109.16	301.19	2218.39
1987	344.31	214.60	535.48	3008.50
1988	315.34	262.11	659.51	2396.75
1989	368.17	40.69	786.66	2549.48
1990	101.71	44.07	500.37	2023.97
1991	296.99	114.88	680.07	1336.55
1992	205.12	366.33	635.72	1994.58
1993	145.41	397.84	782.60	1458.79
1994	149.58	245.23	945.60	1635.02
1995	210.33	592.59	1221.68	1524.36
1996	244.05	93.19	999.72	1597.05
1997	174.49	2393.73	1040.51	2284.28
1998	143.44	2996.00	561.89	2557.80
1999	117.39	2107.69	774.95	2389.62
2000	50.54	2703.33	1063.62	1716.62

Appendix-3

Trade Model for Important Indian Fruits (1981-2000)

Fruits	Model	Intercept	Year	Unit Value	R^2
Apple	I	8.25	1.0389*	-	0.19
			(0.019)		
	II	7.66	0.368*	-0.511	0.24
			(0.018)	(0.592)	
Banana	I	3.82	1.279*	-	0.74
			(0.044)		
	II	3.36	0.247	-0.416	0.75
			(0.503)	(0.377)	
Grapes	I	7.02	1.183*	-	0.86
			(0.0188)		
	II	6.78	0.159*	-1.594**	0.90
			(0.014)	(0.612)	
Mango	I	9.15	1.080*	-	0.85
			(0.0083)		
	II	9.18	0.067*	-0.181	0.85
			(0.023)	(0.426)	

* Significant at 1 per cent level of significance
** Significant at 5 per cent level of significance

Figures in parenthesis are standard errors.

Appendix -4

Export Projections of Important Fruits from India

Particulars	Apple	Banana	Grapes	Mango
1. **Base Year Export (TE -2000)**	5.26	7.68	15.34	40.69
2. **Annual Growth (Per Cent)**				
Model -I	3.89	27.90	18.29	8.01
Model-II	3.68	24.70	15.90	6.74
3. Projections ('000 tonnes)				
2003				
Model -I	5.89	16.06	25.38	51.27
Model-II	5.86	14.89	23.87	49.48
2004				
Model -I	6.12	20.54	30.02	55.38
Model-II	6.07	18.57	27.66	52.81
2005				
Model -I	6.36	26.27	35.51	59.81
Model-II	6.29	23.15	32.06	56.37

Model-I : Trend line projections based on Model-I
Model-II: Projections at constant export price

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