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**AGRICULTURAL EXPORTS OF INDIA WITH SPECIAL
REFERENCE TO NON-TRADITIONAL COMMODITIES :
FUTURE PROSPECTS AND POLICY ISSUES**

**DEEPAK SHAH
ASHOK K MITRA**

**AGRO-ECONOMIC RESEARCH CENTRE
GOKHALE INSTITUTE OF POLITICS AND ECONOMICS
(DEEMED TO BE A UNIVERSITY)**

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FOREWORD

India, like several other Asian Countries, has a comparative advantage in agriculture and the new economic policy ushering economic liberalisation is expected to create a favourable climate for agricultural output to increase. It is further contended that the trade reforms, bringing into existence the World Trade Organisation, are expected to improve the terms of trade of tradable agriculture, make it internationally competitive and enable it to record large increases in export output. Thus, the on-going economic reforms, it is believed, not only have the potential of consolidating the food security already achieved but also have considerable scope for raising farm income and employment by stepping up agricultural export, specially those of non-traditional crops, viz. fruits, vegetables, flowers, among others.

The subject matter under this study deals with the aforementioned issues. An attempt has been made in this study to examine what prospects do the agricultural exports hold and what do the relative potentials for exports of traditional agricultural commodities as against the non-traditional ones look like. The analysis and discussions on these issues are posed against the various scenarios of estimates in domestic demand and supply of selected agricultural commodities in the years 2001 and 2006 as well as against the trends in the movement of international and domestic prices of these commodities.

The study arrives at the conclusion that the structure of agricultural exports underwent significant change over the past decade and half with India losing her stranglehold on some of the traditional exports and gaining ground on some of the non-traditional commodities like horticultural crops and oilseed cakes and meals. Secondly, the study reveals that notwithstanding the recent inroads made by India in the exports of some of the non-traditional crops, the country's share in various horticultural commodity exports in Asia and in the world in particular is still very insignificant and declining.

As for the future prospects, the findings of the study suggest that various cereals and vegetables in particular are likely to generate reasonable exportable surplus in the year 2001 taking into account the domestic demand estimates. However, the movement in international price vis-a-vis domestic price would be the crucial determining factor in realizing such export potential.

It is hoped that the findings of the study will be useful for the researchers engaged in such studies and for the policy makers evolving strategies for accelerated growth in agricultural exports of India.

Gokhale Institute of Politics & Economics
(Deemed to be a University),
Pune 411 004

(D.C.Wadhwa)
Director

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PREFACE

Non-traditional commodity exports have of late become the prima donna of all the agricultural exports in India. Initiation of the process of integration of forward and backward linkages in horticultural production in the aftermath of liberalisation has given a fresh fillip to horticultural exports in this country. Consequently, not only the horticultural exports have improved but it has also resulted in considerable expansion of the horticultural production base. Vertical integration of production and marketing agencies initiated in recent years has also contributed to far reaching structural changes in the horticultural economy of the country.

There is no doubt that India has great potential in the horticultural sector and that exports of non-traditional commodities such as horticultural ones have grown many folds over time. There is also no denying the fact that the adoption of several liberal policy measures by the Government in more recent times and the application of scientific production techniques have boosted the country's horticultural production. However, the relevant questions that could strike one are how did the structure of agricultural production and exports of India changed over time and what future prospects India holds in the exports of non-traditional commodities as against the traditional ones in the light of rapidly changing world market conditions and in view of various trade policy measures adopted by various developed and developing nations.

It is on this background that it was thought prudent to evaluate the output and export performance of India vis-a-vis Asia and world over the past decade and a half. The present study entitled 'Agricultural Exports of India With Special Reference to Non-traditional commodities : Future Prospects and Policy Issues was undertaken at the initiative of the Ministry of Agriculture, Government of India. Dynamics of Changes in the structure of agricultural production and trade in India are the main foci of the subject matter under study. The discussion revolves round the underlying trends in exports in relation to production as well as round the trends in domestic demand in relation to domestic supply in respect of certain select agricultural commodities of India, that include traditional as well as non-traditional ones.

We are grateful to Professor D.C. Wadhwa, Director of our Institute for his unstinted support in carrying out this study and to Dr. R.S.Deshpande of the Agro-Economic Research Centre of this Institute for his keen interest in the study.

We hereby extend our hearty thanks to Shri R.D.Khodaskar for his assistance in data collection and tabulation work.

It gives us great pleasure in extending our grateful thanks to all the members of the Computer Centre and in particular to Smt. A.S.Kher, Smt. A.A.Chandrachud and Shri M.M.Marathe who took pains in processing and analysing the data on the computer. We

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Gokhale Institute of Politics and Economics
(Deemed to be a University),
Pune 411 004

Deepak Shah
Ashok K Mitra

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CHAPTER - I

INTRODUCTION

The new economic policy, ushering in the era of economic liberalisation, initiated in early nineties, throws up many challenges as well as opportunities for Indian agriculture. Even though economic liberalisation programme is not primarily focused on agriculture, the strategy of reforms is aimed at creating a more favourable policy framework for agricultural development and what more needs to be done in this area. Economic liberalisation is expected to provide a powerful thrust to growth and modernisation of agriculture in near future through favourable terms of trade. Further, with the signing of the agreement on Dunkel Draft Report, giving rise to World Trade Organisation (WTO) from January 1995, it is believed that the opportunities for enhanced agricultural exports, not only traditional but also non-traditional, have opened up considerably which the country should take advantage of. The new policy environment is designed to create a favourable climate for agricultural output to increase. Effective exchange rate adjustment and trade reforms are expected to improve the terms of trade of tradable agriculture, make it internationally competitive and enable it to record large increases in export output. Simultaneously, freeing agriculture from internal control in domestic trade alongwith removal of undue protection given to the industry is expected to have positive impact on agricultural terms of trade and hence on overall agricultural production.

Under such a changing economic scenario and circumstances what prospects do the agricultural export hold and what do the relative potentials for export of traditional agricultural commodities as against the non-traditional ones look like and what steps are to be initiated to realise such potentials are the issues raised and matters for investigation in this study. To begin with such a discussion will require analysis of changing global production scenario and the structure of world export of agricultural commodities. The related issue of world prices will also required to be analysed so as to ascertain the emerging trends in the same. In the context of such a scenario, it will then be necessary to analyse the changing structure of agricultural production and export in India in particular in terms of their respective shares in the world and Asia. Further, analyses of domestic demand and domestic prices will also be necessary for such a discussion. Therefore, broadly the objectives of the study are to examine all these aspects with a view to ascertain the potentials and possibilities of agricultural exports of India with special reference to non-traditional crops.

Specifically the objectives of the study are as follows:

- (i) to examine the changing structure of world production over time with a view to assess the nature of growth and instability in world agricultural production.

- (ii) to examine the changing structure of world exports with a view to assess the nature and extent of growth and instability in world exports of agricultural commodities.
- (iii) to examine the trends in world (international) prices with a view to assess the nature and extent of instability in the prices of agricultural commodities.
- (iv) to examine the share of India's agricultural production to that of the world with a view to assess the changing trends.
- (v) to examine the share of India's agricultural exports in the world export of agricultural commodities with a view to assess the changing trends.
- (vi) to examine the domestic demand for agricultural commodities with a view to assess its impact on exportable surplus.
- (vii) to examine the trends in domestic prices of agricultural commodities with a view to assess the nature and extent of instability in such prices vis-a-vis corresponding world prices.

The study is divided into six chapters. First chapter gives the introduction to the study, its importance in the present context alongwith the methodology of the study and the data and their sources used in this study. The second chapter deals with the trends in world agricultural output, export and prices. Trends in the agricultural output, export and prices in Asia are discussed in chapter third. The fourth chapter deals with the existing pattern and structure of production and export trade of India. This chapter also places an onus on evaluating growth performance of production and export trade of India, apart from analysing growth in the country's share in Asia and the world production and export trade coupled with instability in the same over the given period of time. The fifth chapter examines trends in domestic demand and domestic prices of agricultural commodities and thus evaluates future prospects for agricultural exports. The sixth chapter includes summary and conclusions alongwith policy suggestions/implications based on the findings of the present investigation.

1.1 List of Commodities Included in the Study

Since the focus of the study is on export potentiality of non-traditional commodities of India, main emphasis is placed on studying the changing structure of exports of various oilseed cakes and horticultural commodities such as fruits and vegetables. Apart from these commodities, certain other traditional commodities of developing nations have also been included to get a comparative picture (scenario).

To be more specific, the export performance of the following commodities was studied in the present investigation:

- (i) Cereals - wheat and wheat flour in wheat equivalent, Rice,
- (ii) Pulses, (iii) Potatoes, (iv) Onions, (v) Oranges including tangerines and Clementines, (vi) Bananas, (vii) Apples, (viii) Grapes, (ix) Oilseed cake and meal including other vegetable oil residues, (x) Soybean cake and meal, (xi) Groundnut cake and

meal, (xii) Cottonseed cake and meal, (xiii) Sunflower cake and meal (xiv) Rapeseed cake and meal, (xv) Groundnuts, total green, shelled basis, (xvi) Sesame seed, (xvii) Castor Oil, (xviii) Cotton lint, (xix) Jute and bast fibres, (xx) Tea, (xxi) Coffee, green or roasted, and coffee substitutes containing coffee, (xxii) Tobacco unmanufactured, (xxiii) Processed vegetables (xxiv) Fresh vegetables and (xxv) Floriculture.

Apart from assessing the export performance of the above mentioned commodities, the production performance of certain selected commodities enlisted above was also examined. Since some of the commodities enlisted above were found to be in processed form, the commodities selected to study output performance differed from the above list. The output performance of the following commodities was judged: (i) Cereals - Wheat, Rice/Paddy, (ii) Pulses, (iii) Potatoes, (iv) Onions, (v) Oranges, (vi) Bananas, (vii) Apples, (viii) Grapes, (ix) Groundnut in shell, (x) Sesame seeds, (xi) Cotton lint, (xii) Jute and allied fibres, (xiii) Tea, (xiv) Coffee (Green) and (xv) Tobacco Leaves.

METHODOLOGY

1.2 Period of Study and Data Sources

Data used for this study were collected from various secondary sources. Time series data for fifteen years (1979 - 1993) on production (in quantity terms) and exports (quantity as well as in value terms) of various selected agricultural commodities for the World, Asia and India were collected from various issues of the annual publication of Food and Agricultural Organisation of the United Nations (FAO), "Production Yearbook", "Trade Yearbook", FAO; International Trade Statistics Yearbook, Volume II Trade by Commodity; UNCTAD Commodity Yearbook and FAO Commodity Review and Outlook; Fertiliser Statistics (New Delhi : FAI); Indian Agriculture in Brief, Ministry of Agriculture, Government of India.

1.3 Analytical Technique

The structural changes for various agricultural commodities were studied in terms of total quantity produced and the quantum as well as value of exports by drawing triennium average figures for different representative periods viz., 1979-81 (Period 1), 1985-87 (Period 2) and 1991-93 (Period 3) for the World, Asia and India. These three periods represented the changes that took place during the early eighties, mid-eighties and the early-nineties. Apart from drawing triennium average figures of production and exports of selected commodities, the triennium average share of each of the identified and listed individual commodity in total world production and exports of these commodities was also ascertained for Asia and India in order to better understand the commodity-wise export performance. In the case of India, the triennium average share of each of the selected commodity in total Asia's production and exports was also worked out.

1.3.1 Growth Rates and Estimation of Trend Equations

To the time series data obtained from various sources, exponential trend equation of the following form was fitted:

$$Y = e^{a+bt}$$

$$\text{Log } Y = a + b^*t \quad \dots(1)$$

where, Y = Production/Export; T = Year (time)

The compound growth rates $(r) = (e^b - 1) \times 100$ were tested for their significance by the student 't' statistics.

Since the time series data often contain the trend component, an index of instability as suggested by Mitra (1989) and subsequently used by Neelkanthiah (1995) was incorporated into the exponential analysis in order to take care of the trend component in the data.

In fact, when the trend in the time-series is determined, the residual sum of squares (R.S.S.) obtained gives the extent of overall fluctuations around the trend. In order to make it unit free, this is divided by the square of the mean and we have an index of instability in the values of a variable 'Y' as:

$$\begin{aligned} \frac{\text{R.S.S.}}{Y^2} &= \frac{\sum (y - \bar{y})^2}{\bar{y}^2} \\ &= (1-R^2) \frac{\sum (y - \bar{y})^2}{\bar{y}^2} \quad \dots(ii) \end{aligned}$$

Where, \bar{y} is the estimated trend and R^2 is the coefficient of determination for the estimated trend. Equation (ii) implies

$$\begin{aligned} \frac{(100)^2}{n-1} \cdot \frac{\text{R.S.S.}}{\bar{y}^2} &= (100)^2 \frac{\sum (y - \bar{y})^2}{(n-1) \cdot \bar{y}^2} \cdot (1-R^2) \\ &= (\text{c.v.})^2 \cdot (1-R^2) \end{aligned}$$

Thus, for the general index of instability in a time-series, we may consider an index as follows:

$$I = (\text{c.v.})^2 \cdot (1-R^2)$$

where, $I \leq (\text{c.v.})^2$

Here, the index of instability (I) is either less than or equal to the square of the coefficient of variation (c.v.).

To examine whether the growth rates have been accelerating or decelerating, we have made use of Log quadratic equation or modified exponential equation of the form

$$\text{Log } Y = a + bt + ct^2 \quad \dots(\text{iii})$$

Where, b represents average growth over time ' t ' and ' c ' represents annual change in growth i.e. the rate at which growth is accelerating or decelerating.

It can be seen that the exponential form (i) is a special case of this log quadratic equation when ' c ' becomes zero. In log quadratic trend equation (iii), there can be four possibilities:

- (a) Both ' b ' and ' c ' can be greater than zero. This will imply that ' Y ' has been increasing with an annual average growth of ' b ' at a rate of annual increment of ' c ', i.e., ' Y ' is increasing at an increasing rate.
- (b) ' b ' is greater than zero but ' c ' is less than zero. This will imply that ' Y ' has been increasing with an annual average growth of ' b ' at a rate of annual decline of ' c ', i.e., ' Y ' is increasing at a declining rate.
- (c) Both ' b ' and ' c ' can be less than zero. This will imply that ' Y ' has been declining with an annual average decline of ' b ' at a rate of annual increase in decline of ' c ', i.e., ' Y ' is declining at increasing rate.
- (d) ' b ' is less than zero but ' c ' is greater than zero. This will imply that ' Y ' has been declining with an annual average decline of ' b ' at a rate of increment in decline of ' c ', i.e., ' Y ' is declining at declining rate.

According to Srinivasan (1979), if there is no gap in the time series data, it is to be noted that the simple average of the changing growth rates ' $b+2ct$ ' equals the growth rate given by the exponential equation. Thus, growth rates can also be calculated using this formula. However, in our analysis, we have worked out compound growth rates from exponential function and the estimation of quadratic function was done to see the direction and magnitude of change.

Exponential growth rate equations were mainly fitted on shares of output and exports of each of the selected commodities of Asia and India in corresponding World output and exports of the same. However, in the case of world as a whole and India in particular, these growth rate equations were also tried on 'absolute figures of production and exports of various commodities. Similar kind of analysis was also performed by estimating Log quadratic trend equations to gauge the direction and magnitude of change.

CHAPTER - II

WORLD AGRICULTURAL PRODUCTION AND EXPORTS

Many countries in the world have unilaterally liberalised agricultural trade since the mid 1980s. This has resulted in higher growth in world exports of many of these commodities. However, in the case of certain agricultural commodities, there is decline or stagnant rate of growth in exports over time. This corroborates to the fact that growth in agricultural exports of certain commodities took place at the expense of other commodities which gradually became less competitive in the world markets. In the changing world market conditions, livestock and horticultural commodities have made trade of many agricultural commodities relatively less important. These commodities put together have assumed considerable share in total exports of agricultural commodities of the world in the recent past. Since our analysis is confined to certain select commodities which excludes exports of livestock products from the purview, the main emphasis is placed on analysing export performance of horticultural commodities, apart from taking into account certain other traditional and non traditional commodities of the developing world. This chapter, therefore, begins by reviewing, assessing and evaluating the output and export performance of the selected agricultural commodities of the world during the last one and a half decades.

2.1 Changing Global Output Scenario

The scenario obtaining over the last 15 years in terms of global output of various commodities revealed a perceptible rise in world output of majority of the commodities listed in Table 2.1. Though for most of these commodities, there was considerable increase in overall world output i.e. between period 1 and 3, and also in between early eighties and the mid-eighties and the mid-eighties and early nineties, there was also considerable slowing down in the production increases between the mid-eighties and the early nineties. This slowing down in production increases was by far more vigorous for cereals, pulses, potatoes, apples, sesame seeds, tea, coffee and tobacco. Contrary to this, in the case of oranges, bananas and groundnuts in shell, principal increase in global output was noticed between the mid-eighties and the early nineties. The production increase in the case of cotton lint remained stagnant and hovered around 13 percent in between period 1 and 2 and period 2 and 3. The global output of jute and allied fibres showed an increase of nearly 10 percent between the early - and the mid-eighties. But, between the mid-eighties and early nineties, its global output declined drastically; the decline being to the tune of nearly 22 percent. Such sharp decline in global output of jute between the mid-eighties and the early nineties has resulted in an overall production loss of 15 percent of jute and allied fibres between early eighties and early nineties. Similarly, the global output of grapes also showed a

declining trend during the last 15 years; the decline being more vigorous between the period 2 and 3. On the average, there was 20-50 percent increase in the global output of majority of commodities listed in Table 2.1 between the period 1 and 3.

Table 2.1: Changing Structure of World Output of Important Agricultural Commodities

(in '000' MT)

Commodities	Triennium Averages			Per cent Change		
	Period			2 Over 1	3 Over 2	3 Over 1
	1	2	3			
Cereals	1592754	1832096	1910819	15.03	4.30	19.97
a) Wheat	443858	520001	558584	17.15	7.42	25.85
b) Rice/Paddy	396259	466701	524245	17.78	12.33	32.30
Pulses	40694	52693	55959	29.49	6.20	37.51
Potatoes	258465	286371	274043	10.80	-4.30	6.03
Onions	19541	24966	29191	27.76	16.92	49.38
Oranges	36387	42756	56698	17.50	32.61	55.82
Bananas	39201	38991	50284	-0.54	28.96	28.27
Apples	34503	38940	41097	12.86	5.54	19.11
Grapes	65993	63705	58463	-3.47	-8.23	-11.41
Groundnut in Shell	18277	20846	24379	14.06	16.95	33.39
Sesame Seeds	1887	2268	2393	20.19	5.51	26.82
Cotton Lint	14402	16342	18496	13.47	13.18	28.43
Jute+Allied Fibres	4115	4502	3532	9.40	-21.55	-14.17
Tea	1841	2317	2558	25.86	10.40	38.95
Coffee (Green)	5173	5739	6001	10.94	4.57	16.01
Tobacco Leaves	5321	6417	8006	20.60	24.76	50.46

Note : (1) Period 1 = 1979-81; Period 2 = 1985-87;
Period 3 = 1991-93

In order to get a better insight into the pattern of growth of these commodities, we have gone into the estimates of their rates of growth. Unless growth rates of these commodities are assessed or checked, it is difficult to arrive at any concrete conclusion about the pattern of growth performance of these commodities.

2.2 Growth and Instability in Global Production

The pattern of global output growth performance of the selected commodities alongwith instability in their growth over the past one and a half decades is presented in Table 2.2.

A significant and appreciable growth in the global output of majority of the commodities was noticed. Most of the commodities listed in Table 2.2 showed 2-4 per cent annual growth rate in their production. In certain commodities like grapes and jute and allied fibres, the global output was observed to decline.

The main cause for a decline in global output of grapes could be traced in the steep fall in the production of grapes of Europe which generally accounts for a lion's share of the total world grape production. Not only has the grape production of Europe declined by nearly 23 per cent from the early eighties to early nineties but its share in global output has also come down from 60 per cent during the early eighties to nearly 50 per cent by early nineties (according to estimates of FAO production Yearbook, various issues). This consequently has affected the total grape production in the world which has shown an annual decline of nearly 1.3 per cent over the last 15 years. An annual decline of nearly 1.6 per cent in jute output of the world is due to steep fall in Asia's output of this commodity during the last 15 years. In fact, whole of the globally produced jute and allied fibres comes from Asia. Though Asia's share in global output of this commodity is constant over the last 15 years and stands at around 95 percent, its production, however, has declined by 13 per cent from early eighties to early nineties (according to estimates of FAO Commodity Yearbook, various issues). This has, obviously, adversely affected the global production of this commodity.

Table 2.2: Compound Growth Rates in World Output of Important Agricultural Commodities (Quantity terms): (1979-1993)

Commodities	CGR (%)	t-Statistics	R ² (%)	Instability Index (%)
Cereals	1.52***	7.06	79.30	10.71
a) Wheat	1.91***	8.12	83.53	12.73
b) Rice/Paddy	2.32***	11.60	91.19	9.00
Pulses	2.82***	9.34	87.03	5.69
Potatoes	0.17	0.38	1.12	151.89
Onions	3.27***	16.70	95.55	8.51
Oranges	3.97***	16.18	95.27	14.21
Bananas	2.01***	16.34	75.57	25.46
Apples	0.78	1.56	15.69	57.38
Grapes	-1.29***	4.24	58.02	23.18
Groundnut in Shell	2.60***	8.47	84.66	22.01
Sesame Seeds	1.65***	4.44	60.21	32.82
Cotton Lint	2.07***	4.56	61.51	49.58
Jute+Allied Fibres	-1.60*	1.83	20.44	119.16
Tea	2.82***	11.47	91.00	6.40
Coffee (Green)	1.45***	3.70	51.23	97.35
Tobacco Leaves	2.86***	6.23	74.91	83.49

Note : *, ** and *** represent significance at 10, 5 and 1 per cent level of probability.

A further scrutiny of the results revealed that in certain commodities fluctuations in output growth were very wide. Very high degree of instability noticed in the case of tobacco leaves is associated with high growth rate. To a large extent this is

true of cotton lint also. Moderately high degree of instability is associated with moderate growth rates in the case of bananas, sesame seeds and groundnut in shell. Jute and grapes show negative rates of growth with high degree of instability; jute in particular. Crops showing high growth rate associated with low degree of instability are paddy, pulses, onion and oranges. Wheat can also be considered in this category.

To have a better understanding of the direction and magnitude of change in world output growth rates of various commodities, Log Quadratic trend equations were fitted and estimated. These results are brought out in Table 2.3. The results of the Log Quadratic trend equations are interpreted only for those commodities whose regression coefficients of time variable were significant.

As noticed in Table 2.2, cereals registered an annual output growth of 1.5 per cent during the period 1979-1993. But, in fact, this increase in cereal output was at a declining rate of 0.20 per cent (Table 2.3). Similarly, among cereals, wheat and rice also showed an increase in output at a declining rate; the rate of decline being 0.24 per cent per annum. A deceleration in output growth was also noticed in the case of pulses, onions, apples, and tea; the deceleration being more perceptible for pulses and apples. Since, as pointed out earlier, the production increase in majority of the commodities have slowed down between the mid-eighties and the early nineties, a deceleration in output growth has caught up with these commodities.

An important feature of these trend equations is that the degree of predictability of time variable for the commodities has improved substantially from that of exponential functions which were fitted for working out compound growth rates. Further, as the values of DW-test were found to be within the permissible range i.e. $du < d^*(4-du)$, there was no auto-correlation between the successive figures of output of different commodities over time.

Thus, so far as growth in output is concerned, almost all the commodities selected for the study have registered impressive growth rates. But, evaluation of structural changes in output growth over time is one end of the problem, the other end being trade. The subsequent section, therefore, analyses the export performance of not only these commodities but various other commodities in processed form also, viz., oilseed cakes and meals, vegetables, etc., besides tracing production - export relationship.

Table 2.3: Estimated Log Quadratic Trend Equations for World Output of Important Agricultural Commodities (1979-1993)

Commodity	a	+bt	+ct ²	R ² (%)	d-statistics
Cereals	14.2235	0.0316*** (3.8672)	-0.0010* (2.0796)	84.79	2.02
a) Wheat	12.9411	0.0380*** (4.3541)	-0.0012** (2.2474)	88.40	2.12
b) Rice/Paddy	12.8139	0.0424*** (6.3215)	-0.0012** (2.9757)	94.93	1.39
Pulses	10.4930	0.0658*** (9.3363)	-0.0024*** (5.5384)	96.36	2.24
Potatoes	12.4583	0.0226 (1.2172)	-0.0013 (1.1586)	11.07	1.76
Onions	9.8057	0.0478*** (6.6233)	-0.0010** (2.2270)	96.86	2.60
Oranges	10.4245	0.0263** (2.6145)	0.0008 (1.2942)	95.85	1.81
Bananas	10.5979	-0.0140@ (1.4449)	0.0021*** (3.5932)	88.24	1.58
Apples	10.4073	0.0447** (2.2917)	-0.0023* (1.9460)	35.89	2.57
Grapes	11.1505	-0.0117 (0.8579)	-0.0001 (0.0961)	58.10	2.41
Groundnut in Shell	9.7409	0.0308** (2.2875)	-0.0003 (0.3919)	84.80	2.89
Sesame Seeds	7.5070	0.0250@ (1.5320)	-0.0005 (0.5407)	61.12	1.14
Cotton Lint	9.4804	0.0433** (2.2872)	-0.0014 (1.2368)	65.86	2.09
Jute+Allied Fibres	8.3305	0.0035 (0.0895)	-0.0012 (0.5181)	22.20	1.68
Tea	7.4193	0.0527*** (6.6920)	-0.0016*** (3.2493)	95.24	2.03
Coffee (Green)	8.4693	0.0304* (1.8216)	-0.0010 (0.9877)	54.89	3.58
Tobacco Leaves	8.5831	0.0196 (0.9809)	0.0005 (0.4378)	75.28	2.22

Note : 1) Figures in parentheses are t-values of the respective regression coefficients
 2) @, *, **, and *** represent significance of coefficients at 20, 10, 5 and 1 per cent level of probability.

2.3 Changing Structure in World Exports

Over the last one decade or so, the structure of world export of agricultural commodities has undergone a distinctive change. The falling international prices for majority of agricultural commodities in the 1980s have significantly affected the total volume of exports. As a matter of fact, mid-eighties saw a decline in exports both in volume and value terms for majority of agricultural commodities; the decline being more vigorous in value terms. And, this could be attributed to depressed international prices for agricultural commodities during the 1980s, apart from the trade policy changes that were taking place both in developing and the developed nations.

A cross commodity scrutiny revealed that the total quantity as well as the value of world exports of most of the commodities listed in Tables 2.4 and 2.5 had declined in general during the mid-eighties owing to fall in international prices for most of the commodities during this period. However, certain commodities showed a continuously rising trend in their exports over the past 15 years. This was especially true of pulses, fruits and vegetables, floricultural products and some of the oilseed cakes and plantation crops.

In isolation of commodities like groundnut cake, castor oil and jute which showed a decline in their overall global exports, all the selected commodities have shown an uptrend in their total volume of world exports during the past 15 years. In value terms, however, the commodities which showed their overall global exports to decline were groundnut cake and cottonseed cake (among oilseed cakes), castor oil, cotton lint, jute and coffee.

Among foodgrains, both cereals and pulses have gone up in their overall exports in quantitative terms, overall increase being more sharp for global pulses exports both in quantity and value terms. The rise in overall global cereal exports in quantitative terms was mainly because of significant increase in the same after the mid-eighties since between the early- and the mid-eighties there was marginal decline in total quantum of world cereal exports (Table 2.4). But, in value terms, there was overall decline in world cereal exports. In fact, the increasing trend in world cereal exports between the mid-eighties and the early nineties could not reverse the overall decline brought about by sharp decline in the same between the early- and the mid-eighties owing to fall in international prices of cereals in eighties (Table 2.5). It is to be noted here that the increase in export of pulses have been more than proportionate to their increase in output over time. From the early eighties to early nineties, while global production in pulses showed an increase of nearly 38 percent, the global trade in pulses during the same period increased by about 134 percent (Tables 2.1 and 2.4). Interestingly, over the last one and a half decades, the proportion of cereal exports to production has remained constant at around 12 percent and among the cereals, both wheat and rice also showed constant proportion of exports to production - the proportion hovered around 20 percent for wheat and 3 percent for rice during the past 15 years (Table 2.6). Nevertheless, in the case of pulses, a continuously rising trend in proportion of exports

to production was noticed.

Perhaps the commodities which figure in Tables 2.4 and 2.5 and which, of late, have shown remarkable expansion in exports are the horticultural commodities and various oilseed cakes and meals. This is also evident from Table 2.7 which gives an account of changing shares of various commodities in the total value of world trade in selected commodities as well as all-commodities. In due course of time, the shares of fruits and vegetables as well as oilseed cakes and meals have increased sharply not only in total value of world agricultural exports of selected commodities but also in world agricultural exports of all-commodities put together. Not only this, the share of floricultural exports has also increased substantially over time both in total value of world agricultural exports of selected commodities and all-commodities. In dismal contrast to this, there has been continuous decline in share of cereals both in world agricultural exports of selected commodities and all-commodities. These observations amply demonstrate that while cereals are losing their traditional grounds in the global agricultural commodity trade, with the advent of time horticultural products in particular and various oilseed cakes in general are gaining newer grounds and acquiring considerable importance in the international agricultural trade.

Among the horticultural products, the trading pattern in the study is assessed for potato, onion, various fruits like oranges, bananas, apples and grapes, two categories of vegetables viz., all types of processed vegetables and the fresh vegetables preserved and prepared for global trade, and floricultural products. Over the past 15 years, there has been 20-60 percent overall increase in total quantum of world exports of various fruits and vegetables (Table 2.4). The overall increase in value terms of trade of fruits and vegetables has been much higher revealing thereby favourable international prices of these high value crops during this period (Table 2.5). In terms of proportion of exports to production, there has been a continuous rise in this proportion for all the selected fruits and vegetables over the past 15 years with the only exception of oranges which followed a reverse trend in this scenario (Table 2.6). In general, oilseed cakes and meals have gone up in their global exports more in quantity than in value terms. Among the oilseed cakes and meals, overall global export expansion of the highest order was noticed for rapeseed cake followed by sunflower cake both in quantity and value terms.

Other commodities which showed their overall global exports to expand considerably over time both in quantity and value terms were groundnut in shell, sesame seeds, tea and tobacco (Tables 2.4 and 2.5). However, jute and bast fibre showed a continuously declining trend in global exports; overall decline being around 40 percent both in quantity and value terms of exports. But, cotton lint and coffee, though showed an overall increase in global trade in quantity terms, their net international trade in value terms was credited with a declining trend owing to unfavourable international prices of cotton lint and coffee during the past 15 years.

Table 2.4: Changing Structure in World Exports of Important Agricultural Commodities (In Quantity)
(in '10,000' MT)

Commodities	Triennium Averages			Per cent Change		
	Periods			2 Over	3 Over	3 Over
	1	2	3	1	2	1
i) Cereals	21821	21582	23825	-1.10	10.39	9.18
a) Wheat and wheat flour	9523	10360	11921	8.79	15.07	25.18
b) Rice	1276	1211	1510	-5.09	24.69	18.34
ii) Pulses	275	460	644	67.27	40.00	134.18
iii) Potatoes	482	564	751	17.01	33.16	55.81
iv) Onions	163	194	263	19.02	35.57	61.35
v) Oranges + Tang + Clem	507	545	591	7.50	8.44	16.57
vi) Bananas	698	722	1098	3.44	52.08	57.31
vii) Apples	328	347	401	5.79	15.56	22.26
viii) Grapes	105	143	178	36.19	24.48	69.52
ix) Oilseed Cake+ Meal	2559	3353	4108	31.03	22.52	60.53
a) Soybean Cake	1761	2298	2758	30.49	20.02	56.62
b) Groundnut Cake	102	57	68	-44.12	19.30	-33.33
c) Cottonseed Cake	90	87	135	-3.33	55.17	50.00
d) Sunflower Cake	85	176	228	107.06	29.55	168.24
e) Rapeseed Cake	67	184	353	174.63	91.85	426.87
x) Groundnut Tot Shell	77	88	107	142.29	21.59	38.96
xi) Sesame Seed	24	36	47	50.00	30.56	95.83
xii) Castor Oil	20	18	18	-10.00	0.00	-10.00
xiii) Cotton Lint	450	479	492	6.44	2.71	9.33
xiv) Jute+Bast Fibre	56	47	32	-16.07	-31.91	-42.86
xv) Tea	95	110	117	15.79	6.36	23.16
xvi) Coffee Green + Roast	376	431	493	14.63	14.39	31.12
xvii) Tobacco Unmanu- factured	141	135	167	-4.26	23.70	18.44

Note: 1) Period 1 = 1979-81; Period 2 = 1985-87;
Period 3 = 1991-93

Table 2.5: Changing Structure in World Exports of Important Agricultural Commodities (In Value)

(in million \$)

Commodities	Triennium Averages			Per cent Change		
	Periods			2 Over 1	3 Over 2	3 Over 1
	1	2	3			
i) Cereals	38857	28149	35571	-26.61	26.37	-7.26
a) Wheat and wheat flour	17210	13632	17134	-20.79	25.69	-0.44
b) Rice	4970	3182	4902	-35.98	54.05	-1.37
ii) Pulses	1395	1683	2270	20.65	34.88	62.72
iii) Potatoes	881	849	1574	-3.63	85.39	78.66
iv) Onions	383	364	737	-4.96	102.47	92.43
v) Oranges+Tang+Clem	1886	2087	2957	10.66	41.69	56.79
vi) Bananas	1281	1740	3340	35.83	91.95	160.73
vii) Apples	1374	1349	2301	-1.82	70.57	67.47
viii) Grapes	654	992	1614	51.68	62.70	146.79
ix) Oilseed Cake+Meal	5435	5315	7167	-2.21	34.84	31.87
a) Soybean Cake	4248	4226	5563	-0.52	31.64	30.96
b) Groundnut Cake	183	71	100	-61.20	40.85	-45.36
c) Cottonseed Cake	142	78	137	-45.07	75.64	-3.52
d) Sunflower Cake	126	155	230	23.02	48.39	82.54
e) Rapeseed Cake	112	177	407	59.04	129.94	263.39
x) Groundnut Tot Shell	641	564	764	-12.01	35.46	19.19
xi) Sesame Seed	200	216	339	8.00	56.94	69.50
xii) Castor Oil	170	117	111	31.18	-5.13	-34.71
xiii) Cotton Lint	7304	5992	6802	-17.96	13.52	-6.87
xiv) Jute+Bast Fibre	193	152	114	-21.24	-25.00	-40.93
xv) Tea	1907	2194	2349	15.05	7.06	23.18
xvi) Coffee Green + Roast	11052	12307	6707	11.36	-45.50	-39.31
xvii) Tobacco Unmanufactured	3994	3963	5530	-0.78	39.54	38.46
xviii) Vegetables						
-Processed	2438	3127	5080	28.26	62.46	108.37
xix) -Fresh	7133	8782	18494	23.12	110.59	159.27
xx) Floriculture	3415	5141	10390	50.54	102.10	204.25
Total Value(i to xx)	90593	85083	114211	-6.08	34.23	26.07
	(41.57)	(37.19)	(33.91)			
Total Value of Agricultural Exports@	217920	228780	336770	4.98	47.20	54.54

Note: 1) Figures in parentheses are percentages to total value of World Exports of Agricultural Products.

2) @ Triennium averages for the total value of world exports of agricultural products are based on the figures presented in various issues of United Nations Commodity Review and Outlook.

Table 2.6: Changing Structure of World Agricultural Exports
as Proportion of World Agricultural Production
(In percent)

Commodities	Triennium Averages		
	Periods		
	1	2	3
Cereals	13.70	11.78	12.47
a) Wheat	21.46	19.92	21.34
b) Rice/Paddy	3.22	2.59	2.88
Pulses	6.76	8.73	11.51
Potatoes	1.86	1.97	2.74
Onions	8.34	7.77	9.01
Oranges	13.93	12.75	10.42
Bananas	17.81	18.52	21.84
Apples	9.51	8.91	9.76
Grapes	1.59	2.24	3.04
Groundnut in Shell	4.21	4.22	4.39
Sesame Seeds	12.72	15.87	19.64
Cotton Lint	31.25	29.31	26.60
Jute + Allied Fibres	13.61	10.44	9.06
Tea	51.60	47.48	45.74
Coffee (Green)	72.69	75.10	82.15
Tobacco Leaves	26.50	21.04	20.86

Note : Period 1 = 1979-81; Period 2 = 1985-87;
Period 3 = 1991-93

Table 2.7: Share of Various Commodities in Total Value of Agricultural Exports

(in percent.)

Commodities	Share in World Agricultural Exports of Selected Commodities			Share in Total World Agricultural Exports of All-Commodities		
	Periods			Periods		
	1	2	3	1	2	3
Cereals	42.89	33.08	31.14	17.83	12.30	10.56
a) Wheat and Wheat Flour	19.00	16.02	15.00	7.90	5.96	5.09
b) Rice	5.49	3.74	4.29	2.28	1.39	1.46
Pulses	1.54	1.98	1.99	0.64	0.74	0.67
Fruits and Vegetables						
Oranges	2.08	2.45	2.59	0.87	0.91	0.88
Bananas	1.41	2.05	2.92	0.59	0.76	0.99
Apples	1.52	1.59	2.01	0.63	0.59	0.68
Grapes	0.72	1.17	1.41	0.30	0.43	0.48
Potatoes	0.97	1.00	1.38	0.40	0.37	0.47
Onions	0.42	0.43	0.65	0.18	0.16	0.22
Processed Vegetables	2.69	3.68	4.45	1.19	1.37	1.51
Fresh Vegetables	7.87	10.32	16.19	3.27	3.84	5.49
Total	17.68	22.69	34.77	7.43	8.43	10.72
Oilseed Cake & Meal	6.00	6.25	6.28	2.49	2.32	2.13
Soybean Cake	4.69	4.97	4.87	1.95	1.85	1.65
Groundnut Cake	0.20	0.08	0.09	0.08	0.03	0.03
Cottonseed Cake	0.16	0.09	0.12	0.07	0.03	0.04
Sunflower Cake	0.14	0.18	0.20	0.06	0.07	0.07
Rapeseed Cake	0.12	0.21	0.36	0.05	0.08	0.12
Floriculture	3.77	6.04	9.10	1.57	2.25	3.09
Groundnuts in Shell	0.71	0.66	0.67	0.29	0.25	0.23
Sesame Seed	0.22	0.25	0.30	0.09	0.09	0.10
Castor Oil	0.19	0.14	0.10	0.08	0.05	0.03
Cotton Lint	8.06	7.04	5.96	3.35	2.62	2.02
Jute and Bast Fibres	0.21	0.18	0.10	0.09	0.07	0.03
Tea	2.11	2.58	2.06	0.88	0.96	0.70
Coffee Green & Roast	12.20	14.46	5.87	5.07	5.38	1.99
Tobacco Un-manufactured	4.41	4.66	4.84	1.83	1.73	1.64

A noteworthy feature that emerged through examination of Table 2.5 was the phenomenal increase in the value of global vegetable and floricultural exports over the past decade and a half. While processed and fresh vegetables showed their overall global exports to increase by more than two fold in value terms between the early eighties and the early nineties, the increase in the value of overall floricultural exports of the world during the same period was nearly three folds. Most of the increase in the value of exports of these commodities was noticed in the second half of the overall period considered, that is, after the

mid-eighties. This further gives a reflection of increasing importance of horticultural exports in more recent times.

Thus, the overall analysis encompassing all the commodities reveals that even though fruits and vegetable exports as well as floricultural exports had grown at a high rate between the early and the mid-eighties, the decline in the value terms of trade of cereals, some of the oilseed cakes, fibre crops and plantation commodities caused the international trade in 20 listed group of agricultural commodities to show an overall decline of 6 percent in export value (Table 2.5). However, after the mid-eighties, a resurgence in exports was observed for majority of the agricultural commodities resulting in the total value of exports to grow by 34 percent in early nineties over the mid-eighties level and by 26 percent when the trading was reckoned between the initial and terminal periods of this study.

2.4 Growth and Instability in Global Exports

The scenario obtaining in terms of export growth performance of selected agricultural commodities reveals a considerable variation in their annual growth over time. While certain commodities like pulses, horticultural commodities and majority of oilseed cakes showed very high annual growth in their exports, the growth rate in certain other commodities were either too low or their exports were found to decline over time. The degree of predictability of time variable in explaining export growth rates was observed to be very high for majority of the selected commodities, particularly in quantity terms of exports than in value terms of exports. Wide fluctuations in export growth rates across various commodities were noticed over the past 15 years. Export growth rates in value terms showed higher fluctuations than in quantity terms.

Interestingly, majority of the commodities showed higher growth in their quantity exported compared to growth in total value of their global exports. While certain commodities showed positive and significant growth in terms of quantum of their exports, the export value of the same commodities were, on the other hand, found to decline over time. This held true of cereal exports in general and coffee export in particular.

A smaller positive and significant growth in the total quantum of cereal export was noticed over the past 15 years (Table 2.8). In value terms, however, cereals showed a decline in their exports, though insignificant. However, among cereals, both wheat and rice showed impressive and significant growth in their total quantum of global exports. In quantity terms, global rice export registered an annual growth rate of 1.5 percent. But, in fact, rice export was found to decline at a declining rate in the initial years of the period considered. This is revealed by the estimated log quadratic trend equation of rice export (Table 2.10). Because of decline in rice export at declining rate, in the latter period rice export showed a positive growth rate. Consequently, overall annual compound growth rate of rice turned out to be positive. In value terms too, the estimated log quadratic equation revealed a similar trend of rice export (Table 2.11). The triennium average figures of rice

export over time depicted in Tables 2.4 and 2.5 also reveal a decline in export of this commodity between the early -and the mid-eighties in the face of perceptible rise in export between the mid-eighties and early nineties.

The international trade in pulses has been increasing at a very high rate both in quantity and value terms. However, the growth in quantity terms of trade is much faster than value terms of trade. The degree of predictability of the time variable is also high in the case of international trade in pulses. Though, in quantity terms, global export fluctuations in pulses was quite high compared to other commodities - as revealed by its degree of export growth instability, its overall export growth rate was also high. However, in value terms, pulses showed very low year to year fluctuations in its export compared to other commodities. Further, though pulses have shown an overall growth of 8.3 per cent per annum in their global exports over the past 15 years, there appears to be a deceleration in their export growth (Table 2.10). This deceleration in export growth of pulses was noticed between the mid-eighties and the early nineties (Table 2.4).

As regards export growth performance of horticultural commodities, all the selected fruits and vegetables have shown appreciable growth rates, particularly in value terms. The degree of predictability of time variable was also noticed to be high both in quantity and value terms of trade of these fruits and vegetables. As regards degree of instability, export growth fluctuations of the lowest order was noticed among various fruits and vegetable trade compared to other commodities of international trade. During 1979-93 period, various fruits and vegetables registered 2-4 per cent annual growth in their global quantity exports and 4-9 per cent growth in the value of their international trade. However, in the case of banana, which showed an annual compound growth rate of 3.8 per cent in quantity terms of trade and 8.3 per cent in value terms of trade during 1979-93, there was, in fact, a decline in export growth rate of this commodity in quantity terms in the initial years of study. But this decline in banana export was at a declining rate of very high order. Consequently, banana export showed a substantial growth in the latter period of study and, thus, net overall annual growth in banana export was not only positive but it was quite high too. This export growth trend of banana export is revealed by the log quadratic equation (Table 2.10). Among other fruits and vegetables, potatoes, onions and grapes registered around 4 per cent annual growth in their quantum of global exports and 5.8 per cent annual growth in their value of exports.

As the growth rates of vegetables reveal, the world export in fresh vegetables is growing much faster than processed vegetables. Though fresh vegetables show a higher growth compared to processed ones, the degree of fluctuations in export growth, as revealed by its index of instability, is also high. The fitted log quadratic trend equations also reveal a considerable acceleration in export growth of both categories of vegetables over the past one and a half decades (Table 2.11). Further, floricultural exports of the world has grown even faster than processed and fresh vegetable trade - the annual compound growth in global floricultural trade being nearly 11 per cent during 1979-93.

Table 2.8: Compound Growth Rates in World Exports of Important Agricultural Commodities (Quantity terms): (1979-1993)

Commodities	CGR (%)	t-Statistics	R ² (%)	Instability Index (%)
Cereals	0.68**	2.21	27.23	21.79
a) Wheat and Wheat Flour	1.59***	3.32	45.92	48.52
b) Rice/Paddy	1.51**	2.67	35.34	84.87
Pulses	8.26***	12.15	91.91	92.08
Potatoes	4.00***	8.97	86.09	47.65
Onions	3.89***	12.00	91.72	25.85
Oranges+Tang+Clem	1.37***	4.46	60.43	23.45
Bananas	3.82***	6.31	75.36	99.36
Apples	1.53***	6.16	74.50	15.32
Grapes	4.44***	12.04	91.77	31.78
Oilseed Cake+Meal	4.19***	13.53	93.37	20.81
Soyabean Cake	3.84***	9.45	87.29	33.68
Groundnut Cake	-1.81	1.09	8.43	770.05
Cottonseed Cake	4.42***	4.24	58.00	269.94
Sunflower Cake	8.35***	7.24	82.16	211.01
Rapeseed Cake	15.02***	19.16	96.58	101.99
Groundnut Tot Shell	3.17***	7.81	82.44	38.74
Sesame Seed	5.83***	10.58	89.59	68.85
Castor Oil	-0.09	0.12	0.11	125.91
Cotton Lint	1.32**	2.68	35.67	61.78
Jute+Bast Fibre	-3.90***	4.91	64.98	146.68
Tea	2.03***	7.74	82.16	15.76
Coffee Green+Roast	2.30***	9.90	88.30	12.78
Tobacco Un-manufactured	1.26***	3.27	45.09	37.95

Note : 1) *,** and *** represent significance at 10,5 and 1 per cent level of probability.

Table 2.9: Compound Growth Rates in World Exports of Important Agricultural Commodities (Value terms): (1979-1993)

Commodities	CGR (%)	t-Statistics	R ² (%)	Instability Index (%)
Cereals	-0.42	0.48	1.77	174.96
a) Wheat & Wheat Flour	0.06	0.06	0.03	172.45
b) Rice	0.59	0.48	1.78	360.80
Pulses	5.64***	5.67	71.18	212.80
Potatoes	5.11***	4.01	55.26	413.20
Onions	6.29***	5.07	66.44	367.91
Oranges+Tang+Clem	4.29***	6.24	74.94	114.50
Bananas	8.31***	13.52	93.36	96.01
Apples	4.40***	4.15	56.98	298.18
Grapes	8.54***	13.34	93.20	91.40
Oilseed Cake+Meal	2.94***	3.46	47.98	162.26
Soyabean Cake	2.81***	3.24	44.67	169.14
Groundnut Cake	-2.62	1.14	9.06	1396.57
Cottonseed Cake	0.90	0.49	1.82	661.20
Sunflower Cake	5.39***	5.32	68.51	211.01
Rapeseed Cake	12.25***	11.67	91.28	228.31
Groundnut Tot				
Shell	2.26**	2.28	28.59	261.77
Sesame Seed	4.90***	4.26	58.32	407.66
Castor Oil	-2.15	1.71	18.44	397.66
Cotton Lint	0.26	0.31	0.75	168.90
Jute+Bast Fibre	-3.73***	4.05	55.79	221.49
Tea	2.07**	2.64	34.96	148.38
Coffee Green+Roast	-3.55***	3.08	42.19	325.51
Tobacco Un-				
manufactured	2.27***	3.73	51.73	97.22
Vegetables				
- Processed	6.90***	11.45	90.98	85.26
- Fresh	9.23***	9.28	86.89	232.23
Floriculture	10.81***	10.99	90.29	209.42

Note : 1) *, ** and *** represent significance at 10, 5 and 1 per cent level of probability.

Except groundnut cake, all the oilseed cakes have shown substantial growth over time. Groundnut cake has shown a decline in exports both in equantity and value terms. However, not only the export growth rate of this commodity was found to be non significant but the degree of predictability of the time variable in explaining export growth trend was also very low.

The growth in the international trade in total oilseed cake and meal was higher in quantity terms than in value terms. Though, in general, various oilseed cakes registered about 4.2 percent annual growth in their quantity of exports, the export growth of these commodities appeared to have decelerated (Table 2.10). This deceleration in export growth was noticed after the mid-eighties (Table 2.4). A trend of similar nature was noticed

in the case of soybean cake, sunflower cake and rapeseed cake. In the case of cottonseed cake, initially the quantity of global exports was found to decline. But this decline was at a declining rate and, consequently, in the latter period the global exports of this commodity appeared to have picked up resulting in an overall positive growth in export of this commodity (Table 2.10). This export growth trend is also evident from Table 2.4.

The scenario obtaining in terms of export growth performance of fibre crops reveal that during 1979-93 period, while world cotton lint export grew at the rate of 1.3 per cent per annum in quantity terms, there was a significant decline in jute and bast fibre export during the same period, both in quantity and value terms. This decline in jute export was to the tune of 3.9 per cent per annum in quantity terms and 3.7 per cent per annum in value terms.

Among plantation commodities, the global export of coffee was found to grow at the rate of 2.3 per cent per annum in quantity terms. But, in value terms, its export declined by nearly 3.6 per cent per annum during 1979-93. This trend in export growth performance of coffee is also evident in Table 2.4. As regards export growth performance of other plantation commodities like tea and unmanufactured tobacco, not only the export growth rates of these commodities were positive and significant but the predictability of time variable was also high. However, the instability indices or export growth fluctuations of these two commodities was too low both in quantity and value terms of exports. Further, while tea export increased at an increasing rate during 1979-93, the export of tobacco, on the other hand, was found to decline at a declining rate (Table 2.10). This trend has resulted in an overall positive growth in global exports of these two commodities.

Table 2.10: Estimated Log Quadratic Trend Equations for World Export of Important Agricultural Commodities - (Quantity terms) - (1979-1993).

Commodity	a	+bt	+ct ²	R ² (%)	d-stat- istics
Cereals	14.5744	0.0069 (0.5028)	-0.0001 (0.0096)	27.16	1.62
a) Wheat and Wheat Flour	13.6994	0.0380* (1.8915)	-0.0014 (1.1397)	51.16	1.42
b) Rice	14.0987	-0.0356* (1.7702)	0.0032** (2.5876)	58.51	2.52
Pulses	14.5363	0.1164*** (4.3209)	-0.0023@ (1.4162)	93.07	0.97
Potatoes	15.3189	0.0196 (1.0564)	0.0012 (1.0811)	87.34	1.02
Onions	14.2372	0.0245* (1.8040)	0.0009 (1.0374)	92.43	2.17
Oranges+Tang+ Clem	15.4300	-0.0005 (0.0352)	0.0009 (1.1147)	64.13	2.56

(Contd.)

Table 2.10: (Contd.)

Commodity	a	+bt	+ct ²	R ² (%)	d-stat- isti- cs
Bananas	15.8231	-0.0456*** (4.6620)	0.0052*** (8.7374)	96.65	2.22
Apples	15.0024	0.0014 (0.1407)	0.0009@ (1.3837)	77.98	1.69
Grapes	13.7919	0.0358** (2.2542)	0.0005 (0.4909)	91.97	2.17
Oilseed Cake+ Meal	14.6160	0.0664*** (5.9263)	-0.0016** (2.3239)	95.46	1.98
Soyabean Cake	14.2318	0.0749*** (5.3717)	-0.0023** (2.7463)	92.19	1.78
Groundnut Cake	14.0155	-0.1507** (2.3901)	0.0083** (2.1606)	34.08	0.99
Cottonseed Cake	13.7044	-0.0323 (0.8143)	0.0047* (1.9596)	68.19	1.65
Sunflower Cake	13.3322	0.1718*** (4.6015)	-0.0057** (2.5241)	88.36	2.54
Rapeseed Cake	13.0406	0.1883*** (6.4220)	-0.0030@ (1.6971)	97.23	1.39
Groundnut Tot	13.4798	0.0157 (0.9105)	0.0010 (0.9303)	83.65	2.11
Shell					
Sesame Seeds	12.2491	0.0697** (2.9575)	-0.0008 (0.5699)	89.87	2.25
Castor Oil	12.2275	-0.0505@ (1.7409)	0.0031@ (1.7588)	20.59	1.55
Cotton Lint	15.2601	0.0151 (0.6942)	-0.0001 (0.0954)	35.67	1.69
Jute+Bast Fibres	13.2647	-0.0188 (0.5292)	-0.0013 (0.6050)	66.02	2.52
Tea	13.6765	0.0378*** (3.6573)	-0.0011@ (1.7645)	85.78	1.35
Coffee Green+ Roast	15.1027	0.0209* (2.0494)	0.0001 (0.1784)	88.33	2.30
Tobacco Un- manufactured	14.2044	-0.0303** (2.6647)	0.0027*** (3.8695)	75.58	1.31

Note : 1) @, *, ** and *** represent significance at 20,10,5 and 1 per cent level of probability.

2) Figures in parentheses are t-values of the respective regression coefficients.

Table 2.11: Estimated Log Quadratic Trend Equations for World
Export of Important Agricultural Commodities -
(Value terms) - (1979-1993)

Commodity	a	+bt	+ct ²	R ² (%)	d-stat- isti- cs
Cereals	15.2154	-0.0496 (1.3493)	0.0028 (1.2689)	13.39	1.30
a) Wheat and Wheat Flour	14.3761	-0.0208 (0.5281)	0.0013 (0.5576)	2.56	1.20
b) Rice	15.5222	-0.1077** (2.5400)	0.0071** (2.7552)	39.84	1.45
Pulses	13.9110	0.0550 (1.2740)	-0.0001 (0.0041)	71.18	1.07
Potatoes	13.7044	-0.0308 (0.6144)	0.0050@ (1.6556)	63.59	1.51
Onions	12.8199	-0.0409 (0.9235)	0.0064** (2.3656)	77.11	1.97
Oranges+Tang+ Clem	14.4358	-0.0223 (0.9634)	0.0040** (2.8523)	85.06	1.25
Bananas	14.0095	0.0096 (0.5960)	0.0044*** (4.4964)	97.53	1.49
Apples	14.1767	-0.0499 (1.3442)	0.0058** (2.5739)	72.28	1.46
Grapes	13.2279	0.0569** (2.1632)	0.0016 (0.9761)	93.72	1.25
Oilseed Cake+ Meal	13.1249	0.0201 (0.5392)	0.0006 (0.2451)	48.21	1.35
Soyabean Cake	12.8526	0.0342 (0.8953)	-0.0004 (0.1729)	44.82	1.35
Groundnut Cake	12.3946	-0.2272** (2.6606)	0.0125** (2.4164)	38.82	0.96
Cottonseed Cake	12.0126	-0.1157@ (1.6033)	0.0078* (1.7760)	22.26	1.71
Sunflower Cake	11.5836	0.0748@ (1.7173)	-0.0014 (0.5263)	69.22	2.45
Rapeseed Cake	11.4044	0.0914* (2.0962)	0.0015 (0.5721)	91.53	1.67
Groundnut Tot Shell	13.3054	-0.0304 (0.7477)	0.0033 (1.3324)	37.80	2.33
Sesame Seeds	12.1278	0.0189 (0.3831)	0.0018 (0.6034)	59.63	1.03

(Contd.)

Table 2.11: (Contd.)

Commodity	a	+bt	+ct ²	R ² (%)	d-stat- isti- cs
Castor Oil	12.0525	-0.0329 (0.5835)	0.0007 (0.2043)	18.71	1.53
Cotton Lint	15.7535	-0.0067 (0.1791)	0.0006 (0.2566)	1.29	0.89
Jute+Bast Fibres	12.2364	-0.0620@ (1.5056)	0.0015 (0.6007)	57.09	1.73
Tea	14.3414	0.0542@ (1.6372)	-0.0021 (1.0473)	40.40	1.63
Coffee Green+ Roast	13.7837	0.0623 (1.4346)	-0.0062** (2.3311)	60.21	1.42
Tobacco Un- manufactured	15.2415	-0.0197 (0.8301)	0.0026* (1.8259)	62.22	0.98
Vegetables -Processed	14.5964	0.0285 (1.2186)	0.0024@ (1.6849)	92.72	1.07
-Fresh	15.6664	0.0116 (0.3246)	0.0048** (2.1984)	90.64	0.88
Floriculture	14.8765	0.0402 (1.0777)	0.0032@ (1.7214)	92.21	0.73

Note : 1) @, *, ** and *** represent significance at 20,10,5 and 1 per cent level of probability level.

2) Figures in parentheses are t-values of the respective regression coefficients.

As regards export growth rate performance of other commodities like groundnuts in shell, sesame seed and castor oil, it was noticed that except castor oil the remaining two commodities registered significant and positive growth rates. However, the global sesame seed export grew faster than shelled groundnut export both in quantity and value terms.

Durbin-Watson 'd' statistics was applied in the estimated log quadratic trend equations to assess the incidence of auto-correlation. Since the critical values of 95 per cent level of 'd' statistics were found to be within the permissible range i.e. $du < d^* < (4-du)$ where d^* is the estimated value of 'd' statistics and du is the upper limit of tabulated value of the same, there was no auto-correlation between the successive figures of quantity and value of exports of majority of commodity over time.

2.5 International Price Instability

A continuous decline in average prices of all food commodities relative to those of other tradable goods and a marked increase in price fluctuations have been prominent characteristics of international food markets in the past two decades. Since the early 1970s, the real international food prices have shown tremendous fluctuation and wavered from

reaching twice the early 1970s value to hovering down to half the 1980 values. Such wide variation in prices can be reckoned as the widest observed this century. Although fluctuations in climate have always made agricultural markets comparatively volatile, this volatility, however, has increased as more governments have come to use international food markets as possible outlet for the residual supply and also for dumping grounds for unplanned surpluses. Exchange rate fluctuations have also affected prices directly (Rod Tyers, 1990). In addition to this, over the last decade production has also outpaced the growth of demand for agricultural commodities in the world economy. Consequently, this has resulted in weak or falling prices for many agricultural commodities (Deán A. De Rosa, 1991). The depressed world prices together with government policies that tax agriculture relative to industry in developing countries have discouraged realisation of true farm output and consequently have been instrumental for lower rural incomes. In addition, prolonged protection of producers in the industrialised market economies coupled with slower income growth in the developing countries have combined to result in global glut in the market for many farm products. Export subsidies designed to dispose of the surplus have vitiated the world price situation even more and have further depressed world prices (Thomas W. Hartel, 1990). However, a marked increase in agricultural export prices was noticed from 1988 and onwards (Table 2.12). A part of the explanation for this recent price surge lies in the economic recovery that is being witnessed in most of the developed regions and which has benefitted agricultural commodity prices also in general. This phenomenon can also be partly attributed to adjustment of agricultural supply to the earlier period of depressed prices and partly to adverse weather effects on crops that made global food stocks to decline. But, as a matter of fact, the increase in export prices was largely contributed by perceptible rise in export prices of developing countries, both for food and non-food items. The export prices of food and non-food items of developed countries showed continuously a declining trend, with the sole exception of 1988 when the developed countries' export prices of food and non-food items rose by 18 per cent from the level of 1987. Thereafter, an all pervasive declining trend in export prices again caught up with developed nations, and in 1993 prices fell by nearly 25 per cent for food and 20 per cent for non-food items from the level of 1988.

As per FAO Commodity Review and Outlook, 1994-95, for developing countries as a whole, the price index for their agricultural, fishery and forestry export commodities rose by over 20 per cent in 1994; the surge in similar index for developed countries was, however, only 2 per cent.

In fact, by 1992 the net barter terms of trade (or real prices) for developing countries' agricultural exports had fallen to some 60 percent of the level realised during early 1980s. After stagnating at this level well through 1993, the terms of trade for developing countries were estimated to have recovered to 77 per cent in 1994 (FAO Commodity Review and Outlook, 1994-95). The surge in market prices in the recent years underlines the continuing instability of world agricultural commodity

markets. While developments in international trade policy dominated the scene during the past year, the up-turn in agricultural commodity prices witnessed in world markets in 1994 was expected to get further consolidated in 1995 providing in its wake a welcome relief and respite to exporters after long years of declining international prices.

Table 2.12: Trend in Food and Non-food Export Price Indices

Year	Total Agriculture (World)	Food			Non-food		
		World	Deve- loped	Deve- loping	World	Deve- loped	Deve- loping
(indices 1980 = 100)							
1981-83 (Average)	83	81	85	73	87	90	83
1984	80	74	75	70	91	93	90
1985	71	66	68	63	74	75	73
1986	74	74	73	77	75	77	70
1987	78	75	79	66	86	89	82
1988	92	87	93	75	100	105	93
(indices 1979-81 = 100)							
1989	97	95	82	101	102	93	108
1990	99	96	78	105	104	94	109
1991	94	93	73	102	97	89	101
1992	95	95	71	107	94	89	97
1993	89	90	70	98	88	84	91

Source : FAO Commodity Review and Outlook (Various Issues)

2.6 Review of Future Agricultural Export Scenario

Though cereal exports, of late, have grown by 26 per cent in value terms and have shown a 10 per cent increase in trading volumes in quantity terms in early nineties over the mid-eighties, the future expansion of exports in cereals would greatly depend on future price mechanisms, aside from considerations such as reduced anti-export bias in the overall trade regime and the pattern of trade that obtains in the North-Central America and Europe after trade liberalization since north-central America and European Countries together contribute to more than two-thirds of the global trade in cereals. It is noteworthy and worth a mention here that the trading regimes in most of the developing countries were substantially free of anti-export bias even during the mid 1980s (Judith et. al., 1994).

According to Martin Brown and Ian Goldin (1992) the World Food product markets are likely to witness major shifts in the trading pattern in the coming decades. The authors have tried to analyse and assess the alternative projections provided by various international agencies in order to interpret their impli-

cations on food policies of developing countries. They predict that the world trade in major food products would rise substantially by the year 2000. In terms of product composition, their projections are that rice would remain relatively unimportant in global cereals trade even though some other more dynamic projections imply relatively rapid growth. As per World Bank projections, global rice trade would rise by 4.5 per cent annually over the 1987-2000 period to reach 22 million tons. During the same period, the wheat and coarse grains were projected to grow by 4.3 per cent and 5.0 per cent annually to register an additional 80-90 million tons export volume of each of these two commodities. Total world cereal trade was projected to register an additional 150 million tons to the year 2000 from mid-1980 levels i.e. an increase of the order of nearly 75 per cent over the mid-1980 levels.

On the other end of the spectrum, Joachim Zietz and Alberto Valde's (1990), while comparing results of various studies on world food prices, predicted fairly large degree of uncertainty in world food commodity prices in the next 20 years or thereabouts. According to them, the real prices of wheat and coarse grains would continue to show a decline. The World Bank projections also predict the prices of major food products to fall. As per the projections with the prices prevailing over 1970-84 period as a base for comparison, the international food prices would fall by an average of 50-60 per cent by the year 2000. The outlook of rice prices, however, is much more uncertain: the projection undertaken for the Development Centre of the OECD points to a significant rise, as do those of International Institute for Applied Systems Analysis (IIASA).¹ The IIASA projections also predicted a little change in the long run prices of cereals, although wheat and coarse grains prices were projected to register modest falls over the 1980-2000 period. In line with the Development Centre (OECD) projections but in contrast to those of World Bank, IIASA projects a slight rise in rice prices. The uncertainty about the rice prices surely has a bearing for some of the large but low-income countries.

The World Bank (1989) also forecasted a 60 per cent drop in international food prices in 1995 from the level of 1980-82. The US Department of Agriculture in its forecast had predicted a 70 per cent sliding back in grain and soybean prices by the year 2000 from their 1980-82 levels. On the other hand, sugar, meat and dairy prices were projected to be somewhat higher (Roningen, Dixit and Seeley, 1982).²

The various projections cast a shadow on the prospects and ability of cereal exporters in the developing countries to

1. See Zietz and Valde's (1989) and Parikh et. al. (1988).

2 See also Johnson et al (1989). These forecasts - which are a continuation of the past long-term trend predictions, (Griulli and Yang, 1987) - contrast with the Food and Agricultural Organisation's 1979 report entitled "Agriculture: Towards 2000, which had predicted the traded international food prices to rise. Parikh et al (1988) had also predicted a rise in international food prices while constructing their reference model.

increase their share in the net global cereal trade. It is widely argued that the large low-income Asian countries (especially, China, India, Bangladesh and Pakistan) are unlikely to emerge as significant net cereal exporters. However, the question is, can other Asian or Latin American countries ever emerge as major cereal exporters? The projections are by and large dismal in this regard, primarily because of the supply constraints and more generally due to the pessimistic nature of economic interactions in these countries. And, such pessimism does exert its effect on agriculture in these countries. The implications of such projections is that only the organization for Economic Co-operation and Development (OECD) countries can be implicated to increase their exports because these OECD countries have the ecological, technological and "structural" capacity to not only meet the rising export demands but also retain buoyancy in their agricultural sectors. These projections may, however, reflect excessive 'technological' and 'structural' pessimism as regards the capacity and ability of some of the exporters in developing countries (Martin Brown and Ian Goldin, 1992).

Intra-trade between developing countries also crucially impinge the total global agricultural exports. In fact, trade between developing countries has been a growing and dynamic feature of world trade during the last two decades. The share of intratrade is virtually increasing for all categories of exports from developing countries. Therefore, it is not surprising that most intratrade is transacted within the major regions of the developing world viz., Asia, Africa and Latin America. Even though manufactured goods continue to be the major components of intratrade, the share of agricultural commodities in intratrade is also showing promising signs of expansion. According to Islam (1992), while agricultural exports from developing to developed countries grew by 6 per cent per year during 1960-89, intratrade in agricultural commodities registered a 7.3 per cent growth per year. He further estimated that an annual growth rate of 5 per cent in developing countries would increase their aggregate intratrade as much as 71 per cent by the year 2001. His projections have predicted much higher growth rates for intratrade in meat, fruits and vegetables, sugar and oilseeds, fats, and oils in that order. And, as per these projections, by 2001, the share of intratrade in agricultural exports is estimated to touch 80 per cent for wheat and rice, 62 per cent for coarse grains, 55 per cent for oilseeds, oils and fats, 38 per cent for sugar, 40 per cent for agricultural raw materials, 37 per cent for fruits and vegetables, and 16 per cent for tropical beverages and tobacco. The author has strived to correlate intratrade with income in these countries and, according to him, as the incomes grow in developing countries, the share of intratrade for agricultural commodities would also increase. And, consequently, the total volume of world trade in agricultural commodities would also increase.

In the present milieu, faced with rapidly shifting international market conditions, horticultural products in particular have acquired much attention and significance in international trade. The prospects for the liberalization of trade in horticultural products may be linked with the success of the Uruguay

Round of the Multilateral Trade negotiations. In the changed market conditions, horticultural products are expected to have better prospects particularly for developing countries because import demand in these commodities is growing fast for not only in higher income developing countries but also in the developed countries. This inherent importance of horticultural products in world agricultural trade and in developing countries' agricultural exports was stressed by many writers. Due to changing pattern of food consumption and expenditures and the reduction of official barriers, developing countries were observed to increase their share in world horticultural trade, with fruit and fruit products constituting a large proportion of their total horticultural exports (Islam, 1990). Since developing countries with abundant labour in relation to capital or land enjoy a comparative advantage in labour-intensive horticultural products, as against for cereal products, the growth prospects for exports of these products are, therefore, likely to be favourable for developing countries. A rise in non-traditional agricultural exports, such as horticultural exports, in developing countries will not only lead to expansion of foreign exchange earnings which can be used to meet rising import requirements of other countries but also to meet mounting debt service payments. Thus, developing countries should find potentiality in non-traditional exports at a time when growth in the traditional ones is foundering.

CHAPTER - III

AGRICULTURAL PRODUCTION AND TRADE IN ASIA

Since our purpose in this study is to analyse and examine the potentiality that Indian agricultural exports, specially the non-traditional ones, hold in the post economic liberalisation period and in the aftermath of WTO coming into existence, it will be useful to analyse the changing structure of agricultural production and exports in Asia too. A number of East and South East Asian Countries trade in agricultural commodities both within Asia and with the rest of the world. India being one of the largest countries in Asia, predominantly agricultural, also has trading partners in agricultural commodities in Asia and at the same time India will also have many competitors for agricultural exports. In view of the afore mentioned reasons, in this chapter we deal with the trends in and changing structure of agricultural production and exports in Asia.

3.1 Changing Agricultural Production Scenario in Asia

The changes in the production pattern of agricultural commodities in Asia witnessed since the early eighties have been briefly examined in this section. But, before taking up this discussion we shall first examine Asia's share in World production of the selected commodities.

Asia's share in the total world production of various selected commodities has increased reasonably in due course of time. As for Asia's contribution to world cereal production, nearly 40 per cent of the global cereal output was produced in Asia during 1979-81. This proportion had improved marginally to 42 per cent by the mid-eighties. A further increase in this proportion was noticed after the mid-eighties and by the early nineties it had reached a level of about 46 per cent of the total global cereal output (Table 3.1). Thus, it is quite discernible that Asia's contribution to world cereal output has been continuously rising over the past 15 years. This rise can be mainly attributed to increased share of Asia in global output of wheat since the share of the continent in global rice output has remained largely constant at around 90 per cent over the past one and a half decades. Apart from cereals, Asia also accounts for the bulk of the pulses produced in the world. However, the share of this continent in global pulse production has declined over the years (Table 3.1). All the selected fruits and vegetables produced in Asia have shown a continuously rising trend over time in terms of their share in total global production. While the share of Asia in world potato production had increased from 15 per cent during 1979-81 to 25 per cent by 1991-93, for onions this share rose from 45 per cent to 53 per cent, for oranges from 16 per cent to 22 per cent, for bananas from 37 per cent to 40 per cent, for apples from 23 per cent to 32 per cent and for grapes from 11 per cent to 17 per cent, respectively, between the same period. Other selected commodities like groundnuts in

shell, sesame seeds, cotton lint, jute, tea, coffee and tobacco produced in Asia have also followed a similar rising trend in terms of their share in total global production. However, inspite of the fact that whole of the jute and tea produced in the world comes from Asia, their share in total world production was found to grow at a very slow pace and, in fact, hovered at around 95 per cent and 80 per cent, respectively, over the past 15 years. It is worth mentioning here that bulk of the tobacco produced in the world also comes from Asia and that the share of the continent in total global tobacco production has increased from 44 per cent to 62 per cent between the early eighties and the early nineties. However, in the case of coffee, more than two-thirds of the global production is contributed by America (according to FAO estimates).

Table 3.1: Triennium Average Share of Asia in World Output of Various Agricultural Commodities (Quantity Terms) (in per cent)

Commodities	Triennium Average		
	Periods		
	1	2	3
Cereals	40.15	41.77	46.28
a) Wheat	30.44	35.43	38.67
b) Rice/Paddy	90.91	91.63	91.47
Pulses	52.34	45.69	45.58
Potatoes	14.59	19.73	25.37
Onions	44.80	48.67	53.11
Oranges	15.80	18.57	22.41
Bananas	37.49	38.22	39.52
Apples	23.08	25.19	32.30
Grapes	10.79	12.18	16.66
Groundnut in Shell	58.64	65.87	69.12
Sesame Seeds	62.75	68.74	74.30
Cotton Lint	38.97	45.97	50.40
Jute + Allied Fibres	95.80	96.47	96.86
Tea	79.41	78.59	81.04
Coffee (Green)	11.06	12.42	16.48
Tobacco Leaves	44.13	54.99	62.38

Note : Period 1 = 1979-81; Period 2 = 1985-87;
Period 1991-93

Thus, so far as share of Asia in global production is concerned, there has been phenomenal increase in the continent's share in total world production of all the selected commodities over the given period of time. However, this is one end of the spectrum. The other end being evaluation of pattern of change in the structure of agricultural production of Asia during the last 15 years.

The scenario obtaining over the past one and a half decades reveals that majority of agricultural commodities produced within

the Asian periphery have registered perceptible rise in their production. While production of cereals and pulses expanded by nearly 20-40 per cent between the early eighties and the early nineties period, the production increases in the case of various fruits and vegetables during the same period were in the range of 30-120 per cent (Table 3.2). Various plantation commodities also showed an increase of about 40-110 per cent in their production during the same period. Though overall Asia's production of the selected agricultural commodities showed perceptible increases between the early eighties and the early nineties period, the period was also marked with considerable slowing down of production increases for majority of the selected commodities in the later half of this period. This was especially true of commodities like cereals - both wheat and rice, pulses, potatoes, onions, groundnuts, sesame seeds, cotton lint, tea and tobacco.

Table 3.2: Structural Changes in Asia's Production of Important Agricultural Commodities

(in '000' MT)

Commodities	Triennium Averages			Per cent Change		
	Periods			2 Over 1	3 Over 2	3 Over 1
	1	2	3			
Cereals	639551	765250	884313	19.65	15.56	38.27
a) Wheat	135099	184255	215985	36.39	17.22	59.87
b) Rice/Paddy	360233	427639	479538	18.71	12.14	33.12
Pulses	21300	24078	25506	13.04	5.93	19.75
Potatoes	37716	56513	69534	49.84	23.04	84.36
Onions	8755	12152	15502	38.80	27.57	77.06
Oranges	5749	7940	12705	38.11	60.01	120.99
Bananas	14695	14902	19872	1.41	33.35	35.23
Apples	7963	9810	13274	23.19	35.31	66.70
Grapes	7122	7762	9741	8.99	25.50	36.77
Groundnut in Shell	10717	13732	16851	28.13	22.71	57.24
Sesame Seeds	1184	1559	1778	31.67	14.05	50.17
Cotton Lint	5613	7513	9322	33.85	24.08	66.08
Jute+Allied Fibres	3942	4343	3421	10.17	-21.23	-13.22
Tea	1462	1821	2073	24.56	13.84	41.79
Coffee(Green)	572	713	989	24.65	38.71	72.90
Tobacco Leaves	2348	3529	4994	50.30	41.51	112.69

Note : 1) Period 1 = 1979-81; period 2 = 1985-87;
 Period 3 = 1991-93

Nevertheless, all the fruits showed accelerated production expansions after the mid-eighties. In fact, with the passage of time, fruits and vegetables in particular have shown remarkable growth in their production levels. While potatoes and onions have registered principal production expansions between the early- and the mid-eighties and thereafter a considerable slowing down in their production expansion is also noticed, all the selected fruits, on the other hand, have shown major production expansions

after the mid-eighties, that is, in the later half of the overall period considered. But, in the case of jute and allied fibres, in spite of about 10 per cent production increase between the early- and the mid-eighties, the overall jute production was found to have declined during 1979-1993 period (Table 3.2). This overall decline in jute production could be mainly attributed to a steep fall in the production of this commodity after the mid-eighties. It is pertinent to mention that India and Bangladesh are the two major jute producing countries of the world and together, they account for more than 70 percent of the total jute produced in Asia. According to the estimates of FAO, the raw jute and jute goods produced in these two countries showed drastic decline after the mid-eighties. While this decline in jute output for India was estimated at only about 4 per cent between the mid-eighties and the early nineties, Bangladesh showed a sharper decline of 15 per cent during the same period. In fact, falling international prices of jute have adversely affected the jute production in Bangladesh leading to overall global decline in the jute production.

Thus, from the scenario obtaining from tables 3.1 and 3.2, it becomes amply clear that except jute and the allied fibres, with the advent of time not only Asia's total production of all the selected commodities increased perceptibly but its share in the total world production has also gone up significantly.

3.2 Growth Trends and Instability in Asia's Share in World Agricultural Production

The observance of output growth trends shows that Asia's share in the world output of most commodities has risen by about 1-4 per cent annually. However, in the case of certain commodities, this continent has shown very slow growth in terms of its share in the world output. Interestingly, the degree of predictability of time variable in explaining growth rates has been relatively high among those commodities which showed impressive growth rates over time. However, in the face of wide global fluctuations in the output growth, Asia's share in the world output of selected commodities shows some growth.

During the 1979-93 period, Asia's share in the world cereal output grew at the rate of 1.10 per cent per annum (Table 3.3). This largely owes it to the growth in Asia's share in global wheat output. Thus, while the share of this continent in world rice output had grown negligibly during the 1979-93 period, that of wheat grew at 1.7 per cent per annum during the same period. This is corroborated by the fact that Asia's share in world rice output continues to stagnate at around 90 per cent over the past 15 years. And, that is why the instability or output growth fluctuations of the lowest order is noticed in the case of Asia's share in world wheat output.

Though in absolute terms Asia's overall pulses production shows expansion over time, its share in the world, however, has declined considerably. In fact, the share of Asia in the world pulses output has been declining at 1.3 per cent per annum rate. The estimated log quadratic trend equation also corroborates to a

decline in the share of Asia in the world pulses output but shows a slowing down in this declining trend over time (Table 3.4). The same is also evident from Table 3.2 which indicates how the share of Asia in world output of pulses has remained almost constant between the mid-eighties and the early nineties after initially showing a steep fall in its share between the early-and the mid-eighties.

Between 1979-93 period, the share of Asia in the world production of all the selected fruits and vegetables grew at the rate of about 3-4 per cent per annum except for onions and bananas from Asia which showed their share in the world output to grow only at 1.2 per cent and at a much below 1.0 per cent level, respectively, during the same period. Asia's share in world potato production was found to fluctuate very widely over the past 15 years. Such wide fluctuations concomitant with significantly higher growth rates have meant that Asia's share in the global potato production almost doubled between the early eighties and the early nineties (Table 3.1). But, in the case of remaining fruits and vegetables, the overall fluctuations in output growth were not observed to be as wide (Table 3.3). Though overall share of Asia in world potato production grew at the rate of 3.3 per cent per annum between 1979 and 1993, a deceleration in the same was noticed (Table 3.4). This deceleration took place between the mid-eighties and the early nineties (Table 3.1).

The share of Asia in both groundnut and sesame seeds production of the world grew at the rate of around 1.2 per cent per annum during 1979-93. The degree of predictability of time variable in explaining this growth was same for both these commodities. The overall fluctuation in output growth for these two commodities was also similar. Thus, groundnuts and sesame seeds followed similar trends in terms of their output growth and growth fluctuations.

Regarding fibre crops, although overall jute production in Asia declined considerably between the early eighties and the early nineties, yet its share in the world output of this commodity was found to be near stagnant during this period. However, the share of this continent in cotton lint production of the world grew appreciably between the early-eighties and the early nineties.

While Asia's share in tea production of the world grew at a very low rate during the past 15 years, its share in the world coffee and tobacco production was found to grow at a very high rate during this period. Further, this continent showed very high degree of instability in terms of its share in world coffee production. As a matter of fact, Asia's share in world coffee production fluctuated widely between the mid-eighties and the early nineties (Table 3.1). The share of Asia in world tobacco production, however, grew at a rate which was slightly below that of coffee. Though the share of coffee output of Asia in the world showed a high rate of growth between 1979 and 1993, a considerable slowing down or deceleration in the growth (Table 3.4) of this commodity could be observed between the mid-eighties and the early nineties (Table 3.1).

Table 3.3: Compound Growth Rates on Asia's Share in World Output of Various Agricultural Commodities (Quantity Terms) : (1979-1993)

Commodities	CGR(%)	t-statistics	R ² (%)	Instability Index(%)
Cereals	1.10***	5.11	66.75	11.22
a) Wheat	1.74***	6.05	73.76	19.01
b) Rice/Paddy	0.04	1.04	7.64	0.32
Pulses	-1.33***	5.02	66.00	18.01
Potatoes	3.34***	3.16	43.39	213.98
Onions	1.18***	7.83	82.50	5.57
Oranges	2.98***	7.56	81.49	36.59
Bananas	0.53***	3.53	48.93	5.42
Apples	2.93***	6.90	78.54	42.06
Grapes	3.77***	9.40	87.17	38.92
Groundnut in Shell	1.17***	4.26	58.23	17.21
Sesame Seeds	1.20***	3.98	54.87	20.57
Cotton Lint	1.60***	3.47	48.05	46.98
Jute+Allied Fibres	0.09*	2.05	24.51	0.43
Tea	0.19**	2.73	36.39	1.22
Coffee(Green)	3.72***	5.20	67.53	117.76
Tobacco Leaves	2.64***	7.84	82.56	24.88

Note : 1) *, ** and *** represent significance at 10, 5 and 1 per cent level of probability

Table 3.4: Estimated Log Quadratic Trend Equations for Asia's Share in World Output of Various Agricultural Commodities (Quantity Terms) : (1979-1993)

Commodity	a	+bt	+ct ²	R ² (%)	d-statistics
Cereals	3.6834	0.0083 (0.8693)	0.0002 (0.2876)	66.98	2.14
a) Wheat	3.3912	0.0206@ (1.6275)	-0.0002 (0.2758)	73.93	1.66
b) Rice/Paddy	4.5066	0.0028* (1.9379)	-0.0002@ (1.7258)	26.01	1.59
Pulses	4.0322	-0.0378*** (4.0319)	0.0015** (2.6821)	78.74	2.29
Potatoes	2.6221	0.0947** (2.2163)	-0.0039@ (1.4875)	52.20	1.20
Onions	3.8054	0.0056 (0.8663)	0.0004 (0.9847)	83.81	1.15
Oranges	2.7005	0.0367* (2.1409)	-0.0005 (0.4439)	81.79	1.44
Bananas	3.6067	0.0097@ (1.4729)	-0.0003 (0.6855)	50.85	1.71
Apples	3.0743	0.0171 (0.9315)	0.0007 (0.6607)	79.30	2.56

(Contd.)

Table 3.4 (Contd.)

Commodity	a	+bt	+ct	R ² (%)	d-statistics
Grapes	2.3200	0.0198 (1.1781)	0.0011 (1.0519)	88.25	2.39
Groundnut in Shell	4.0406	0.0262** (2.3073)	-0.0009 (1.3224)	63.55	1.36
Sesame Seeds	4.1098	0.0203@ (1.5436)	-0.0005 (0.6548)	56.43	1.75
Cotton Lint	3.6369	0.0752 (0.2856)	-0.0081 (0.5060)	7.97	2.41
Jute+Allied Fibres	4.5641	-0.0013 (0.7445)	0.0001 (1.2701)	33.46	1.68
Tea	4.3783	-0.0034 (1.2546)	0.0003* (2.0178)	52.51	2.60
Coffee(Green)	2.3541	0.0241 (0.7722)	0.0008 (0.4129)	67.98	2.57
Tobacco Leaves	3.7313	0.0453*** (3.3124)	-0.0012@ (1.4469)	85.15	2.59

Note : 1) @ *, ** and *** represent significance at 20, 10, 5 and 1 per cent level of probability.

2) Figures in parentheses are t-values of the respective coefficients.

Thus, except for pulses which showed a decline in output growth and a few other commodities which indicated slow growth over time, Asia's share in world output of majority of the commodities has grown perceptibly during the period 1979-93. Fruits and vegetables in particular have shown very high rate of growth in terms of share of Asia in total world production. At the same time, this rising trend in Asia's share in world production of fruits and vegetables was witnessed in the face of very wide overall output growth fluctuations, specially for potatoes followed by apples, grapes and oranges. In the case onions and bananas, though the share of Asia in the world production grew at a very low rate, the overall fluctuation in the output growth was also very low. Not only this, the degree of predictability of time variable in explaining these growth rates was also found to be poor in the case of these two fruits and vegetables. By and large, there has been perceptible rise in the share of Asia in total world production of various fruits and vegetables during the 1979-93 period.

3.3 Agricultural Exports of Asia

In order to promote, support and develop exports, production expansions must go hand in hand with a suitable trade policy that makes the production surpluses available for exports on a sustained basis. So far as production expansion is concerned, over the past one and a half decades, the agricultural production situation in Asia has improved significantly. This is mainly

because of the technological innovations that have been taking place in many of the Asian countries. The ever growing linkages between agriculture and industry have also contributed to significant production expansions in the field of agriculture. Now, in order to find out whether such production expansions have also led to significant expansion of agricultural exports, it is imperative to assess the overall trade scenario obtaining in this continent over the past 15 years.

3.3.1 General Trend in Structure of Agricultural Trade of Asia

It is estimated that the share of Asia in the overall global agricultural exports has grown only slightly during the past 15 years. In fact, from its early eighties level, it had grown in value terms by only about 20 per cent by the early nineties (Table 3.6). In general, agricultural exports of Asia took a quantum jump only after the mid-eighties period, particularly in value terms of trade. Mid eighties were a period when the agricultural exports from Asia showed a steady decline more in value than in volume terms of trade (Tables 3.5 and 3.6). This declining trend in exports in the mid-eighties was due to depressed international prices for many of the agricultural commodities during this period. However, some of the agricultural commodities produced in Asia showed major increase in their exports only between the early and the mid-eighties; thereafter, a considerable slowing down in their export expansions could be observed between the mid-eighties and the early nineties. A continuous decline in volume of exports of certain commodities was also noticed. Thus, agricultural exports of Asia underwent perceptible and significant changes during the past 15 years.

In the cereals group a very large increase in wheat export is noticed, both in quantity and value terms, specially between the mid-eighties and the early nineties. Rice export though picked up in the period between mid-eighties and early nineties after a fall during the earlier period (early eighties to mid-eighties), did not show any large increase in quantity terms and in fact showed a decline in value terms. Pulses showed a slowing down of the increase in export in the later period both in quantity and value terms (Tables 3.5 and 3.6).

In the horticultural crops group except oranges and grapes all other crops show increasing trend in export both in quantity and value terms between early eighties and early nineties, brought about specially by such increases in the period mid-eighties to early nineties. Grapes and oranges, however, show increasing trend in trade in value terms, specially between mid-eighties and early nineties (Tables 3.5 and 3.6).

Table 3.5: Structural Changes in Asia's Export of Important Agricultural Commodities (Quantity terms)
(in '10,000'MT)

Commodities	Triennium Averages			Per cent Change		
	Periods			2 Over 1	3 Over 2	3 Over 1
	1	2	3			
Cereals	1257.37	1867.70	2773.47	48.54	48.50	120.58
a) Wheat and Wheat Flour	128.07	160.67	586.18	25.45	264.83	357.70
b) Rice	792.97	781.52	998.79	-1.44	27.80	25.96
Pulses	76.79	148.06	199.06	92.81	34.45	159.23
Potatoes	44.24	42.94	93.32	-2.94	117.33	110.94
Onions	40.34	52.81	79.14	30.91	49.86	96.18
Oranges+Tang+Clem						
Bananas	105.75	99.22	113.43	-6.17	14.32	7.26
Apples	27.08	22.44	31.96	-17.13	42.42	18.02
Grapes	8.93	10.45	10.15	17.02	-2.87	13.66
Oilseed Cake+						
Meal	334.32	602.81	906.31	80.61	50.10	171.09
Soyabean Cake	29.93	177.20	287.99	492.05	62.52	862.21
Groundnut Cake	49.53	31.75	39.13	-35.90	23.24	-21.00
Cottonseed Cake	23.79	44.30	84.28	86.21	90.25	254.27
Sunflower Cake	0.46	7.72	29.08	1578.26	276.68	6221.74
Rapeseed Cake	5.79	68.25	153.99	1078.76	125.63	2559.59
Groundnut Tot	20.20	36.63	49.80	81.34	35.95	146.53
Shell						
Sesame Seed	7.13	21.98	29.09	208.27	32.35	307.99
Castor Oil	6.32	7.47	14.42	18.20	93.04	128.16
Cotton Lint	72.10	150.60	94.65	108.88	-37.15	31.28
Jute+Bast Fibre	54.54	45.94	31.07	-15.77	-32.37	-43.03
Tea	66.89	73.11	76.84	9.30	5.10	14.88
Coffee Green+						
Roast	36.75	53.73	69.98	46.20	30.24	90.42
Tobacco Un-						
manufactured	36.06	29.05	38.03	-19.44	30.91	5.46

Note : 1) Period 1 = 1979-81; Period 2 = 1985-87;
Period 3 = 1991-93

Table 3.6: Structural Changes in Asia's Export of Important
Agricultural Commodities (Value terms)
(in Million \$)

Commodities	Triennium Averages			Per cent Change		
	Periods			2 Over 1	3 Over 2	3 Over 1
	1	2	3			
1 Cereals	3568.85	2851.06	4740.93	-20.11	66.29	32.84
a) Wheat and Wheat Flour	205.91	225.87	674.22	9.69	198.50	227.43
b) Rice	2827.39	1676.86	2739.77	-40.69	63.39	-3.10
2 Pulses	332.19	503.29	703.68	51.51	39.82	111.83
3 Potatoes	89.03	88.29	220.05	-0.83	149.24	147.16
4 Onions	85.01	83.07	156.52	-2.28	88.42	84.12
5 Oranges+Tang+ Clem	368.86	298.33	300.01	-19.12	0.56	-18.67
6 Bananas	150.30	182.21	257.39	21.23	41.26	71.25
7 Apples	119.38	97.42	143.78	-18.40	47.59	20.44
8 Grapes	49.34	59.44	79.27	20.27	33.26	60.66
9 Oilseed Cake+ Meal	456.51	674.40	1187.52	47.73	76.09	160.13
Soyabean Cake	75.88	300.12	603.83	295.52	101.20	695.77
Groundnut Cake	83.04	40.21	56.19	-51.58	39.74	-32.33
Cottonseed Cake	36.79	34.36	80.66	-6.61	134.75	119.24
Sunflower Cake	0.80	6.03	26.08	653.75	332.50	3160.00
Rapeseed Cake	8.39	50.61	132.59	503.22	161.98	1480.00
10 Groundnut Tot Shell	201.46	229.23	358.27	13.78	56.29	77.84
11 Sesame Seed	56.25	115.93	186.00	106.10	60.44	230.67
12 Castor Oil	54.17	51.66	84.72	-4.63	64.00	56.40
13 Cotton Lint	1159.49	1493.65	1212.78	28.82	-18.80	4.60
14 Jute+Bast Fibre	186.18	146.35	106.77	-21.39	-27.04	-42.65
15 Tea	1343.10	1497.42	1479.31	11.49	-1.21	10.14
16 Coffee Green+ Roast	910.43	1264.49	678.67	38.89	-46.33	-25.46
17 Tobacco Un- manufactured	821.78	685.36	1024.70	-16.60	49.51	24.69
Vegetables -						
18 Processed	384.93	593.44	1490.77	54.17	151.21	287.28
19 Fresh	1392.09	1817.30	3351.18	30.54	84.40	140.73
20 Floriculture	247.91	298.94	562.95	20.58	88.32	127.08

(Contd.)

Table 3.6: (Contd.)

Commodities	Triennium Averages			Per cent Change		
	Periods			2 Over 1	3 Over 2	3 Over 1
	1	2	3			
Total Value (1 to 20)	11977.26 (42.71)	13031.28 (39.19)	18325.27 (35.19)	8.55	39.51	51.4
Total Value of Asia's Agricultural Exports	28044.10	33255.33	52082.00	18.58	56.61	85.7
Total Agril. Exports of Asia as pro- portion of Total World Agricultural Exports	12.87	14.54	15.47	12.98	6.40	20.2

Note: 1) Figures in parentheses are proportions of total value [(1) to (20)] to total value of Agricultural exports of Asia.

2) Triennium averages for the total value of Asia's Agricultural Exports are based on the figures presented in various issues of United Nations Commodity Review and Outlook.

Table 3.7: Changing Structure of Exports of Asia as Proportion of its Production of Various Agricultural Commodities (in per cent)

Commodities	Triennium Average		
	Periods		
	1	2	3
Cereals	1.97	2.44	3.14
a) Wheat	0.95	0.87	2.71
b) Rice/Paddy	2.20	1.83	2.08
Pulses	3.61	6.15	7.80
Potatoes	1.17	0.76	1.34
Onions	4.61	4.35	5.11
Oranges	22.56	11.73	5.77
Bananas	7.20	6.66	5.71
Apples	3.40	2.29	2.41
Grapes	1.25	1.35	1.04
Groundnut in Shell	1.88	2.67	2.96
Sesame Seeds	6.02	14.10	16.36
Cotton Lint	12.85	20.05	10.15
Jute + Allied Fibres	13.84	10.58	9.08
Tea	45.75	40.15	37.07
Coffee (Green)	64.25	75.36	70.76
Tobacco Leaves	15.36	8.23	7.62

Note : Period 1 = 1979-81; Period 2 = 1985-87;
Period 3 = 1991-93

Overall oilseed cake and meals' export increased significantly between the early eighties and early nineties, specially in value terms. However, most of the oilseed cake and meals showed a slowing down in export, specially in value terms between mid-eighties and early nineties. Similarly, the exports of oilseeds also show a slowing down trend, both in quantity and value terms between the mid-eighties and early nineties compared to the period between early eighties and mid-eighties. As regards fruits and vegetables there appears to be a mixed trend. While in the case of potato and onion, an increasing trend in export, both in quantity and value terms, is noticed, in the case of oranges and grapes, though the quantity export show declining trend, the exports in value terms are seen to have increased (Tables 3.5 and 3.6). Further, an increasing trend is noticed in the case of banana export, both in quantity and value terms. Other commodities like cotton lint, tea and tobacco have also followed a rising trend in terms of their exports, both in quantity and value terms. However, in the case of jute, there has been an overall decline in its exports, both in quantity and value terms. Similarly, the total value of coffee exports has also come down perceptibly in due course of time (Table 3.6). A noteworthy feature emerging from Table 3.6 has been a continuously rising trend in the Asia's vegetable (both processed and fresh) and floricultural exports over the past 15 years. The value of processed and fresh vegetable exports as well as flori-

cultural exports of Asia picked up during the period between the mid-eighties and the early nineties after showing a slow expansion in the same between the early- and the mid-eighties.

As regards proportion of exports to production, except for cereals led by wheat and the oilseeds crops Asia's exports of the selected commodities as proportion of its production is seen to be depicting a decreasing trend which implies increasing domestic consumption of these commodities (Table 3.7).

3.4 Asia's Share in the World Trade

Asia accounts for the bulk of the world's trade in commodities like rice (among cereals), pulses, groundnut cake, cottonseed cake, rapeseed cake, sesame seeds, castor oil, jute and tea. The general trend of the past decade and a half reveals that the share of this continent in the world trade of these commodities has increased significantly over time. However, various plantation commodities like tea and tobacco in general and all the fruits selected in the study in particular have shown a continuous decline in their international trade with the passage of time. How the trade structure of Asia in various agricultural commodities has changed over time has been brought out in Tables 3.8 and 3.9 in the context of its share in world trade.

Since the early eighties, the share of Asia in the world cereal trade has expanded considerably more in value than in quantity terms. During the early eighties, Asia's contribution to the world cereal trade was about 6 per cent in quantity and 9 per cent in value terms (Tables 3.8 and 3.9). In the mid-eighties, however, these proportions had risen to 9 per cent and 10 per cent, respectively. A further increase in the same was noticed in the early nineties and during this period, the contribution of Asia to world cereal trade was estimated at about 12 per cent in quantity and 13 per cent in value terms. Interestingly, inspite of about 20 per cent decline in the value of cereal trade of Asia between the early eighties and the mid-eighties, its share in the world trade registered a marginal increase during this period (Tables 3.5 and 3.8). Unlike total cereals, the share of Asia in both wheat and rice trade of the world was found to grow more in quantity than in value terms. In terms of value, the share of Asia in the world rice trade dropped slightly in the mid-eighties only to pick up and show some improvement in the subsequent period.

Between the early eighties and the early nineties, though in quantity terms pulses trade of Asia in the world remained more or less constant and stood at around 30 per cent, a perceptible rise in the same was noticed in value terms. The share of Asia in total pulses trade of the world increased from 24 per cent to 31 per cent during this 1979-1993 period (Table 3.9).

Asia's trade structure in terms of horticultural commodities has undergone tremendous change over time particularly in respect of its share in the world trade of these commodities. One alarming trend, however, has been a continuous decline in Asia's share of fruit trade in the world. While the share of the continent in the world trade of potatoes, onions and various other processed and fresh vegetables had increased remarkably

with the advent of time, a continuously declining trend in the trade of various fruits was all too glaring to escape notice. From early eighties to early nineties, the potato trade of Asia in the world registered an increase from 9 per cent to 12 per cent in quantity terms and from 10 per cent to 14 per cent in value terms. Similarly, the share of onion trade of Asia in the world expanded from 25 per cent to 30 per cent in quantity terms during the same period. But, in value terms, this continent's share in the world onion trade was found to be stagnating at around 20 per cent during the past 15 years. In the case of processed vegetables, the share of this continent in the world trade increased dramatically after the mid-eighties. During the early eighties, Asia contributed about 16 per cent to the world trade in processed vegetables. This proportion was found to increase marginally to 19 per cent in the mid-eighties. But, after the mid-eighties, this proportion rose sharply so much so that by the early nineties, Asia's share of the world trade in processed vegetable had risen to about 30 per cent. However, no expansion in the share of Asia in world fresh vegetables trade could be noticed and it remained by and large constant at around 20 per cent during the past 15 years (1979-1993). Further, despite more than two fold increase in Asia's floricultural exports between the early eighties and the early nineties, its share in the world trade of the same was found to be declining continuously during this period (Tables 3.6 and 3.9).

Unlike vegetables, fruit trade of Asia in the world fell sharply over time. More vigorous decline in this respect was noticed in the case of oranges and bananas. Though apples and grapes also followed similar trends, however, the decline in their share was not as sharp as for the oranges and the bananas. In general, between the early eighties and the early nineties, the share of Asia in the apples and grape trade of the world hovered at around 8 per cent both in quantity and value terms.

As regards oilseed cakes and meals, the continent's share in the world trade has increased substantially over time. The total oilseed cake trade of Asia in the world expanded from 13 per cent during the early eighties to 22 per cent in the early nineties in quantity terms; the expansion in value terms during the same period was from 8 to 17 per cent. Among various oilseed cakes, Asia accounted for the bulk of the world trade in groundnut cake, cottonseed cake and rapeseed cake. Though oilseed cake trade of Asia in the world registered a perceptible increase over time, the principal increase was noticed only between the early eighties and the mid-eighties, both in quantity and value terms of trade for all the oilseed cakes.

Other important commodity in which Asia's share has increased considerably, of late, in the world trade are various oilseeds such as groundnut - both green and shelled ones and sesame seeds.

Table 3.8: Triennium Average Share of Asia in World Export of Various Agricultural Commodities (Quantity Terms) (in per cent)

Commodities	Triennium Average		
	Periods		
	1	2	3
Cereals	5.76	8.65	11.64
a) Wheat and Wheat Flour	1.34	1.55	4.92
b) Rice	62.15	64.52	66.13
Pulses	27.96	32.16	30.89
Potatoes	9.18	7.62	12.43
Onions	24.80	27.19	30.15
Oranges+Tang+ Clem	25.58	17.08	12.39
Bananas	15.16	13.74	10.33
Apples	8.25	6.46	7.97
Grapes	8.53	7.34	5.70
Oilseed Cake+ Meal	13.07	18.01	22.06
Soyabean Cake	1.70	7.71	10.44
Groundnut Cake	48.40	55.82	57.46
Cottonseed Cake	26.42	51.02	62.29
Sunflower Cake	0.54	4.38	12.74
Rapeseed Cake	8.59	37.03	43.63
Groundnut Tot Shell	26.24	41.46	46.73
Sesame Seed	29.36	61.75	61.80
Castor Oil	32.31	42.32	81.09
Cotton Lint	16.04	31.42	19.25
Jute+Bast Fibre	97.01	96.98	95.70
Tea	70.33	66.66	65.57
Coffee Green + Roast	9.77	12.48	14.20
Tobacco Unmanufactured	25.65	21.49	22.81

Note : 1) Period 1 = 1979-81; Period 2 = 1985-87;
Period 3 = 1991-93

Among the fibre crops, while the share of Asia in the world trade of jute remained constant at around 95 per cent during the past 15 years, that of cotton lint showed wide fluctuations. The share of Asia in world cotton lint trade registered an increase in the mid-eighties and, thereafter, a considerable slowing down in the international trade of Asian cotton lint was observed, both in quantity and value terms.

The general trend of the past one and a half decades in terms of plantation commodities reveals that the tea and tobacco exports of Asia in the world had declined marginally, both in quantity and value terms. Contrary to this, the share of Asia in world coffee trade showed an increase during this period with the increase being more in quantity than in value terms. In fact, the share of Asia in total value of world trade in coffee stood

constant at about 10 per cent between the mid-eighties and the early nineties and this despite the fact that coffee exports of Asia had declined by about 50 per cent in the early nineties compared to its mid-eighties level (Table 3.5 and 3.9).

Table 3.9: Triennium Average Share of Asia in World Export of Various Agricultural Commodities (Value Terms)
(in per cent)

Commodities	Triennium Average		
	Periods		
	1	2	3
Cereals	9.30	10.13	13.33
a) Wheat and Wheat Flour	1.20	1.66	3.93
b) Rice	56.89	52.69	55.89
Pulses	23.82	29.90	30.99
Potatoes	10.10	10.40	13.98
Onions	22.19	22.84	21.24
Oranges+Tang+			
Clem	19.56	14.29	10.15
Bananas	11.73	10.47	7.71
Apples	8.69	7.22	6.25
Grapes	7.55	5.99	4.91
Oilseed Cake+			
Meal	8.40	12.69	16.57
Soyabean Cake	1.79	7.10	10.86
Groundnut Cake	45.36	56.33	55.97
Cottonseed Cake	25.96	44.14	58.92
Sunflower Cake	0.64	3.88	11.35
Rapeseed Cake	7.46	28.67	32.58
Groundnut Tot Shell	31.42	40.66	46.92
Sesame Seed	28.15	53.57	54.94
Castor Oil	31.87	44.26	76.16
Cotton Lint	15.88	24.93	17.83
Jute+Bast Fibre	96.31	96.49	93.56
Tea	70.43	68.26	62.98
Coffee Green + Roast	8.24	10.27	10.12
Tobacco Unmanufactured	20.57	17.30	18.53
Vegetables -			
- Processed	15.79	18.98	29.35
- Fresh	19.51	20.69	18.12
Floriculture	7.26	5.81	5.42

Note : 1) Period 1 = 1979-81; Period 2 = 1985-87;
Period 3 = 1991-93

The foregoing analysis is a pointer to the fact that the share of Asia in the world agricultural trade has fluctuated to a considerable extent during the past one and a half decades. While Asia's share in the world trade of cereals, pulses, vegetables and all the oilseed cakes has expanded significantly since

the early eighties, the share of Asia in global fruit trade is noticed to be continuously declining. Added to this, Asia's share in total world floricultural exports has also come down with the passage of time.

3.5 Growth Trends and Instability in Agricultural Exports of Asia

The share of agricultural exports of Asia in the world fluctuated widely across various commodities during different periods. These fluctuations, however, could not explain the exact nature of secular trend that various commodities had followed over time. In order to recapitulate and discern the exact secular trend in the time series data, compound growth rates have been worked out with respect to the changing shares of various commodity exports of Asia in world trade of the same encompassing the period 1979-1993. Further, to understand export growth performance better and in order to capture the overall fluctuations in the same over a given period of time, an index of instability has also been incorporated in order to take care of trend component in the time series data in terms of the share of Asia in the world trade of various commodities.

As the general trend reveals, agricultural exports of Asia in the world has grown in the face of very wide fluctuations in the same during the past 15 years. With the exception of fruits and save for some of the fibre and plantation commodities, all the selected commodities of Asia have acquired considerable share in the world trade over time. Though cross-commodity examination reveals considerable variation in these growth rates, by and large the exports of Asia in the world has grown at a very high rate over the past decade and a half. As the Tables 3.10(a) and 3.11(a) reveal, the share of Asia in the world trade of wheat and wheat flour, soybean cake, sunflower cake and rapeseed cake rose at a noticeably very high rate, both in volume and value terms of trade. In dismal contrast to this, not only Asia's share in the world fruit trade declined persistently over time but its share in the world trade of certain commodities like jute, tea and tobacco also fell sharply. Further, the degree of predictability of time variable in explaining export growth performance trend was noticed to be very low in the case of commodities such as rice (among cereals), pulses, onions, groundnut cake (among oilcakes), cotton lint, jute, tea, tobacco and fresh vegetables. This held particularly true in value terms of trade for these commodities. However, overall export growth fluctuations were generally high in quantity terms than in terms of value.

The share of Asia in the world cereal exports has grown at a higher rate in quantity terms than in value terms. It was observed that the Asian share in the world cereal exports grew at an annual average rate of 5.3 per cent in quantity and 3.0 per cent in value terms between the 1979-1993 period (Table 3.10(a) and 3.11(a)). As regards the export growth of cereals, it may be worth a mention here that while the share of rice export of Asia in the total world trade encompassing this commodity grew at a very low rate in quantity and, in fact, declined marginally in value terms, that of wheat and wheat flour, on the contrary, showed a fairly high growth rate as can be seen by observing the

growth trend in cereal export of Asia during the past 15 years. As a matter of fact, the wheat and wheat flour export of Asia in the total world trade grew at a rate of more than twice the average growth rate of cereal export of Asia in the world trade of the same during the period between 1979 and 1993. And, this scenario held true both in quantity and value terms of trade. In addition to this, the overall export growth fluctuation for wheat and wheat flour was substantially high compared to the average cereal export growth fluctuation. As against this, rice export of Asia in the world fluctuated at a very low rate compared to other cereals. One important feature that emerged from observing the growth of wheat and wheat flour export of Asia in the world trade of this commodity was that it had grown at a rate of about 12 per cent per annum during the 1979-1993 period even as the annual output growth of wheat and wheat flour of Asia in the total world output encompassing this commodity grew only at about 2 per cent (Tables 3.3 and 3.10(a)).

Table 3.10(a): Compound Growth Rates on Asia's Share in World Export of Various Agricultural Commodities (Quantity Terms): (1979-1993)

Commodities	CGR(%)	t-Statistics	R ² (%)	Instability Index(%)
Cereals	5.27***	6.06	73.86	185.37
a) Wheat and Wheat Flour	11.54***	4.89	64.78	1357.79
b) Rice	0.41*	2.01	23.72	10.32
Pulses	0.28	0.37	1.06	133.46
Potatoes	1.76	1.65	17.33	284.32
Onions	1.03*	2.11	25.50	59.46
Oranges+Tang+Clem	-5.82***	12.14	91.89	57.39
Bananas	-3.24***	6.36	75.66	57.28
Apples	-0.71	0.99	6.98	117.58
Grapes	-3.37***	6.55	76.75	63.51
Oilseed Cake+Meal	4.74***	6.85	78.32	101.74
Soyabean Cake	16.72***	6.93	78.68	683.39
Groundnut Cake	1.65*	2.12	25.67	136.37
Cottonseed Cake	7.12***	6.18	74.60	233.29
Sunflower Cake	27.20***	8.51	84.79	856.57
Rapeseed Cake	12.53***	4.10	56.39	854.61
Groundnut Tot Shell	6.44***	3.85	53.28	354.55
Sesame Seed	5.73***	5.03	66.05	210.75
Castor Oil	6.42***	5.00	65.76	335.17
Cotton Lint	2.41	1.50	14.75	741.64
Jute+Bast Fibres	-0.19*	1.82	20.28	2.64
Tea	-0.34*	2.01	23.73	6.98
Coffee Green+Roast	3.30***	7.92	82.85	38.50
Tobacco Un-manufactured	-1.30**	2.30	28.95	85.05

Note : 1) *, ** and *** represent significance at 10, 5 and 1 per cent level of probability.

Regarding the share of Asia in the world exports of pulses, though it grew at an annual average growth rate of 1 per cent in value terms, it was found that in quantity terms, the growth rate was of negligible order. In this case, the predictability of time variable in explaining export growth was also very poor, particularly in quantity terms. Asia's share in the world pulses output in fact was observed to be declining continuously at an annual rate of 1.3 per cent (Table 3.3) during the past 15 years and hence, a very slow growth for Asia's share in world pulses exports is quite understandable.

Though in more recent times horticultural exports of Asia have increased considerably but in terms of their share in world trade, a continuous decline was only too evident from observing the trend during the past 15 years. Except potatoes and processed vegetables, the share of Asia in world trade encompassing all the fruits and vegetables registered a decline in value terms during this period. However, the onion export of Asia in quantity terms showed a significant and positive growth in the same period in the world trade of this commodity.

Potato export of Asia in the world grew at an annual compounded growth rate of 1.8 per cent in quantity and 2.5 per cent in value terms during the period 1979 to 1993. Higher growth in value terms is symptomatic of the fact that the international prices of potatoes were more favourable during this period. On the other hand, while the onion export of Asia in the world grew at 1 per cent per annum rate in quantity terms (Table 3.10(a)), in value terms, it declined by a similar rate with this decline being attributable to depressed or falling international prices of onions between the period between 1979 and 1993.

An important aspect of the potato exports of Asia in the world has been acceleration in its growth even in the face of time-scale deceleration at some phase. Though overall the share of Asia in world onion trade grew over time, nonetheless it also experienced deceleration in its growth at some period of time. This is evident from the estimated log quadratic trend equation for the potato export of Asia in the world which indicated the decline in export growth at a declining rate (Table 3.10(b)). This deceleration, in fact, took place between the early and the mid-eighties and, thereafter, Asian share in the world potato exports showed considerable acceleration in its growth. And, as a result, not only the overall growth turned out to be positive but it was relatively high as well.

During the 1979-1993 period, the share of Asia in the world export of processed vegetables recorded a growth rate of 5.3 per cent per annum and it turned out to be much higher than the growth rate recorded in the case of potato exports. However, the share of Asia in the world fresh vegetable trade showed a marginal decline during this period with the decline being of the order of about 1 per cent per annum.

An alarming feature of the world trade in various fruits has been a persistently declining share of Asia in it. Over the past one and a half decades, the share of various fruits of Asia in the world trade has declined drastically. This decline was observed to be more vigorous in the case of oranges as compared to other fruits, both in quantity and value terms of trade. It

was observed that the share of Asia in the world trade of oranges had declined by 5.8 per cent per annum in quantity and 5.3 per cent per annum in value terms between 1979 and 1993. The international trade of banana produced in Asia showed a similar declining trend with the decline being of the order of about 3.2 per cent per annum in quantity and 3.9 per cent per annum in value terms during the same period. Apples and grapes of Asia also exhibited similar trends but the decline in the case of apple exports of Asia in quantity terms was not too sharp. However, in value terms, apple exports of Asia in the world registered a fall of about 2.6 per cent per annum during the 1979-1993 period. The share of Asia in world grape trade during the same period was observed to decline at the rate of 3.4 per cent per annum in quantity and 3.7 per cent per annum in value terms. In general, Asia's share in the world trade of various fruits declined more in value than in quantity terms.

Table 3.10(b): Estimated Log Quadratic Trend Equations for Asia's Share in World Export of Various Commodities (Quantity Terms) : (1979-1993)

Commodity	a	+bt	+ct ²	R ² (%)	d-statistics
Cereals	1.7042	0.0322 (0.8612)	0.0012 (0.5275)	74.45	1.66
a) Wheat and Wheat Flour	0.3032	-0.0449 (0.5968)	0.0010* (1.7897)	72.20	1.73
b) Rice/Paddy	4.1222	0.0076 (0.8360)	-0.0002 (0.3933)	24.69	2.13
Pulses	3.3097	0.0375 (1.1813)	-0.0022 (1.1243)	10.49	2.24
Potatoes	2.3985	-0.0807** (2.1720)	0.0061** (2.7172)	48.82	1.42
Onions	3.1967	0.0251 (1.1808)	-0.0009 (0.7177)	28.57	2.46
Oranges+Tang+ Clem	3.3545	-0.0495** (2.2680)	-0.0007 (0.4935)	92.05	1.60
Bananas	2.7387	-0.0035 (0.1627)	-0.0018@ (1.4157)	79.15	1.98
Apples	2.2528	-0.0609** (2.1779)	0.0034* (1.9775)	29.84	1.27
Grapes	2.1995	-0.0134 (0.5960)	-0.0013 (0.9534)	78.39	2.35
Oilseed Cake+ Meal	2.4560	0.0554* (1.8448)	-0.0006 (0.3111)	78.50	1.74
Soyabean Cake	-0.2556	0.4212*** (6.9687)	-0.0167*** (4.5362)	92.15	1.30
Groundnut Cake	3.7998	0.0196 (0.5711)	-0.0002 (0.0987)	25.74	2.73
Cottonseed Cake	3.0010	0.1581*** (3.7645)	-0.0056** (2.1869)	81.84	3.01

(Contd.)

Table 3.10(b) (Contd.)

Commodity	a	+bt	+ct ²	R ² (%)	d-statistics
Sunflower Cake	-1.3542	0.5196*** (5.4625)	-0.0174*** (3.0160)	91.35	2.04
Rapeseed Cake	1.7082	0.3368*** (3.0362)	-0.0137* (2.0275)	67.51	1.95
Groundnut Tot Shell	2.6664	0.2215*** (4.0433)	-0.0099** (2.9863)	57.71	0.60
Sesame Seed	3.0897	0.1851*** (5.9383)	-0.0081*** (4.2675)	86.52	1.72
Castor Oil	3.4687	0.0613 (1.1020)	0.0001 (0.0185)	65.76	0.66
Cotton Lint	2.3541	0.1956*** (3.9907)	-0.0107*** (3.6050)	59.07	1.26
Jute+Allied Fibres	4.5855	-0.0042 (0.8901)	0.0001 (0.4920)	21.85	1.52
Tea	4.2381	-0.0033 (0.4428)	-0.0001 (0.0081)	23.73	1.37
Coffee(Green) Roast	2.1598	0.0613*** (3.7990)	-0.0018* (1.8388)	86.62	3.05
Tobacco Unmanufactured	3.3251	-0.0500** (2.1817)	0.0023 (1.6557)	42.16	1.72

Note :1) @, *, ** and *** represent significance at 20, 10, 5 and 1 per cent level of probability.

Perhaps the commodities in which the continent has acquired considerable share in the world trade in due course of time are various oilseed cakes and meals. On an average, the share of the oilseed cake and meal trade of Asia in the world trade grew at an annual compound growth rate of 4.7 per cent in quantity and 6.0 per cent in value terms between the period between 1979 and 1993. As a matter of fact, Asia's share in the world trade of various oilseed cakes has increased by leaps and bounds over the past one and a half decades. The soybean cake, sunflower cake and rapeseed cake exports of Asia in the world export of the same has grown at a tremendous rate, both in quantity and value terms (Tables 3.10(a) and 3.11(a)). During the period 1979-1993, while the share of Asia in the world soybean export grew at the rate of about 16 per cent per annum, both in quantity and value terms, that of sunflower cake was still better and it stood at 27 per cent per annum in quantity and about 24 per cent per annum in value terms of trade. Similarly, cottonseed cake and rapeseed cake exports of Asia in the world export of the same also showed very high growth during the same period. However, the growth in the case of cottonseed cake export was much below than that noticed for soybean cake, sunflower cake and rapeseed cake; nonetheless it was much higher than the annual average growth rate recorded in case of oilseed cake and meal trade of Asia in the world trade of the same. In spite of the fact that groundnut cake export of Asia had fallen to some 20 per cent in quantity

and about 30 per cent in value terms by the early nineties from its early eighties level, the share of Asia in the world export of this commodity could still record some growth during this period albeit at a much lower level than the rate at which the share of Asia in the total world oilseed cake trade grew (Tables 3.5, 3.6, 3.10(a) and 3.11(a)). The reason for this is not far to seek from. Though Asia's overall exports of groundnut cake has fallen considerably, nonetheless the fall in the Asian exports of groundnut cake is still not as sharp as the fall in world exports of this commodity. Moreover, Asia accounts for the bulk of the world exports in groundnut cake. Therefore, despite a steep decline in Asia's overall exports in this commodity, its share in the world exports in the same has grown over time.

Table 3.11(a): Compound Growth Rates on Asia's Share in World Export of Various Agricultural Commodities (Value Terms): (1979-1993)

Commodities	CGR(%)	t-Statistics	R ² (%)	Instability Index
Cereals	2.97***	4.47	60.58	111.62
a) Wheat and Wheat Flour	10.28***	5.90	72.82	673.99
b) Rice	-0.04	0.16	0.20	18.95
Pulses	1.31	1.50	14.79	159.30
Potatoes	2.47***	3.19	43.98	160.42
Onions	-1.00	1.34	12.20	157.37
Oranges+Tang+Clem	-5.25***	8.88	85.85	84.49
Bananas	-3.93***	6.04	73.74	96.72
Apples	-2.55***	3.37	46.62	126.05
Grapes	-3.70	6.99	78.98	70.74
Oilseed Cake+ Meal	6.01***	7.65	81.82	123.10
Soyabean Cake	16.15***	7.79	82.37	497.55
Groundnut Cake	6.47***	2.12	25.72	145.80
Cottonseed Cake	6.47***	5.23	67.79	280.31
Sunflower Cake	24.47***	7.53	81.33	929.60
Rapeseed Cake	10.53***	3.38	46.78	969.17
Groundnut Tot Shell	5.70***	3.41	47.24	376.46
Sesame Seed	5.06***	5.04	66.18	168.97
Castor Oil	6.00***	4.90	64.86	301.22
Cotton Lint	1.78	1.50	14.74	363.81
Jute+Bast Fibres	-0.36**	2.78	37.23	4.04
Tea	-0.69***	3.31	45.69	45.90
Coffee Green+Roast	1.92***	4.29	58.65	10.24
Tobacco Un-manufactured	-0.80	1.19	9.86	122.55
Vegetables - Processed	5.27***	6.52	76.58	155.82
Fresh	-0.94	1.57	15.94	92.64
Floriculture	-2.64***	7.97	82.99	27.83

Note: 1) *, ** and *** represent significance at 10, 5 and 1 per cent level of probability.

Though the share of Asia in the world exports of soybean cake, cottonseed cake, sunflower cake and rapeseed cake has grown rapidly with the course of time, it was observed that this growth had a declining rate, both in quantity and value terms of trade (Tables 3.10(b) and 3.11(b)). This deceleration was noticed between the mid-eighties and the early nineties (Tables 3.8 and 3.9). Further, barring groundnut cake trade, the degree of predictability of time variable in explaining the export growth performance was reasonably high for all the oilseed cakes and meals. Among various oilseed cakes, sunflower cake and rapeseed cake showed maximum overall fluctuations in terms of export growth of the continent in the world trade.

An annual growth rate of 5-6 per cent was recorded in the share of Asia in the world trade of groundnuts (both green and shelled ones), sesame seeds and castor oil, both in quantity and value terms, between the period 1979 and 1993. In this respect, while the Asian trade of groundnut and sesame seed in the world trade of the same grew more in quantity than in value terms, the growth in castor oil was slightly higher in value than in quantity terms. A deceleration in export growth was noticed in the case of both groundnuts and sesame seeds (Tables 3.10(b) and 3.11(b)). This deceleration in the same took place after the mid-eighties when the share of Asia in the world trade of these two commodities remained stagnant.

As regards fibre and plantation commodities like jute, tea and tobacco, the share of Asia in the world trade of these commodities fell marginally between 1979 and 1993 period. However, the share of Asia in the world trade of cotton lint and coffee recorded perceptible increases during this period, both in quantity and value terms. The coffee export of Asia fell by 25 per cent in the early nineties from its early eighties level and despite this fall its share in the world trade of this commodity was found to have recorded a growth of about 2 per cent per annum during this period. Nevertheless, a deceleration in its export growth was observed between the mid-eighties and the early nineties (Tables 3.10(b), 3.11(b), 3.8 and 3.9).

The share of Asia in total value of floriculture exports of the world was found to be declining at the rate of 2.6 per cent per annum between 1979 and 1993 (Table 3.11(a)). However, this declining trend in floricultural exports of Asia in the world was found to be at a declining rate (Table 3.11(b)). This is also evident from Table 3.9 which indicates a slowing down in this declining trend between the mid-eighties and the early-nineties, after showing a sharp decline in the same between the early- and the mid-eighties.

In order to check the incidence of autocorrelation between the successive figures of share of Asia in the total world trade of various selected commodities, Durbin-Watson 'd' statistics was applied to the estimated log quadratic trend equations. The critical values of 'd' statistics for the various estimated equations were observed to fall within the permissible range i.e. $du < d^* < (4-du)$, revealing, thereby, the absence of autocorrelation between the successive values of shares over time.

Table 3.11(b): Estimated Log Quadratic Trend Equations for Asia's Share in World Export of Various Commodities (Value Terms): (1979-1993)

Commodity	a	+bt	+ct ²	R ² (%)	d-statistics
Cereals	2.2388	-0.0218 (0.8717)	0.0032* (2.1013)	71.18	2.39
a) Wheat and Wheat Flour	0.1376	0.0113 (0.1623)	0.0054 (1.2838)	76.10	1.83
b) Rice/Paddy	4.0636	-0.0174@ (1.5300)	0.0011@ (1.5331)	16.54	2.28
Pulses	3.1327	0.0662* (1.8775)	-0.0033@ (1.5514)	29.03	1.69
Potatoes	2.3911	-0.02994 (0.9759)	0.0034* (1.8371)	56.28	2.20
Onions	3.1204	0.0266 (0.8399)	-0.0023 (1.1914)	21.49	1.85
Oranges+Tang+ Clem	3.0223	-0.0192 (0.7290)	-0.0012@ (1.4754)	88.03	1.86
Bananas	2.4991	0.0098 (0.3358)	-0.0031* (1.9415)	80.01	1.79
Apples	2.1961	-0.0066 (0.1945)	-0.0012 (0.5878)	48.12	1.42
Grapes	2.1278	-0.0435* (1.8138)	0.0005 (0.2499)	79.09	2.19
Oilseed Cake+ Meal	1.9755	0.0840** (2.5331)	-0.0016 (0.7962)	82.73	1.63
Soyabea ⁿ Cake	-0.0876	0.3746*** (6.9732)	-0.0141** (4.3054)	93.07	1.59
Groundnut Cake	3.7184	0.0348 (0.9961)	-0.0011 (0.5297)	27.41	2.60
Cottonseed Cake	3.0331	0.1377** (2.8348)	-0.0047@ (1.5887)	73.39	3.07
Sunflower Cake	-1.0959	0.4736*** (4.4885)	-0.0159** (2.4820)	87.66	1.93
Rapeseed Cake	1.6581	0.3115** (2.6793)	-0.0132* (1.8699)	58.79	1.88
Groundnut Tot Shell	2.7679	0.2098*** (3.7376)	-0.0096** (2.8284)	68.34	1.33
Sesame Seed	3.0823	0.1681*** (6.5053)	-0.0074*** (4.7242)	88.17	1.55
Castor Oil	3.4455	0.0697 (1.3163)	-0.0007 (0.2223)	65.00	0.64

(Contd.)

Table 3.11(b): (Contd.)

Commodity	a	+bt	+ct ²	R ² (%)	d-statistics
Cotton Lint	2.4177	0.1561*** (4.7723)	-0.0087*** (4.3528)	66.94	1.62
Jute+Allied Fibres	4.5798	-0.0036 (0.6223)	0.0001 (0.0023)	37.23	1.18
Tea	4.2171	0.0124@ (1.6697)	-0.0012** (2.6809)	66.04	1.46
Coffee(Green)	1.9950	0.0568*** (3.4946)	-0.0024** (2.3912)	71.99	1.76
Tobacco Unmanufactured	3.0547	-0.0368 (1.2704)	0.0018 (1.0199)	17.05	1.75
Vegetables					
- Processed	2.6864	0.0348 (0.9999)	0.0010 (0.4894)	77.04	1.61
- Fresh	2.9232	0.0393@ (1.7310)	-0.0030** (2.2093)	40.24	2.20
Floriculture	2.0845	-0.0474*** (3.4716)	0.0013@ (1.5572)	85.85	1.95

Note : 1) @, *, ** and *** represent significance at 20, 10, and 1 per cent level of probability.

A few points need to be emphasized in the light of the changing structure of agricultural production and exports of Asia over the past decade and a half. First, agricultural exports of Asia in the selected commodities expanded sharply between the mid-eighties and the early nineties compared to the period between the early- and the mid-eighties even though production expansion in certain commodities slowed down after the mid-eighties. This held particularly true of wheat and rice among cereals and potatoes and onions among vegetables. On the other end of the spectrum, in the case of groundnuts in shell, sesame seeds and all the fibre and plantation commodities, principal expansion in both production and export was noticed only between the early- and the mid-eighties and, thereafter, these commodities showed perceptible slowing down in the same. Second, the overall expansion in export was much higher than overall expansion in output especially in the case of cereals, pulses, potatoes, onions, groundnut in shell, sesame seeds and coffee. Third, there was very slow expansion in the fruit trade of Asia in the face of considerable increase in the output of these commodities during the past one and a half decades. Fourth, between the period 1979 and 1993, Asia's share in the world trade of cereals, pulses, groundnut in shell, sesame seeds and cotton lint grew more rapidly than output growth in this respect for these commodities. In dismal contrast to this, in spite of impressive growth rates witnessed in terms of Asia's share in the world output of various fruits, jute, tea and tobacco, the continent's share in the total world trade of these commodities fell sharply during the period under mention. Fifth, in isolation of commodities

like, potatoes, bananas, apples and grapes, the overall export of Asia in all the selected commodities expanded more in quantity than in value terms. This brings us closer to the fact that in general international prices of majority of the selected commodities were unfavourable during the past 15 years. Even though world prices of majority of the commodities recorded an increase after the mid-eighties, this increasing trend in international prices could not reverse or offset the overall decline brought about by rather sharp decline in the international prices of these commodities witnessed between the early and the mid-eighties. Consequently, the overall increase in exports turned out to be much higher in quantity than in value terms. Sixth, while the share of Asia in the total world output of pulses declined continuously during the past 15 years, its share in total global trade had increased marginally in quantity and reasonably in value terms during this period. Seventh, the share of Asia in the total world tobacco trade declined considerably even though there was a perceptible rise in the share of this continent in the total world output of this commodity.

Evidently, agricultural exports of Asia have undergone some major changes during the past 15 years. While many of the traditional export commodities of Asia such as jute, tea and tobacco are growing rather slowly and gradually losing their importance in the international trade, some other traditional exports of the continent such as rice and wheat among cereals and coffee, as well as non-traditional exports such as vegetables, oilseed cakes, groundnuts-green and shelled ones, sesame seeds castor oil and floricultural products have acquired fresh grounds in the world trade. However, a continuously declining trend witnessed in the case of fruit exports of Asia is indeed quite alarming for the continent and despite their greater significance in total world trade, Asian fruit exports have fallen sharply with the course of time. But, if fruits and vegetables are looked at separately, it is noticed that the continent has recorded dynamic growth in vegetable exports. Further, although Asia's share in world production of various fruits has grown considerably over the past 15 years, its share in the total world trade of these fruits, however, has gone down during this period. This gives a reflection of rising domestic consumption requirement of these high value fruit crops in many Asian countries owing to rise in income levels coupled with rapid increase in human population. And, as a result of these factors, Asia's share in world fruit trade has declined over time, inspite of phenomenal increase in production levels of these fruit crops.

3.6 Future Prospects of Non-Traditional Exports of Asia

What is likely to be the main driving force behind the expansion of Asia's agricultural exports in the future is one of the crucial questions that merits debate and discussion. In fact, the future growth in exports for this continent would largely depend on the increase in world import demand and the increase in international prices of agricultural commodities, aside from trade policies of various Asian countries. Of these important factors, it is the increase in world import demand

that might fuel and act as an engine of export growth. At the same time, it must be emphasised that the Asian countries need to launch concerted efforts towards increasing their share in world horticultural trade. As a matter of fact, Asian countries must strive to place greater emphasis on this source of growth. In this context, the competitive advantage of developing Asian countries in world horticultural trade can be strengthened by laying more emphasis on developing infrastructure and working towards cost-reducing technological innovations. Success in production and export front also depends on economy-wide exchange rate and trade policies of different countries.

CHAPTER IV

PRODUCTION AND EXPORT PERFORMANCE OF INDIAN AGRICULTURE

Agriculture in India continues to be a dominant sector since it not only employs two-thirds of the country's population and generates nearly one-third of the national income but it also constitutes a significant component of foreign trade. The sustainability of Indian agricultural productivity improvements and a production growth that could match the requirements of the increasing population and the increased participation requirements in international trade have become its major concerns. Though in 1992-93, the agricultural sector contributed about 30 per cent of the GDP, its contribution to exports was rather below par and stood at 16.8 per cent during the same year. The advent of globalization, liberalization and privatisation in the wake of ushering in of new economic policies have thrown up newer kind of challenges before the country that require some bold initiatives on the part of policy makers. The agricultural policy reforms have come upfront as a result of this economic liberalisation in India.

4.1 Liberalisation and Agricultural Sector

Owing to the sheer size of India's agricultural sector and the importance of agricultural products in the consumer budget, agricultural performance and agricultural policy have an economy-wide impact. The country launched significant efforts and a march towards trade policy reforms in 1991.¹ Prior to this, high tariff and severe quota restrictions had created an export-unfriendly environment which was further vitiated by jealous export controls and an uncanny regime of export incentives. All this contributed to wide variations in export incentives across various industries. However, in the New Economic Environment, the Government of India is striving to implement a major programme on macro-economic stabilization. This programme which has been in force since July 1991 seeks to bring about necessary structural adjustments in economy via a regime of new trade and

1. New initiatives were taken in trade policy to create an environment which would provide a stimulus to export while reducing the degree of regulation and licencing control in foreign trade at the same time. The devaluation of rupee in July '91 resulting in the exchange rate adjustment of 18 per cent in the value of the rupee was designed to provide a substantial stimulus to exports. This change was accompanied by several other changes in trade policy. Some important trade policy reforms were introduced in July '91 itself. The aim was to reduce the degree of licencing in import trade, to broaden, enhance and harmonise export incentives and to introduce a self balancing mechanism where imports would be automatically regulated by the availability of 'exim script' through export earnings.

industrial policies. The main thrust of new Trade policy is on: exchange rate adjustments, decanalisation and a reduction in peak tariff rates besides abolition of export subsidies, encouraging investments - both domestic and foreign, improving competitiveness of Indian exports and integration of the national market with international market. It is visualised that the reduction of tariff, delicensing and encouragement to foreign investors in the manufacturing industry will promote competition, leading to efficiency and reduction in the cost of production. This may also contribute to availability of industrial goods at real lower prices, thus, correcting terms of trade in favour of agriculture. In its wake, the outflows of resources from agriculture may also be arrested accruing a major gain to the agricultural sector (Sharma and Tiwari, 1993).

All this shows that the benefits of the liberalisation process are yet to be realised fully vis-a-vis the agricultural sector and liberalisation is still a small player in this sector. It is in this context that the new economic policy lays considerable emphasis on agricultural exports. The new agricultural policy declared by the Government of India on 31st March, 1993 suggest to provide fresh concessions to agricultural exports with a view to boost the volume of agricultural exports further. The main objective of all this process was to encourage the establishment of export oriented units in the agricultural sector. In order to propel the economy towards greater exports, sweeping changes were brought forth in the trade policy which ranged from devaluation to abolition of Cash Compensatory Scheme (CCS) and Exim Scripts in addition to partial convertibility of rupee. The main aim of this measure was an increased accent on liberalisation so as to achieve not only rapid and sustained growth in agriculture but also ensure growth in the industrial sectors as well.

4.2 New Economic Environment and Agricultural Trade

In a highly competitive world market of today where, every country is struggling to export some or the other commodity, how best India can meet the challenges and the needs arising from the globalization process will depend on export capabilities of the country. Because of highly diversified nature of agricultural produce, India has a unique opportunity in the free trade regime under World Trade Organisation (WTO). The key elements for strengthening the agricultural trade of the country are import substitution and export promotion measures. These two important planks if pursued logically can also help reduce the external debt burden of the country while improving its the foreign exchange reserve position. As a matter of fact, the main determinants of export performance of agricultural commodities are - adequate surplus of specific commodities, international price, quality of products, market competition and comparative advantage of producing the exportable commodities aside from Government's foreign trade policies. The export performance is also determined largely by the foreign demand and commercial overseas policies having a bearing on tariff and non-tariff barriers. The influence of external factors becomes important in the case of

those commodities where India enjoys a significant share of the global market.

Much of the success of the new economic policies depends on the country attaining a sustainable export growth. The Eighth Plan envisages the country's gross domestic product (GDP) to grow at a rate of 5.6 per cent and to allow this to happen, it is necessary that India's exports grow at about 14 per cent in dollar terms. In the same context, it is necessary to keep the current account deficit to within or at 1.5 per cent of the GDP. According to Nayyar and Ramaswamy (1995), a minimum export growth rate of 20 to 25 per cent in dollar terms may be necessary for India if the country has to have a comfortable and sustainable balance of payment (BOP) position in order to pay off its foreign debts.

So far as agricultural trade of India is concerned, the experience of the last one and a half decades shows that the country's share in the global exports of agricultural commodities has continuously declined (Table 4.2). High tariff rates, over valued exchange rates, deterrent import and export licensing policies, infrastructural bottlenecks and plethora of other

Table 4.1: Trade of Indian Agriculture: (1979-1993)
(Million US \$)

Particular	Triennium Average			Per cent Change		
	Period			2 Over	3 Over	3 Over
	1	2	3	1	2	1
Total agricultural exports	2435 (30.81)	2350 (23.56)	3004 (14.86)	-3.49	27.83	23.37
Total agricultural imports	1245 (9.36)	1515 (9.54)	1152 (5.17)	21.69	-23.96	-7.47
Net agricultural exports	1190	835	1852	-29.83	121.80	55.63
Total export trade	7902	9973	20220	26.21	102.75	155.88
Total import trade	13299	15878	22300	19.39	40.45	67.68
Balance of trade as a whole	-5397	-5905	-2080	9.41	-64.78	-61.46

Source : Computations are based on various issues of Food and Agricultural Organisation of the United Nations (FAO) "Trade Yearbook", FAO.

Note : 1) Period 1 = 1979-81; Period 2 = 1985-87; Period 3 = 1991-93.
2) Figures in parentheses are the percentage to the total exports and imports.

unrealistic trade policy instruments could be considered as some of the factors responsible for this decline. However, in absolute terms, the value of agricultural exports showed 23 per cent increase between the early eighties and the early nineties when the import of the agricultural commodities declined by 8 per cent in value terms (Table 4.1). The decline in agricultural imports can be viewed as a welcome trend as not only the import value of agricultural commodities showed a continuous decline during the past decade and a half but the share of agricultural imports in the nation's total imports also declined steadily during this period. The export promotion and import substitution of agricultural commodities have, certainly eased country's balance of payment position and this is also indicative of the fact that strategically, our agricultural policy is on the right track. But, India still has a lot of catching up to do in order to effectively compete in the growing international market.

4.3 India's Share in Asia and World Exports

In spite of the fact that agricultural development in India is central to all strategies of planned socio-economic development and that agricultural products constitute significant component of foreign trade of the country, India's share in Asia as well as world trade of agricultural commodities has shown a steady decline over time. However, this decline can be attributed not only to the overall nature and regime of trade policies generally adopted by the developed countries, but also to our own policies. The high cost structure, the policy of over-valued exchange rates, low producer prices, export taxation, excessive industry protection and incentives from import substitution can be thought of as some of the reasons that might have triggered this decline.

India's share in the world trade is not encouraging. It has very marginal presence in the world market of agricultural products. Despite several trade policy measures adopted by the Government, its share in world agricultural exports declined from 1.12 per cent in the early eighties to 0.89 per cent by the early nineties (Table 4.2). Not only India's share in world agricultural trade showed a decline, but the same in Asia also declined from 8.68 per cent to 5.77 per cent during the same period. However, the share of Asia in the agricultural as well as total world exports was found to show an increasing trend over time. Nayyar and Sen (1994) tried to elucidate the reasons for this downward slide in the share of India in global exports of agricultural commodities. According to them, 'green revolution' while reducing the supply deficit of foodgrains did not lead to generation of any real exportable surplus. An, overly placed emphasis on cereals in the national agricultural policy agenda meant that emphasis on the growth of stable export crops was diluted. This also distracted policy makers from viewing India's long-run problem of stable export crops not outpacing the growing domestic demand. Agricultural exports of India have fluctuated highly because more emphasis has always been placed first on the domestic consumption needs. The opinion of the policy makers and the political class has all through been one of exporting only

Table 4.2: India's Share in Asia and World Exports

Agricultural/ Total Exports	Triennium Average			India's Share		
	Period			Period		
	1	2	3	1	2	3
	(in million US \$)			(in per cent)		
<u>Agricultural Exports</u>						
Asia	28044 (7.61)	33255 (6.08)	52082 (4.87)	8.68	7.07	5.77
World	217920 (14.39)	228780 (10.42)	336770 (9.10)	1.12	1.03	0.89
Asia's Share in World (%)	12.87	14.54	15.47			
<u>All-Merchandise Exports</u>						
Asia	368531	547384	1070410	2.14	1.82	1.89
World	1514370	2195000	3701330	0.52	0.45	0.55
Asia's Share in World (%)	24.34	24.94	28.92			

Source : Compiled from various issues of Food and Agricultural Organisation of the United Nations (FAO), "Trade Year-book", FAO.

Note : 1) Period 1 = 1979-1981; Period 2 = 1985-87; Period 3 = 1991-93
2) Figures in parentheses are shares of Agricultural exports of Asia and World in their respective All-Merchandise exports (Total Exports).

after the domestic consumption requirements have been fully met and when there are distinct surpluses. A study made by Pal (1992) has also shown that export of agricultural products of India is constrained by the increasing domestic demand. Lack of production increases in line with making available on a sustained basis surpluses for exports and productivity improvements directed at bringing down the cost of production in addition to ushering in competitiveness can be regarded as the other major impediments behind this dismal export scenario encompassing agricultural products. Productivity levels of the major agricultural products although improving are yet in a number of cases below the world competitive standards. The imperative need of the hour, therefore, is to provide appropriate incentives to boost the production of those commodities which have been part of our agricultural exports. Further, consistency in export policies is vital to succeed in the global market. Though India's share in the world agricultural trade has been witnessing a declining trend, it is, however, expected that the country's share will eventually rise in future as a result of the GATT negotiations. Nonetheless, it may be difficult to predict as to

how much India might gain from the GATT negotiations as much would depend on the price rise in international agricultural market and India's own ability to export. How much the country improves in the infrastructural facilities would also determine India's share of agricultural exports:

4.4 Scope of Non-traditional Commodities for Steady Exports

In more recent times when traditional commodities are losing their significance in international trade, non-traditional ones are acquiring greater importance in the new economic environment. Policy-makers and trade-analysts also suggest nontraditional export promotion as one of the crucial component of strategies for diversified agricultural exports. The dawn of growing interest in horticultural exports in India also stems from this search for a more diversified nontraditional agricultural exports. Foreign exchange earnings from such a boost to exports is not only going to help the country in meeting rising import bills but will also ensure a better servicing of our ever mounting debt burden and, therefore, a more sustained and meaningful economic growth. Further, a drive towards maximizing net returns and foreign exchange earnings through non-traditional agricultural exports also places more stress on the exports of agricultural products in processed form.

India is blessed with diverse agro-climatic conditions and so has the ability to produce a wide variety of fruits, flowers, vegetables and a host of other agro based products round the year. Considering all these factors, it should be possible for India to substantially increase the current share of the agricultural sector in its total exports from the present rather low levels of 14 to 15 per cent to about 30 per cent, which is the share of agriculture in the GDP. Despite their immense potential, only a meagre quantity of horticultural products are exported today. A substantial quantity of the country's horticultural produce is lost at the alter of poor post-harvest processing, handling and storage operations. It is estimated that nearly 30 to 35 per cent of the total horticultural production, particularly of fruits and vegetables, is lost annually in post-harvest losses² (Singhal, 1995) and this could be hampering India's net horticultural exports. Rising domestic demand for these high value commodities could also be working as a deterrant and might be responsible for India's poor share in the total global horticultural exports. Creation of appropriate and adequate post-harvest infrastructure and related facilities and sustained production of high quality horticultural produce of international standard can only improve the current situation. In fact, India is yet to fully realise its potential in horticultural exports and the rapidly changing world trade scenario demands that this potential be tapped to the best possible extent. The era of liberalization ushered in since July 1991 has

2 It is estimated that about 30 per cent of fresh horticultural produce is lost due to poor post-harvest infrastructure relating to processing, scientific package and cold storage chains.

given a boost to agricultural exports, in general and to horticulture, in particular. The activities aimed at increasing the export of horticultural produce, with particular reference to gearing up the production of export quality produce, are indeed quite relevant to the development of horticultural industry in India.

With this backdrop, we observe that the new economic environment has led to significant changes in the export strategies encompassing the agricultural sector. Vertical integration of production and marketing agencies have brought about structural changes in the economy. And, in this pro-liberalisation environment, the export of agricultural commodities without doubt have gained considerable strength due to their inherent export advantages. However, identification of various commodities which are favourable for export in the light of new economic environment and examination of the role of agricultural exports in the world trade market are crucial in the changing world trade scenario. Therefore, in order to understand and grasp the possibility as well as the direction of required export trade, it is pertinent to assess the existing pattern and structure of export trade of India. Towards this end, an attempt has been made to analyse the production and export performance of major agricultural commodities during the period 1979-1993. Besides, an attempt has also been made to evaluate growth performance of production and export trade of India in selected commodities, apart from analysing growth in the country's share in Asia and the world production and the export trade over the given period of time. The present chapter, therefore, ventures to probe into these issues and covers wide spectrum of agricultural commodities - both traditional and non-traditional from India's point of view. The changes studied related to variation in: (i) pattern of agricultural production and exports, (ii) share of exports in total production, (iii) growth rate of individual agricultural commodities produced and exported, and (iv) India's share in Asia and world production and trade and underlying growth trends in the same.

4.5 Changing Structure of Agricultural Production in India

Agriculture is the mainstay of the Indian economy and constitutes nearly one-third of the country's GDP. Agriculture is the prima donna and has been receiving foremost priority in every successive five-year plans in this country. Generally, the Government's policy frame-work for maximising agricultural production encompasses three important planks, namely, productive technology package, efficient delivery services and remunerative prices for the producers. The application of scientific technologies, coupled with favourable government policies and programmes in the agricultural sector, have certainly helped the country in augmenting the production of several commodities and the resultant marketable surplus has transformed Indian agriculture from a subsistence to a near commercial enterprise (Nayyar and Ramaswamy, 1995). However, to sustain exports, and to meet the increasing domestic demand, production has to keep pace with requirements. Technologies have been developed in this direction that

not only sustain production but also have the ability to augment and boost the production further so as to generate exportable surpluses. It is hoped that the new environment of economic liberalization with removal of restrictions will act as a catalyst and provide incentive for higher production and bring in its wake prosperity to India agriculture. However, India's response to the changing world trade scenario will depend on higher world prices for agricultural products and on its potentially to generate exportable surpluses of specific agricultural commodities. In this context, it is worthwhile to analyse past and present status of agricultural production in the country.

Over the last several years, there have been significant shifts in the agricultural production profile and changes in the commodity composition. This is evident from Table 4.3 which provides an insight into country's changing structure of agricultural production since the early 1980s.

Table 4.3: Structural Changes in India's Output of Important Agricultural Commodities (Quantity terms)
(in '000' MT)

Commodities	Triennium Averages			Per cent Change		
	1	2	3	2 Over 1	3 Over 2	3 Over 1
Cereals	113873	132727	163931	16.56	23.51	43.96
a) Wheat	35227	45848	57194	30.15	24.75	62.36
b) Rice/Paddy	49603	60415	75420	21.80	24.84	52.05
Pulses	10415	12010	12904	15.31	7.44	23.90
Potatoes	9353	11908	15771	27.32	32.44	68.62
Onions	1633	2791	3645	70.91	30.60	123.21
Oranges	1153	1357	1930	17.69	42.23	67.39
Bananas	4425	4833	7279	9.22	50.61	64.50
Apples	734	911	1153	24.11	26.56	57.08
Grapes	196	260	699	32.65	168.85	256.63
Groundnut in Shell	5596	5227	7783	-6.59	48.90	39.08
Sesame Seeds	428	431	786	0.70	82.37	83.64
Cotton Lint	1323	1309	1932	-1.06	47.59	46.03
Jute+Allied Fibres	1453	1726	1656	18.79	-4.06	13.79
Tea	565	651	735	15.22	12.90	30.79
Coffee (Green)	130	153	177	17.69	15.69	36.15
Tobacco leaves	450	462	574	2.67	24.24	27.56

Note : 1) Period 1 = 1979-81; Period 2 = 1985-87;
Period 3 = 1991-93

Production of majority of the selected commodities have increased perceptibly during the last 15 years. While cereals and pulses were observed to expand in their production by 20 to 60 per cent, the production increase in the case of various fruits and vegetables ranged from 60 to 260 per cent during this period. As regards fibre crops, the production expansion was not very impressive and ranged from about 15 to 45 per cent. Similarly various plantation commodities included in the study also

could not show impressive production expansions. In general, the post mid-eighties period registered principal increases in production in the case of majority of the commodities. Notable exceptions to this trend were certain commodities like pulses, jute, tea, coffee and tobacco, the production expansions of which were either stagnant or the rate of production increase was very slow. This held true particularly after the mid-eighties. Considering that the groups vegetables and fruits have shown relatively largest increase in production between the mid-eighties and the early nineties and the observation made earlier that structure of world production and world trade in agricultural commodities are changing over decades eighties and nineties and moving relatively more in favour of groups of crops, fruits and vegetables, let us probe a little deeper into the production trends in fruits and vegetables in India.

4.5.1 Fruits and Vegetable Production in India

The sustained thrust to planned development has vastly transformed the horticultural scene in the country. Not only is this thrust seen in the significant expansion of the horticultural base, it has also turned it into a potentially profitable and economically viable industry. Cultivation, processing, marketing and distribution of horticultural products also have immense potential in employment generation. Horticultural products, especially fruits, can also fetch the country valuable foreign exchange through exports since many of the fruits enjoy fairly high international prices.

As per the estimates provided by Singhal (1995), horticultural crops had about 12 million hectares of land under its cultivation during the year 1993-94, and the production of fruits and vegetables during this year was estimated at about 100 million tonnes. Of this, fruits accounted for about 35 million tonnes and the rest 65 million tonnes owed it to the vegetables. An appraisal of the past performance of this country reveals that during 1991-92, India occupied the second position in the world in fruit as well as vegetable production. During this year, while Brazil occupied first position in fruit production, China was the largest producer of vegetables. However, as per the estimates of FAO production Yearbook, 1993, India had overtaken Brazil in total fruit production relegating the latter to the second position. These figures and facts clearly underscore the pre-eminent position that India enjoys in the world in fruits and vegetable production. Due to its rich and varied agro-ecological and geographical resource base, India definitely have greater prospects of accelerating the horticultural production in the country in tune with international market that is emerging in the face of current globalisation and liberalisation scenario.

In the light of the above background, this section seeks to examine the production performance of some of the selected fruits and vegetables grown in the country with early 1980s period serving as the initial period for this study. As is readily discernible from Table 4.3, majority of the selected fruits and vegetables showed perceptible production expansion during the past 15 years. The overall production expansion in

the case of potatoes was about 70 per cent between the early eighties and the early nineties. This production expansion in potatoes was, however, faster between the mid-eighties and early-nineties compared to the period between the early- and the mid-eighties. Onions, on the other hand, though showed an overall production increase of 123 per cent between the early eighties and the early nineties, a considerable slowing down in production increase of this commodity was also noticed after the mid-eighties. Various fruits also followed a trend similar to the selected vegetables in terms of production expansions. While the production increases in case of fruits like oranges, bananas and apples were to the tune of about 60 to 70 per cent between the early eighties and the early nineties, grapes showed fairly dramatic production expansion as it was found to increase by a whopping 257 per cent during this period. Most of the expansion in production in the selected fruits was noticed after the mid-eighties. While production increase in the case of grapes was only 33 per cent between the early and the mid-eighties, the increase after the mid-eighties was dramatic when it registered an increase of nearly 170 per cent between the mid-eighties and the early nineties. These observations are symptomatic of the great potential that India has in the cultivation of horticultural crops.

Further, the scenario obtaining over the past one and a half decades in terms of share of India in Asia and in the world output of various selected fruits and vegetables reveals a considerable rise in country's share not only in Asia but in the world too, particularly in the production of commodities like onion, banana and grapes (Table 4.4). During the early eighties, India accounted for about 19 per cent of the total onion produced in Asia. This proportion rose to 23 per cent by the mid-eighties. A marginal increase in this proportion was further noticed after the mid-eighties and by early nineties it had reached a level of about 24 per cent (fig 4.1). In the world too, India's share of onion production increased from a 8 per cent during the early eighties to about 12 per cent by the early nineties (fig 4.2). Banana and grapes produced in India also followed an increasing trend over time in terms of their share in Asia and in the total world production. While India accounted for 30 per cent of the total banana produced in Asia during the early eighties, this proportion was found to increase sharply to 37 per cent by the early nineties (fig 4.3). Similarly, the share of India in global banana production increased from 11 per cent to 14 per cent during the same period (fig 4.4). In the case of grape production, though India's share in Asia was found to increase from 3 per cent to 7 per cent during the past 15 years, its presence in the world appeared to be very marginal and insignificant (fig 4.3 and 4.4).

The past 15 years have also witnessed a declining output share of India in Asia as well as in the world for commodities like potatoes and apples in general and oranges in particular. As for oranges, India's share in Asia declined from 20 per cent during the early eighties to the low of 15 per cent in the early nineties (fig 4.3). However, a marginal improvement in her share in total world production of this commodity was noticed parti-

Figure 4.1

India's Share in Asia's Production(Vegetables) -- Quantity

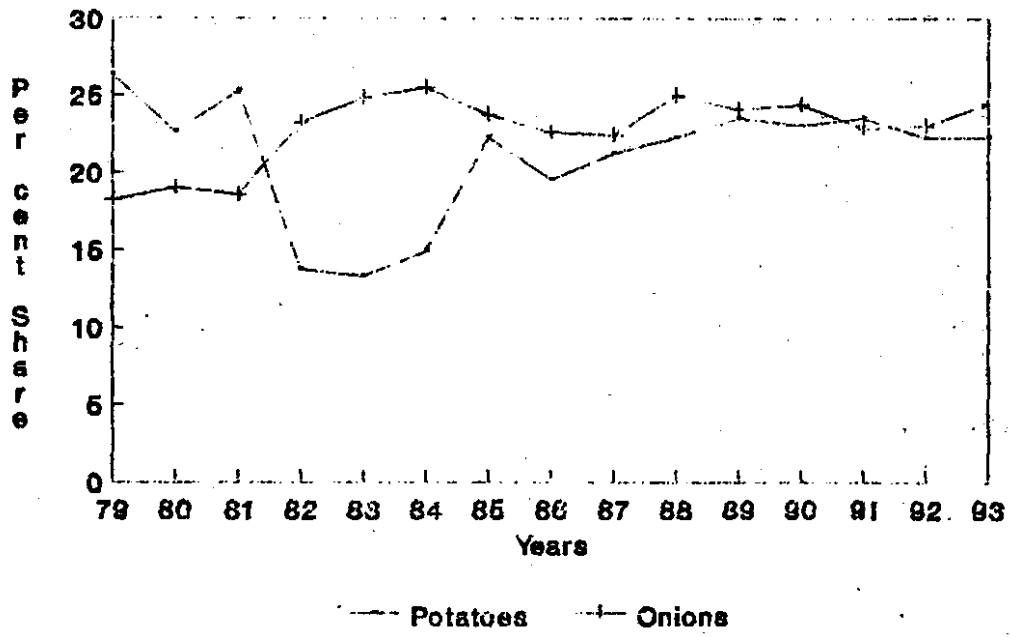


Figure 4.2

India's Share in World Production(Vegetables) -- Quantity

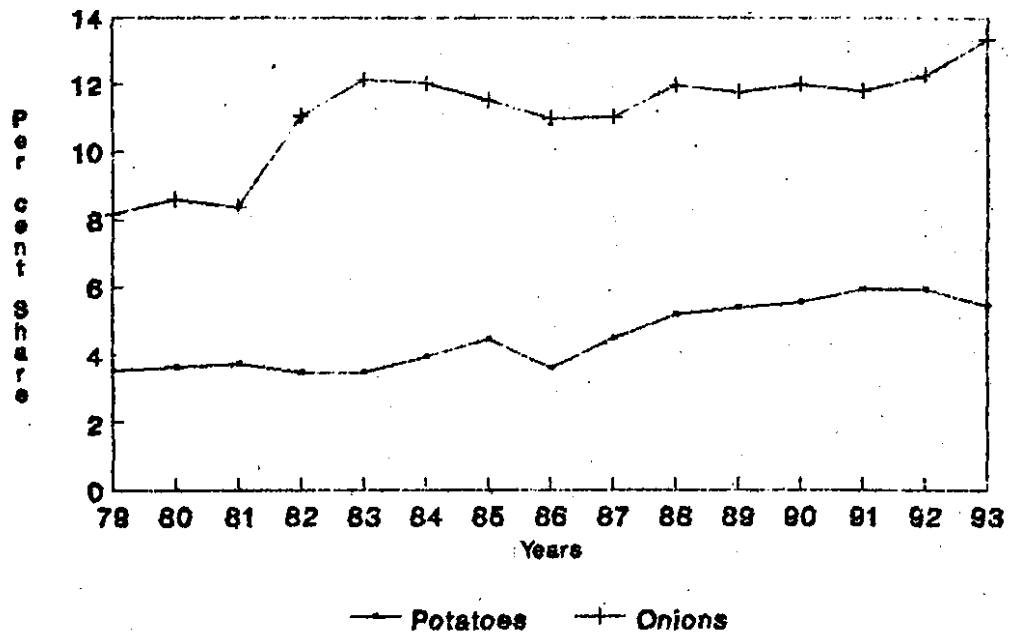
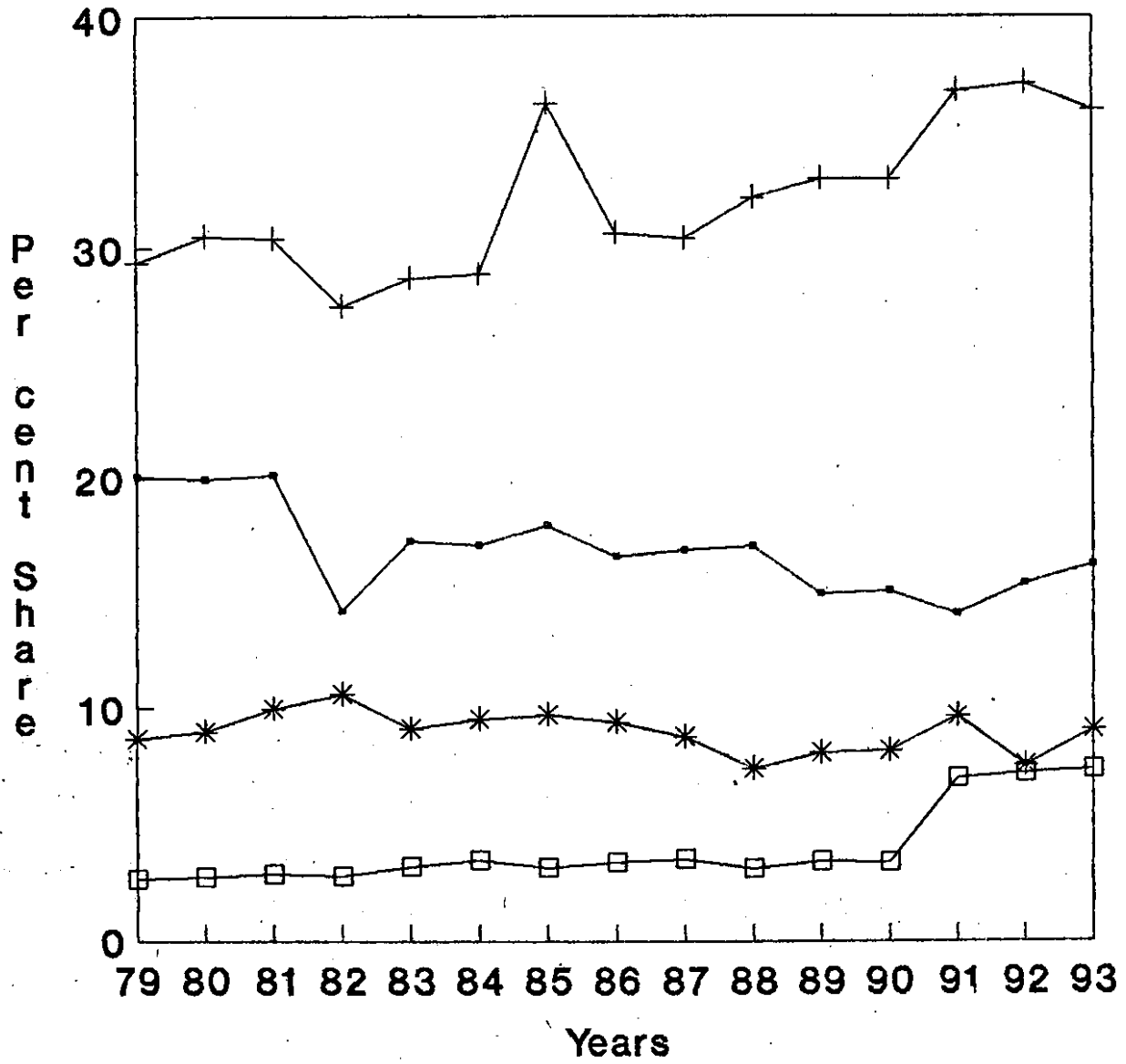


Figure 4.3

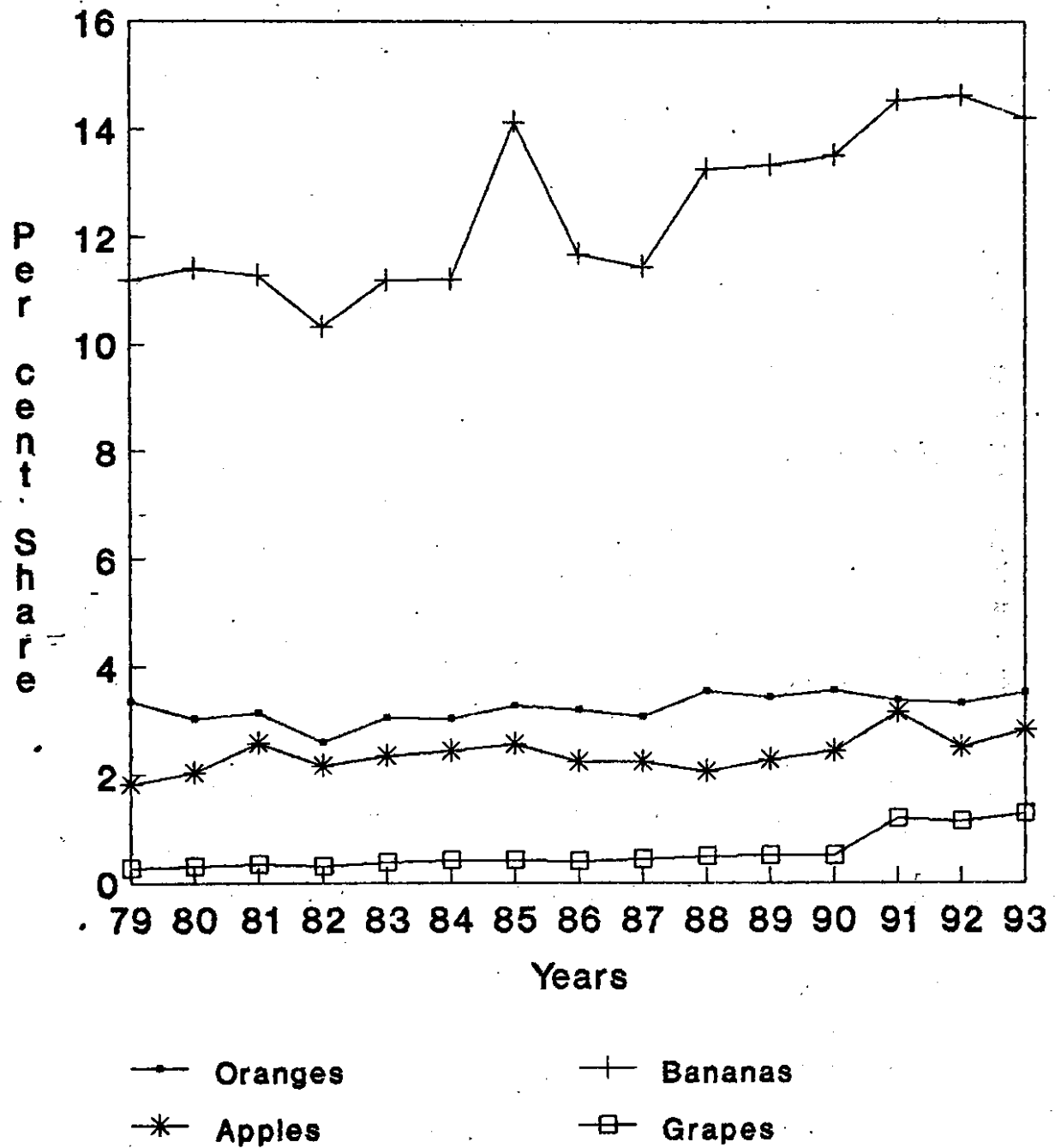
India's Share in Asia's Production(Fruits) -- Quantity



—o— Oranges —+— Bananas
—*— Apples —□— Grapes

Figure 4.4

India's Share in World Production(Fruits) -- Quantity



cularly between the mid-eighties and the early nineties (fig.4.4). Similarly, despite a marked increase in her share in the total world potato production, India's share in Asia was found to decline from 25 per cent during the early 1980s to 23 per cent in the early 1990s (fig 4.1 and 4.2). A declining share of India in total apple production of Asia, was also noticed in the face of a marginal increase in her share in total world production of this commodity during the same period.

Table 4.4: Triennium Average Share of India in Asia's and World's Total Output of Various Agricultural Commodities (Quantity Terms)

(in per cent)

Commodities	India's Share in Asia			India's Share in World		
	Period			Period		
	1	2	3	1	2	3
Cereals	17.81	17.34	18.54	7.15	7.24	8.58
a) Wheat	26.07	24.88	26.48	7.94	8.82	10.24
b) Rice/Paddy	13.77	14.13	15.73	12.52	12.95	14.39
Pulses	48.90	49.88	50.59	25.59	22.79	23.06
Potatoes	24.80	21.07	22.68	3.62	4.16	5.75
Onions	18.65	22.97	23.51	8.36	11.18	12.49
Oranges	20.06	17.09	15.19	3.17	3.17	3.40
Bananas	30.11	32.43	36.63	11.29	12.40	14.48
Apples	9.22	9.29	8.69	2.13	2.34	2.81
Grapes	2.75	3.35	7.18	0.30	0.41	1.20
Groundnut in Shell	52.22	38.06	46.19	30.62	25.07	31.93
Sesame Seeds	36.15	27.65	44.21	22.68	19.00	32.85
Cotton Lint	23.57	17.42	20.73	9.19	8.01	10.45
Jute+Allied Fibres	36.86	39.74	48.35	35.31	38.34	46.89
Tea	38.65	35.75	35.46	30.69	28.10	28.73
Coffee (Green)	22.73	21.46	17.90	25.1	2.67	2.95
Tobacco leaves	19.17	13.09	11.49	8.46	7.20	7.17

Note : 1) Period 1 = 1979-81; Period 2 = 1985-87;
Period 3 = 1991-93

Thus, the past 15 years present two differing scenarios in terms of the country's share in Asia and in the world production of various fruits and vegetables. While on one end of the spectrum, country's share in Asia has increased in the production of onions, bananas and grapes, a gradual decline in the same, on the other end, has also been witnessed for vegetables and fruits like potatoes, oranges and apples (fig. 4.1 and 4.3).

4.6 Growth and Instability in India's Agricultural Production

With the exception of commodities like pulses, jute and allied fibres and some of the plantation crops, in general various selected commodities registered 3-6 per cent annual growth in their production during the period 1979-1993. Majority

of the commodities showed less than 100 per cent overall output growth fluctuations. At the same time, commodities like grapes, sesame seeds and coffee recorded fluctuations of the highest order in their output growth. It is to be noted here that the degree of predictability of time variable in explaining output growth rates has been reasonably high for the commodities that have shown impressive growth rates over time. As the general trend reveals, perhaps the commodities which have recorded maximum growth during the given period of time and for which degree of predictability of time variable in explaining output growth have been quite high were fruits and vegetables. The trend revealed an output growth of more than 4 per cent a year for various selected fruits and vegetables during 1979-93.

Over the period 1979-93, India's cereal production grew at an annual compound growth rate of 3.2 per cent (Table 4.5(a)). This growth in output of total cereals could be achieved chiefly because of perceptible growth in the output of both wheat and rice in the country. These two important cereal crops have evinced a significant move upward in their production over the given period of time. Between the period 1979-93, while wheat

Table 4.5(a): Compound Growth Rates (CGR) on India's Production of Various Agricultural Commodities (Quantity Terms): (1979-1993)

Commodity	CGR(%)	T-Statistics	R ²	Instability Index (%)
Cereals	3.18***	7.64	81.77	38.80
a) Wheat	3.87***	11.24	90.67	25.78
b) Rice/Paddy	3.59***	6.23	74.89	70.60
Pulses	1.50**	2.71	36.07	64.84
Potatoes	4.60***	9.25	86.81	54.33
Onions	6.08***	8.31	84.15	96.90
Oranges	5.13***	9.16	86.58	71.58
Bananas	4.30***	7.71	82.06	78.55
Apples	3.05***	5.28	68.20	75.42
Grapes	9.36***	6.58	76.88	680.36
Groundnut in Shell	2.93**	2.61	34.39	299.01
Sesame Seeds	4.40***	3.55	49.26	338.64
Cotton Lint	3.71***	4.65	62.49	164.91
Jute+Allied Fibres	1.02	1.21	10.16	215.65
Tea	2.31***	11.87	91.55	8.79
Coffee (Green)	2.28*	1.83	20.49	387.35*
Tobacco leaves	1.08	1.46	14.12	127.34

Note : *, ** and *** represent significance at 10, 5 and 1 per cent level of probability.

output has grown at an annual compound growth rate of 3.9 per cent, the growth in rice output of India was found to be slightly lower than wheat and stood at 3.6 per cent a year during the same period. However, both wheat and rice have grown above the average cereal output growth rate. Though cereal production of India has grown above 3 per cent a year during 1979-93, a deceleration

in output growth was also noticed (Table 4.5(b)). This deceleration in the case of wheat output growth was noticed after the mid-eighties (Table 4.3).

Table 4.5(b): Estimated Log Quadratic Trend Equation for India's Production of Various Agricultural Commodities (Quantity Terms): (1979-1993)

Commodity	a	+bt	+ct ²	R ² (%)	d- Stat- istics
Cereals	11.7465	0.0428** (2.2823)	-0.0007 (0.6584)	82.41	1.97
a) Wheat	10.3576	0.0561*** (3.9881)	-0.0011 (1.3272)	91.86	2.43
b) Rice/Paddy	11.0873	0.0568** (2.3236)	-0.0013 (0.9060)	76.50	2.12
Pulses	9.2037	0.0436* (1.8994)	-0.0018 (1.2873)	43.83	2.46
Potatoes	9.0506	0.04497* (2.0736)	-0.0001 (0.0009)	86.81	2.19
Onions	7.2519	0.1218*** (4.7583)	-0.0039** (2.5239)	89.65	1.44
Oranges	6.9450	0.0214 (0.9366)	0.0018 (1.2887)	88.21	1.73
Bananas	8.3797	-0.0081 (0.4180)	0.0031** (2.6752)	88.76	2.17
Apples	6.5636	0.0376@ (1.4842)	-0.0005 (0.3046)	68.44	0.70
Grapes	5.3846	-0.0474 (1.0498)	0.0086*** (3.1190)	87.23	1.36
Groundnut in Shell	8.5936	0.0148 (0.3003)	0.0009 (0.2951)	34.87	2.46
Sesame Seeds	6.0712	0.0085 (0.1591)	0.0022 (0.6703)	51.09	1.49
Cotton Lint	7.2256	-0.0417@ (1.5951)	0.0049** (3.0747)	79.02	1.88
Jute+Allied Fibres	7.2217	0.0190 (0.5081)	-0.0006 (0.2424)	10.60	1.84
Tea	6.2734	0.0285*** (3.3932)	-0.0004 (0.6981)	91.88	2.19
Coffee (Green)	4.8567	0.0004 (0.0071)	0.0014 (0.4175)	21.62	3.17
Tobacco leaves	6.2150	-0.0270 (0.8732)	0.0024 (1.2565)	24.11	1.24

Note : 1) Figures in parentheses are t-values of the respective regression coefficients.

2) ***, **, * and @ represent significance at 1,5,10 and 20 per cent level of probability.

Though pulse production in India stagnated after the mid-eighties, the general trend over the past one and a half decades revealed a positive and significant growth in pulse production in India which grew at a rate of 1.5 per cent a year during this

period. However, this growth rate appeared to be quite unsatisfactory if compared with overall cereal output growth rate. One of the reasons for pulse crops not showing satisfactory growth in output over the past 15 years could be lack of attention in the use of HYV in these crops. The Government of India is now giving top priority for boosting the production of pulses in the country with the objective of meeting the domestic requirement and to reduce the import. Despite the fact that India itself is second largest producer of pulses in the world, the country remained a regular importer of pulses over a decade because of sluggish growth in output caused by low productivity.

Although various selected fruits and vegetables have shown considerable growth over time, there are also large differences in output growth rates across these fruits and vegetables. While output growth for potatoes, onions, oranges, bananas and apples ranged between 3 and 6 per cent a year during the period 1979-93, grape production in the country during the same period grew at an annual compound growth rate of about 9 per cent (Table 4.5(a)). The overall fluctuations in output growth of grape production was also found to be very high (to the tune of 680 per cent). In the case of onion, though average production growth was 6 per cent a year between 1979 and 1993, a deceleration in output growth of onion was also noticed. The deceleration in output growth of onion was found to be to the tune of 0.78 per cent a year (Table 4.5(b)). This is also evident from Table 4.3 which shows considerable slowing down in onion production between the mid-eighties and the early nineties compared to the period between early- and the mid-eighties.

Groundnut and sesame seed followed a similar trend in terms of overall output growth fluctuations. The output growth predictability of time variable was found to be poor for these commodities. In general, the production of these two commodities grew at the rate of 3-4 per cent a year during the period 1979-93.

As regards fibre crops, although cotton lint production in the country was found to grow at an average rate of 3.7 per cent a year, yet it is to be noted that in the initial years of the period under consideration the output of cotton lint declined marginally. Since this decline was at a declining rate - the rate of decline being 0.98 per cent a year, in the latter years there must have been positive growth in cotton lint production and as a result of this cotton lint production has grown substantially over the period 1979-93 (Table 4.5(b)). The production growth rate of jute was found to be insignificant during the given period of time. Moreover, the total variation recorded by the time variable in explaining output growth of jute was also very low.

Among various selected plantation crops, while tea and coffee showed a positive and significant growth in their production between 1979 and 1993, the production growth in the case of tobacco leaves was not only insignificant but also very low during the same period. However, overall fluctuation in output growth was found to be the least for tea and of a very high order in the case of coffee. In fact, during 1979-93, tobacco production in India grew at a rate much below the output growth of both

Tea and Coffee.

Thus, we observe that even though there are considerable differences in production growth rates across various selected agricultural commodities, by and large all the commodities have shown significant and positive growth over time. But, production growth over time is one end of the problem. The other end being an analysis of changing pattern of growth of India's share in the total output growth of Asia and the world and the underlying variations in the same i.e. an analysis into how India's share in Asia and in the world has grown over time in the face of considerable year to year fluctuations in the production of various selected agricultural commodities.

4.7 India's Share in Agricultural Output Growth of Asia and the World And Instability Therein

India has acquired distinction not only in Asian continent but also in the world in the production of commodities like cereals, pulses, groundnuts, sesame seeds, jute, tea and some of the fruits and vegetables. As we have already noticed, production of all the selected commodities of India has gone up reasonably over the past 15 years. But, this is one end of the spectrum. On the other end, during the same period, we can also notice a declining share of India in Asia's total production of commodities like oranges and apples (among fruits), groundnuts, cotton lint and all the selected plantation crops (Table 4.6(a)). Added to this, India's share in world production has also come down during the same period for commodities like pulses, tea and tobacco. But at the same time the general trend reveals a faster growth of India's share in the world production than growth in her share in total Asian production. The observance of growth trends over the last 15 years amply demonstrate that India still has a lot to catch in terms of increased agricultural production. Increase in agricultural production is also essential in the light of increased domestic consumption requirements as a result of rapidly rising human population of the country.

Although cereal output of India has grown above 3 per cent a year during the period 1979-93, this has not resulted in significant growth in her share in total output of cereals of Asia during this period. Country's share in total cereal output growth of Asia has not only been insignificant but also very marginal during the past 15 years. The share of India in total cereal output of Asia was found to grow at a rate of 0.53 per cent a year between 1979 and 1993. Even this growth was achieved due to perceptible growth in the share of India in total rice output of Asia since the share of wheat output growth of India in Asia was found to be very low during this period and stood at only 0.18 per cent a year (Table 4.6(a)). In contrast to this, the annual growth in India's share in total world output of cereals was found to be reasonably high and stood at 1.64 per cent over the past 15 years. Among cereals, India's share in world wheat output grew faster than rice output - the average growth being 1.92 per cent a year for India's share in world wheat output and 1.23 per cent a year for India's share in world rice output.

Table 4.6(a): Compound Growth Rates (CGR) on India's Share in Asia and World Production (Quantity Terms) : (1979-1993)

Commodities	India's Share in Asia				India's Share in World			
	CGR(%)	t-Stat.	R ² (%)	II(%)	CGR(%)	t-Stat.	R ² (%)	II(%)
Cereals	0.53	1.69	18.01	22.74	1.64***	3.75	51.95	44.16
a)Wheat	0.18	0.82	4.97	12.36	1.92***	5.57	70.49	27.81
b)Rice/ Paddy	1.20**	2.75	36.70	42.43	1.23**	2.79	37.40	43.54
Pulses	0.04	0.11	0.10	28.27	-1.29**	2.66	35.19	58.05
Potatoes	1.04	0.80	4.68	319.98	4.42***	8.04	83.26	71.18
Onions	1.52**	2.84	38.32	61.00	2.72***	4.68	62.74	67.52
Oranges	-1.81***	3.49	48.42	68.07	1.11**	2.69	35.76	37.99
Bananas	1.71***	4.35	59.30	37.60	2.24***	5.40	69.18	41.19
Apples	-1.03*	1.83	20.46	74.61	1.87**	2.78	37.36	112.68
Grapes	6.76***	5.19	67.45	561.70	10.79***	7.47	81.10	680.29
Groundnut in Shell	-0.83	0.90	5.85	196.18	0.32	0.35	0.93	194.70
Sesame Seeds	1.49	1.19	9.84	316.50	2.70*	2.06	24.69	342.62
Cotton Lint	-4.79	1.04	7.66	999.25	1.61	1.70	18.11	241.41
Jute+ Allied Fibres	2.58***	7.05	79.29	53.92	2.67***	7.23	80.09	32.99
Tea	-0.69***	5.48	69.75	4.04	-0.50***	3.19	43.89	3.05
Coffee (Green)	-2.80**	2.46	31.71	294.80	0.82	0.68	3.40	357.02
Tobacco Leaves	-4.25***	4.95	65.35	190.07	-1.72**	2.54	33.21	108.09

Note : *, ** and *** represent significance at 10, 5 and 1 cent level of probability

Even though total pulse production of India has increased by about 23 per cent between the early eighties and the early nineties - at an exponential rate of 1.5 per cent growth per annum, the growth in India's share in total pulse production of Asia has been negligible. And, in the world, India's share, in fact, has declined during the same period, the decline being to the tune of 1.3 per cent a year (Table 4.6(a)).

Regarding fruits and vegetables, while oranges and apples produced in India have declined in their share in relation to total production of these commodities in the Asian continent, a perceptible growth in India's share in the total world production of all the selected fruits and vegetables was noticed over the past decade and a half. During 1979-93, India's share in total output of Asia has grown at the rate of 1-2 per cent per annum for commodities like potatoes, onions and bananas. Nevertheless, in the case of oranges and apple production, country's share in Asia was found to decline at the rate of 1.8 per cent a year for

oranges and about 1 per cent a year for apples during the same period. On the other hand, India's share in total grape production of Asia has grown at a very high rate over time, the rate of growth being 6.8 per cent a year between 1979 and 1993. The scenario obtaining over the past 15 years also reveals that growth in India's share in total world production of various fruits and vegetables has been much faster than growth in her share in total Asian production of the same. The general trend revealed 2-4 per cent annual growth in India's share in the total world production of various fruits and vegetables except for oranges and grapes produced in India which showed their share in the world output to grow only at 1.1 per cent a year and at a rate slightly below 11 per cent a year, respectively, during the same period.

Though India's share in total potato production of Asia was found to grow at the rate of 1.1 per cent per annum between 1979 and 1993, the estimated log quadratic trend equation for the same, however, revealed a decline in this share at a declining rate (Table 4.6(b)). This indicates that in the initial years of the period under consideration India's share in total potato production of Asia was declining but since this decline was at a declining rate, after a certain point India's share in Asia started increasing and consequently the average annual growth turned out to be positive. However, in the case of onion, India's share in Asia was found to increase but at a declining rate, the rate of decline being 0.66 per cent a year. The estimated log quadratic trend equation for India's share in world onion production also followed an increase in the share at a declining rate. The rate of decline in this case was 0.60 per cent a year (Table 4.6(c)).

The share of India in total groundnut production of Asia was found to decline at about 1 per cent per annum during 1979-93. Nonetheless, in the world, country's share of the same grew marginally during this period. Between 1979 and 1993, sesame seed production of India has grown at a faster rate in the world than in Asia.

As regards fibre crops, although cotton lint production of India has grown at an annual compound growth rate of 3.7 per cent between 1979 and 1993, yet country's share in Asia in the production of the same has declined drastically during this period - annual average rate of decline being 4.8 per cent. Contrary to this, India's share in the world cotton lint production was found to grow at an annual compound growth rate of 1.6 per cent during the same period. In the case of jute production, India's share in both Asia and the world increased at the same rate - the rate of increase being 2.6 per cent in Asia and 2.7 per cent in the world.

One disturbing trend has been the declining share of India in total Asia as well as in the world production of various plantation crops. The annual average rate of decline was more for tobacco leave production. This trend was noticed despite the fact that all the selected plantation crops have grown perceptibly during the period of study. Though share of tea production of India declined at less than 1 per cent per annum both in Asia and in the world during 1979-93, the rate of decline in India's

Table 4.6(b): Estimated Log Quadratic Trend Equation for India's Share in Asia's Production (Quantity Terms) : (1979-1993)

Commodity	a	+bt	+ct ²	R ² (%)	d-Statistics
Cereals	3.0499	0.0029 (0.2115)	0.0001 (0.1724)	18.21	1.98
a) Wheat	3.2356	-0.0025 (0.2577)	0.0003 (0.4566)	6.59	2.62
b) Rice/Paddy	2.9771	0.0116 (0.5995)	0.0001 (0.0163)	36.70	2.30
Pulses	3.8888	0.0156 (1.0711)	-0.0010 (1.0741)	8.96	2.52
Potatoes	3.1806	-0.0723@ (1.3746)	0.0052@ (1.6168)	21.73	1.17
Onions	2.8511	0.0685*** (3.8793)	-0.0033*** (3.1092)	65.84	1.32
Oranges	3.0304	-0.0416* (1.8712)	0.0015 (1.0808)	52.99	2.12
Bananas	3.3855	-0.0036 (0.2222)	0.0013 (1.2999)	64.32	2.24
Apples	2.2537	-0.0039 (0.1548)	-0.0004 (0.2635)	20.92	1.81
Grapes	1.1243	-0.0555 (1.2811)	0.0076** (2.8714)	80.71	1.46
Groundnut in Shell	4.0223	-0.0422 (1.0474)	0.0021 (0.8636)	11.36	2.16
Sesame Seeds	3.6639	-0.0368 (0.6935)	0.0032 (0.9989)	16.76	1.41
Cotton Lint	3.3627	-0.1153 (0.5493)	0.0041 (0.3245)	8.46	2.34
Jute+Allied Fibres	3.5374	0.0168 (1.0579)	0.0005 (0.5590)	79.81	1.16
Tea	3.6861	0.0208*** (5.3396)	0.0009*** (3.6562)	85.69	2.07
Coffee (Green)	3.2438	-0.0541 (1.0598)	0.0016 (0.5174)	33.20	3.01
Tobacco leaves	3.1110	-0.0919** (2.5276)	0.0030@ (1.3719)	70.05	2.41

Note : (1) Figures in parentheses are t-values of the respective regression coefficients.

(2) ***, **, * and @ represent significance at 1, 5, 10 and 20 per cent level of probability.

Table 4.6(c): Estimated Log Quadratic Trend Equation for India's Share in World Production (Quantity Terms) : (1979-1993)

Commodity	a	+bt	+ct ²	R ² (%)	d-Statistics
Cereals	2.1280	0.0112 (0.5839)	0.0003 (0.2662)	52.23	2.20
a) Wheat	2.0216	0.0181 (1.1892)	0.0001 (0.0617)	70.50	2.90
b) Rice/Paddy	2.8785	0.0144 (0.7337)	-0.0001 (0.1112)	37.51	2.31
Pulses	3.3159	-0.0222 (1.0270)	0.0006 (0.4388)	36.22	2.41
Potatoes	1.1976	0.0224 (0.9645)	0.0013 (0.9263)	84.37	1.59
Onions	2.0513	0.0740*** (3.4600)	-0.0030** (2.2691)	73.93	1.12
Oranges	1.1257	-0.0049 (0.2753)	0.0010 (0.9248)	40.03	1.88
Bananas	2.3870	0.0060 (0.3392)	0.0010 (0.9413)	71.30	2.30
Apples	0.7229	0.0132 (0.4445)	0.0003 (0.1856)	37.54	1.70
Grapes	-1.1621	-0.0353 (0.7758)	0.0086*** (3.1117)	89.54	1.71
Groundnut in Shell	3.4578	-0.0160 (0.3916)	0.0012 (0.4841)	2.83	2.17
Sesame Seeds	3.1685	-0.0165 (0.2939)	0.0027 (0.7903)	28.41	1.33
Cotton Lint	2.3504	-0.0850** (2.8940)	0.0063*** (3.5345)	59.88	2.10
Jute+Allied Fibres	3.4963	0.0155 (0.9745)	0.0007 (0.6984)	80.87	1.14
Tea	3.4592	-0.0242*** (5.8312)	0.0012*** (4.7495)	80.52	2.13
Coffee (Green)	0.9927	-0.0300 (0.5718)	0.0024 (0.7476)	7.70	3.09
Tobacco leaves	2.2371	-0.0467@ (1.5965)	0.0018 (1.0305)	38.64	2.06

Note : (1) Figures in parentheses are t-value of the respective regression coefficients.

(2) ***, **, * and @ represent significance at 1, 5, 10 and 20 per cent level of probability.

share in total coffee production of Asia was more sharp and stood at 2.8 per cent a year. On the other hand, an increase in India's share in total world coffee production was witnessed between 1979 and 1993 which grew at about 1 per cent per annum during this period. Tobacco leave production of India declined at the rate of 4.3 per cent per annum in Asia and 1.7 per cent per annum in the world during the same period. The estimated log quadratic trend equation revealed a declining share of India in

total Asian tobacco production which, in fact, was at a declining rate.

Although an attempt was made to estimate pattern of growth in India's share in the total Asia as well as world production of various selected agricultural commodities, yet it was noticed that the predictabilities of time variable in explaining these growth rates were not very impressive and stood at a very low level for majority of the selected commodities. This held especially true when growth rates were estimated for India's share in total Asian production. Nevertheless, the total variation recorded by the time variable in explaining output growth rates improved substantially when growth rates were estimated for India's share in the total world production.

Very wide overall fluctuations were noticed in terms of growth in India's share in the total output of Asia for commodities like potatoes and grapes (among fruits and vegetables), groundnut and sesame seeds, cotton lint, and coffee and tobacco leaves (among plantation crops). The overall fluctuation in output growth in terms of India's share in Asia ranged from 4 per cent for tea to as high as about 1000 per cent for cotton lint. In the case of India's share in the world production, overall output growth fluctuation ranged from 3 per cent for tea to 680 per cent for grapes. In the case of grape output, India's share in Asia as well as in the world has grown in the face of very high overall fluctuation in the same - the overall grape output growth fluctuation was about 560 per cent for India's share in Asia and 680 per cent for India's share in the world. The share of India in total cotton lint production of Asia also fluctuated widely but this has resulted in a declining share of India in total Asian production of the same - the decline in share was 4.8 per cent per annum during 1979-93. In the case of tea, though there has been marginal decline in India's share in both Asia and the world production, the overall fluctuation in the same has also been noticed to be very low.

An application of Durbin-Watson 'd' statistics to check the incidence of autocorrelation between the successive values of share of India in total Asian as well as global production of various selected commodities revealed the absence of the same since the critical values of 'd' statistics for the various estimated equation were observed to fall within the acceptable range i.e. $du < d^* < (4-du)$.

4.8 Changing Structure of India's Agricultural Export Trade

The discussion on India's agricultural export is centered around following issues. (1) The share of agricultural exports in domestic production, commodity wise and during different periods. This will allow us to ascertain the increasing/decreasing share of exports in production for different groups of commodities considered in our study. (2) India's exports of agricultural commodities in quantity and value terms in different periods and the changes in the same from one period to another. This will give us a scenario about the changing structure of India's agricultural exports. Estimates of rates of growth of exports and the magnitude of fluctuation in the same will

indicate the nature of instability in the agricultural exports. (3) The share of India's agricultural exports, commodity wise in the corresponding world exports and exports of Asia with a view to ascertain India's relative position in the export of agricultural commodities. (4) The world market prices examined through unit value of the commodities under consideration. This will help us to ascertain India's competitiveness in the international markets for the selected commodities.

In order to assess the possibility as well as direction of required export trade, it is essential to evaluate the existing pattern and structure of export trade of India. Therefore, before examining the future prospects and implications of the international trade of agriculture in India, it is worthwhile to examine changing structure of agricultural exports of India over time. Commodity wise agricultural export trade of India over the past decade and a half is presented in a systematic manner as follows:

4.8.1 Cereal Exports of India

Cereal exports of India has been much below 1 per cent of the total production over the past decade and a half (Table 4.9). Though India produced an annual average of about 114 million tonnes of cereals during the early eighties, only 0.83 million tonnes of this was exported annually in the international market and this constituted about 0.73 per cent of the annual average production of cereals during this period (Table 4.7 and 4.9). Despite about 15 per cent increase in total cereal production in the country between the early- and the mid-eighties, cereal exports of India decreased by around 40 per cent in the mid-eighties over the early eighties level (Tables 4.3 and 4.7). However, cereal exports of India increased in tune with rise in production between the mid-eighties and the early nineties. As a result of steep rise in cereal export trade of India between the mid-eighties and the early nineties, the overall increase in quantum of export trade of India in cereals stood at 8 per cent between the early eighties and early nineties. However, the overall increase in export trade of cereals in value terms was much higher than in quantity terms and stood at nearly 38 per cent between early eighties and early nineties. Perceptible rise in cereal exports of India in value terms than in quantity terms between the mid-eighties and the early nineties gives us an indication of higher international prices of cereals during this period. Between the mid-eighties and the early nineties, cereal exports of India in value terms increased by 140 per cent compared to only 77 per cent rise in the same in quantity terms showing an overall increase of 38 per cent between early eighties and early nineties (Tables 4.7 and 4.8).

Table 4.7: Structural Changes in India's Exports of Agricultural Commodities (Quantity Terms)

(in '10,000' MT)

Commodities	Triennium Averages			Per cent Change		
	Period			2 Over	3 Over	3 Over
	1	2	3	1	2	1
1 Cereals	83.36	50.97	90.32	-38.86	77.20	8.35
a Wheat + Wheat Flour	19.39	23.70	23.32	22.23	-1.60	20.27
b Rice	62.39	26.67	62.89	-57.25	135.81	0.80
2 Pulses	0.27	0.58	3.51	114.81	505.17	1200.00
3 Potatoes	1.74	3.90	0.51	124.14	-86.92	-70.69
4 Onions	15.87	22.60	27.78	42.41	22.92	75.05
5 Oranges+Tang + Clem	0.02**	1.00	0.80	4900.00	-20.00	3900.00
6 Bananas	0.02**	-	0.10	-	-	400.00
7 Apples	0.24**	0.31	0.66	29.17	112.90	175.00
8 Grapes	0.03	0.19	1.06	533.33	457.89	3433.33
9 Oilseed Cake+ Meal	157.52	128.59	349.89	-18.37	172.10	122.12
a Soyabean Cake	0.46	3.07	20.08	567.39	554.07	4265.22
b Groundnut Cake	47.52	22.98	27.83	-51.64	21.11	-41.44
c Cottonseed Cake	20.71	4.77	0.92	-76.97	-80.71	-95.56
d Sunflower Cake	0.46	3.07	20.08	567.39	554.07	4265.22
e Rapeseed Cake	1.85	10.10	75.93	445.95	651.78	4004.32
10 Groundnut Tot Shell	3.27	2.17	2.22	-33.64	2.30	-32.11
11 Sesame Seed	0.89	0.94	3.96	5.62	321.28	344.94
12 Castor Oil	4.77	5.27	11.47	10.48	117.65	140.46
13 Cotton Lint	8.47	12.33	15.05	49.09	22.06	77.69
14 Jute + Bast Fibres	2.79	0.77	0.85	-72.40	10.39	-69.53
15 Tea	22.31	20.99	18.38	-5.92	-12.43	-17.62
16 Coffee Green + Roast	7.59	9.06	11.21	19.37	23.73	47.69
17 Tobacco Un- manufactured	8.73	5.98	7.25	-31.50	21.24	-16.95

Note: 1 Period 1=1979-81; Period 2=1985-87; Period 3=1991-93
 2 Triennium average figures with '**' represent exports for only 1 year as there was no export in the other 2 years

Table 4.8: Structural Changes in India's Exports of Agricultural Commodities (Value Terms)

(in million \$)

Commodities	Triennium Averages			Per cent Change		
	Period			2 Over	3 Over	3 Over
	1	2	3	1	2	1
1 Cereals	280.10	160.72	385.65	-42.62	139.95	37.68
a Wheat +						
Wheat Flour	31.48	31.97	21.24	1.56	-33.56	-32.53
b Rice	246.70	128.00	358.50	-48.12	180.08	45.32
2 Pulses	1.51	2.47	19.22	63.58	678.14	1172.85
3 Potatoes	2.40	3.57	0.41	48.75	-88.52	-82.92
4 Onions	31.43	34.50	50.61	9.77	46.70	61.02
5 Oranges+Tang						
+ Clem	0.12**	2.00	1.54	1566.67	-23.00	1183.33
6 Bananas	0.12**	-	0.27	-	-	125.00
7 Apples	0.69**	1.65	2.81	139.13	70.30	307.25
8 Grapes	0.27	1.90	7.78	603.70	309.47	2781.48
9 Oilseed Cake+						
Meal	196.43	165.73	537.53	-15.63	224.34	173.65
a Soyabean Cake	16.50	94.00	380.42	469.70	304.70	2205.58
b Groundnut Cake	79.26	27.53	38.71	-65.27	40.61	-51.16
c Cottonseed Cake	32.00	5.67	1.03	-82.28	-81.83	-96.78
d Sunflower Cake	0.80	2.70	17.11	237.50	533.70	2038.75
e Rapeseed Cake	2.75	9.90	59.73	260.00	503.33	2072.00
10 Groundnut Tot						
Shell	33.30	14.33	13.88	-56.97	-3.14	-58.32
11 Sesame Seed	7.38	5.03	25.31	-31.84	403.18	242.95
12 Castor Oil	39.93	37.93	65.33	-5.01	72.24	63.61
13 Cotton Lint	126.83	119.00	143.74	-6.17	20.79	13.33
14 Jute + Bast						
Fibres	8.56	2.60	2.14	-69.63	-17.69	-75.00
15 Tea	509.99	519.88	408.08	1.94	-21.50	-19.98
16 Coffee Green						
+ Roast	203.61	241.73	129.44	18.72	-46.45	-36.43
17 Tobacco Un-						
manufactured	166.83	100.78	128.63	-39.59	27.63	-22.90
Vegetable -						
18 - Processed	12.12	17.68	26.43	45.87	49.49	118.07
19 - Fresh	37.62	222.27	88.62	490.83	-60.13	135.57
20 Floriculture	0.67	2.03	10.80	202.99	432.02	1511.94
Total Value	1659.91	1655.80	2048.22	-0.25	23.70	23.39
[1 to 20]	(68.17)	(70.46)	(68.18)			

Note: 1 Period 1=1979-81; Period 2=1985-87; Period 3=1991-93
 2 Triennium average figures with '**' represent exports for only 1 year as there was no export in the other 2 years
 3 Figures in parentheses are proportion of exports in 20 groups of commodity to total agricultural exports of India.

The observance of the past trend of 15 years revealed that wheat and rice together accounted for more than 95 per cent of the total cereal exports of India, both in quantity and value terms. In quantity terms, wheat and rice exports accounted for 23 per cent and 75 per cent, respectively, of the total cereal exports of the country during the early eighties. The gap between these proportions narrowed down in the mid-eighties when the proportion of quantum of wheat and rice exports to total cereal exports stood at 47 per cent and 52 per cent, respectively. However, in the early nineties, again the gap between these proportions widened and during this period wheat and rice exports represented 26 per cent and 70 per cent of the total cereal exports, respectively. Nevertheless, in value terms, the contribution of rice exports to total cereal exports continued to remain more than 80 per cent over the past 15 years.

India has been exporting wheat since 1977³. During the early eighties India exported an annual average of 1.94 lakh tonnes of wheat and wheat flour valued at US \$ 31.5 million (Tables 4.7 and 4.8). Even though there was about 22 per cent rise in the volume of wheat export of India between the early and the mid-eighties, the increase in export value of wheat during this period was only marginal indicating thereby a fall in international prices of wheat during this period. Between the mid-eighties and the early nineties, while wheat exports of India in quantity terms declined by only 2 per cent, the fall in export value of wheat during the same period was more sharp and stood at about 34 per cent. This further gives us a reflection of falling international prices of wheat even after the mid-eighties and as a result of this the overall wheat exports of India in value terms has fallen sharply in the face of considerable overall increase in quantity of wheat export of the country between the early eighties and the early nineties. Further, it is worth mentioning that there has been continuous decline in wheat exports of India as proportion of its production over the past decade and a half (Table 4.9).

Rice is one of the important cereals exported from India. Though rice production in India has increased significantly over time, its exports, however, has not matched with the rise in production. In fact, rice exports of India has been highly fluctuating and unstable over time, both in quantity and value terms. Rice exports of India dropped drastically in the mid-eighties only to pick up in the early nineties. Rice exports of India slumped down from an annual average of 6.24 lakh tonnes during the early eighties to an annual average of only 2.67 lakh tonnes by the mid-eighties but increased again to 6.29 lakh tonnes in the early nineties. Thus, in quantity terms, there has been negligible overall expansion in rice exports of India between the early eighties and the early nineties. However, in value terms, there has been about 45 per cent overall expansion

3. In 1977, about 1.36 lakh tonnes of wheat was first exported from India. This figure rose sharply to 1 million tonnes in 1978 and thereafter India continued its presence in the international market for wheat, though not regularly.

in rice exports of India. This overall increase in rice exports of India was witnessed due mainly to perceptible rise in the exports of this commodity between the mid-eighties and the early nineties in the face of sharp decline in the same between the early - and the mid-eighties. Further, rise in exports of rice in value terms than in quantity terms after the mid-eighties gives us an indication of favourable international prices for rice between the mid-eighties and the early nineties.

Not only the rice exports of India has shown considerable fluctuations over the past 15 years but its exports as proportion of production has also fluctuated widely during this period. At the same time it is to be noted that exports of rice as proportion of production continued to remain less than 1 per cent over the past 15 years. Rice exports of India as proportion of its production plummeted from 0.83 per cent during the early eighties to 0.30 per cent by the mid-eighties but rose again to 0.57 per cent in the early nineties (Table 4.9). One of the reasons for poor quantum of exportable surplus of rice has been the burgeoning demand pressure on the available supplies. In spite of the fact that India is the second largest producer of rice in the world, next only to China, exports of this commodity has continued to remain at low level owing to considerable rise in domestic demand for rice resulting from rise in human population.

4.8.2 Pulses Exports of India

Pulses exports of India was found to expand by leaps and bounds over the past 15 years. While only 2.7 thousand million tonnes of pulses were exported from India annually during the early eighties, the annual average exports of the same expanded to 5.8 thousand million tonnes by the mid-eighties and further to the high of 35.1 thousand million tonnes in the early nineties and thus exhibiting 1200 per cent overall rise in pulses exports of India between the early eighties and the early nineties. In value terms too, the overall rise in pulses exports of India during the same period was nearly 1200 per cent. Though principal expansion in quantity as well as value of Pulses exports of India was noticed between the mid-eighties and the early nineties, the export expansion was more in value than in quantity terms during this period. In contrast to this, the export expansion of pulses was more in quantity than in value terms between the early - and the mid-eighties (Tables 4.7 and 4.8). This amply demonstrates the trend of falling international prices of pulses between the early- and the mid-eighties and a sharp rise in the same after the mid-eighties. This is also evident from the observance of the trend in unit value of exports of pulses during the past 15 years. The unit value of exports of pulses in India was US \$ 559 per tonne during the early eighties which declined sharply to US \$ 426 per tonne by the mid-eighties but increased again to US \$ 548 per tonne in the early nineties (Table 4.10).

As regards production-export relationship, a continuous rise in export of pulses as proportion of production was noticed over the past 15 years. As a matter of fact, until the mid-eighties exports of pulses as proportion of production was almost negligible. It was only during the early nineties that a

reasonable quantity of total production was exported from India in the international market. The proportion of pulses exports to production stood at 0.27 per cent during the early nineties (Table 4.9).

Table 4.9: Changing Structure of India's Agricultural Exports as Proportion of Its Agricultural Production
(in per cent)

Commodities	Triennium Average		
	Period		
	1	2	3
Cereals	0.73	0.38	0.55
a) Wheat	0.55	0.52	0.41
b) Rice+Paddy	1.26	0.44	0.83
Pulses	0.03	0.05	0.27
Potatoes	0.19	0.33	0.03
Onions	9.72	8.10	7.62
Oranges	0.02	0.74	0.41
Bananas	-	-	0.01
Apples	0.33	0.34	0.57
Grapes	0.15	0.73	1.52
Groundnut in Shell	0.58	0.42	0.29
Sesame Seeds	2.08	2.18	5.04
Cotton Lint	6.40	9.42	7.79
Jute + Allied Fibres	1.92	0.45	0.51
Tea	39.49	32.24	25.01
Coffee (Green)	58.38	59.22	63.33
Tobacco Leaves	19.40	12.94	12.63

Note : 1) Period 1 = 1979-81; Period 2 = 1985-87;
Period 3 = 1991-93

As a matter of fact, export of domestically produced pulses was restricted until March 1992. Nevertheless, under the advance licencing scheme, imports of pulses for processing and re-export was allowed after meeting the stipulated value-addition norms. A ceiling of 50,000 tonnes was placed by the Ministry of Commerce on exports of pulses for the year 1993-94. During this year, pulses exports were allowed at a minimum export price of US \$ 600 per tonne. At the same time, in order to fulfil domestic shortage, import of low grade pulses was also proposed (Singhal, 1995).

4.8.3 Horticultural Exports of India

Consequent upon several trade liberalization measures and free market environment, a marked change in the trade of horticultural commodities in the form of discernible strategies for their development and new techniques of trade has emerged. In order to propel Indian economy to higher rate of growth, increase in agricultural exports through increased fruits and vegetables

exports in general and floricultural exports in particular has been given due importance by the Ministry of Commerce (Anonymous, 1994). In 1994-95 budget proposals, the Finance Ministry also gave due recognition to the potential of horticultural sector, particularly on the export front. As a matter of fact, it has indeed been only in the last few years that Indian horticultural exports got a real boost because of more liberal market environment. Nonetheless, many a times the fluctuating production has diluted our efforts, commitments and credibility to export. Highly fluctuating nature of horticultural exports of India over the past decade and a half could be seen from Tables 4.7 and 4.8. While on one hand potato exports of India increased considerably between the early - and the mid-eighties, a sharp decline in the same was noticed after the mid-eighties so much so that overall potato exports of India in quantity terms fell by about 70 per cent between the early eighties and the early nineties. In value terms, overall decline in potato export was more vigorous and stood at 82 per cent. This decline in potato exports of India over the past 15 years was noticed chiefly because of sharp decline in international prices of potato during this period which could also be discerned from Table 4.10. In dismal contrast to continuous decline in potato export of India, the onion export of the country has followed a reverse trend and has shown an overall export expansion of 75 per cent in quantity terms of trade and about 60 per cent in value terms of trade between the initial and terminal period under mention. Most of the export expansion for onions was noticed in the first half of the overall period considered as in the second half considerable slowing down in the same took place. In the case of various selected fruits, mixed trend was observed in terms of export expansion during the first half and the second half of the overall period considered. By and large, all the fruits have shown phenomenal overall increase in their exports both in quantity and value terms, the increase being more sharp for oranges and grapes export.

Processed vegetables and floricultural exports of India have also picked up considerably after the mid-eighties. However, in the case of fresh vegetables exports, though there was about 60 per cent fall in value terms of trade between the mid-eighties and the early nineties, this decline in the value of fresh vegetable exports during this period, however, has not affected the overall rise in the same owing to sharp increase in fresh vegetable export of India between the early - and the mid-eighties. In fact, fresh vegetable export of India has been much higher than its exports in processed form both in absolute terms and in terms of overall increase in exports of the same during the past 15 years. Floricultural exports of India in particular has shown tremendous increase over time. While the total value of India's floricultural exports was much below US \$ 1 million during the early eighties, its exports rose to about US \$ 2 million by the mid-eighties which rose further to as high as nearly US \$ 11 million in the early nineties and, thus, India has recorded a whopping 1500 per cent rise in its exports of floricultural products during the past decade and a half in value terms.

Table 4.10: Triennium Average Unit Value of Agricultural Exports of India

(in US \$ per tonne)

Commodities	Triennium Averages		
	Period		
	1	2	3
1 Cereals	336	315	427
(a) Wheat and Wheat Flour	162	135	91
(b) Rice	395	480	570
2 Pulses	559	426	548
3 Potatoes	138	92	80
4 Onions	198	153	182
5 Oranges+Tang+Clem	-	200	193
6 Bananas	-	-	270
7 Apples	288	532	426
8 Grapes	900	1000	734
9 Oilseed Cake+Meal	125	129	154
10 Soyabean Cake	199	185	220
11 Groundnut Cake	167	120	139
12 Cottonseed Cake	155	119	112
13 Sunflower Cake	174	88	85
14 Rapeseed Cake	149	98	79
15 Groundnut Tot Shell	1018	660	625
16 Sesame Seed	829	535	639
17 Castor Oil	837	720	570
18 Cotton Lint	1497	965	955
19 Jute+Bast Fibre	307	338	252
20 Tea	2286	2477	2220
21 Coffee Green + Roast	2683	2668	1155
22 Tobacco Unmanufactured	1911	1685	1774

Note: 1) Period 1 = 1979-81; Period 2 = 1985-87;
Period 3 = 1991-93

There has been mixed trends in terms of proportion of exports to production of various selected fruits and vegetables during the past 15 years. These trends could be readily discerned from Table 4.9. While in the case of potatoes, the proportion of exports to production picked up from 0.19 per cent during the early eighties to 0.33 per cent by the mid-eighties and thereafter a sharp decline in this proportion was noticed during the early nineties, there was continuous decline in exports of onions as proportion of its production during the past decade and a half. The trend followed by bananas in terms of proportion of exports to production was also similar to that of potatoes. Nevertheless, apples and grapes have shown a continuous rise in exports as proportion of their production during the same period. Thus, exports of fruits and vegetables as proportion of production were observed to be highly fluctuating over time.

Another interesting feature that comes out from evaluation of Table 4.10 has been very wide fluctuation in unit value of fruits and vegetable exports over time. Fluctuation in unit value of exports clearly gives us a reflection of considerable international price instability of agricultural commodities over time. Thus, India's horticultural exports have grown in the face of considerable fluctuation in international prices and inspite of rise in domestic consumption requirements for these high value crops within the country. Further, the rising trend in horticultural exports of India over time also brings us closer to the fact that India has been making serious attempts to tap her potentiality in horticultural product exports. The Government of India has made concerted efforts towards rise in horticultural product exports by allocating more funds in Eighth Five Year Plan for horticultural development. Since India still holds vast potential to increase the production of horticultural commodities because of diverse agro-climatic conditions which enable us to produce fruits, flowers and vegetables, this strength needs to be exploited further. This strength, coupled with conducive policy environment that has been recently created in the country, will surely help us emerge as one of the major exporters of quality produce in the world trade. This in turn will provide us a cutting edge over many countries that have been dominating the trade scenario.

4.8.4 Oilseed Cake and Meals Export of India

India has been exporting oilseed cakes and meals for the last few decades. The policy with regard to export of oilseed cakes is determined by various factors like the level of production, domestic requirements and prevailing prices. Liberalization of trade policies coupled with rise in international prices of oilseed cakes and meals in more recent times have given a real thrust towards trade expansion of oilseed cakes and meals from India. In fact, the prices of oilseed cakes have been rising steeply owing to sustained demand from several protein-starved countries. This uptrend in prices in the international market offers an excellent opportunity for India to strengthen its position as a potential exporter of oilseed cakes and meals. It is to be noted that exports of oil cakes from India are limited to solvent extracted oil meals. The observance of the scenario obtaining over the past decade and a half reveals that in general India has recorded more than two fold increase in its various oilseeds cake and meal exports between the early eighties and the early nineties. Nevertheless, this increase has also been marked with a decline in country's oilseed cake trade during the first half of the overall period considered. This decline in oilseed cake exports between the early - and the mid-eighties was noticed to be more sharp in quantity terms than in value terms. However, a sharp increase in oilseed cake trade of India after the mid-eighties could be associated with steep rise in international prices of oilseed cakes and meals during the period between mid-eighties and the early nineties. This could also be discerned from Table 4.10 which shows a sharp increase in the unit value of oilseed cake exports during the latter half of the

overall period.

Though in general oilseed cake export trade of India has increased in due course of time, there has also been decline in export trade of some of the oilseed cakes like groundnut cake and cottonseed cake. In spite of about 20 per cent increase in quantity and 40 per cent increase in value of groundnut cake export of India between the mid-eighties and the early nineties, its overall export was found to decline by about 40 per cent in quantity and 50 per cent in value terms owing to sharp decline in the same between the early - and the mid-eighties. Cottonseed cake export of India, however, has declined continuously over time, the overall decline being of the same order both in quantity and value terms. On the positive side, soybean cake, sunflower cake and rapeseed cake export trade of India has increased many folds during the past 15 years. It is worth mentioning that the declining trend in groundnut and cottonseed cake trade of India during the past 15 years has been more than compensated by the rising trend in soybean cake, sunflower cake and rapeseed cake trade during the same period and as a result of this the overall oilseed cake export trade of India has grown perceptibly over time. Further, the decline in exports of groundnut and cottonseed meal has been due mainly to rapid increase in the availability of soybean meal, the demand for which is increasing fast in the international market. If we look into the trend in terms of unit value of exports of various oilseed cakes over the past 15 years, we notice that except soybean cake, the unit value of exports of all the oilseed cakes and meals have declined continuously during this period (Table 4.10). This further gives, an indication of rising importance of soybean cake vis-a-vis other oilseed cakes in the international market. At the same time, since sunflower cake and rapeseed cake export trade of India has grown many folds during the past 15 years despite a continuous fall in their international prices, these two oilseed cakes could be considered equally important.

It has been observed that domestic prices of oilseed cakes have tended to move closely with world prices. Thus when international prices are high, there is no particular advantage to exporters by way of increased profitability as the domestic prices follow in step with world prices. The only positive advantage in such a situation is that wasteful usage of oilcakes within the country are discouraged and more and more cake is brought under solvent extraction (Mariwala, 1977). The most important aspect for the exports of oilseed cakes and meals for India is the quality standards which the exporters should rigidly adhere to. The opportunities generated in more recent times for the exports of these commodities should not be frittered away in the years to come.

4.8.5 Groundnut, Sesame Seed and Castor Oil Export Trade of India

Various oilseeds have shown mixed trends in terms of their exports. With the advent of time, groundnut export of India has declined sharply, more in value than in quantity terms. Though a marginal increase in total quantum of groundnut export was noticed between the mid-eighties and the early nineties, this

rising trend could not reverse the overall decline in the same owing to steep fall in groundnut export between the early - and the mid-eighties. The decline in groundnut export during the first half of the overall period was due mainly to steep fall in international prices of groundnuts during this period. Not only the total quantum of groundnut exports has declined in due course of time but there has also been continuous decline in exports as proportion of production of this commodity over time (Tables 4.7 and 4.9). Nonetheless, sesame seed and castor oil export trade of India in quantity terms has increased overall as well as in between periods 1 and 2 and periods 2 and 3, most of the increase being noticed after the mid-eighties. In value terms, however, both the commodities revealed a decline in exports during the mid-eighties only to pick up sharply thereafter. In terms of production-export relationship of sesame seeds, an increasing trend in exports as proportion of production of this commodity was noticed over the past 15 years (Table 4.9). At the same time it is worthwhile to mention that there has been remarkable increase in export trade of sesame seed and castor oil from India over the past decade and a half even though their export prices have shown a steady decline over time.

4.8.6 Fibre Product Exports From India.

Cotton lint and jute constitutes two important fibre product exports from India. India has been exporting these two traditional commodities for many years. Though cotton lint export from India has increased nearly two folds in quantity terms between the early eighties and the early nineties, there has been continuous decline in export trade of jute from India during this period. The decline in jute export from India is more sharp in value terms which is chiefly because of falling international prices of jute over time. The reasons for the downward slide in jute export from India are not far to seek from and some of them could be: (i) lack of demand for raw jute and jute goods in the international market, (ii) falling international prices of raw jute and jute goods, particularly after the mid-eighties, (iii) a gradual shift over other substitutes of jute and allied fibres such as synthetic fibres and paper sack, (iv) greater importance being given by India to the export trade of non-traditional commodities such as horticultural ones, (v) international price incompetitiveness of Indian jute goods, (vi) higher profitability at domestic market than in the international market due to fall in world prices, (vii) steep fall in import demand of USSR consequent upon change in political system (USSR was the main jute importer), and (viii) recessionary conditions in the industrial sector of the economy. Due to these very reasons the overall jute exports of India has fallen by 70 per cent in quantity terms and 75 per cent in value terms between the early eighties and the early nineties. In fact, the fall was more sharp during the first half of the overall period considered.

Though India's jute export has declined perceptibly over time, its cotton export has increased unabated over the past 15 years, particularly in quantity terms. In value terms, however,

cotton lint export of India declined by 6 per cent during the mid-eighties over the early eighties level. But, after the mid-eighties, there was steady increase in cotton lint export from India in value terms too. Interestingly, there has been continuous increase in cotton lint export from India despite a steady decline in international prices of cotton lint over the past 15 years (Table 4.10). As for cotton trade, it should be borne in mind that India had been importing cotton until 1977 and it was only from 1978/79 that India emerged as a net exporter of cotton. Once cotton economy is opened with free trade policy, there is every possibility for cotton and textile industry of India to lead the world cotton economy.

4.8.7 India's Exports of Plantation Crops

India has been exporting tea, coffee and tobacco among various plantation commodities. Indian tea and coffee have been export oriented since their inception and, therefore, their exports are traditional in nature. However, tea industry of India has shown gloomy performance on the export front in more recent years. This is evident from Tables 4.7 and 4.8 which show a steady decline in tea export trade of India over the past 15 years, both in quantitative and value terms. Not only this, the proportion of tea export to production has also come down over time (Table 4.9). While India exported about 40 per cent of the total tea produced in the country during the early eighties, this proportion was found to decline to 32 per cent by the mid-eighties and by the early nineties the proportion stood at only 25 per cent. Though unit value of export of tea has remained by and large constant during the past 15 years with occasional upswing during the mid-eighties, its export altogether has remained unsatisfactory over time.

As for coffee exports of India, though there has been nearly 50 per cent overall increase in quantitative terms, its export in value terms has declined by 36 per cent during the early 1990s over the early 1980s level. Steep decline in international prices of coffee after the mid-eighties has adversely affected the total value of coffee exports from India (Table 4.10). The decline in the value of coffee export during the second half of the overall period was so sharp that the rising trend in the value of coffee export from India between the early - and the mid-eighties could not reverse the overall decline in export of this commodity. However, there has been continuous increase in export of coffee as proportion of its production during the past 15 years (Table 4.9). As a matter of fact, India exports about 60 per cent of the total coffee produced in the country and this trend has been continuing since the early 1980s.

So far as tobacco export is concerned, until the early 1980s about one fifth of the total output of unmanufactured tobacco was exported from India. The situation at present has undergone a distinct change. Not only total export of tobacco has declined but its export as proportion of its production has also come down over time. The total export of tobacco from India was found to be only 13 per cent of the total production during the early nineties. The world prices of tobacco declined sharply

in the mid-eighties from the early eighties level. This decline in international prices of tobacco has not only adversely affected the total value but also total volume of tobacco export from India. Though a surge in international prices of tobacco was noticed after the mid-eighties and consequent upon which the total tobacco exports of India increased both in quantity and value terms between the mid-eighties and the early nineties, this increase, however, has failed to reverse the overall decline in the export of this commodity both in quantity and value terms for India (Table 4.7 and 4.8).

Thus, the foregoing analysis clearly reveals an unsatisfactory performance of India on the export front of all the selected plantation commodities, particularly in value terms. Nevertheless, in quantity terms, coffee export has shown an upswing all through the past 15 years. But, as the world prices of coffee are declining in more recent times, this falling trend is bound to affect the total volume of coffee exports from India in the coming years.

An overall analysis drawn from Table 4.8 reveals that the annual average export trade of India encompassing 20 selected commodities put together was about US \$ 1660 million during the early eighties and it constituted about 68 per cent of the total agricultural exports of India during the 1979-81 period (Tables 4.8 and 4.1). In the mid-eighties, the total value of trade in the selected commodities though declined slightly to US \$ 1656 million, their combined share in the total agricultural exports of India had in fact increased to slightly above 70 per cent. Since there was considerable expansion in the exports of majority of the selected commodities between the mid-eighties and the early nineties owing to surge in international agricultural prices, the annual average total value of agricultural exports in the selected commodities registered a rise in the early nineties when the figure rose to US \$ 2048 million representing 68 per cent of the total agricultural exports of India. Thus, while on one hand, the total value of exports encompassing 20 selected commodities expanded by 23 per cent over the past 15 years, the proportion of exports in the selected commodities put together to total value of agricultural exports of India remained by and large constant and hovered at around 70 per cent. Interestingly, the overall export expansion for India in value terms remained at 23 per cent both in the selected commodities put together and all agricultural commodities between the early eighties and the early nineties (Tables 4.8 and 4.1).

4.9 Changing Structure of India's Share in Asia and World Exports

There has been considerable increase in agricultural exports of India after the mid-eighties chiefly because of liberalization of trade and several trade policy changes coupled with surge in international prices of many agricultural commodities that gave real boost to Indian agricultural exports. The upswing in agricultural exports of India in due course of time has also filtered into significant increase in her share not only in Asia but also in total world export trade. At the same time, for some commodities the share of India in Asia as well as in total world

export trade has come down over time, e.g., cereals; groundnuts, jute, tea, coffee and tobacco, especially in quantitative terms. The changing scenario in terms of India's share in Asia and in the total world export trade over the past 15 years is presented in Tables 4.11 and 4.12.

Table 4.11: Triennium Average Share of India in Asia's and World's Total Export of Various Agricultural Commodities (Quantity Terms)

(in percent)

Commodities	India's Share in Asia			India's Share in World		
	Period			Period		
	1	2	3	1	2	3
1 Cereals	6.63	2.73	3.26	0.38	0.24	0.38
(a) Wheat and wheat flour	15.14	14.75	3.98	0.20	0.23	0.20
(b) Rice	7.87	3.41	6.30	4.89	2.20	4.16
2 Pulses	0.35	0.39	1.76	0.10	0.13	0.54
3 Potatoes	3.94	9.08	0.55	0.36	0.69	0.07
4 Onions	39.34	42.80	35.11	9.76	11.63	10.58
5 Oranges+Tang+Clem	0.01	1.07	1.09	0.00	0.18	0.14
6 Bananas	0.01	0.00	0.09	0.00	0.00	0.01
7 Apples	0.29	1.37	2.06	0.02	0.09	0.16
8 Grapes	0.31	1.79	10.48	0.03	0.13	0.60
9 Oilseed Cake+Meal	47.12	21.30	38.61	6.16	3.84	8.52
(a) Soyabean Cake	27.73	28.61	60.07	0.47	2.21	6.27
(b) Groundnut Cake	95.93	72.37	71.13	46.43	40.40	40.87
(c) Cottonseed Cake	87.06	10.77	1.09	23.00	5.49	0.68
(d) Sunflower Cake	99.46	39.75	69.08	0.54	1.74	8.80
(e) Rapeseed Cake	31.99	14.80	49.31	2.75	5.48	21.51
10 Groundnut Tot Shell	16.17	5.92	4.45	4.24	2.45	2.08
11 Sesame Seed	12.44	4.29	13.59	3.65	2.65	8.40
12 Castor Oil	75.46	70.52	79.52	24.38	29.84	64.49
13 Cotton Lint	11.74	8.19	15.90	1.88	2.57	3.06
14 Jute+Bast Fibre	5.12	1.67	2.72	4.97	1.62	2.61
15 Tea	33.35	28.71	23.92	23.46	19.14	15.69
16 Coffee Green + Roast	20.66	16.87	16.02	2.02	2.10	2.27
17 Tobacco Un-manufactured	24.21	20.57	19.05	6.21	4.42	4.35

Note: 1) Period 1 = 1979-81; Period 2 = 1985-87;
Period 3 = 1991-93

Table 4.12: Triennium Average Share of India in Asia's and World's Total Export of Various Agricultural Commodities (Value Terms)

(in percent)

Commodities	India's Share in Asia			India's Share in World		
	Period			Period		
	1	2	3	1	2	3
1 Cereals	7.87	5.64	8.13	0.73	0.57	1.08
(a) Wheat and wheat flour	15.29	14.15	3.15	0.18	0.23	0.12
(b) Rice	8.73	7.63	13.08	4.96	4.02	7.31
2 Pulses	0.46	0.49	2.73	0.11	0.15	0.85
3 Potatoes	2.70	4.04	0.18	0.27	0.42	0.03
4 Onions	36.96	41.53	32.34	8.20	9.48	6.87
5 Oranges+Tang+Clem	0.01	0.67	0.51	0.00	0.10	0.05
6 Bananas	0.03	0.00	0.11	0.00	0.00	0.01
7 Apples	0.19	1.69	1.96	0.02	0.12	0.12
8 Grapes	0.55	3.20	9.82	0.04	0.19	0.48
9 Oilseed Cake+Meal	43.03	24.57	45.26	3.61	3.12	7.50
(a) Soyabean Cake	21.74	31.32	63.00	0.39	2.22	6.84
(b) Groundnut Cake	95.44	68.48	68.88	43.29	38.57	38.55
(c) Cottonseed Cake	86.98	16.49	1.28	22.58	7.28	0.76
(d) Sunflower Cake	99.50	44.81	65.61	0.64	1.74	7.45
(e) Rapeseed Cake	32.75	19.56	45.05	2.44	5.61	14.68
10 Groundnut Tot Shell	16.53	6.25	3.87	5.19	2.54	1.82
11 Sesame seed	13.12	4.34	13.61	3.69	2.33	7.47
12 Castor Oil	73.72	73.44	77.12	23.49	32.50	58.73
13 Cotton Lint	10.94	7.97	11.85	1.74	1.99	2.11
14 Jute+Bast Fibre	4.60	1.78	2.00	4.43	1.71	1.88
15 Tea	37.97	34.72	27.59	26.74	23.70	17.37
16 Coffee Green + Roast	22.36	19.12	19.07	1.84	1.96	1.92
17 Tobacco Un-manufactured	20.30	14.70	12.55	4.18	2.54	2.33
Vegetables-						
18 - Processed	3.15	2.98	1.77	0.50	0.57	0.52
19 - Fresh	2.70	12.23	2.64	0.53	2.53	0.48
20 Floriculture	0.27	0.68	1.92	0.02	0.04	0.10

There has been steady decline in India's share in total quantum of cereal export trade of Asia over the past decade and a half. Nevertheless, in the world, India's share of total cereal exports in quantity terms has remained constant during the same period with a marginal drop in her share in total world cereal exports during the mid-eighties being only a minor aberration in this scenario. The decline in her share in total cereal exports of Asia has been due mainly to steep fall in India's share in total wheat export of Asia since the decline in India's share in

total rice export of the continent has been moderate (fig.4.5(a) and 4.5(b)). In fact, there is no discernible change so far as trend in terms of India's share in total rice export of Asia and her share in total world export of the same is concerned; the trend reveals a decline in India's share in total rice exports of Asia as well as in the world during the mid-eighties and an increase thereafter (Figs.4.5(a), 4.5(b), 4.6(a) and 4.6(b)). Interestingly, though India's share in total cereal exports of Asia has declined in quantitative terms during the past 15 years, there has been moderate increase in her share not only in Asia but in the world too in value terms during the same period. Most of the increase in share was contributed by rice exports of India, the share of which has grown nearly two folds between the mid-eighties and the early nineties both in Asia and in the world.

As for pulses, though there was only a moderate increase in India's share in Asia as well as in total world export trade of the same between the early - and the mid-eighties, a steep rise in her share of this commodity was noticed after the mid-eighties so much so that in value terms India accounted for nearly 3 percent of the total pulses exports of Asia and nearly 1 percent of the world during the early nineties. These proportions were much below 1 per cent during the early eighties (Table 4.12).

There has been very wide fluctuations over the past 15 years in terms of India's share in various horticultural exports of Asia and the world, particularly in the case of potatoes, apples, grapes, fresh vegetables and floricultural product exports. Though India has a very marginal presence in total horticultural exports of the world, in general we notice an uptrend in India's share in total global horticultural export trade over time. At the same time, it is to be noted that India's share in the world fruit export trade, though increasing over time, is negligible.

India accounted for about 4 per cent of the total potato export of Asia in quantity terms and nearly 3 per cent in value terms during the early eighties. This proportion of potato export of India in Asia was found to expand sharply to 9 per cent in quantity terms and 4 per cent in value terms by the mid-eighties but thereafter a steep decline in this proportion was noticed and during the early nineties the proportion had declined to less than 1 per cent both in quantity and value terms (Tables 4.11 and 4.12 and figures 4.7(a) and 4.7(b)). A similar rising and falling trends were noticed when India's share in total world potato export was reckoned over the past 15 years, both in quantity and value terms (fig.4.8(a) and 4.8(b)). However, in the case of onion exports, the fluctuations in terms of India's share in Asia and in the world were not so wide over time. As a matter of fact, India accounts for bulk of the onion exports of Asia. Until the mid-eighties India's contribution to total Asian onion exports was around 40 per cent, both in quantity and value terms, but thereafter its contribution was seen to have declined so much so that it stood at 35 per cent in quantity and 32 per cent in value terms during the early nineties. As for India's share in world onion export, it was seen to hover around 10-11 per cent over the past 15 years in quantitative terms. But, in value terms, India's share in total global onion export was found

Figure 4.5 (a)

India's Share in Asia's Export(Foodgrains) -- Quantity

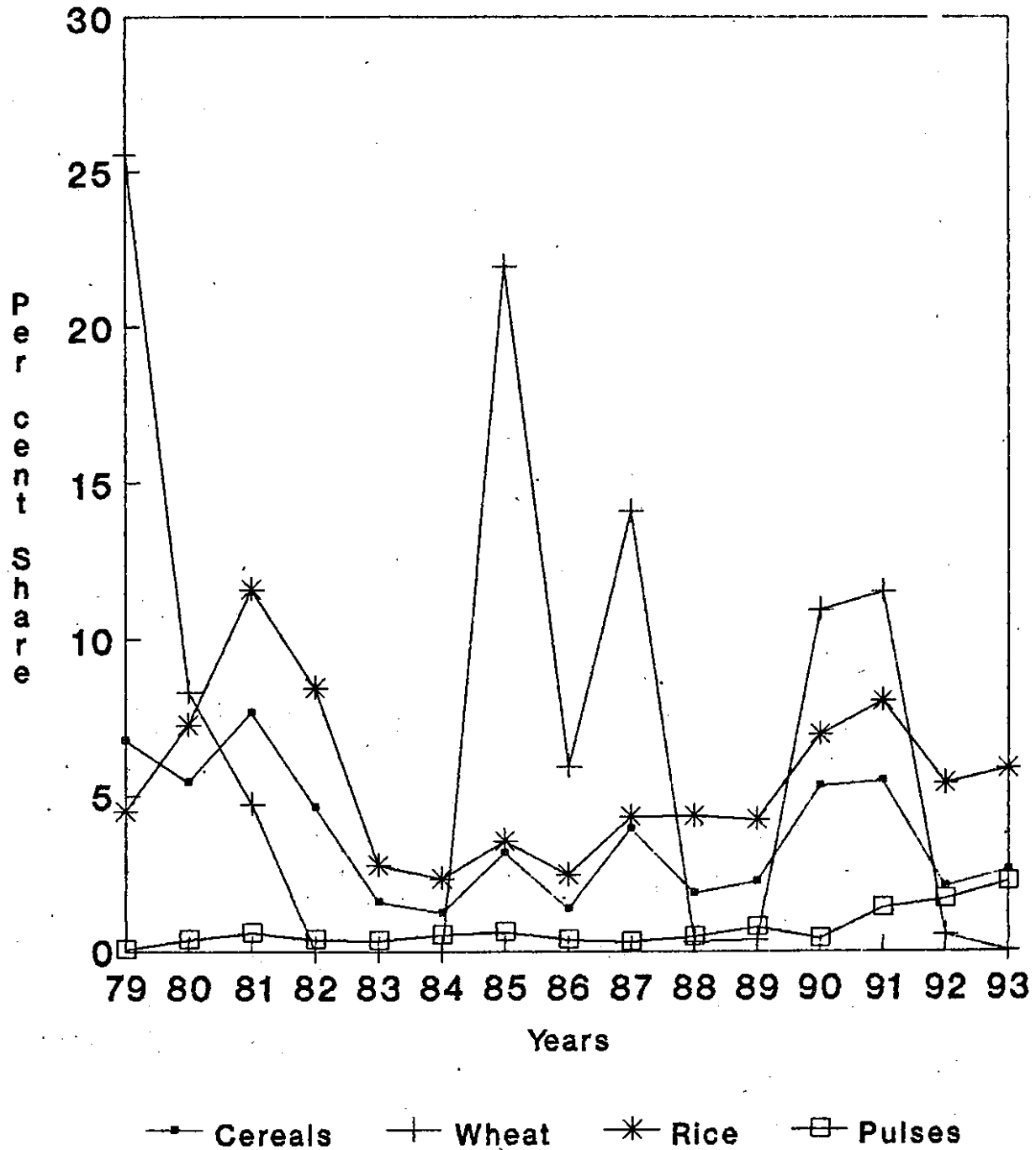


Figure 4.5 (b)
 India's Share in Asia's Export(Foodgrains) -- Value

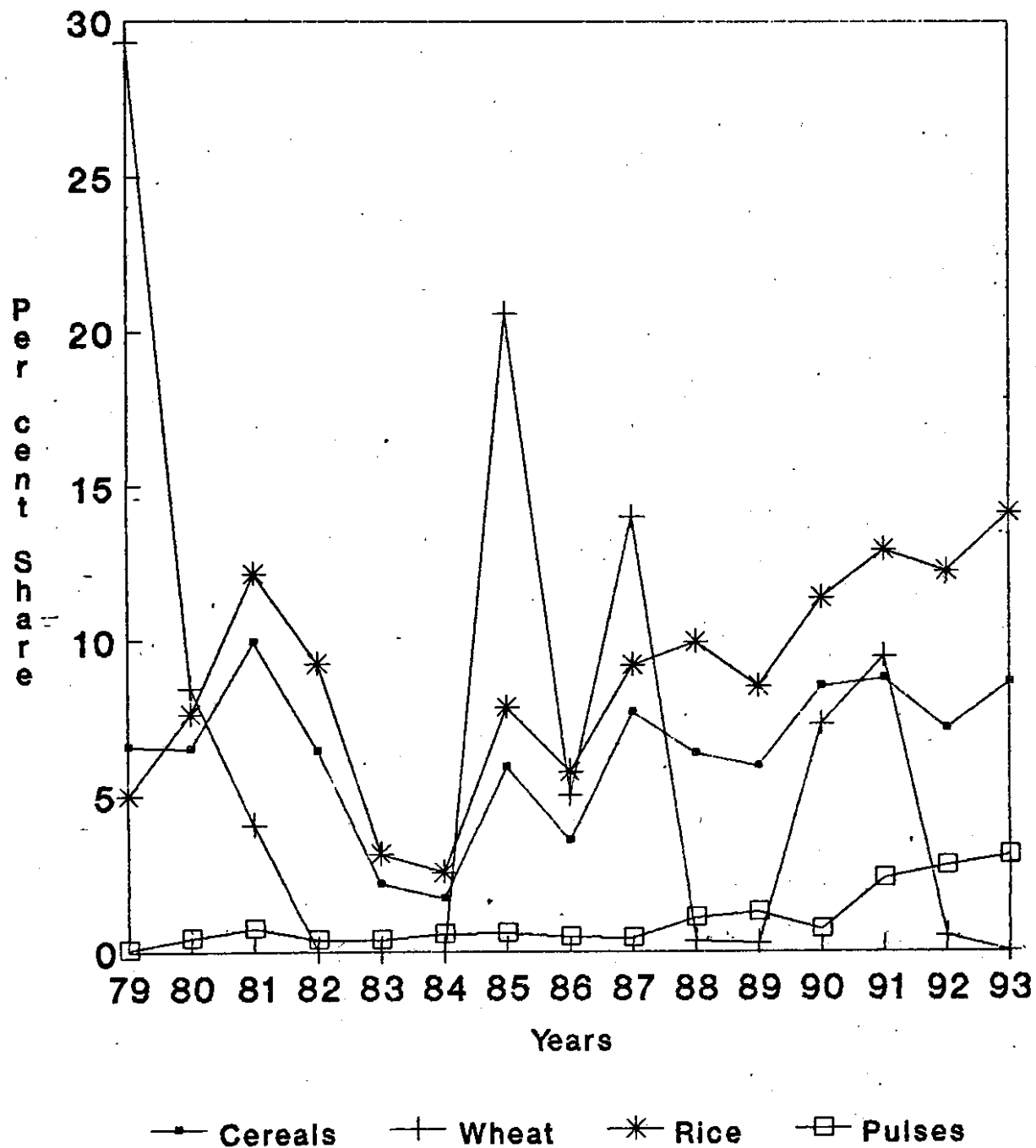


Figure 4.6 (a)

India's Share in World Export(Foodgrains) -- Quantity

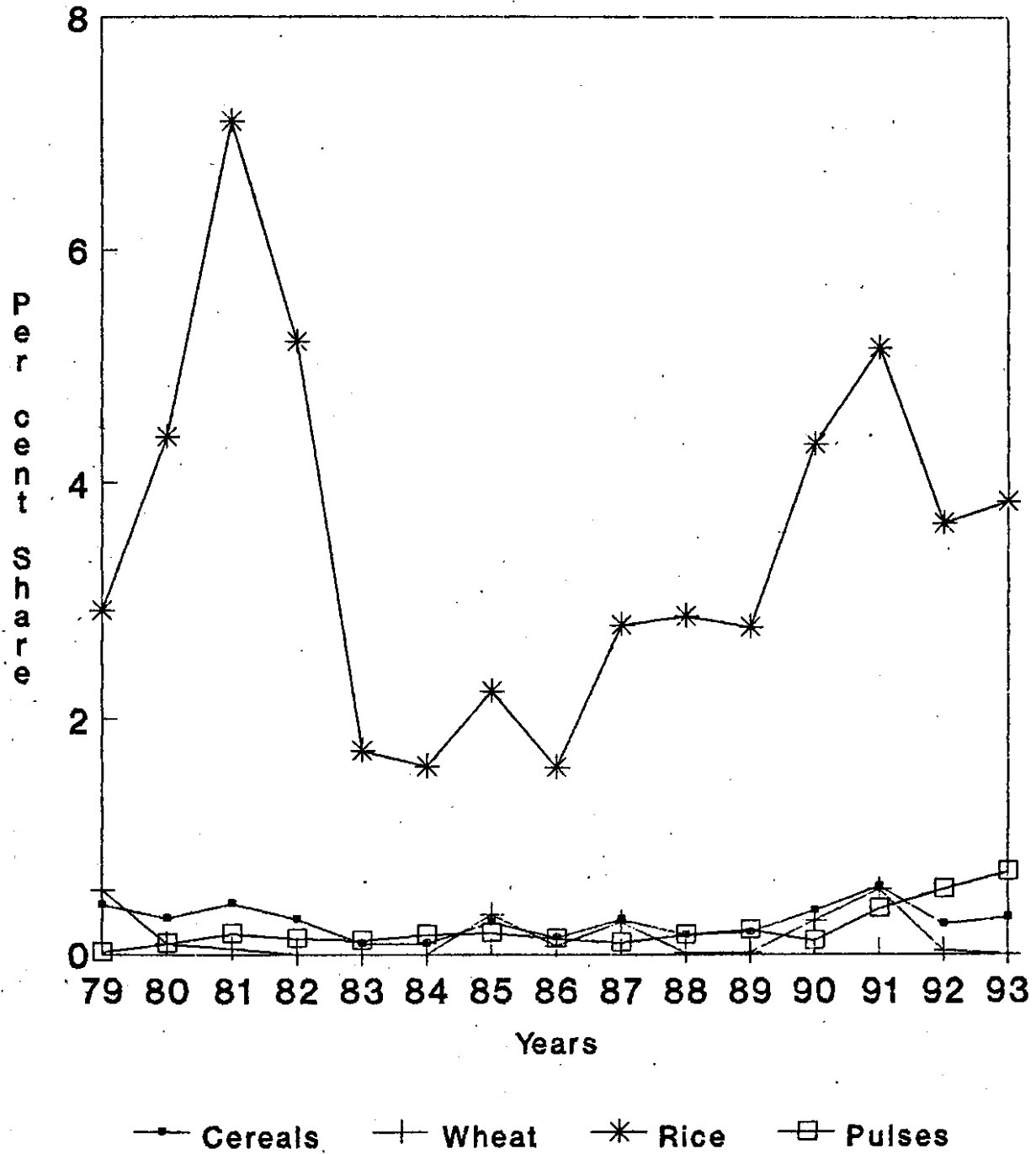


Figure 4.6 (b)

India's Share in World Export(Foodgrains) -- Value

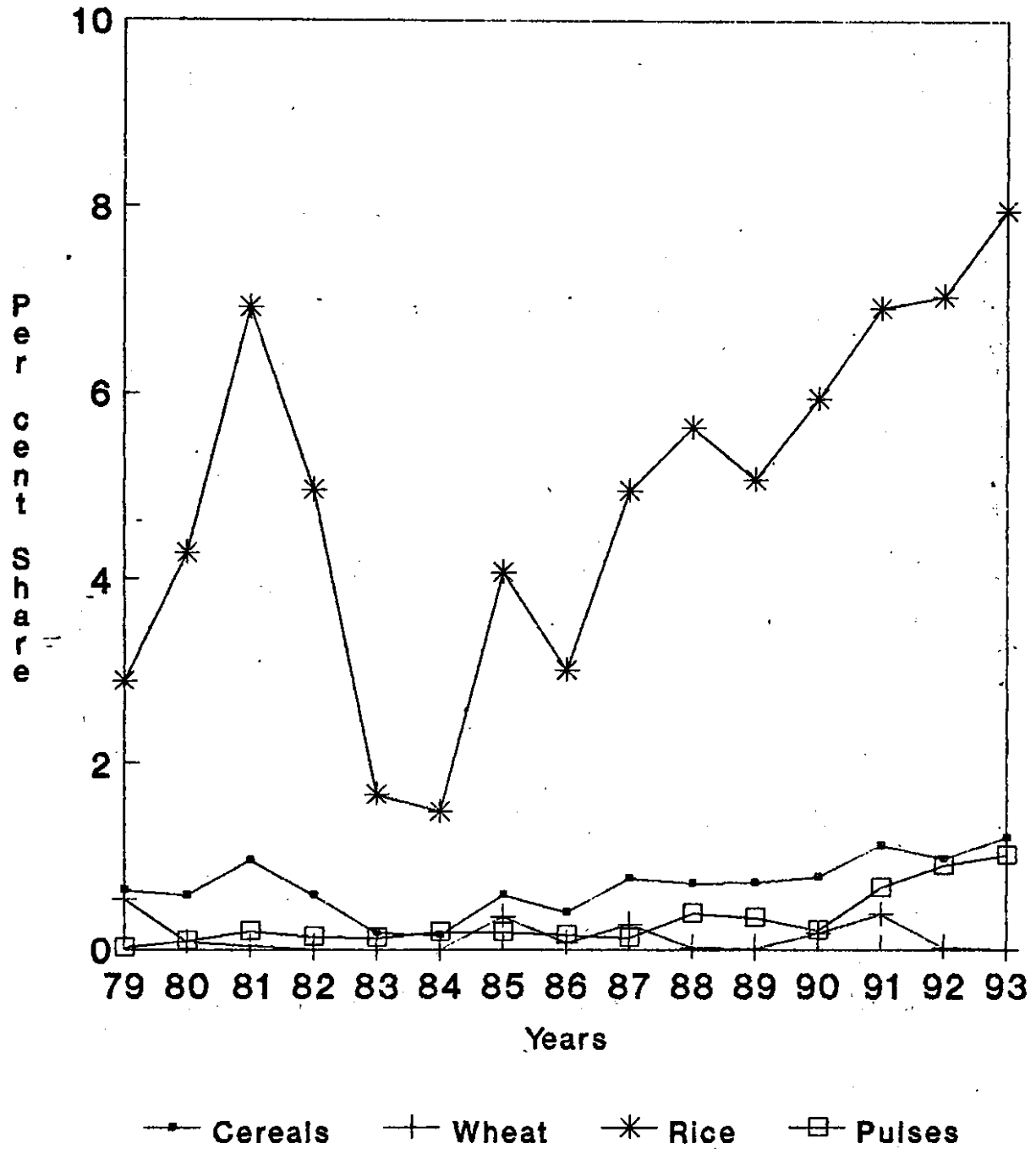


Figure 4.7 (a)
 India's Share in Asia's Export(Vegetables) -- Quantity

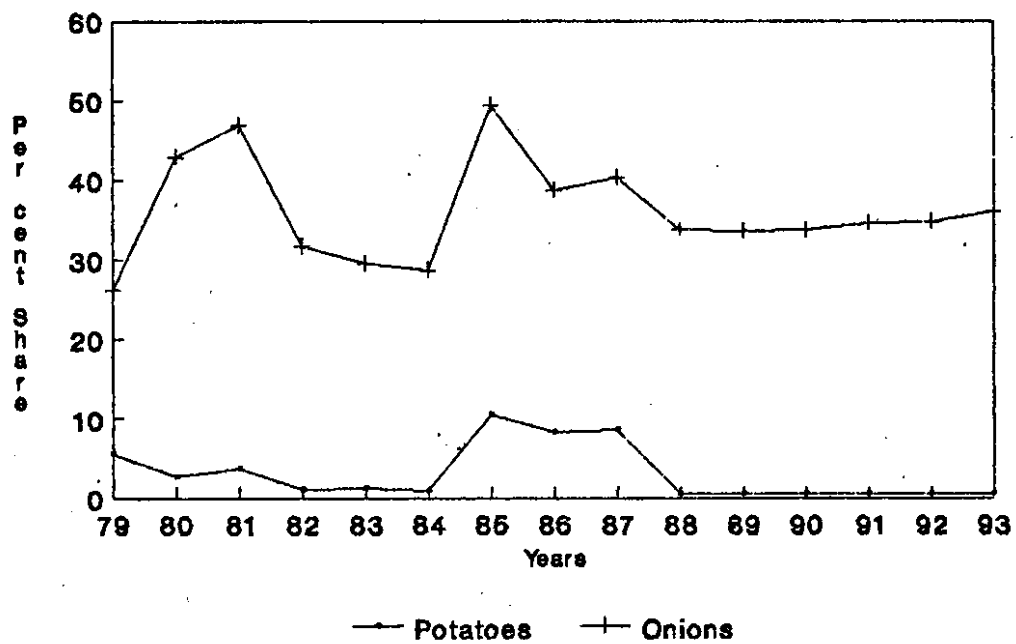


Figure 4.7 (b)
 India's Share in Asia's Export(Vegetables) -- Value

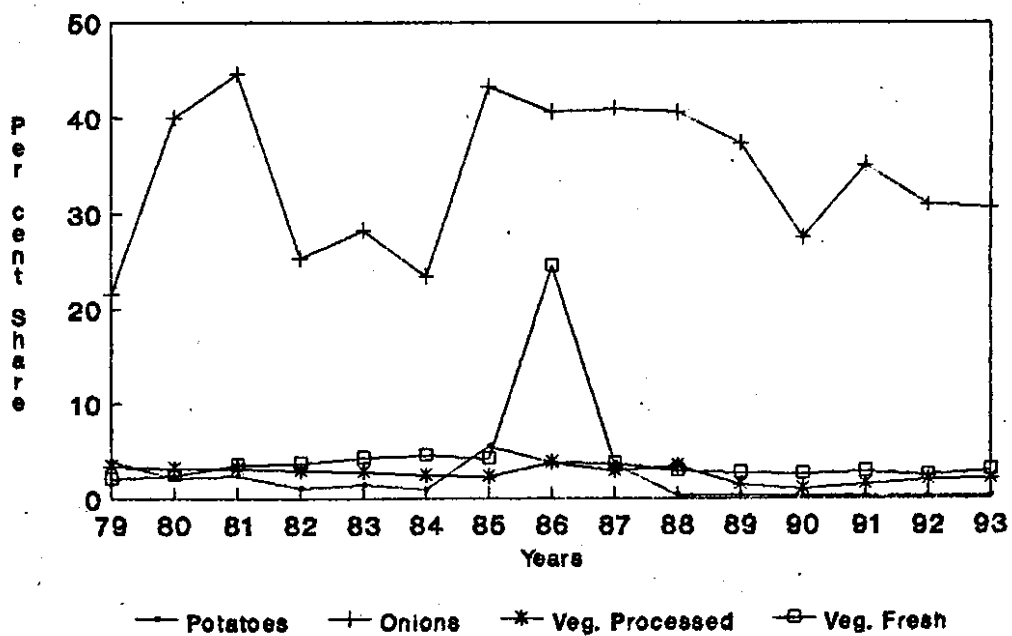


Figure 4.8 (a)
India's Share in World Export(Vegetables) -- Quantity

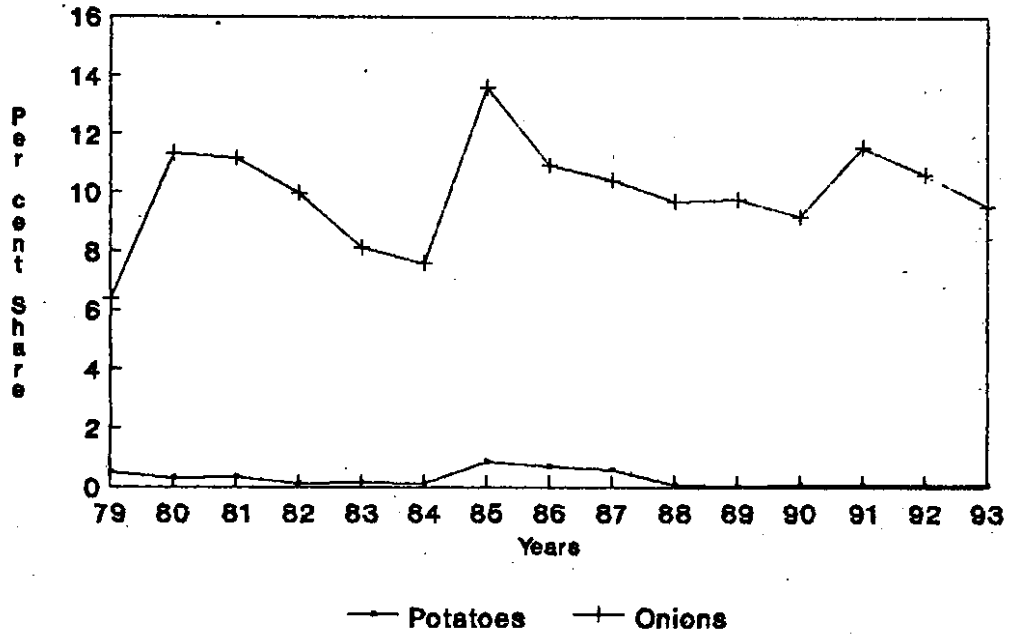
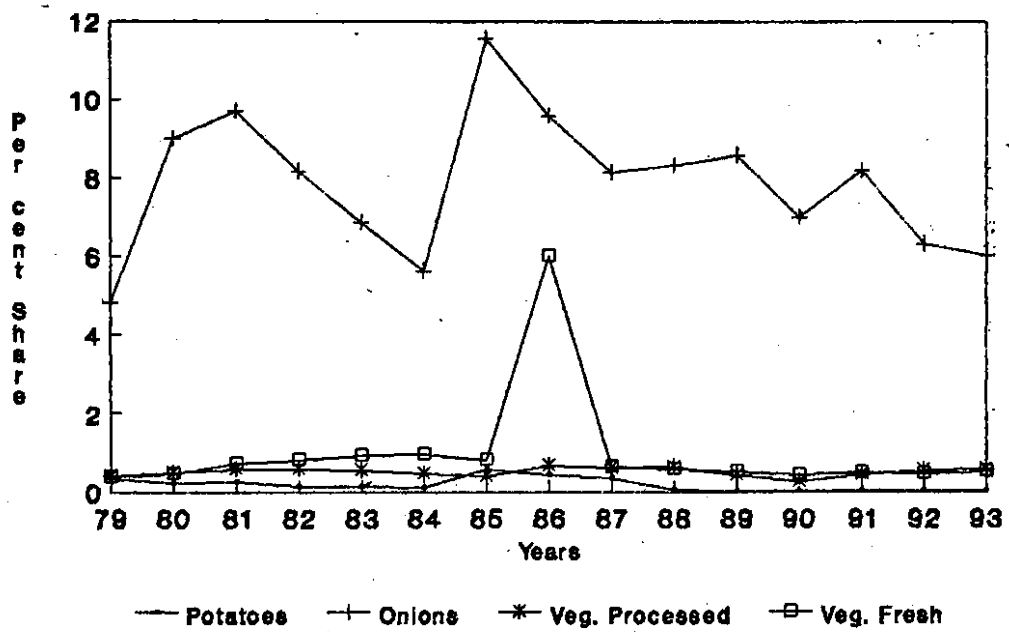


Figure 4.8 (b)
India's Share in World Export(Vegetables) -- Value



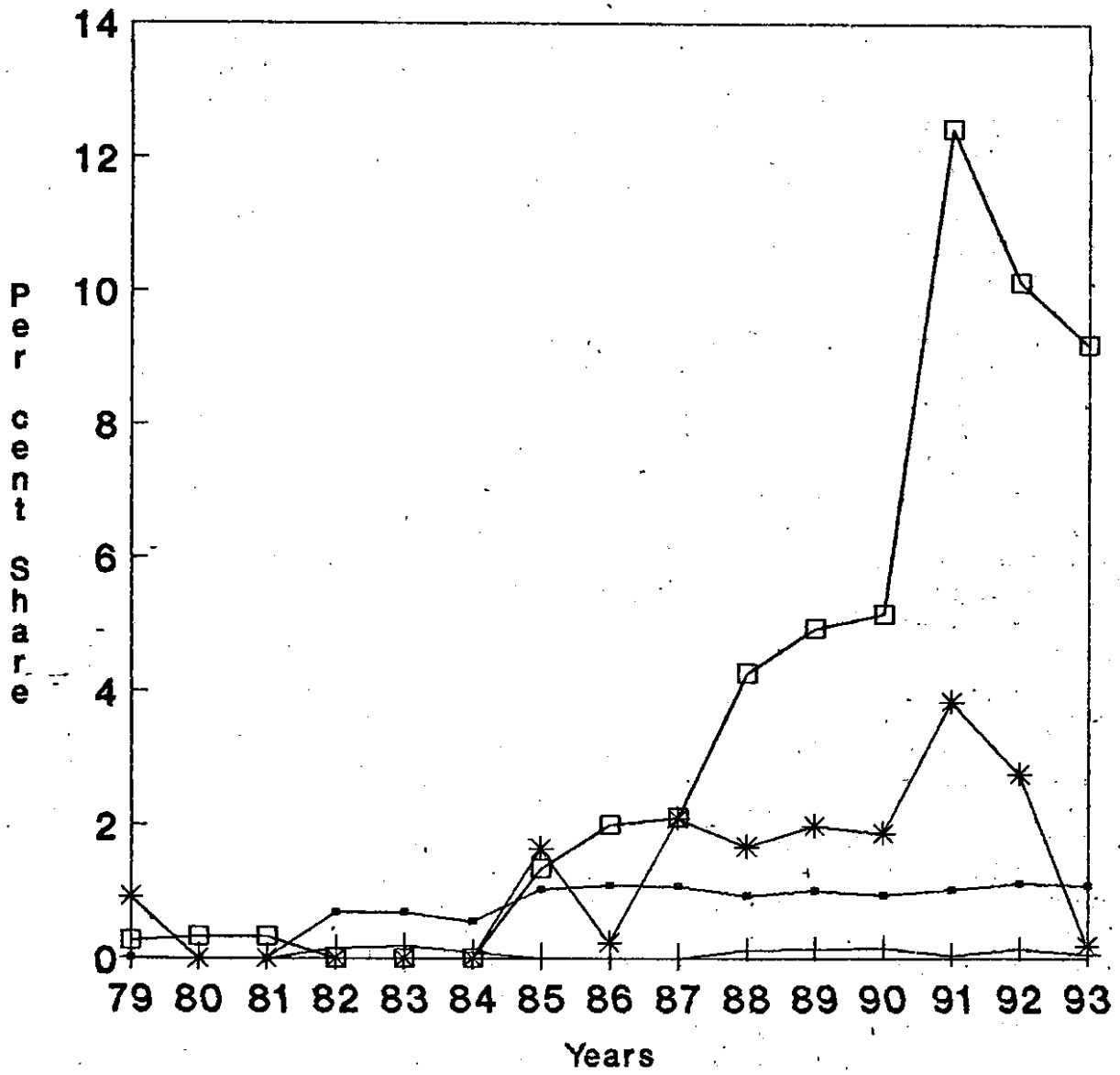
to decline from 9 per cent during the mid-eighties to nearly per cent by the early nineties.

In more recent years, India's share in various fruit export of Asia and the world has increased remarkably (figures 4.9(a), 4.9(b), 4.10(a) and 4.10(b)). As is discernible from Tables 4.11 and 4.12, India's share in total apple export of Asia has increased from much below 1 per cent during the early eighties to about 2 per cent by the early nineties, both in quantity and value terms. As for grape exports, India's share in Asia has increased from less than 1 per cent to about 10 per cent both in quantity and value terms, during the same period. Similarly, for oranges and bananas, an increase in India's share in Asia was noticed but still the country's share in the continent is very low. In the world too, India has shown an increase in her share of fruit trade over time, though India still has a lot to catch in the world fruit market. The scenario over the past 15 years also reveals that in value terms India's fresh vegetable export trade in Asia as well as in the world peaked during the mid-eighties but declined thereafter (Table 4.12 and figures 4.7(b) and 4.8(b)). Nevertheless, there has been steady decline over time in India's share of processed vegetable export trade in Asia. But, in the world, her share of processed vegetable export trade has remained by and large stable over the past 15 years. An interesting feature for India's horticultural export trade over time has been a continuous increase in the country's share in total Asian as well as global floriculture product exports (Table 4.12). India's floriculture export trade in Asia has increased from the low of 0.3 per cent during the early eighties to the high of 1.9 per cent by the early nineties. In the world, India's share of floricultural exports, though increasing, is almost insignificant.

India continues to remain as one of the leading oilseed cake and meal exporter not only in Asia but also in the world. The scenario obtaining over the past 15 years reveals that in general the share of oilseed cake and meal trade of India, though declined during the mid-eighties both in quantity and value terms, picked up again by the early nineties both in Asia and in the world (Figures 4.11(a), 4.11(b), 4.12(b)). Notably, with the advent of time India has emerged as the biggest exporter of soyabean cake in Asia. As a matter of fact, until the mid-eighties China was the major soyabean cake exporter of the Asian continent but after the mid-eighties India had overtaken China in the export trade of this commodity. In the case of groundnut cake export, though there has been a steady decline in India's share in Asia as well as in the world over the past 15 years, India still holds the lion's share in total Asian and global export market of this commodity, both in quantity and value terms (Table 4.11 and 4.12). Cotton seed cake trade of India presents a gloomy trend. The export trade of India for cottonseed cake has declined not only steadily but also steeply over time, both in Asia and in the world in quantity as well as in value terms (figures 4.11(a), 4.11(b), 4.12(a), 4.12(b)). It is also interesting to note that while India's share in total sunflower cake trade of Asia has fallen in due course of time, her share in total world export trade of the same has increased

Figure 4.9 (a)

India's Share in Asia's Export(Fruits) -- Quantity



—•— Oranges —+— Bananas
—*— Apples —□— Grapes

Figure 4.9 (b)

India's Share in Asia's Export(Fruits) -- Value

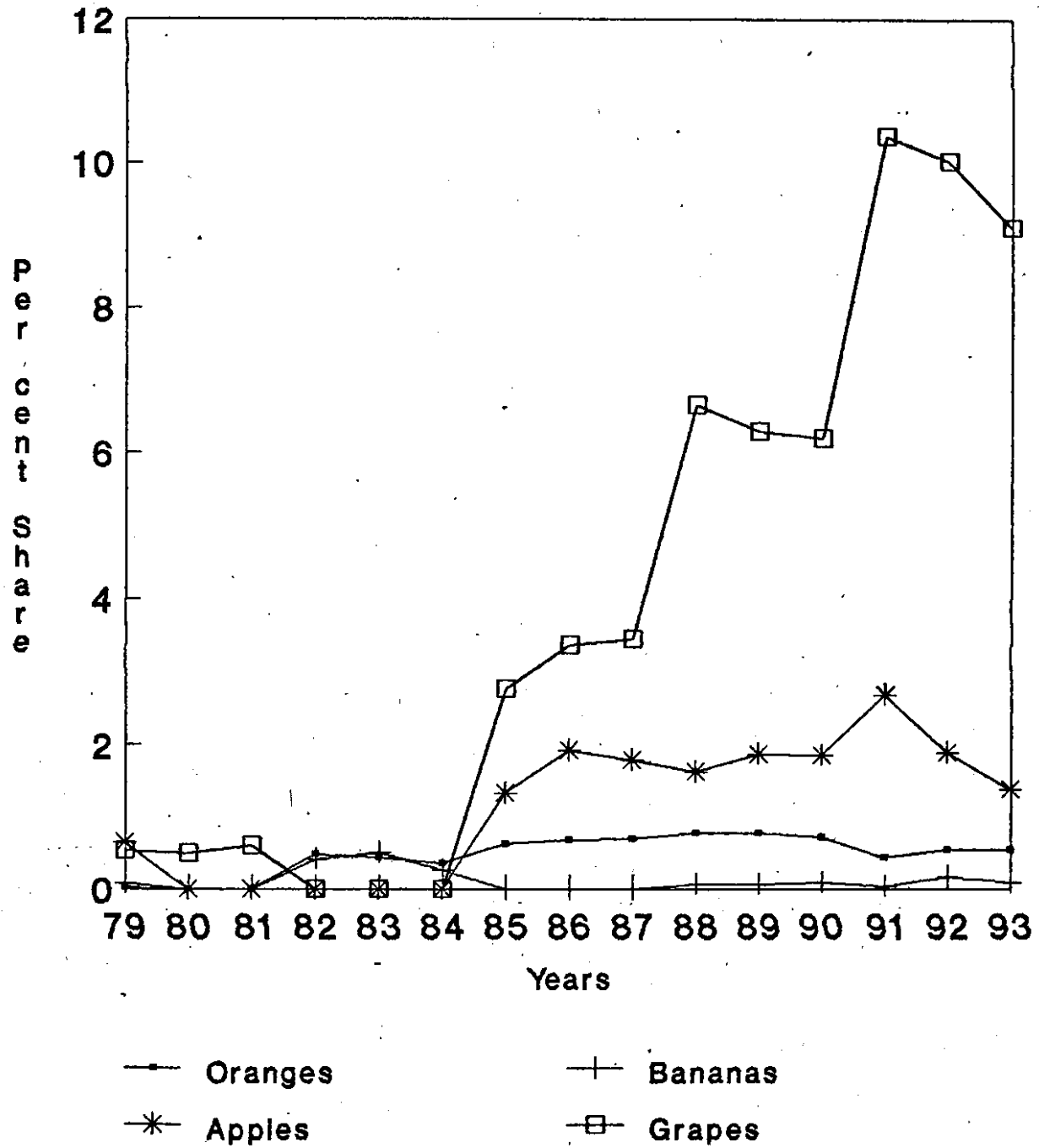


Figure 4.10 (a)

India's Share in World Export(Fruits) -- Quantity

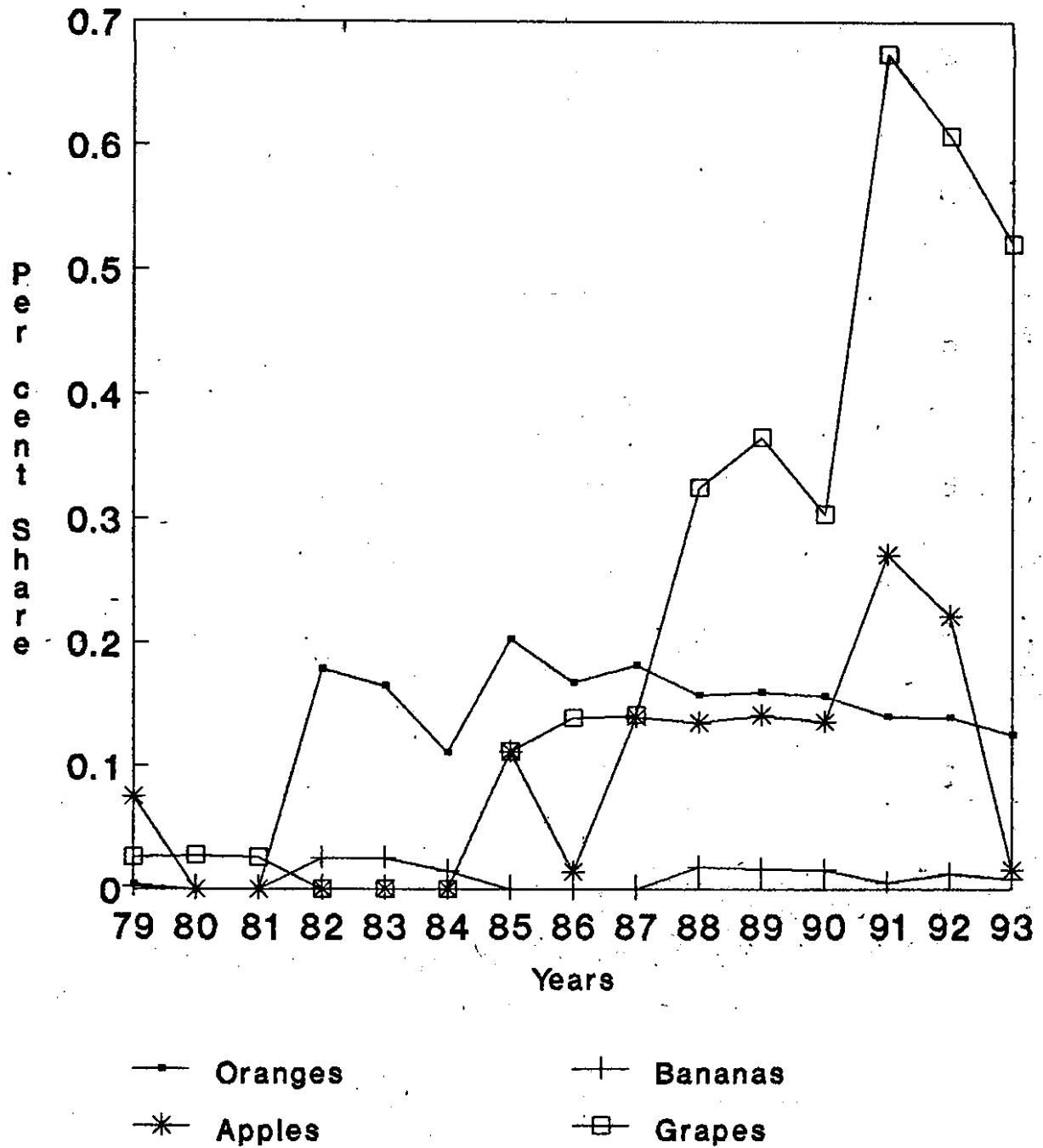
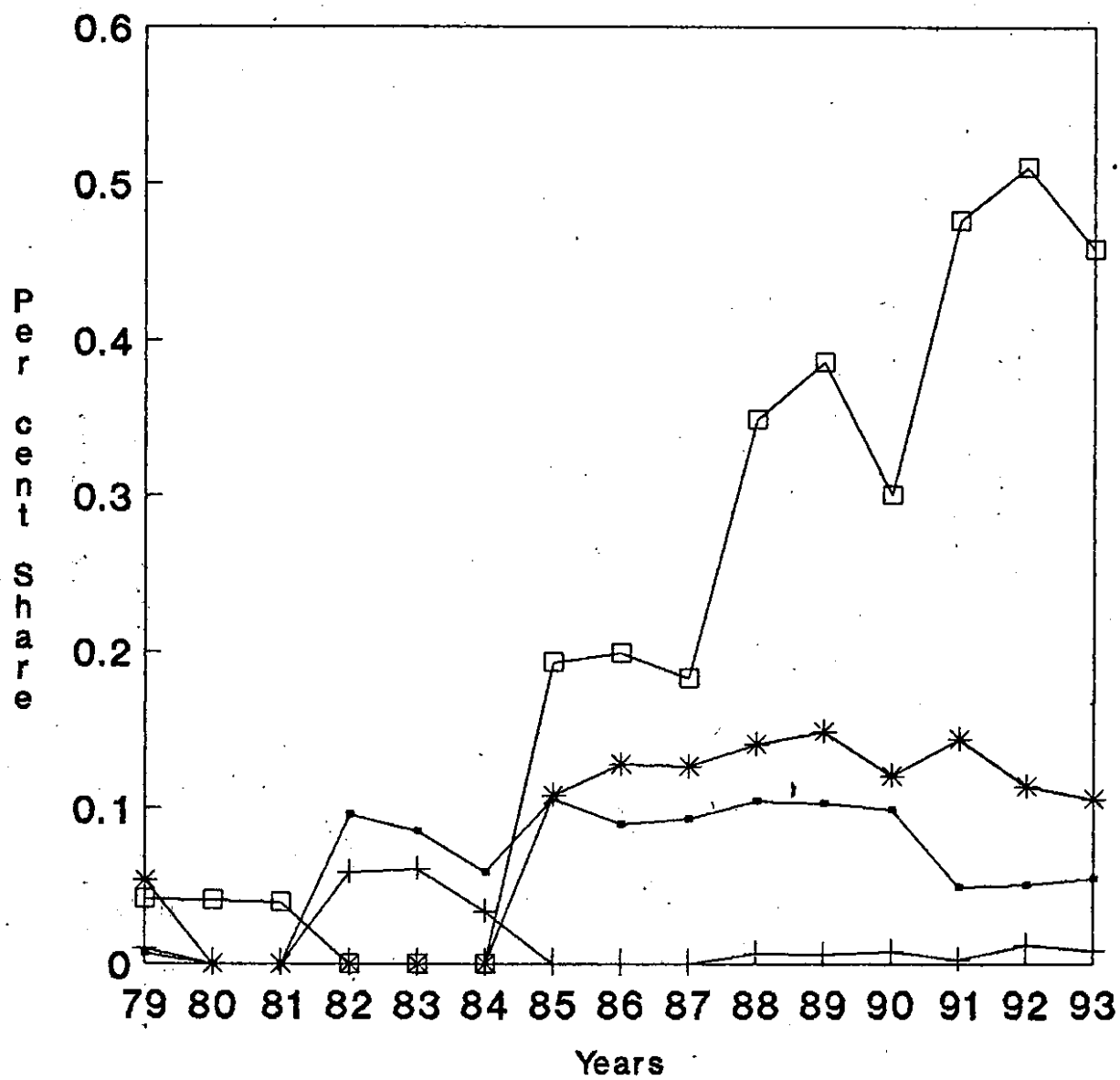


Figure 4.10 (b)
 India's Share in World Export(Fruits) -- Value



—●— Oranges —+— Bananas
 —*— Apples —□— Grapes

Figure 4.11 (a)

India's Share in Asia's Export(Oilseed Cakes) -- Quantity

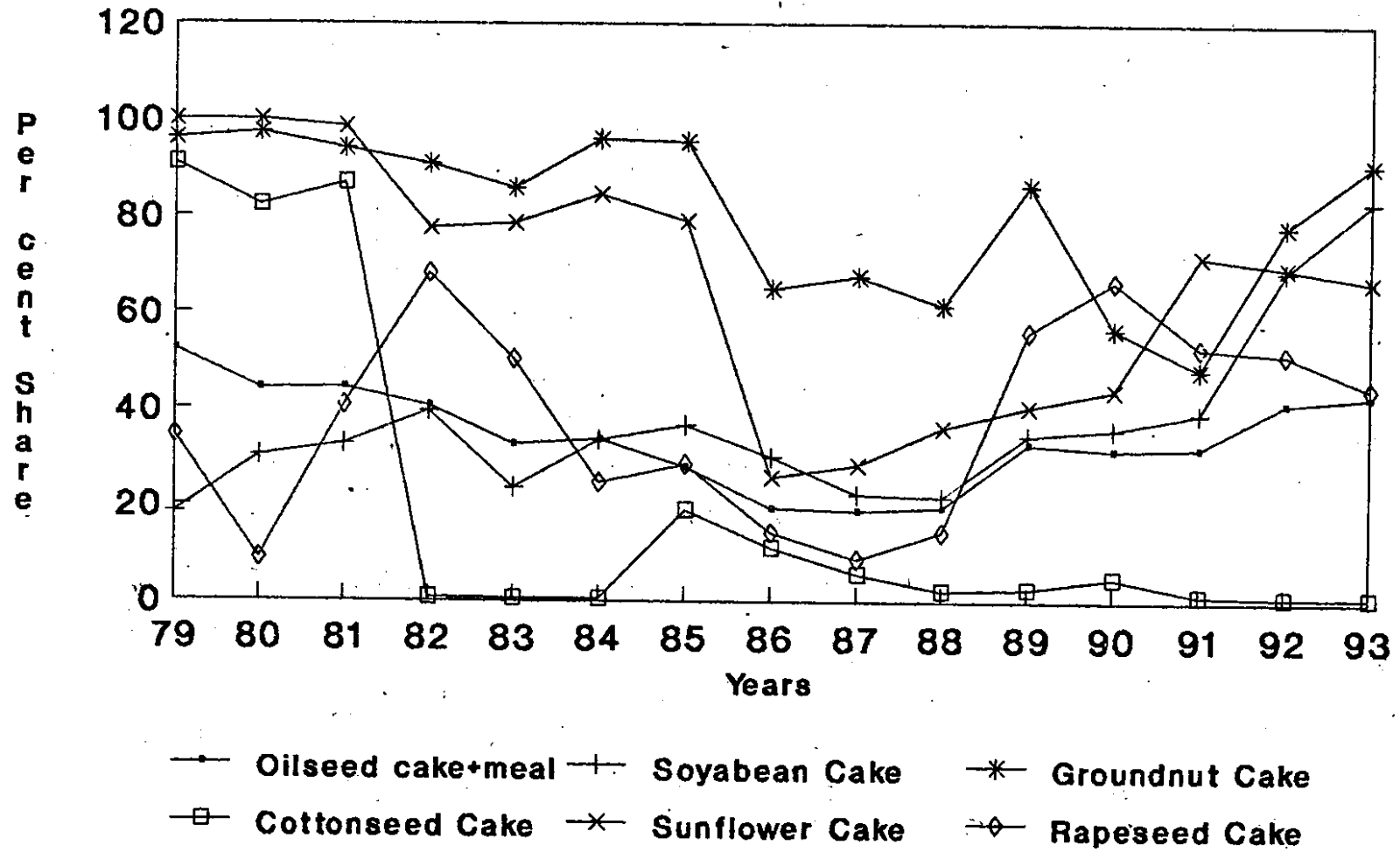


Figure 4.11. (b)

India's Share in Asia's Export(Oilseed Cakes) -- Value

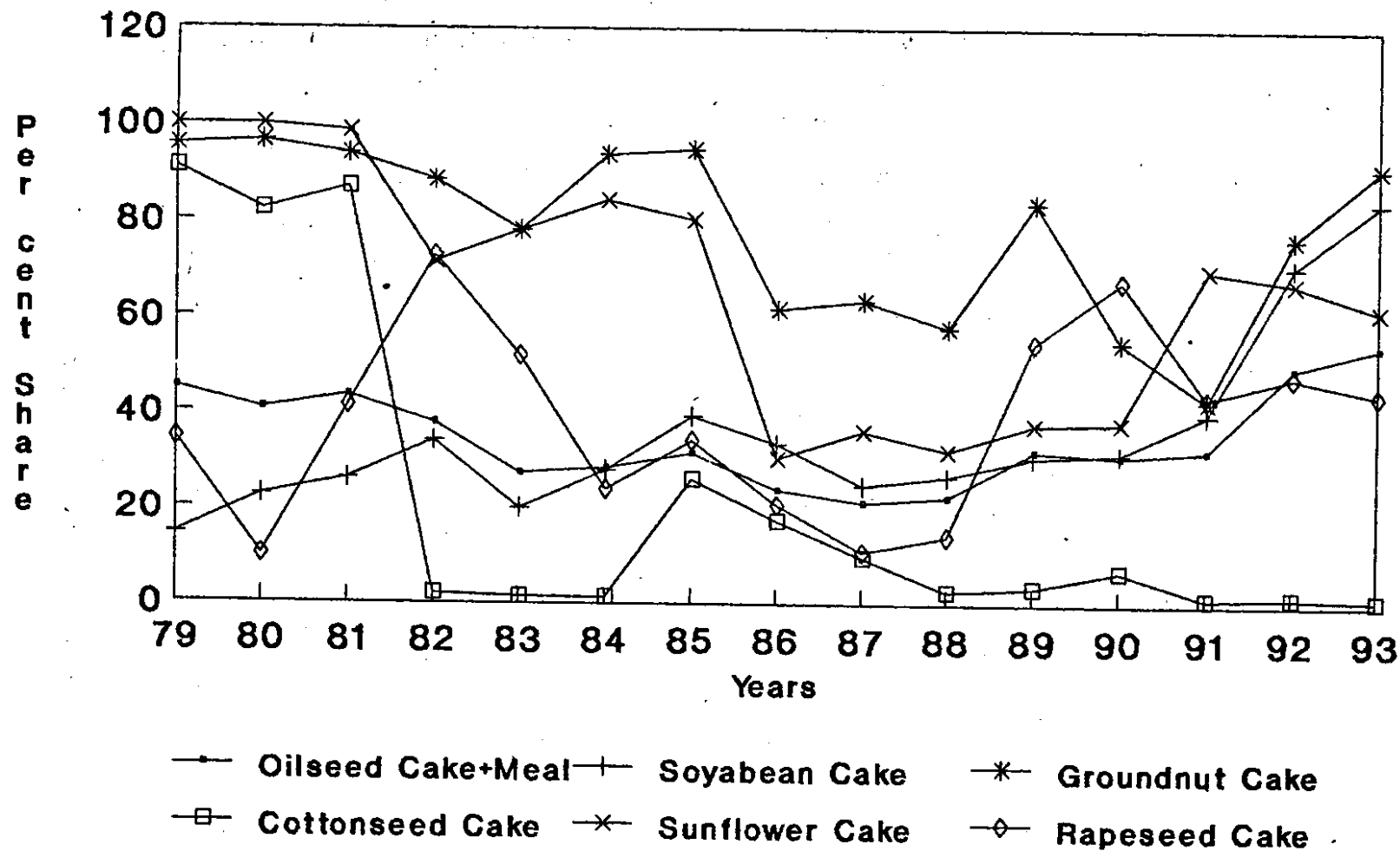


Figure 4.12 (a)

India's Share in World Export(Oilseed cakes) -- Quantity

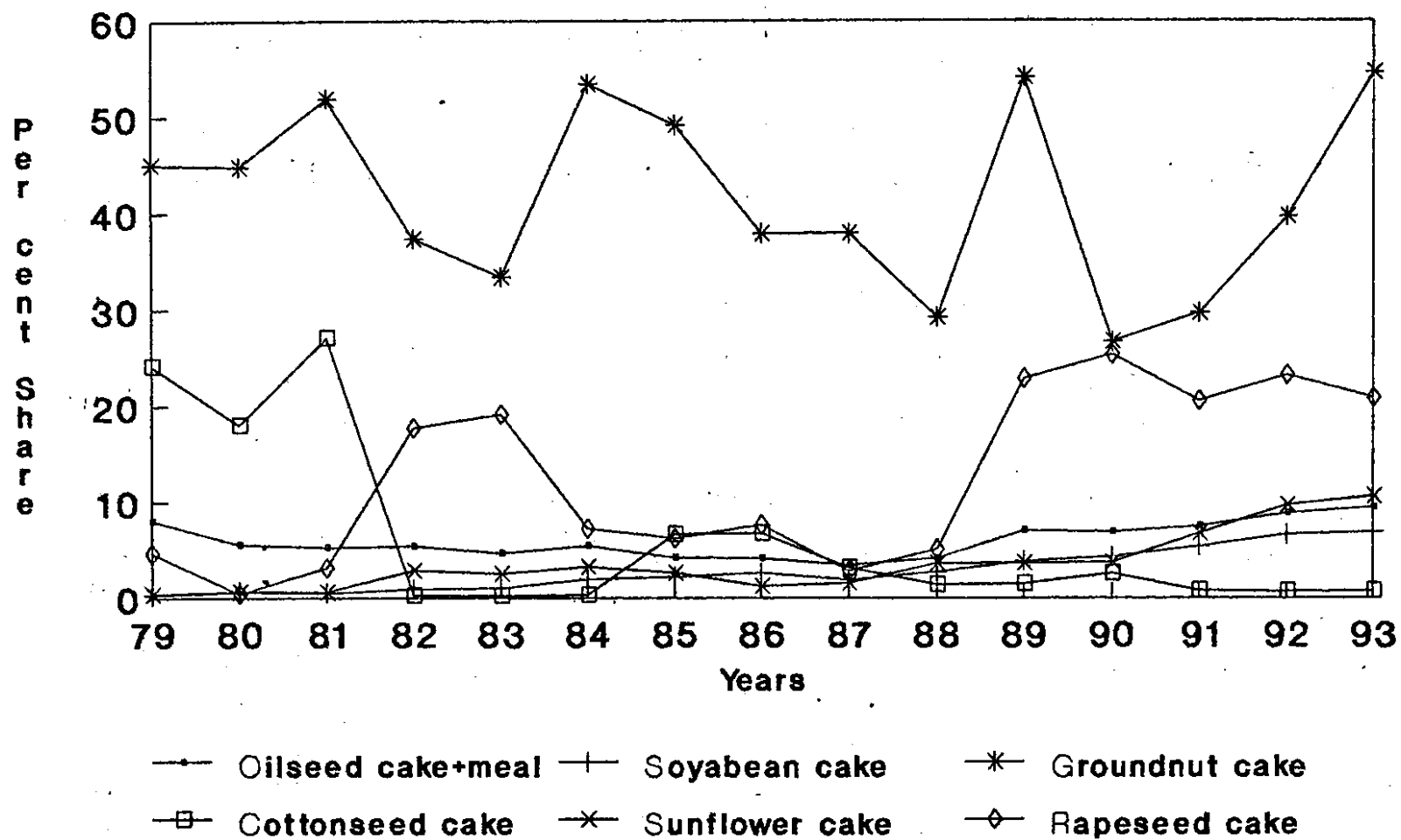
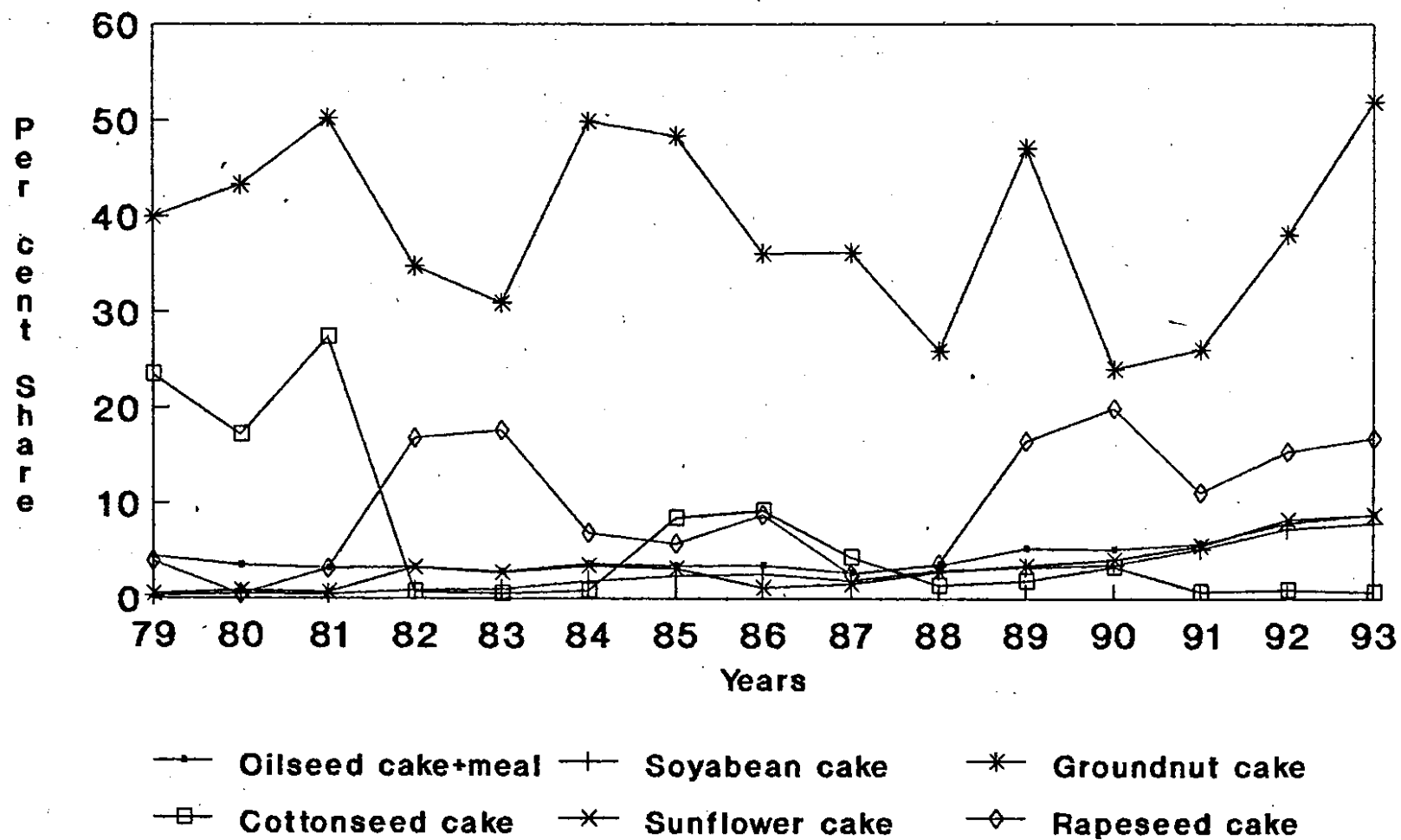


Figure 4.12 (b)

India's Share in World Export(Oilseed cakes) -- Value



sharply over time both in quantity and value terms. As for rapeseed cake, India's share, both in Asia and in the world, has gone up over the past 15 years in quantity as well as in value terms.

A declining trend has caught up with India in terms of her share in Asia and in the world for groundnut, jute, tea, coffee and tobacco exports over the past decade and a half (figures 4.13(a), 4.14(a), 4.17(a), 4.18(a)). In due course of time India's share for these commodity exports has declined steadily not only in Asia but in the world too, both in quantity and value terms. Contrary to this gloomy trend, we notice a perceptible increase in India's share both in Asia and in the world for exports of commodities like sesame seed, castor oil and cotton lint during the past 15 years with the only aberration of mid-eighties when India's share of these commodity exports declined not only in Asia but also in the world, both in quantity and value terms. In the export trade of castor oil in particular, though India's share in Asia has increased moderately over time, in the world, however, her share has gone up sharply after the mid-eighties so much so that during the early nineties her contribution to the total global export market for castor oil stood at about three-fourths (Tables 4.11 and 4.12 and also figures 4.13(a), 4.13(b), 4.14(a) and 4.14(b)). Thus, India has emerged as the biggest exporter of castor oil in the world.

Evidently, agricultural exports of India have undergone some major changes over the past decade and a half. The foregoing analysis is a pointer to the fact that the share of India in Asia as well as in the world agricultural export trade has fluctuated to a considerable extent. While share of India in Asia and in the world trade of majority of the commodities has expanded significantly, particularly after the mid-eighties, there has also been steady decline in her share of traditional exports not only in Asia but also in the world export market.

4.10 Growth and Instability in Agricultural Exports of India

The past decade and a half reveal considerable instability in agricultural export growth of India. Export growth fluctuations for some commodities are seen to be so wide that time variable failed to capture the exact nature and pattern of export growth. The fact that India always exported whatever and whenever it had distinct exportable surpluses also gives us an indication of unstable nature of agricultural exports of the country. Thus, although agricultural exports of India have gone up in due course of time for many commodities, their growths are seen to be associated with very high degree of fluctuation. In this section, therefore, we have tried to study the pattern of export growth trend for various selected agricultural commodities in the face of instability in their rates of growth during the period 1979-93. This exercise is attempted both in quantity and value terms of exports and the results are brought out in Tables 4.13(a) and 4.14(a).

Cereal exports of India has grown much faster in value than in quantity terms during 1979-93. While India's cereal export in quantity terms grew at the rate of 1.7 per cent a year between

Figure 4.13 (a)

India's Share in Asia's Export(Oilseeds) -- Quantity

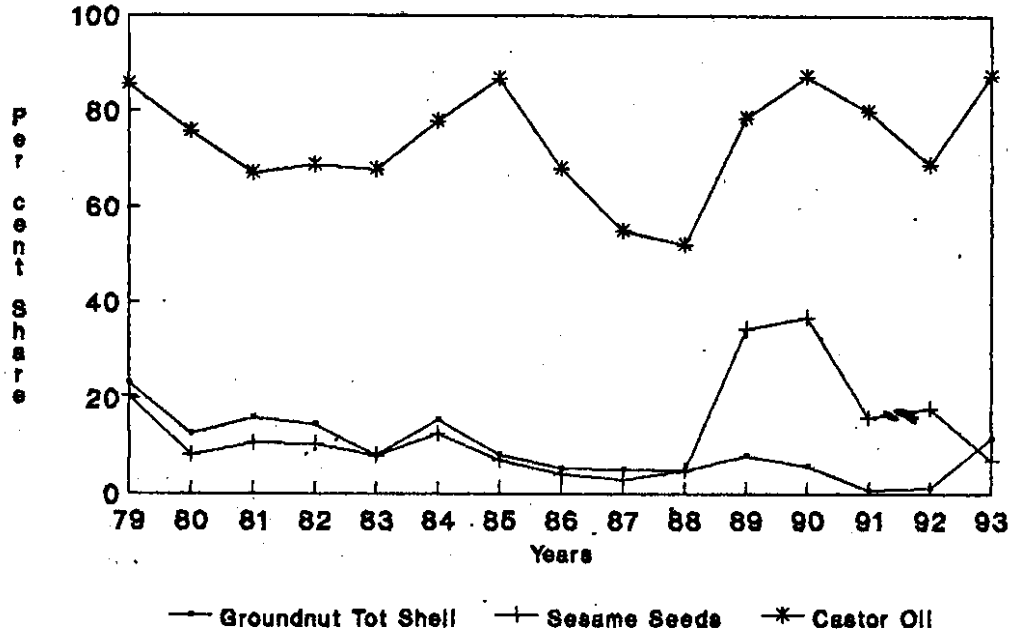


Figure 4.13 (b)

India's Share in Asia's Export(Oilseeds) -- Value

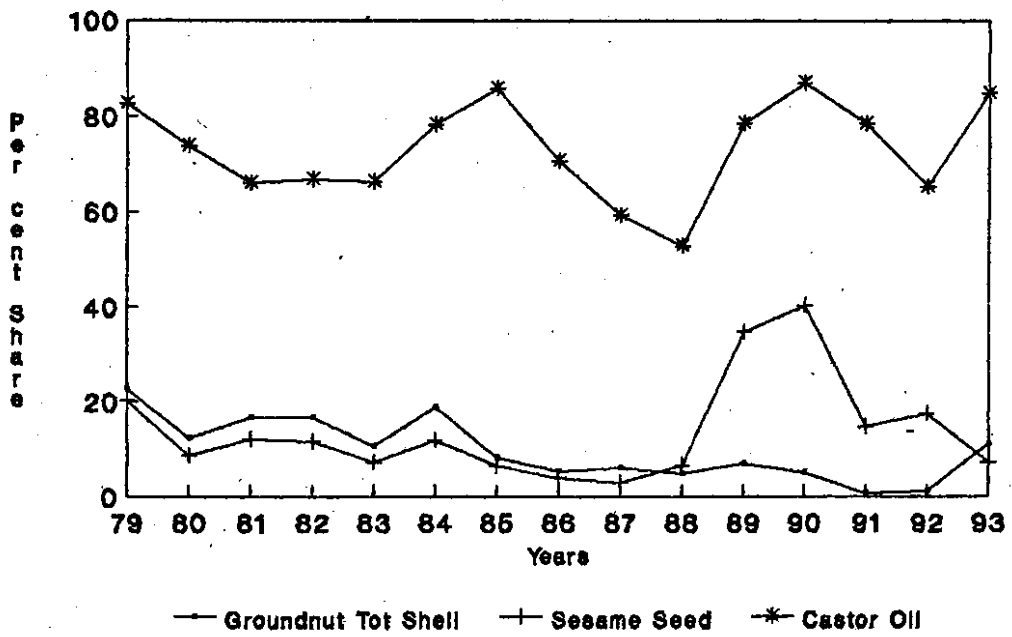


Figure 4.14 (a)
 India's Share in World Export(Oilseeds) -- Quantity

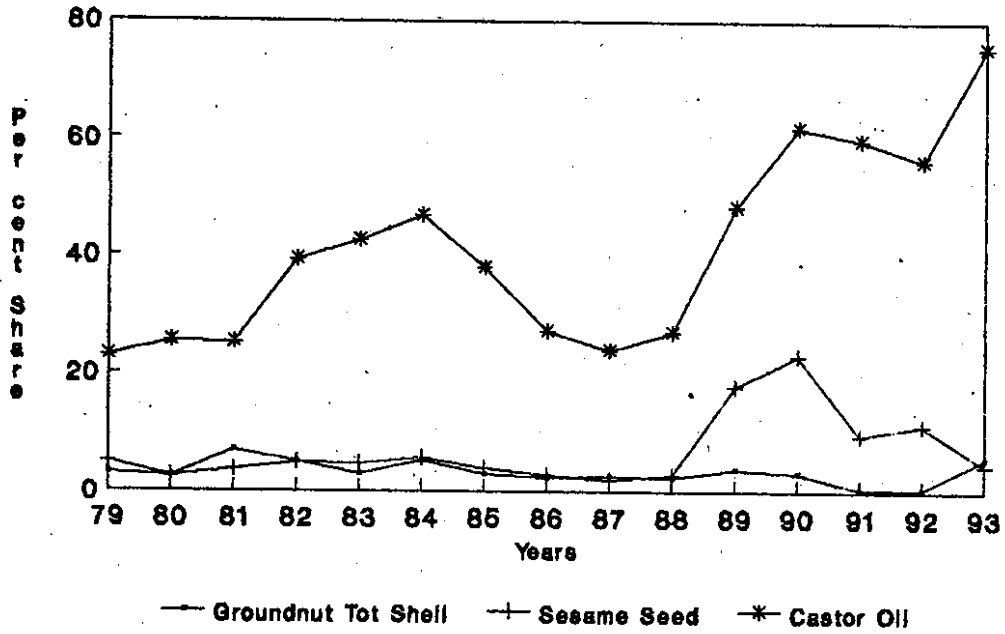


Figure 4.14 (b)
 India's Share in World Export (Oilseed) -- Value

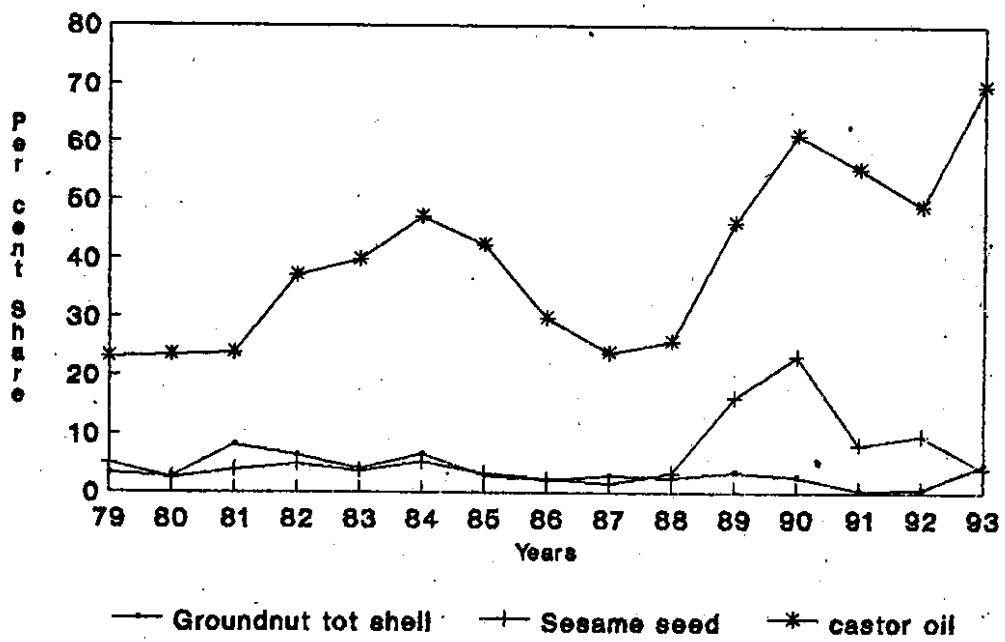


Figure 4.17 (a)

India's Share in Asia's Export(Plantation Crops) -- Quantity

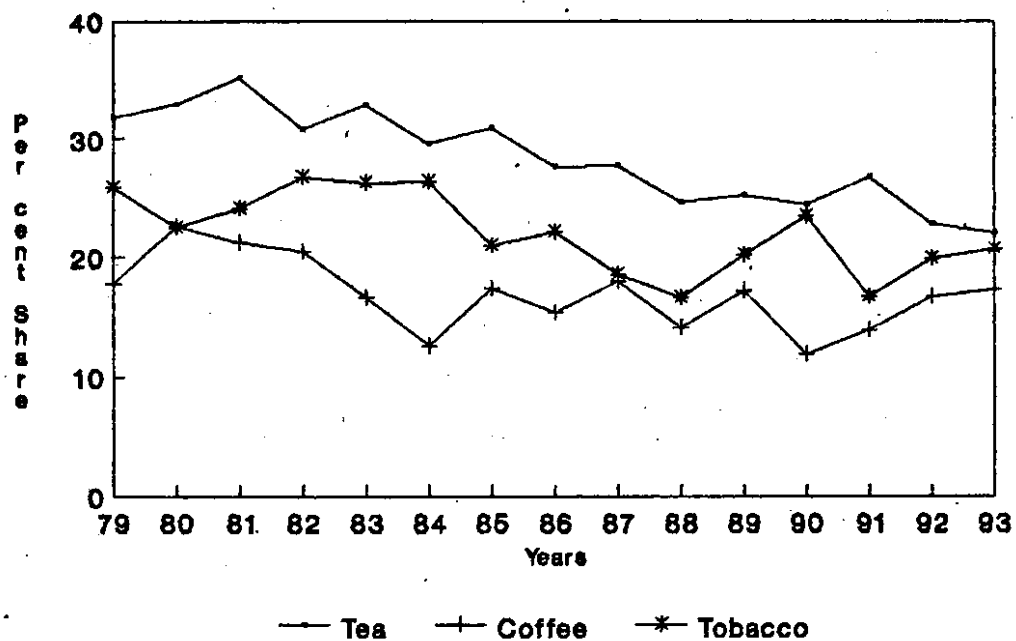


Figure 4.17 (b)

India's Share in Asia's Export(Plantation Crops) -- Value

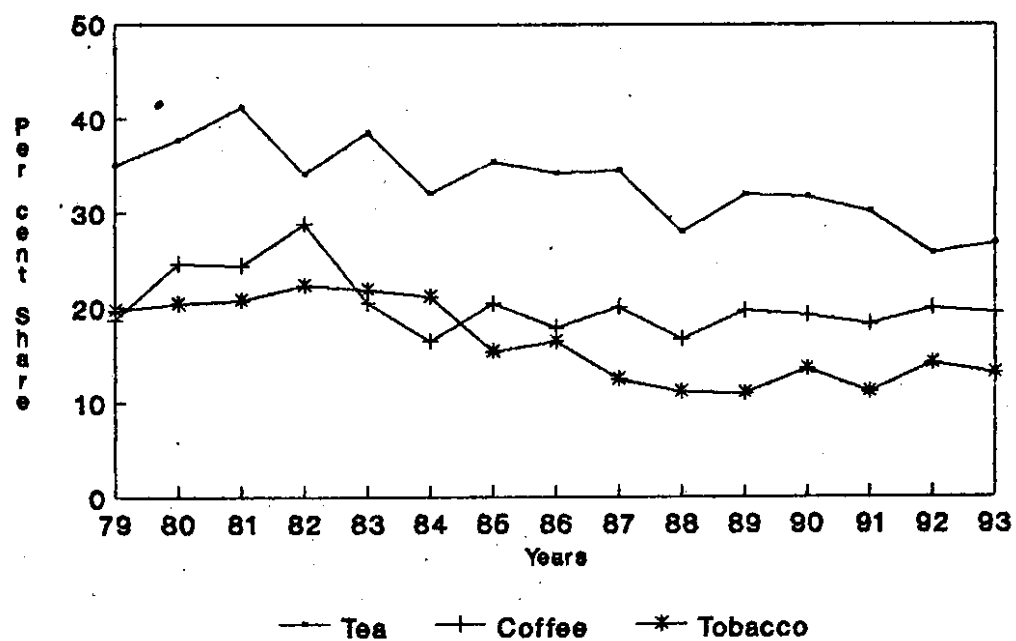


Figure 4.18 (a)
India's Share in World Export(Plantation Crops) -- Quantity

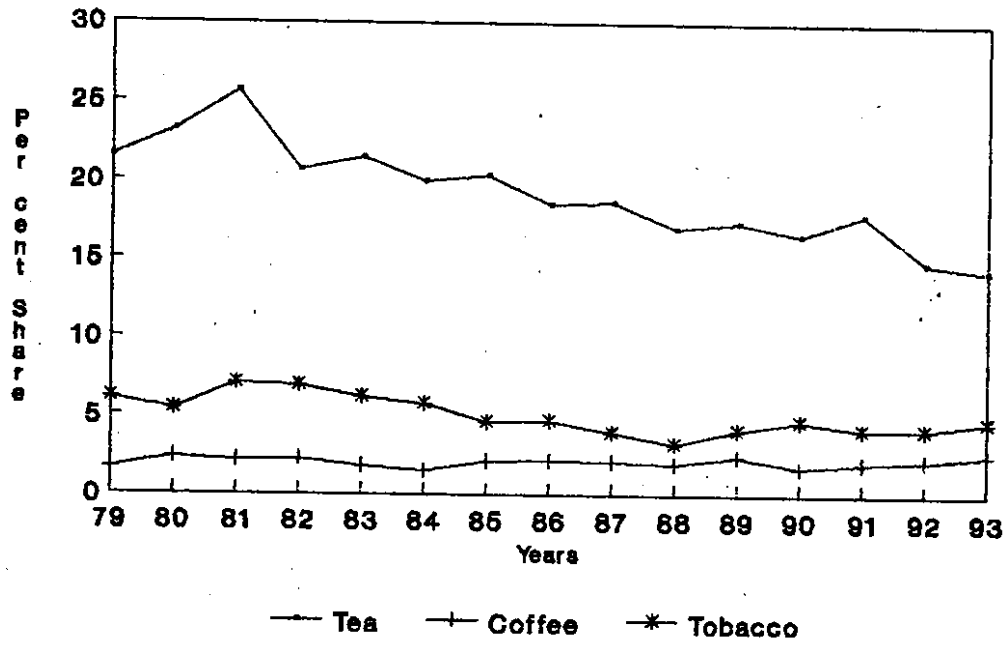
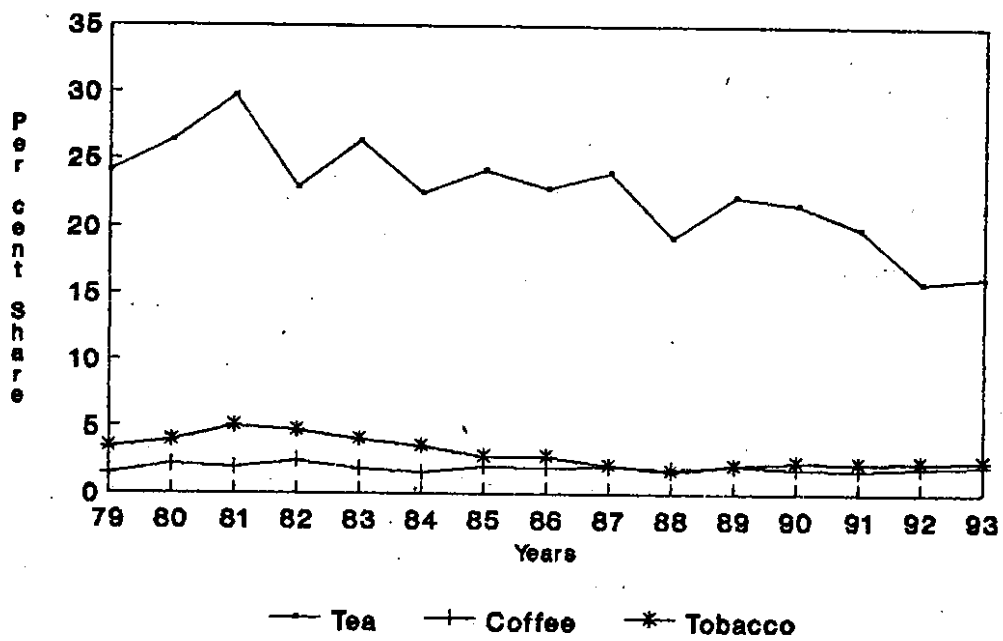


Figure 4.18 (b)
India's Share in World Export(Plantation crops) -- Value



1979 and 1993, its growth in value terms was much higher and stood at 5.9 per cent a year during the same period. Among cereals, rice and wheat have shown differing scenarios in terms of their rates of export growth in quantity and value terms. While rate of growth for wheat export was substantially higher than rice export in quantity terms during 1979-93, the annual export growth of rice was seen to be more than twice the rate of annual export growth of wheat in value terms during the same period. Between 1979 and 1993, the rate of growth for wheat export of India was nearly 5 percent a year in quantity terms and 3 per cent a year in value terms. On the other hand, during the same period, the annual export growth rate for rice was found to be 2 per cent in quantity and nearly 7 per cent in value terms. Although there has been reasonable growth in cereal exports of India, particularly in value terms, a declining trend in cereal exports was seen to be catching up with India. This could be discerned from the estimated log quadratic trend equations which reveal a decline in cereal exports of India at a declining rate, both in quantity and value terms (Tables 4.13(b) and 4.14(b)). This declining trend, as a matter of fact, was noticed during the first half of the overall period considered (Tables 4.7 and 4.8). Nevertheless, after the mid-eighties cereal exports of India expanded sharply and as a consequence of this the overall annual growth in cereal exports was found to be not only positive but substantial too. Rice exports of India, though recorded an annual average growth rate of 2 per cent in quantity and nearly 7 per cent in value terms, had, in fact, declined in the initial years of the period 1979-93. But, at the same time, this decline was at a declining rate. Because of decline in rice exports of India at declining rate, in the latter period rice exports showed a positive growth rate. And, as a result of this, overall annual growth rate of rice turned out to be positive and substantial. Further, the predictability of time variable in explaining these growth trends, though relatively good in value terms, were very weak in quantity terms. Nevertheless, the estimated log quadratic trend equations revealed higher predictability of time variable compared to the fitted exponential equations, both in quantity and value terms of export growth.

Though India exported very small quantity of pulses during the early - and the mid-eighties, its exports was found to expand significantly after the mid-eighties and as a result of this the overall annual increment in pulses exports for India was found to be about 27 percent in quantity and nearly 30 percent in value terms between the period 1979 and 1993 (Tables 4.13(a) and 4.14(a)). The predictability of time variable in explaining export growth for pulses turned out to be very high. At the same time, because of sudden increase in pulses exports from India during the early nineties, the overall export growth instability was also high both in quantity and value terms (Tables 4.7, 4.8, 4.13(a) and 4.14(a)).

Table 4.13(a): Compound Growth Rates (CGR) on Agricultural Exports of India (Quantity Terms): (1979-1993)

Commodity	CGR(%)	t-Statistics	R ² (%)	Instability Index (%)
Cereals	1.72	0.50	1.87	2217.97
a)Wheat and wheat flour	4.83	0.23	0.41	16373.22
b) Rice	1.99	0.65	3.12	2042.59
Pulses	26.51***	6.80	78.05	2656.53
Potatoes	-9.32*	1.86	21.04	7359.66
Onions	5.03	3.91	54.06	318.12
Oranges+Tang +clem	56.20**	2.84	38.21	1638.95
Bananas	36.57	1.60	16.54	6061.38
Apples	82.86***	3.24	44.67	6217.47
Grapes	66.15**	3.17	43.55	7075.40
Oilseed cake+ Meal	6.85***	4.07	56.05	790.56
Soyabean cake	28.24***	16.54	95.47	329.17
Groundnut cake	-3.05	1.56	15.69	1223.27
Cottonseed cake	-10.94	1.18	9.70	16436.70
Sunflower cake	31.29***	8.51	84.78	1613.15
Rapeseed cake	34.95***	5.43	69.43	3138.36
Groundnut Tot Shell	-5.61	1.24	10.62	2801.06
Sesame seeds	14.33***	3.36	46.45	6202.66
Castor oil	6.56	3.34	46.22	997.06
Cotton lint	2.94	0.43	1.39	4982.70
Jute+Bast fibre	-1.08	0.07	0.04	10565.87
Tea	-1.30**	2.58	33.91	59.83
Cotton Green+ Roast	3.47***	4.06	55.91	172.85
Tobacco Un-manufactured	-2.35*	1.90	21.79	359.51

Note: *, **, *** represent significance at 10, 5 and 1 per cent level of probability.

Table 4.13(b): Estimated Log Quadratic Trend Equation for
Agricultural Exports of India (Quantity Terms)
: (1979-1993)

Commodity	a	+bt	+ct ²	R ² (%)	d-statistics
Cereals	9.3034	-0.2728* (2.1621)	0.0181** (2.3622)	33.01	1.99
a)Wheat & wheat flour	5.4092	-0.1661 (0.1833)	0.0133 (0.2420)	0.90	1.10
b) Rice	11.2418	-0.2543** (2.3251)	0.0171** (2.5769)	37.63	1.25
Pulses	6.8165	0.2668@ (1.7314)	-0.0019 (0.2108)	78.13	1.33
Potatoes	9.5924	0.0081 (0.0350)	-0.0066 (0.4688)	22.46	1.24
Onions	11.7087	0.0786@ (1.4203)	-0.0018 (0.5479)	55.18	1.87
Oranges+Tang+clem	0.3902	1.7305** (2.9372)	-0.0828** (2.2420)	56.45	1.83
Bananas	3.7197	-0.2435 (0.2935)	0.0351 (0.6788)	19.62	1.38
Apples	0.6787	0.5684 (0.6839)	0.0022 (0.0434)	44.68	1.19
Grapes	3.9669	-0.1427 (0.2072)	0.0407 (0.9711)	47.66	0.99
Oilseed cake+ Meal	12.2050	-0.1415*** (3.6929)	0.0130*** (5.5762)	87.76	1.53
Soyabean cake	8.2424	-0.4076*** (8.5477)	-0.0099*** (3.4265)	97.71	1.95
Groundnut cake	13.3624	-0.2157** (3.0943)	0.0115** (2.7258)	47.93	2.11
Cottonseed cake	12.0099	-0.5289 (1.2605)	0.0258 (1.0124)	16.81	1.08
Sunflower cake	7.9537	0.4013** (2.9183)	-0.0081 (0.9650)	85.88	1.31
Rapeseed cake	9.1313	0.3935@ (1.6094)	-0.0059 (0.3945)	69.83	1.76
Groundnut Tot Shell	10.2418	0.0198 (0.0960)	-0.0048 (0.3869)	11.72	1.91
Sesame seeds	8.9520	0.0438 (0.2489)	0.0056 (0.5269)	47.66	1.15
Castor oil	10.9428	-0.0530 (0.6841)	0.0073@ (1.5472)	55.16	1.17

(Contd.)

Table 4.13(b) :(Contd.)

Commodity	a	+bt	+ct ²	R ² (%)	d-statistics
Cotton lint	11.7209	-0.2238 (0.7648)	0.0158 (0.8883)	7.47	2.14
Jute+Bast fibre	10.4797	-0.6017 (0.8977)	0.0369 (0.9065)	6.45	2.09
Tea	12.2376	0.0188 (0.9220)	-0.0020@ (1.6022)	45.56	2.33
Cotton Green+ Roast	11.1956	0.0033 (0.0913)	0.0019 (0.8710)	58.53	2.38
Tobacco Un- manufactured	11.6363	-0.1203** (2.5114)	0.0060* (2.0717)	42.39	0.99

Note:(1) Figures in parentheses are t- values of the respective regression coefficients.

(2) ***,**, * and @ represent significance at 1,5,10 and 20 per cent level of probability.

Table 4.14(a): Compound Growth Rates (CGR) on Agricultural Exports of India (Value Terms): (1979-1993)

Commodity	CGR(%)	t- statistics	R ² (%)	Instability Index (%)
Cereals	5.87	1.61	16.54	1865.90
a)Wheat and wheat flour	3.02	0.14	0.16	15170.44
b) Rice	6.90*	1.89	21.59	2127.06
Pulses	29.30***	7.00	79.03	2421.18
Potatoes	-13.69***	3.59	49.74	3128.39
Onions	5.95***	3.55	49.26	490.83
Oranges+Tang +clem	44.99**	2.87	38.85	1947.02
Bananas	20.66	1.13	8.96	12229.65
Apples	81.36***	3.71	51.46	3371.70
Grapes	63.10**	3.06	41.95	5906.80
Oilseed cake+ Meal	9.02***	4.96	65.40	986.68
Soyabean cake	29.04***	16.15	95.26	398.89
Groundnut cake	-4.02	1.62	16.79	1876.87
Cottonseed cake	-15.76**	2.38	30.39	13793.07
Sunflower cake	24.36***	6.62	77.11	1801.69
Rapeseed cake	28.08***	4.38	59.66	3571.27
Groundnut Tot Shell	-7.99*	1.79	19.78	4235.20
Sesame seeds	12.47**	2.34	29.64	12147.04
Castor oil	3.99	1.65	17.24	1546.86
Cotton lint	0.83	0.14	0.15	6061.33
Jute+Bast fibre	-4.20	0.32	0.76	11535.40
Tea	-1.12	1.04	7.62	273.52
Coffee Green + Roast	-3.16**	2.39	30.64	446.53
Tobacco Un-manufactured	-3.46*	2.03	23.98	750.15
Vegetables-Processed	6.32***	4.20	57.57	546.42
-Fresh	7.17*	1.86	21.03	12333.34
Floriculture	24.47***	9.10	86.44	1177.85

Note: *, ** and *** represent significance at 10, 5 and 1 per cent level of probability.

Table 4.14(b): Estimated Log Quadratic Trend Equation for
Agricultural Exports of India (Value Terms):
(1979-1993)

Commodity	a	+bt	+ct ²	R ² (%)	d sta- tistics
Cereals	10.3627	-0.2572* (2.0072)	0.0196** (2.5217)	45.45	1.53
a)Wheat and wheat flour	6.0105	-0.2718 (0.2947)	0.0188 (0.3363)	1.09	1.11
b) Rice	12.3934	-0.2186@ (1.6475)	0.0178** (2.21116)	44.30	1.31
Pulses	6.0242	0.2743@ (1.6755)	-0.0011 (0.1089)	79.05	1.55
Potatoes	7.7148	0.0139 (0.0787)	-0.0101 (0.9374)	53.17	1.28
Onions	9.9594	0.0684 (0.9442)	-0.0007 (0.1515)	49.35	1.57
Oranges+Tang +clem	0.3823	1.4149** (2.9084)	0.0652** (2.2057)	56.49	1.90
Bananas	3.8052	0.3662 (0.5070)	0.0346 (0.7887)	13.45	1.39
Apples	0.4187	0.5471 (0.7649)	0.0030 (0.0693)	51.48	1.03
Grapes	3.8523	-0.0956 (0.1385)	0.0366 (0.8708)	45.40	0.98
Oilseed cake+ Meal	10.0761	-0.1342*** (3.2022)	0.0138*** (5.4126)	89.95	2.03
Soyabean cake	6.6361	0.3990*** (7.1344)	-0.0090** (2.6493)	97.01	2.17
Groundnut cake	11.6797	-0.2930*** (3.3451)	0.0157*** (3.0516)	53.15	1.97
Cottonseed cake	10.3180	-0.4577@ (1.4778)	0.0179 (0.9504)	35.26	1.24
Sunflower cake	6.4093	0.2828* (1.9411)	-0.0041 (0.4576)	77.50	1.03
Rapeseed cake	7.4148	10.3156 (1.2571)	-0.0043 (0.2789)	59.92	1.72
Groundnut Tot Shell	10.1888	-0.0149 (0.0723)	-0.0043 (0.3403)	20.55	1.92
Sesame seeds	8.8526	-0.0252 (0.1147)	0.0089 (0.6673)	32.16	1.03
Castor oil	10.6762	-0.0060 (0.0570)	0.0028 (0.4409)	18.56	1.29

(Contd.)

Table 4.14(b): (Contd.)

Commodity	a	+bt	+ct ²	R ² (%)	d sta- tistic
Cotton lint	12.0964	-0.2268 (0.8772)	0.0147 (0.9351)	6.93	2.27
Jute+Bast fibre	9.2620	-0.5417 (0.9189)	0.0312 (0.8700)	6.65	2.17
Tea	12.9611	0.0686@ (1.6152)	-0.0050* (1.9344)	29.58	1.97
Coffee Green + Roast	9.7677	0.0749@ (1.4799)	-0.0067** (2.1740)	50.24	2.13
Tobacco Un- manufactured	12.3168	-0.1354* (1.8921)	0.0063@ (1.4402)	35.19	0.69
Vegetables- Processed	9.3027	0.0318 (0.4923)	0.0018 (0.4706)	58.34	1.47
Fresh	9.8751	0.3316** (2.2599)	-0.0164 (1.8386)	38.39	2.55
Floriculture	6.1894	0.1927* (1.7943)	0.0017 (0.2585)	86.51	2.18

Note: (1) Figures in parentheses are t-values of the respective regression coefficients.

(2) ***, **, * and @ represent significance at 1,5,10 and 20 per cent level of probability.

All the horticultural commodities have shown very high rate of growth in their exports during 1979-93 with the only exception of potatoes which showed a decline in its exports during the same period, both in quantity and value terms. Despite 115 per cent increase in quantity and about 50 per cent increase in value between the early - and the mid-eighties, potato export of India was found to decline at the rate of 9 per cent a year in quantity and 14 per cent a year in value terms during 1979-93, due mainly to steep fall in its exports from India after the mid-eighties (Tables 4.7, 4.8, 4.13(a) and 4.14(a)). But, this was the only aberration in the scenario of export growth of horticultural commodities over time. Onion export of India was found to grow at the rate of 5 per cent a year in quantity and 6 per cent a year in value terms during the same period. Between 1979 and 1993, various fruits have registered 20-80 per cent annual growth in their exports both in quantity and value terms; the rate of export growth was slightly higher in quantity terms than in value terms. In fact, fruit crop export of India remained highly unstable during the past 15 years. For instance, while India exported only 200 metric tonnes of oranges annually during the early eighties, its annual export was found to expand to 10,000 metric tonnes during the mid-eighties. Similarly, in the case of banana, though its annual average exports increased from 200 metric tonnes during the early eighties to 1000 metric tonnes by the early nineties, India did not export bananas during the mid-eighties (Table 4.7). Weak predictability of time variable in

explaining export growth of banana associated with very high degree of instability also stems from this fact (Tables 2.13(a)). These observations amply reveal very high export growth fluctuations for various fruit crops of India during the past 15 years. Further, though exports of oranges from India expanded at an annual compound growth rate of 56 per cent in quantity and 45 per cent in value terms between 1979 and 1993, a deceleration in export growth of this commodity was also noticed which, in fact, took place during the second half of the overall period considered. Apples and grapes have also shown perceptible expansion in their exports in the face of very high export growth instability. As for vegetables, processed vegetable export of India in value terms had grown at a rate slightly below that of fresh vegetable export, the annual rate of increment being 6.3 per cent for processed vegetables and 7.2 per cent for fresh vegetables during 1979-93. Not only fresh vegetable export of India grew faster than processed vegetables exports but the overall fluctuation in export growth of fresh vegetables was also higher than processed vegetables. However, the time variable predictability was noticed to be relatively weak in the case of fresh vegetable exports compared to export of vegetables in processed form. Further, though there has been positive and substantial annual growth in fresh vegetable exports of India during the period 1979-93, this period has also been marked with deceleration in export growth of fresh vegetables (Table 4.14(b)). The deceleration in export growth of fresh vegetable was noticed between the mid-eighties and the early nineties (Table 4.8). Among other horticulture product export, floricultural exports of India was found to grow at an annual compound growth rate of about 25 per cent during 1979-93. In fact, in the case of floriculture product, there has been a smooth and steadily rising export growth trend over time (Table 4.8).

Oilseed cake export trade of India in general has increased both in quantity and value terms. Between 1979 and 1993, the overall oilseed cake and meal export trade of India was found to grow at the rate of nearly 7 per cent a year in quantity and 9 per cent a year in value terms. However, this growth in overall oilseed cake and meal trade of India was achieved in the face of considerable deceleration during the period between the early- and the mid-eighties. Thus, initially the quantity as well as the value of oilseed cake and meal exports declined but, at the same time, this decline was at a declining rate and, as a result of this, in the latter period the exports of oilseed cake and meals in general appeared to have picked up resulting in an overall positive growth in exports. Further, though in general there has been significant and substantial growth in various oilseed cakes traded from India during the past 15 years, there has also been considerable decline for some of the oilseed cakes traded from India during this period. Groundnut and cottonseed cakes have declined in their exports both in quantity and value terms, the rate of decline for cottonseed cake being much faster than groundnut cake. While groundnut cake trade of India declined at the rate of 3 per cent a year in quantity and 4 per cent a year in value terms during 1979-93, the decline for cottonseed cake trade during the same period was more steep and

stood at 11 per cent a year in quantity and 16 per cent a year in value terms. However, as can be seen through the estimated log quadratic trend equation, a deceleration in this declining trend had taken place for groundnut cake exports, both in quantity and value terms (Tables 4.13(b) and 4.14(b)). As a matter of fact, groundnut cake export of India expanded considerably between the mid-eighties and the early nineties, after showing a sharp decline in the same between the early - and the mid-eighties (Tables 4.7 and 4.8). In contrast to decline in groundnut and cottonseed cake exports of India, soyabean cake, sunflower cake and rapeseed cake export trade of India has grown remarkably in due course of time; the annual rate of increment in quantity and value terms of trade being 28 per cent and 29 per cent, respectively, for soyabean cake, 31 per cent and 24 per cent for sunflower cake and 35 per cent and 28 per cent, respectively, for rapeseed cake between the period 1979 and 1993. Though soyabean cake has recorded impressive growth over time, a deceleration in export growth of this important oilseed cake was also noticed during the period between mid-eighties and the early nineties, both in quantity and value terms (Tables 4.7, 4.8, 4.13(b) and 4.14(b)). Further, exports of soyabean cake was found to be less unstable over time compared to other oilseed cake and meal exports. Added to this, the variability in export growth explained by time variable was noticed to be the highest for soyabean cake indicating thereby fairly high predictability of time variable in explaining export growth of soyabean cake over time.

Among various oilseeds, groundnut export trade of India has declined over time, more in value than in quantity terms; the rate of decline being about 6 per cent a year in quantity and 8 per cent a year in value terms between 1979 and 1993. On the other hand, both sesame seeds and castor oil have increased in their exports during the same period; the rate of increase in export growth being much faster in the case of sesame seeds compared to castor oil.

As for fibre crops, cotton lint showed very weak and insignificant growth in its exports over the past 15 years, particularly in value terms. Jute exports of India, on the other hand, appeared to have declined during 1979-93, the rate of decline being more sharp in value terms than in quantity terms. At the same time, the predictability of time variable in explaining export growth of these two important fibre crops was noticed to be very weak, both in quantity and value terms (Tables 4.13(a) and 4.14(a)).

Except a positive rate of growth for coffee exports in quantity terms, all the selected plantation commodities showed a significant decline in their exports over time, both in quantity and value terms. Tea export of India was found to decline at the rate of 1.3 per cent a year in quantity and 1.1 per cent a year in value terms during 1979-93. Similarly, unmanufactured tobacco exported from India during the past 15 years declined at the rate of 2.4 per cent a year in quantity and 3.5 per cent a year in value terms. However, coffee exports from India, though increased at the rate of 3.5 per cent a year in quantity terms between 1979 and 1993, declined at the rate of 3.2 per cent a year in value terms during the same period. Further, as

the estimated log quadratic trend equation for tea and coffee exports revealed, initially the exports of both the plantation commodities were increasing but these increases were at a declining rate and, consequently, exports of these commodities appeared to have declined sharply in the latter period resulting in an overall negative growth in their exports (Tables 4.13(b) and 4.14(b)). Tobacco exports of India also followed a trend similar to tea and coffee exports with the only difference that in the case of coffee there was decline in its exports at a declining rate. Since the magnitude of rate of decline in this declining trend was very small, the overall exports of coffee continued to show a decline during the past 15 years.

In order to examine the incidence of autocorrelation, Durbin-Watson 'd' statistics was applied to the estimated log quadratic trend equations. Since the critical values of 95 per cent level of 'd' statistics were noticed to be within the admissible range i.e. $du < d^* < (4-du)$ where d^* is the estimated value of 'd' statistics and du is the upper limit of tabulated value of the same, there was no auto-correlation between the successive figures of quantity and value of exports of majority of commodities over time.

4.11 Growth and Instability in India's Share in Agricultural Export Trade of Asia

No doubt India has great potential in her agricultural sector and that her agricultural production has increased unabated over the years. There is also no denying the fact that agricultural exports of India has increased considerably over time due mainly to rise in production and because of several trade policy measures adopted by the government in more recent times. However, in spite of all this, the share of agricultural exports of India in Asia fluctuated widely across various selected commodities during different periods. And, in general, the share of India in Asia appeared to have declined perceptibly over time for majority of the selected commodities. It could be readily discerned from Tables 4.15(a) and 4.16(a) that except cereals in value terms, pulses, some of the horticultural crops, oilseed cakes and meals, and save for some of the oilseeds, India's share in total export trade of Asia for all the selected commodities has declined with the advent of time. At the same time, decline in India's share in Asia was noticed in the face of considerable overall fluctuations in the same during the past 15 years.

A decline in India's share in Asia was noticed for cereal exports in quantity terms during the period between 1979 and 1993. But, in value terms, the share of India in total cereal exports of Asia appeared to have increased during the same period. These trends amply reveal a rise in international prices of cereals during the past 15 years. Share of cereal exports of India in Asia was found to decline at an annual average rate of 4 per cent in quantity terms during 1979-93 in the face of about 3 per cent per annum rise in her share in total value of cereals traded by Asia during the same period. As regards the export growth of cereals, it may be worth a mention here that the share

of wheat exports of India in Asia declined at the rate of about 21 per cent a year between 1979 and 1993, both in quantity and value terms. Nevertheless, during the same period, rice exports of India in Asia had increased at the rate of 6 per cent a year in value terms, though the rate of increase being negligible in quantity terms. As a matter of fact, in value terms, share of rice exports of India in Asia grew at a rate of more than twice the average growth rate of share of cereal exports of India in Asia during the 1979-93 period. The predictabilities of time variable in explaining these growth trends for various cereal exports of India in Asia were noticed to be very low and weak. The overall fluctuation in terms of share of India in Asia was noticed to be relatively low for rice exports compared to wheat and overall cereal exports. Further, though India's share in total cereal exports of Asia was found to decline at the rate of 4 per cent a year in quantity terms during 1979-93, the period also appeared to be marked with rise in India's share in total cereal exports of Asia (Tables 4.15(a) and 4.11). Thus, the decline in India's share in Asia for cereal exports at a declining rate - as noticed from the estimated log quadratic trend equation for the same, stems from this fact (Table 4.15(b)).

During 1979-93, the rate of growth in India's share in Asia for pulses exports was noticed to be very high, both in quantity and value terms. At the same time, the rate of growth in this respect was faster in value terms than in quantity terms indicating thereby favourable international prices for pulses during the past 15 years. The time variable also revealed relatively high predictability in terms of export growth of pulses of India in total Asian trade encompassing the same.

India's trade structure in terms of horticultural commodities has undergone tremendous change over time particularly in respect of its share in total Asian trade of these commodities. Though in more recent times horticultural exports of India have increased considerably but in terms of their share in total Asian trade, a continuous decline was only too evident from observing the trend during the past 15 years. The declining trend in terms of share of India in Asia was noticed for horticultural commodities like potato and banana exports - both in quantity and value terms, and also for various processed and fresh vegetable exports in value terms. On the other end of the spectrum, export trade of India in Asia was seen to grow at a reasonable rate for certain other horticultural commodities like oranges and apples, and at a very high rate for grapes and various floricultural products.

A significant decline in India's share in total potato exports of Asia was noticed over the past 15 years; the decline being more sharp in value terms than in quantity terms of trade. Between 1979-93, potato exports of India in Asia was found to decline at the rate of about 14 per cent a year in quantity terms and 20 per cent a year in value terms. Higher decline in value terms is symptomatic of the fact that the export prices of potatoes for India were unfavourable during this period. On the other hand, though India's share in total onion exports of Asia appeared to have increased in due course of time, the rate of growth in this respect was noticed to be very slow and weak. Not

only this, the time variable also could not explain the exact nature of secular trend that onion exports of India had followed in Asia over time.

All the selected fruits of India showed relatively high rate of growth in respect of their share in total Asian export trade encompassing these commodities during the period 1979 to 1993 with banana being the only aberration from this scenario which showed its export trade to decline in Asia at the rate of 5.6 per cent a year in quantity terms and 13.1 per cent a year in value terms during the same period. An important feature in respect of banana exports of India in Asia has been that its share in total Asian trade remained highly fluctuating over time. And, as a result of this, the time variable could not capture the nature of export growth trend for this commodity, though in value terms the predictability of time variable was seen to be relatively high compared to predictability in quantity terms.

Table 4.15(a): Compound Growth Rates (CGR) on Share of Agricultural Exports of India in Asia (Quantity Terms)
: (1979-1993)

Commodity	CGR(%)	t-statis- tics	R ² (%)	Instabi- lity Index (%)
Cereals	-4.02	1.15	9.18	2704.02
a)Wheat & Wheat flour	-21.04*	1.97	23.04	10526.59
b)Rice	0.06	0.02	0.01	2105.87
Pulses	16.53***	4.18	57.39	3012.86
Potatoes	-14.32**	2.61	34.42	7844.98
Onions	0.07	0.06	0.03	308.99
Oranges+Tang+clem	12.81*	2.14	26.04	2164.11
Bananas	-5.56	0.75	4.10	7460.29
Apples	2.69	0.53	2.10	10333.64
Grapes	32.04***	17.87	96.09	505.06
Oilseed cake+Meal	-2.09	1.11	8.60	740.16
Soyabean cake	5.81**	2.90	39.23	1286.51
Groundnut cake	-2.86**	2.53	32.93	263.05
Cottonseed cake	-20.38**	2.32	29.28	18387.39
Sunflower cake	-4.73	1.94	22.42	1076.53
Rapeseed cake	4.26	0.99	6.98	2520.29
Groundnut Tot Shell	-14.05***	3.38	46.76	2181.66
Sesame seeds	2.17	0.48	1.71	5480.85
Castor oil	0.22	0.22	0.38	213.87
Cotton lint	-0.79	0.11	0.09	4380.88
Jute+Bast fibre	-2.83	0.70	3.62	6712.77
Tea	-2.93***	8.91	85.94	26.37
Coffee Green+Roast	-2.09**	2.18	26.69	221.09
Tobacco Unmanufactured	-2.29***	3.16	43.42	124.23

Note: *, ** and *** represent significance at 10, 5 and 1 percent level of probability.

Table 4.15(b): Estimated Log Quadratic Trend Equation for Share of Agricultural Exports of India in Asia (Quantity Terms): (1979-1993)

Commodity	a	+bt	+ct ²	R ² (%)	d-statistics
Cereals	2.2352	-0.3118** (2.2572)	0.0169* (2.0155)	32.15	1.91
a)Wheat and Wheat flour	1.3822	0.2102 (0.4061)	-0.0279 (0.8870)	27.77	1.34
b)Rice	2.2311	-0.2262* (2.0052)	0.0142* (2.0675)	26.27	1.32
Pulses	-1.8167	0.1121 (0.6891)	0.0026 (0.2584)	57.62	1.44
Potatoes	1.0852	0.0691 (0.2707)	-0.0140 (0.9004)	38.57	1.27
Onions	3.4851	0.0290 (0.5999)	-0.0018 (0.6020)	2.96	1.85
Oranges+ Tang+ Clem	-2.4865	0.5405** (2.4768)	-0.0262* (1.9792)	44.24	1.66
Bananas	-2.6865	0.5104@ (1.7131)	-0.0355* (1.9591)	27.34	1.80
Apples	-0.4777	0.1732 (0.7880)	-0.0092 (0.6863)	5.80	1.86
Grapes	-1.7121	0.3329*** (4.9363)	-0.0034 (0.8383)	96.31	2.29
Oilseed cake+ Meal	4.3433	-0.2634* (5.7609)	0.0151*** (5.4492)	73.69	1.29
Soyabean cake	3.4764	-0.0883 (1.1674)	0.0091* (1.9685)	54.06	1.21
Groundnut cake	4.7573	-0.0846@ (1.7421)	0.0035 (1.1766)	39.86	1.70
Cottonseed cake	4.5143	-0.6547@ (1.5606)	0.0267 (1.0463)	35.19	1.21
Sunflower cake	5.1854	-0.2900*** (3.3388)	0.0151** (2.9019)	54.41	1.19
Rapeseed cake	3.5928	-0.1316 (0.7261)	-0.0108 (0.9834)	13.92	1.33
Groundnut Tot Shell	3.3059	-0.2174 (1.0926)	0.0041 (0.3409)	47.27	1.19
Sesame seeds	2.8235	-0.2110 (1.1115)	0.0145 (1.2596)	13.19	1.18
Castor oil	4.4571	-0.0637@ (1.6045)	0.0041@ (1.7071)	19.84	1.42

(Contd.)

Table 4.15(b): (Contd.)

Commodity	a	+bt	+ct ²	R ² (%)	d-statistics
Cotton lint	3.3169	-0.4345@ (1.4855)	0.0267@ (1.4999)	15.87	1.90
Jute+Bast fibre	1.5182	-0.1640 (0.9165)	0.0085 (0.7775)	8.24	1.42
Tea	3.5333	-0.0157 (1.0969)	-0.0009 (1.0120)	87.04	2.39
Coffee Green + Roast	3.1440	-0.0789* (1.9882)	0.0036@ (1.4982)	38.25	2.17
Tobacco Un- manufactured	3.3172	-0.0399 (1.2340)	0.0010 (0.5325)	44.72	1.73

Note: 1) Figures in parentheses are t-values at the respective regression coefficients.
2) ***, **, * and @ represent significance at 1, 5, 10 and 20 percent level of probability.

Contrary to falling share of India in total banana exports of Asia, India's share in total oranges exports of Asia was found to expand at the rate of 12.8 per cent a year in quantity terms and 6.2 per cent a year in value terms during 1979-93. Lower rate of growth for oranges exports in value terms in this respect is a pointer of falling international prices of oranges during the given period of time. Though oranges exports of India in Asia has grown at a reasonable rate over time, a time scale deceleration during the given period of time in this respect was also noticed, both in quantity and value terms (Tables 4.15(b) and 4.16(b)). As for growth of apple exports of India in Asia, it was observed that while on one hand the growth in India's share in total apple exports of Asia was very slow and insignificant in quantity terms between 1979 and 1993, the rate of growth in this respect in value terms, on the other hand, was not only significant but quite substantial too during the same period. The share of grape exports of India in Asia has increased remarkably during the given period of time, both in quantity and value terms. However, the rate of increase in quantity term was noticed to be much faster than value terms. Not only India's share of grape exports in total Asian trade encompassing this commodity increased perceptibly over time but the predictability of time variable in explaining this growth over time also appeared to be very high. An important aspect that emerges about the oranges, apples and grapes exports of India in the total Asian trade encompassing these commodities has been acceleration in their growth even in the face of time-scale deceleration at some phase during 1979-93 (Tables 4.15(b) and 4.16(b)).

A falling trend in terms of India's share in Asia for both processed and fresh vegetable exports was noticed in value terms during 1979-93; though the decline for fresh vegetable exports in this respect was only meagre and insignificant. In fact, the

declining share of India in Asia for fresh vegetables could not be explained by time variable because of very wide overall fluctuations in its export over time. Though India's share in Asia for fresh vegetables declined marginally during the period between 1979 and 1993, a deceleration in this declining trend was also noticed during this period (Table 4.16(b)). As for other horticultural exports, India has shown remarkable growth in terms of her share of floricultural exports in Asia during the given period of time. India's share in total floricultural exports of Asia was found to expand at an annual compound growth rate of 15 per cent during 1979-93. Such a high rate of growth for floriculture product exports of India in Asia is a pointer to the fact that India has not left any stone unturned to tap its exports potential in floriculture products.

India presents a gloomy trend in terms of her share in Asia for various oilseed cakes and meals. This is despite the fact that India has achieved remarkable growth on oilseed cake and meal export front over the past decade and a half. Though overall oilseed cake and meal exports of India expanded at the rate of about 7 per cent a year in quantity terms and 9 per cent a year in value terms during the period between 1979 and 1993, a decline to the tune of about 2 per cent a year in quantity terms and a marginal decline in value terms was only too evident when India's share for overall oilseed cake trade in Asia was reckoned during the same period (Table 4.13(a), 4.14(a), 4.15(a) and 4.16(a)). The reason for the declining share of India in Asia for various oilseed cakes and meal exports during the past decade and a half is not far to seek from. In fact, on the oilseed cake and meal export front, India has a stiff competition with China. This is corroborated from the fact that during 1979-93, China's share in total Asian trade encompassing various oilseed cake and meals increased at the rate of 21 per cent a year in quantity terms and 19 per cent a year in value terms, whereas India's share in Asia for the same during this period declined (growth rate estimates for China's share in Asia are based on FAO estimates). This is a pointer to the fact that China's policy on the export front for various oilseed cakes and meals is more pragmatic than India. Further, although oilseed cake and meal export trade of India in Asia has declined in general during 1979-93, a time-scale deceleration in this declining trend was also noticed, both in quantity and value terms. This is evident from estimated log quadratic trend equation for India's share in Asia in respect of overall trade in oilseed cake and meals (Table 4.15(b) and 4.16(b)).

Though Soyabean cake and rapeseed cake presented comfortable scenario in terms of growth in their share in total Asian trade encompassing these commodities, this rising trend, however, could not reverse the overall decline in India's share in Asia for oilseed cake and meal brought about by steep fall in India's share in Asia for other oilseed cakes and meals like groundnut cake, cottonseed cake and sunflower cake, both in quantity and value terms. Further, though sunflower cake export trade of India in Asia declined - both in quantity and value terms, a deceleration in this declining trend was also noticed (Table 4.15(b) and 4.16(b)). This deceleration took place

between the mid-eighties and the early nineties when India's share in Asia for this commodity export increased in the face of a sharp decline in the same between the early - and the mid-eighties (Table 4.11 and 4.12). Another important aspect has been the decline in cottonseed cake exports of India in Asia in the face of very high overall fluctuation in the same. However, groundnut cake exports of India, though declined, revealed lowest overall fluctuation in terms of its share in total Asian trade of the same, both in quantity and value terms. In general, it was noticed that the predictabilities of time variable in explaining export growth trend in respect of India's share in Asia for various oilseed cake and meals were relatively very low and weak, both in quantity and value terms (Tables 4.15 and 4.16).

Table 4.16(a): Compound Growth Rates (CGR) on Share of Agricultural Exports of India in Asia (Value Terms)
: (1979-1993)

Commodity	CGR(%)	t-statistics	R ² (%)	Instability Index (%)
Cereals	3.25	1.05	7.78	1185.96
a)Wheat & Wheat flour	-21.86	2.14	26.09	12125.88
b)Rice	6.32**	2.29	28.80	1075.47
Pulses	20.84***	5.56	70.41	2425.48
Potatoes	-19.88***	4.39	59.67	3692.15
Onions	0.69	0.47	1.69	467.55
Oranges+Tang+clem	6.24	1.28	11.24	2696.42
Bananas	-13.12**	2.28	28.53	11100.82
Apples	7.32***	5.34	68.72	1967.98
Grapes	27.86**	14.71	94.33	489.26
Oilseed cake+Meal	-0.09	0.05	0.02	780.10
Soyabean cake	8.05***	4.44	60.24	1043.63
Groundnut cake	-3.08**	2.37	30.25	337.62
Cottonseed cake	-21.58***	3.13	42.99	12415.52
Sunflower cake	-5.20**	2.38	30.29	971.79
Rapeseed cake	3.23	0.83	5.04	2322.99
Groundnut Tot Shell	-14.87***	3.69	51.17	2060.97
Sesame seeds	2.05	0.44	1.53	5799.68
Castor oil	0.26	0.29	0.62	184.73
Cotton lint	-1.19	0.19	0.28	4422.61
Jute+Bast fibre	-5.10	1.25	10.75	7871.20
Tea	-2.45***	5.30	68.35	51.20
Coffee Green+Roast	-1.49*	1.79	19.77	196.38
Tobacco Unmanufactured	-4.83***	5.15	67.13	216.53
Vegetables -Processed	-5.52***	3.06	41.94	585.50
-Fresh	-0.95	0.26	0.53	14064.41
Floriculture	15.38**	2.83	61.65	1585.08

Note: *, ** and *** represent significance at 10, 5 and 1 per cent level of probability.

Table 4.16(b): Estimated Log Quadratic Trend Equation for Share of Agricultural Exports of India in Asia (Value Terms): (1979-1993)

Commodity	a	+bt	+ct ²	R ² (%)	d-Stat- istics
Cereals	2.1188	-0.1859 (1.5495)	0.0136* (1.8677)	28.55	1.61
a)Wheat & Wheat flour	1.5388	0.1521 (0.3043)	-0.0249 (0.8203)	30.01	1.37
b)Rice	2.0179	-0.0934 (0.8490)	0.0097@ (1.1459)	39.31	1.54
Pulses	-1.8135	0.1541 (1.0172)	0.0022 (0.2388)	70.55	1.64
Potatoes	0.8293	0.0743 (0.3575)	-0.0185@ (1.4651)	65.79	1.28
Onions	3.2294	0.0827@ (1.3496)	-0.0047 (1.2719)	13.37	1.85
Oranges+ Tang+ clem	-2.0558	0.3810* (2.0281)	-0.0200@ (1.7542)	29.35	1.72
Bananas	-1.2340	0.2223 (0.8764)	-0.0227@ (1.4717)	39.46	1.55
Apples	-0.5617	0.1812*** (3.6991)	-0.0069** (2.3214)	78.41	1.41
Grapes	-1.3036	0.3431*** (4.9931)	-0.0061@ (1.4567)	95.18	1.76
Oilseed cake+ Meal	4.1861	-0.2383*** (6.4215)	0.0148*** (6.5793)	78.30	1.68
Soyabean cake	3.0818	-0.0098 (0.1339)	0.0055 (1.2224)	64.64	1.20
Groundnut cake	4.7771	-0.1006 (1.8247)	0.0043 (1.2924)	38.77	1.76
Cottonseed cake	4.4826	-0.4797@ (1.4141)	0.0148 (0.7172)	45.33	1.30
Sunflower cake	5.1314	-0.2655*** (3.3968)	0.0133** (2.7899)	57.71	1.30
Rapeseed cake	3.5627	-0.0873 (0.5227)	0.0074 (0.7333)	9.11	1.46
Groundnut Tot Shell	3.3258	-0.1943 (0.9993)	0.0021 (0.1789)	51.29	1.76

(Contd.)

Table 4.16(b) (Contd.)

Commodity	a	+bt	+ct ²	R ² (%)	d-Statistics
Sesame seeds	2.8527	-0.2122 (1.1196)	0.0145 (1.2617)	13.06	1.14
Castor oil	4.3886	-0.0427 (1.1180)	0.0028 (1.2195)	11.58	1.54
Cotton Lint	3.1352	-0.3761@ (1.4454)	0.0228@ (1.4391)	14.95	2.13
Jute + Bast Fibre	1.3893	-0.1207 (0.6499)	0.0043 (0.3783)	11.80	1.37
Tea	3.6130	0.0020 (0.1036)	-0.0017@ (1.4273)	72.94	2.82
Coffee Green+ Roast	3.1994	0.0442 (1.2169)	0.0018 (0.8274)	24.10	1.80
Tobacco Unmanu- factured	3.2309	-0.0739* (1.8794)	0.0018 (0.7197)	68.49	1.10
Vegetable -Processed	1.2302	-0.0315 (0.3823)	-0.0016 (0.3161)	42.42	1.25
-Fresh	0.4961	0.2806* (2.0415)	-0.0181* (2.1711)	28.59	2.10
Floriculture	1.6891	-0.1526 (0.6708)	0.0082 (0.8722)	67.77	2.16

Note: *, ** and *** represent significance at 10, 5 and 1 per cent level of probability.

Various oilseed exports of India have shown mixed trends in terms of their growth in total Asian trade over time. While the share of groundnut export of India in total Asian trade encompassing this commodity was seen to decline at the rate of about 15 per cent a year between 1979 and 1993, a low but positive growth in export trade for sesame seeds and castor oil was noticed during the same period when India's share in Asia was reckoned in this respect. Interestingly, while India's share in Asia for groundnut export had fallen at the same rate in quantity and value terms during 1979-93, the rates of increase in export growth for sesame seeds and castor oil in this respect were also found to be similar both in quantity and value terms during this period. Time variable, however, could not predict the nature of secular trend in export growth for sesame seeds and castor oil. However, the predictability of time variable in explaining negative export growth of groundnuts was seen to be reasonably high, both in quantity and value terms.

All the fibre and plantation commodity exports of India have shown unsatisfactory trend in terms of growth in their share in total Asian trade over time (Figures 4.15(a), 4.15(b), 4.17(a), 4.17(b)). An annual decline to the tune of 1-3 per cent in quantity terms and 1-5 per cent in value terms was noticed when India's share in Asia for the export trade of various fibre and plantation commodities was reckoned for the period between 1979 and 1993. The rate of decline for these fibre and planta-

Figure 4.15 (a)

India's Share in Asia's Export(Fibres) -- Quantity

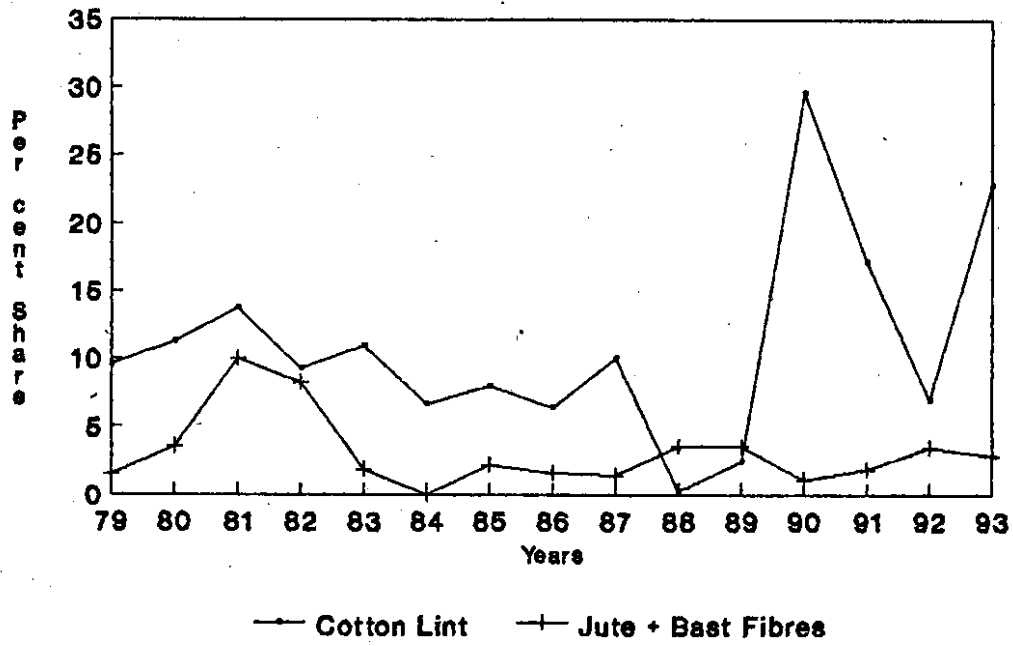
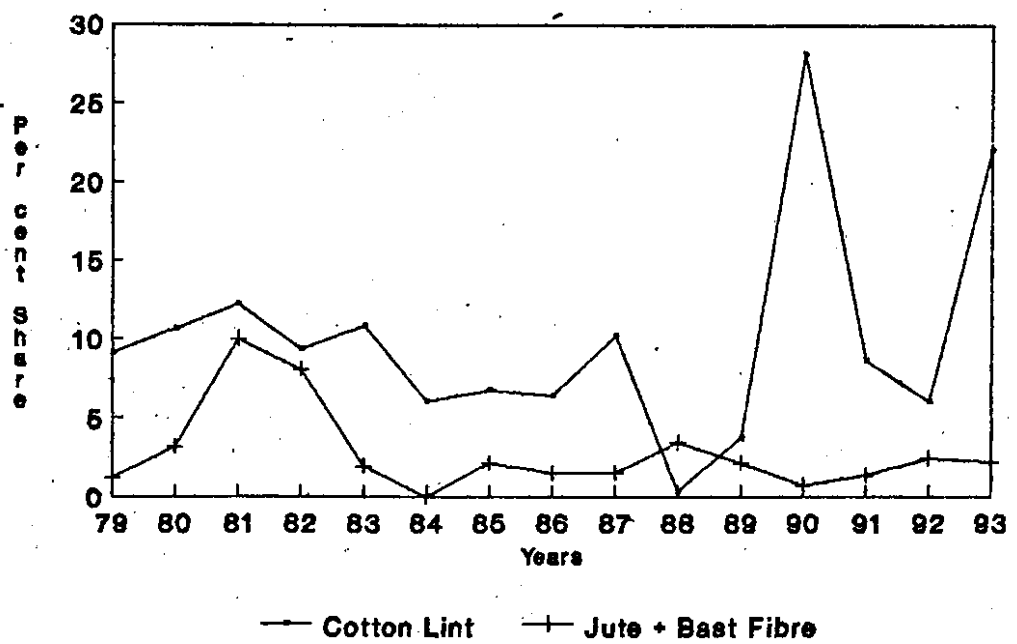


Figure 4.15 (b)

India's Share in Asia's Export(Fibres) -- Value



tion commodities, in general, was more sharp in value terms than in quantity terms. An important aspect of the negative growth of India's share in Asia for various plantation commodities has been that the degree of overall fluctuations in these declining trends were very low, particularly in the case of tea exports. Coffee exports of India in Asia, though declined, showed a time scale deceleration in the declining trend during 1979-93, particularly in quantity terms (Table 4.16(b)). This deceleration, as a matter of fact, took place between the mid-eighties and the early nineties (Table 4.11).

Thus, the scenario obtaining over the past decade and a half reveal considerable variation in rates of export growth in terms of India's share in Asia for various selected agricultural commodities. Though a declining share of India in Asia for majority of the commodities is only too evident, horticultural products - particularly various selected fruits and floriculture products, and also a couple of oilseed cakes and oilseeds have shown some growth in terms of their share in total Asian trade encompassing the same during the given period of time.

In order to assess the incidence of autocorrelation between the successive figures of share of India in total Asian trade of various selected commodities, Durbin-Watson 'd' statistics was applied to the estimated log quadratic trend equation. The critical values of 'd' statistics for the various estimated equations were seen to fall within the permissible range i.e. $du < d^* < (4 - du)$, revealing, thereby, the absence of autocorrelation between the successive values of shares over time.

4.12 Growth and Instability in India's Share in World Exports

Though in due course of time India has shown remarkable growth in terms of her share in the total world production of various agricultural commodities, her performance on export front in this respect nevertheless has remained by and large dismal. The scenario obtaining over the past 15 years amply reveals a declining share of India in total global exports for majority of the selected commodities. The dismal performance of India in terms of time-scale fall in her share in global exports was noticed not only for traditional commodities but also for non-traditional ones. As a matter of fact, in the case of certain fruit crops India has shown some growth in total Asian export trade. But, when India's share in the world fruit export trade was reckoned over time, a fall in the same was only too evident. The results obtained in respect of growth trends coupled with instability in the rates of growth for India's share in world exports of various selected agricultural commodities over the period between 1979 and 1993 are brought out in Tables 4.17(a), 4.17(b), 4.18(a) and 4.18(b).

Cereal exports of India has grown at a much faster rate in the world than in the total Asian trade, both in quantity and value terms. In quantity terms, cereal exports of India appeared to have declined in total Asian trade during 1979-93; though a positive and reasonable rate of growth was noticed in this respect in value terms (Tables 4.15(a) and 4.16(a)). Contrary to this, the share of India in total world cereal exports grew at a

very high rate in value terms and at a low but positive rate in quantity terms during the same period (Tables 4.17(a) and 4.18(a)). In fact, in value terms, the growth in cereal exports of India in Asia was found to be half the rate of growth of cereal exports of India in the total world trade for the same. During 1979-93 period, India's share in total world cereal exports grew at the rate of about 1 per cent a year in quantity terms and about 6 per cent a year in value terms. This positive rate of growth for India's share in world cereal exports during 1979-93 was achieved chiefly because of perceptible growth in her share of total global rice exports since wheat exports of the country declined sharply in the total world trade during this period. The rate of decline for India's share in total global wheat exports was more sharp in value terms than in quantity terms. On the other hand, the annual average rate of growth for rice exports of India in its total global exports was found to be about 6 per cent during 1979-93, both in quantity and value terms. Although cereal exports of India have shown a positive rate of growth in the world between 1979 and 1993, a deceleration in this export growth appeared to have taken place during this period, both in quantity and value terms. This deceleration, in fact, took place between the early - and the mid-eighties when share of India in world cereal exports declined (Tables 4.11 and 4.12). Similarly, a time-scale deceleration in the rising trend of share of India in total quantum of global rice exports was also noticed during 1979-93 period (Table 4.17(b)). As regards cereal exports of India, an important aspect has been that the predictabilities of time variable in explaining growth trends over time in terms of India's share in total global cereal exports, though within the reasonable limit in value terms, were very poor and weak in quantity terms. Nonetheless, the estimated log quadratic trend equations revealed high predictabilities in this respect compared to the fitted exponential equations. Further, the decline in the share of wheat exports of India in total global wheat trade was noticed in the face of very high overall fluctuations in the same; the level of overall fluctuations for wheat exports being same in quantity and value terms.

There has been tremendous growth in India's share in total global pulses exports during the period between 1979 and 1993. Though India's share in total pulses exports of the world grew at an annual compound growth rate of nearly 17 per cent in quantity terms and about 22 per cent in value terms during 1979-93, most of the increase in India's share in total global pulses exports was noticed after the mid-eighties. As a matter of fact, more open and liberal trade policy measures initiated by the government of India during the early nineties did contribute towards significant rise in India's share in total world pulses exports. And, as a result of these changes, the overall average rate of growth in India's share in global pulses exports was found to be not only positive but significantly high too during the given period of time. In this case, the predictability of time variable in explaining export growth was very high, particularly in value terms.

Though various foodgrains of India, in general, have shown perceptible growth in respect of their share in global exports

during the past 15 years, a disquieting and gloomy trend, on the contrary, was noticed in terms of growth in India's share in global horticultural exports. This held particularly true in the case of various fruits and vegetables. With grapes being the only exception, all the fruits and vegetables of India have shown a decline in their share in global exports between 1979 and 1993, particularly in value terms. Nevertheless, in quantity terms, onions and oranges have also shown some growth, though insignificant, in terms of rise in their share in global exports over time. Among other horticultural crops, floricultural exports of India, however, have shown remarkable growth in their share in total global exports during the given period of time. By and large, the past decade and a half reveals a discouraging trend in terms of growth in India's share in global horticultural exports.

The share of India in total global potato exports was found to shrink at the rate of 13 per cent a year in quantity terms and 18 per cent a year in value terms during 1979-93. Unlike potato exports, onion exports of India in quantitative terms has shown some growth in its global trade during 1979-93 but when the trade in value terms was reckoned, a marginal decline in India's share in total global onion exports was only too evident during the same period. Though onion exports of India in value terms has declined marginally in its world trade during 1979-93 period, initially India's share of onion exports in the world was found to increase but, at the same time, this increase was at a declining rate - as revealed by the estimated log quadratic trend equation, and consequently in the latter period there would have been a negative growth in the same (Table 4.18(b)). This trend might have resulted in an overall annual decline in the share of onion exports of India in the total global trade of the same. This is also evident from Table 4.12 which reveals an increase in the share of onion exports of India in the world from the early eighties to mid-eighties and a sharp decline in the same thereafter. Further, in value terms, both processed and fresh vegetables of India have also shown a marginal decline in their share in total global exports during 1979-93, the decline being more sharp for fresh vegetable exports. However, the time variable could not capture the exact nature of secular trend in export growth in terms of India's share in the world for processed and fresh vegetables. The negative rate of growth for fresh vegetable exports of India in the world was associated with very high overall fluctuation during the given period of time. Furthermore, though fresh vegetable exports of India declined at the rate of about 2 per cent per annum during the period between 1979 and 1993, the period was also marked with time-scale acceleration in this declining trend. In the initial years of the overall period considered, there was a sharp increase in the share of fresh vegetable exports of India in the total global exports of the same but this increase was at a declining rate of very high order and, as a result of this, the overall annual growth in India's share in total global fresh vegetable exports turned out to be negative. This trend is revealed by the estimated log quadratic trend equation (Table 4.18(b)). An increasing share of India in the world for fresh vegetables during the period between early -

and the mid-eighties and a sharp fall in the same after the mid-eighties can also be seen from Table 4.12.

Barring oranges in quantity terms and grapes in quantity as well as value terms, all the selected fruits of India have shown a falling trend in terms of their share in global exports during the period between 1979 and 1993, both in quantity and value terms. The decline in India's share in total world exports was noticed to be more sharp for bananas followed by apples, both in quantity and value terms. At the same time, while banana exports of India declined more in value than in quantity terms in respect of its share in total global exports during 1979-93, the decline in this respect in the case of apple exports was more sharp in quantity than in value terms during the same period. Oranges exports of India also followed a falling trend in terms of its share in global exports over time, particularly in quantity terms since in value terms, there was a small but positive annual rate of growth in India's share in total global oranges exports over the past 15 years. Grape exports of India in particular has grown at a very high rate in its total world trade, more in quantity than in value terms. The rate of growth in the share of India in total global grape exports was found to be nearly 18 per cent a year in quantity terms and 13 per cent a year in value terms during the given period of time. However, a time-scale deceleration in this rising trend was also noticed (Table 4.18(b)). This deceleration in the rising share of India in global grape exports appeared to have taken place between the mid-eighties and the early nineties (Table 4.12). In general, poor predictability of time variable was noticed in terms of growth in India's share in total world exports for various selected fruit crops.

India's share is expanding very fast in the world for floriculture product exports. Between 1979 and 1993, India's share in the world for floriculture product exports grew at the rate of about 13 per cent a year in value terms. However, India's share in Asia for floriculture product exports has grown at a much higher rate than rate of growth in her share for the same in the world exports (Tables 4.16(a) and 4.18(a)).

While on one hand India's share in Asia has fallen over-time for various oilseed cakes and meal exports, a positive and significantly high rate of growth, on the other hand, was noticed when India's share for various oilseed cakes and meals was reckoned in the world trade over the past 15 years (Tables 4.15(a), 4.16(a), 4.17(a) and 4.18(a)). The average annual rate of growth in value terms stood at more than twice the average annual rate of growth in quantity terms when India's share in total world exports was reckoned for overall oilseed cakes and meals; the rate of growth being 2.6 per cent a year in quantity terms and 5.9 per cent a year in value terms between 1979 and 1993. At the same time, a deceleration in this accelerated growth was also noticed which, in fact, took place during the first half of the overall period considered when India's share in the world trade for overall oilseed cakes and meals had fallen sharply, both in quantity and value terms, only to pick up significantly during the latter half of the period between 1979 and 1993 (Tables 4.11, 4.12, 4.17(b) and 4.18(b)). Further,

Table 4.17(a): Compound Growth Rates (CGR) on Share of Agricultural Exports of India in the World (Quantity Terms): (1979-93)

Commodity	CGR(%)	t-statistics	R ² (%)	Instability Index (%)
Cereals	1.03	0.30	0.68	2194.26
a)Wheat and Wheat Flour	-5.97	0.63	2.95	15780.90
b)Rice	0.47	0.17	0.21	1872.08
Pulses	16.74***	4.28	58.48	3032.16
Potatoes	-12.78*	2.56	33.52	6497.29
Onions	1.10	0.99	6.95	269.58
Oranges+Tang+clem	0.91	0.12	0.11	2739.29
Bananas	-15.31	1.29	11.39	7371.38
Apples	-14.54*	2.05	24.38	7927.63
Grapes	17.83**	2.40	30.63	7471.35
Oilseed cake+Meal	2.55	1.40	13.15	785.82
Soyabean cake	23.50***	15.05	94.57	312.41
Groundnut cake	-1.26	0.88	5.60	468.47
Cottonseed cake	-14.71	1.69	17.97	16301.91
Sunflower cake	21.18***	6.21	74.81	1810.14
Rapeseed cake	17.32**	2.89	39.08	2978.77
Groundnut Tot Shell	-8.51*	1.88	21.47	2384.87
Sesame seeds	8.03*	1.92	22.03	5881.35
Castor oil	6.66***	3.78	52.35	710.74
Cotton lint	1.59	0.23	0.42	4368.12
Jute+Bast fibre	-3.04	0.76	4.25	6808.34
Tea -	-3.26***	8.73	85.43	35.02
Coffee Green+Roast	1.14	1.28	11.15	179.81
Tobacco Unmanufactured	-3.56***	3.77	52.29	226.18

Note: *,** and *** represent significance at 10,5 and 1 per cent level of probability.

Table 4.17(b): Estimated Log Quadratic Trend Equation for Share of Agricultural Exports of India in the World (Quantity Terms): (1979-1993)

Commodity	a	+bt	+ct ²	R ² (%)	d-Statistics
Cereals	-0.6669	-0.2794** (2.1950)	0.0181** (2.3403)	31.81	1.95
a)Wheat and Wheat flour	-0.5474	-0.2910 (0.6740)	0.0143 (0.5465)	5.30	1.71
b)Rice	1.7483	-0.2187* (2.0505)	0.0140* (2.1542)	28.04	1.32
Pulses	-3.0921	0.1451 (0.8990)	0.0006 (0.0620)	58.50	1.20

Table 4.17(b): (Contd.)

Commodity	a	+bt	+ct ²	R ² (%)	d- Statist- tics
Potatoes	-1.1195	-0.0124 (0.0528)	-0.0078 (0.5430)	35.11	1.21
Onions	2.0766	0.0542 (1.1285)	-0.0027 (0.9254)	13.15	1.95
Oranges+Tang +Clem	-2.8223	0.3243 (1.0059)	-0.0197 (1.0055)	7.87	1.69
Bananas	-3.9011	0.6497 (1.2497)	-0.0510@ (1.6139)	27.20	1.60
Apples	-0.6856	-0.0341 (0.1002)	-0.0077 (0.3715)	25.24	1.31
Grapes	-3.7290	0.5028@ (1.7427)	-0.0212 (1.2073)	38.15	1.22
Oilseed cake +Meal	2.1942	-0.2079*** (5.1446)	0.0146*** (5.9319)	77.91	1.64
Soyabean cake	-1.3839	0.3326*** (6.5084)	-0.0076** (2.4461)	96.38	2.03
Groundnut cake	-3.9520	-0.0650 (1.0381)	0.0033 (0.8589)	11.07	2.19
Cottonseed cake	2.9108	-0.4964 (1.2151)	0.0211 (0.8491)	22.62	1.14
Sunflower cake	-0.7737	0.2296@ (1.6695)	-0.0023 (0.2801)	74.97	1.21
Rapeseed cake	0.6963	0.2051 (0.8321)	-0.0028 (0.1891)	39.26	1.60
Oilseed cake	4.0337	-0.2723*** (4.6128)	0.0141*** (3.9413)	69.01	1.01
Groundnut Tot	1.3672	0.0040 (0.0194)	-0.0058 (0.4583)	22.83	1.85
Sesame seeds	1.3082	-0.0259 (0.1463)	0.0064 (0.5988)	24.29	1.19
Castor oil	3.3206	-0.0025 (0.0337)	0.0042 (0.9371)	55.60	0.82
Cotton lint	1.0659	-0.2388 (0.8138)	0.0159 (0.8924)	6.62	2.02
Jute+Bast Fibre	1.5075	-0.1665 (0.9402)	0.0085 (0.7874)	8.95	1.41
Tea	3.1663	-0.0190 (1.1577)	-0.0009 (0.8862)	86.32	2.38
Coffee Green + Roast	0.6982	-0.0178 (0.4559)	0.0018 (0.7705)	15.34	2.01
Tobacco Un- manufactured	2.0371	-0.0899** (2.2591)	0.0034@ (1.3861)	58.88	1.07

Note : 1) Figures in parentheses are t-values of the respective regression coefficients.

2) ***, **, * and @ represent significance at 1, 5, 10 and 20 per cent level of probability.

Table 4.18(a): Compound Growth Rates (CGR) on Share of Agricultural Exports of India in the World (Value Terms) : (1979-1993)

Commodity	CGR(%)	t-statistics	R ² (%)	Instability index (%)
Cereals	6.31*	1.83	20.47	1461.84
a)Wheat and Wheat Floor	-8.05	0.82	4.90	15922.41
b)Rice	6.27**	2.27	28.48	1105.69
Pulses	22.29***	5.26	72.53	2462.60
Potatoes	-17.91***	4.06	55.91	3761.12
Onions	-0.32	0.22	0.38	471.09
Oranges+Tang+clem	-5.78	0.84	5.16	2991.10
Bananas	-23.34**	2.22	27.43	14775.36
Apples	-12.04**	2.26	28.25	4094.81
Grapes	13.09*	2.05	24.40	5620.54
Oilseed cake+Meal	5.91***	3.62	50.26	802.14
Soyabean cake	25.51***	13.74	93.56	444.21
Groundnut cake	-1.44	0.94	6.37	515.66
Cottonseed cake	-16.51**	2.50	32.48	11100.36
Sunflower cake	18.00***	5.21	67.62	1759.26
Rapeseed cake	14.10**	2.40	30.61	2950.07
Groundnut Tot Shell	-10.02**	2.51	29.04	2484.46
Sesame seeds	7.22	1.70	18.16	6615.94
Castor oil	6.27***	3.70	51.34	641.54
Cotton lint	0.57	0.09	0.07	4708.29
Jute+Bast fibre	-5.46	1.35	12.32	7956.33
Tea	-3.13***	5.30	68.39	80.01
Coffee Green+koast	0.46	0.55	2.25	127.55
Tobacco Unmanufactured	-5.59***	4.54	61.30	412.27
Vegetables -				
- Processed	-0.25	0.17	0.22	413.94
- Fresh	-1.88	0.46	1.62	19089.86
Floriculture	12.60***	3.90	53.95	1701.18

Note : *, **, and *** represent significance at 10, 5 and 1 per cent level of probability.

Table 4.18(b): Estimated Log quadratic Trend Equation for Share of Agricultural Exports of India in the world (Value Terms): (1979-1993)

Commodity	a	+bt	+ct ²	R ² (%)	d-Statistics
Cereals	-0.2479	-0.2074@ (1.6425)	0.0168** (2.1878)	43.15	1.54
a)Wheat and Wheat Flour	-0.5656	-0.2916 (0.6433)	0.0130 (0.4712)	6.63	1.69
b) Rice	1.4762	-0.1108 (1.0253)	0.0107 (1.6332)	41.44	1.47
Pulses	-3.2623	0.2148@ (1.4025)	-0.0009 (0.0915)	72.55	1.44
Potatoes	-1.3867	0.0458 (0.2239)	-0.0152 (1.2227)	60.79	1.18
Onions	1.7447	0.1093* (1.9977)	-0.0070* (2.1144)	27.42	2.02
Oranges+Tang+ Clem	-2.4255	0.1332 (0.4286)	-0.0120 (0.6379)	8.27	1.72
Bananas	-2.7132	0.4197 (0.8480)	-0.0428 (1.4245)	37.92	1.49
Apples	-0.8486	0.0254 (0.1020)	-0.0096 (0.6350)	30.58	1.19
Grapes	-3.3534	0.4908* (2.0050)	-0.0229@ (1.5449)	36.94	1.19
Oilseed Cake+ Meal	1.5563	-0.1543*** (4.7640)	0.0132*** (6.7231)	89.96	2.11
Soyabean Cake	-1.6113	0.3643*** (5.9432)	-0.0086** (2.3064)	95.53	1.69
Groundnut Cake	3.8903	-0.0658 (0.9799)	0.0032 (0.7854)	10.95	1.99
Cottonseed Cake	2.9106	-0.3419 (1.0742)	0.0101 (0.5218)	33.98	1.25
Sunflower Cake	-0.5699	0.2081@ (1.4744)	-0.0027 (0.3107)	67.88	1.16
Rapeseed Cake	0.6154	0.2242 (0.9183)	-0.0058 (0.3889)	31.48	1.64
Groundnut Tot Shell	1.4884	0.0155 (0.0771)	-0.0076 (0.6193)	31.24	1.77
Sesame Seeds	1.3299	-0.0442 (0.2454)	0.0071 (0.6506)	20.95	1.14
Castor Oil	3.2289	0.0270 (0.3714)	0.0021 (0.4798)	52.26	0.93
Cotton Lint	0.9483	-0.2202 (0.8370)	0.0141 (0.8828)	6.16	2.19

(Contd.)

Table 4.18(b): (Contd.)

Commodity	a	+bt	+ct ²	R ² (%)	d- Stati- stics
Jute+Bast Fibre	1.3605	-0.1220 (0.6616)	0.0041 (0.3672)	13.29	1.35
Tea	3.2249	0.0144 (0.6288)	-0.0029* (2.0708)	76.71	2.67
Coffee Green+ Roast	0.5894	0.0125 (0.3828)	-0.0005 (0.2673)	2.83	2.09
Tobacco Un- manufactured	1.6791	-0.1154* (2.1421)	0.0036 (1.1050)	64.88	0.75
Vegetables -Processed	-0.7587	0.0199 (0.3073)	-0.0014 (0.3555)	1.26	1.33
-Fresh	-1.1869	0.3200* (2.0864)	-0.0212** (2.2731)	31.23	2.18
Floriculture	-4.0542	0.1341 (0.9890)	-0.0010 (0.1170)	54.01	1.92

Note : 1) Figures in parentheses are t-values of respective regression coefficients.
2) ***, **, * and @ represent significance at 1,5,10 and 20 per cent level of probability.

among the various oilseed cakes and meals, except a marginal fall in groundnut cake exports and steep decline in cottonseed cake exports, all the selected oilseed cakes and meals of India have shown perceptible growth in respect of their share in total global exports during 1979-93, both in quantity and value terms. Soyabean cake exports of India in particular grew at a very high rate in its world trade during the same period. Sunflower and rapeseed cake exports of India have also followed a similar rising trend in respect of growth in their share in the world trade over time. However, while for sunflower and rapeseed cake, the rate of growth in India's share in world exports was higher in quantity terms than in value terms during 1979-93, the growth in the case of soyabean cake in this respect, on the other hand, turned out to be slightly more in value than in quantity terms during the same period. And, this gives an indication of favourable international prices for soyabean cake vis-a-vis sunflower and rapeseed cake over the past 15 years. Nevertheless, as for soyabean cake, the increase in India's share in world export trade has been noticed at a declining rate, both in quantity and value terms. This trend is revealed by the estimated log quadratic trend equation for soyabean cake (Table 4.17(b) and 4.18(b)). An important feature of the world trade in soyabean cake has been a persistently rising share of India in it in the face of very low overall fluctuations in the same during the past 15 years, both in quantity and value terms. Not only this, the degree of predictability of time variable in explaining rising share of India in the total world exports of soyabean cake during

the given period of time had turned out to be very high compared to the predictabilities revealed by other oilseed cakes of India in terms of their growth in the world trade.

Regarding various oilseeds, groundnut exports of India was found to decline at the rate of about 8 per cent a year in quantity terms and 10 per cent a year in value terms in its total world trade during 1979-93. Sesame seeds and castor oil, on the contrary, have shown an increase in their share in the total world trade during the same period; the rate of annual increase in share being 6-8 per cent for both the commodities in quantity as well as value terms (Figures 4.16(a) and 4.16(b)). As for fibre crops, while cotton lint exports of India has shown some growth in terms of its share in world trade during 1979-93, a decline in the case of jute and allied fibres was only too evident when its share in the total world trade was reckoned during the same period, both in quantity and value terms. With coffee being the only exception, various selected plantation commodities of India have also followed a falling trend in terms of their share in the total world trade encompassing these commodities during the given period of time, both in quantity and value terms. However, in the case of unmanufactured tobacco in quantitative terms, a time scale deceleration in the falling trend was noticed during some phase of the period between 1979 and 1993 (Table 4.18(b)). Thus, by and large, various selected fibre and plantation commodities of India have shown disquieting trend in terms of their growth in the world trade over the past 15 years.

The past decade and a half has witnessed a significant decline in India's share in the world trade for commodities like wheat among cereals, most of the fruits and vegetables, a couple of oilseed cakes and meals and some of the fibre and plantation commodities. At the same time, her share in the world trade has gone up in due course of time for certain other commodities like rice among cereals, pulses, grapes and floriculture products in particular among horticultural products, soyabean; sunflower and rapeseed cakes among various oilseed cakes and sesame seeds and castor oil among selected oilseeds. The decline in India's share in the world trade was noticed despite the fact that agricultural exports of India for majority of the selected commodities have gone up perceptibly in absolute terms, both in quantity and value terms. However, as the general trend revealed, the decline in India's share in the world trade was less prominent than rate of decline in India's share in total Asian trade. At the same time it is worthwhile to mention here that a deceleration in the falling trend has also taken place due mainly to significant increase in India's share in both Asia and in the world trade in the post liberalization period, i.e. in the period early nine-ties.

4.13 Emerging Observations Regarding Structural Changes

The observance of changes that took place over the past decade and a half on the production and export fronts of agricultural commodities of India could be considered as a barometer to directly gauge the cumulative effect of various policies that were initiated by the government for the agricultural sector. An

Figure 4.16 (a)

India's Share in World Export(Fibres) --- Quantity

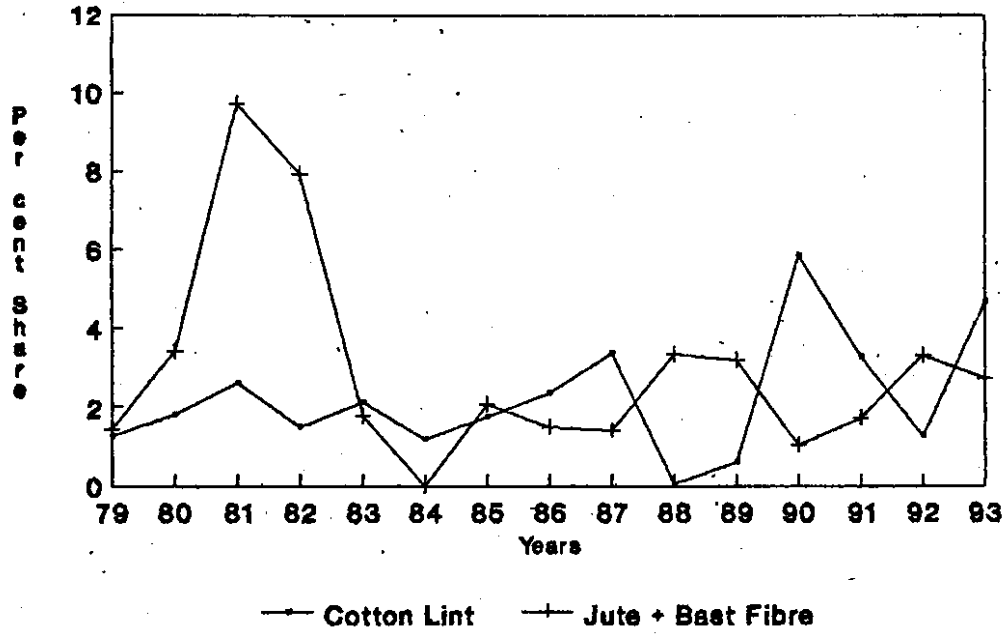
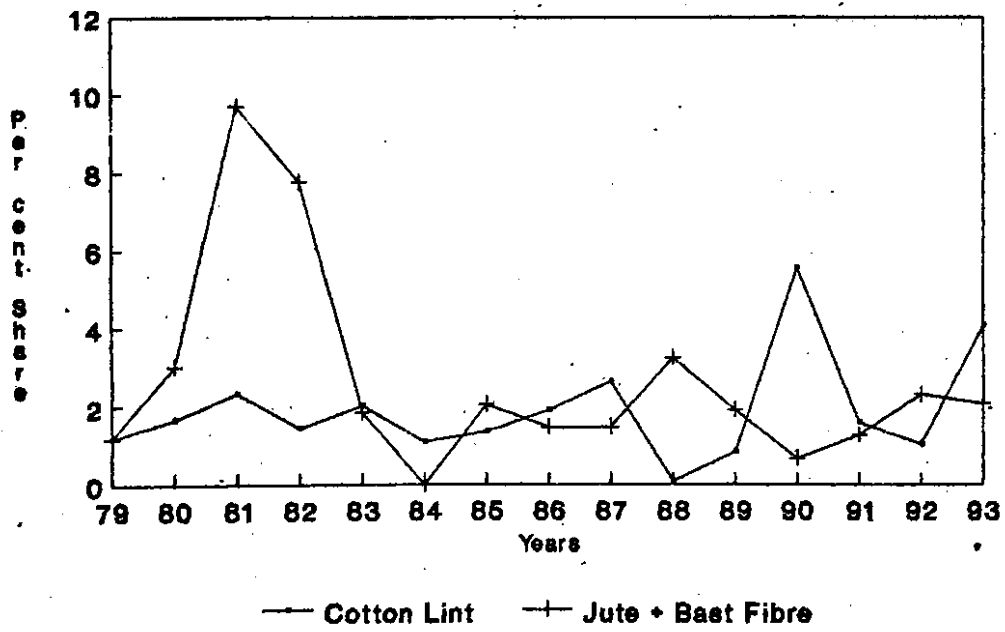


Figure 4.16 (b)

India's Share in World Export(Fibres) --- Value



overall analysis drawn from the entire discussion on the changing pattern and structure of agricultural production and exports of India during the past 15 years brings us closer to the following major observations:

(a) Evidently, all the selected agricultural commodities of India have shown significant overall expansions in their production levels over the past one and a half decades, though a time-scale deceleration in production expansions for some commodities like groundnuts, cotton lint and jute also took place during this period. Most of the selected commodities recorded principle increase in their production levels only after the mid-eighties. This held especially true of rice among cereals, all the selected fruits and vegetables with onion being an exception, groundnuts in shell, sesame seeds, cotton lint and tobacco. However, despite significant increase in production levels, certain selected commodities showed their share in total Asian production pool to decline. This unseemly trend was noticed for commodities like oranges and apples among various fruits, groundnuts, cotton lint, tea, coffee and tobacco. Added to this, a persistently declining share of India in total global production was also witnessed for commodities like pulses, tea and tobacco, though a deceleration appeared to have taken place in this declining trend during some phase of the overall period considered.

(b) Even though production expansions in certain commodities slowed down after the mid-eighties, their exports were found to expand sharply between the mid-eighties and the early nineties as against the period between the early eighties and the mid-eighties. This held particularly true of commodities like pulses, jute and coffee. Contrary to this, in the case of wheat and onions, major increase in both production and export was noticed only between the early - and the mid-eighties and, thereafter, a considerable slowing down in the same was only too evident. Pulses in particular have shown remarkable increase in their exports after the mid-eighties in the face of very slow growth in production expansion during the period between mid-eighties and the early nineties.

(c) In spite of about 15 per cent rise in production level, jute and fibre product exports of India had fallen to some 70 per cent by the early nineties from its early 1980s level. Similarly, potato, groundnuts, tea and tobacco exports of India have also fallen over time despite significant overall production expansions. An important aspect about jute and fibre products has been that its exports from India had increased by 10 per cent in quantitative terms between the mid-eighties and the early nineties even though there was about 4 per cent production loss of jute during this period.

(d) Overall export trade of India has expanded much faster than overall increase in production levels, particularly in the case of pulses among foodgrains, all the selected fruit crops, sesame seeds, cotton lint and coffee. On the other end of the spectrum, there has been very slow expansion in various cereal exports from India despite about 40-60 per cent rise in their production levels over the past 15 years. As for cereals, it is

worthwhile to mention here that their domestic requirements are very high in India. Exports of cereals are permitted only when there are distinct surpluses. Thus, highly fluctuating nature of cereal exports from India stems from this fact.

(e) During 1979-93 period, India's share in the world grew faster in exports than in production for commodities like pulses, grapes, sesame seeds and coffee. In fact, in the case of pulses, the rate of growth for India's share in global export was very high inspite of the fact that India's share in the global production for the same had fallen during 1979-93. Similarly, during the same period, a significant growth in India's share in Asia for oranges and apple exports was noticed even though the growth in India's share in total Asian production of these two commodities was negative.

(f) The output growth of India's share in the world was much higher than growth in her share in total Asian production. This held true of all the selected commodities. The same also held true when India's share in Asia as well as in the world was reckoned for various commodity exports with selected fruits being the only aberration in this scenario which showed their share of exports to grow at a much higher rate in Asia than in the world.

(g) Although India has recorded impressive growth rates in terms of her share in world production of commodities like wheat, potato, bananas, apples, groundnuts in shell and jute, her share in global exports of these commodities nevertheless has declined sharply in due course of time. Similarly, the shares of wheat, potato, banana and jute exports of India have fallen in total Asian export trade inspite of positive and significant rate of growth in her share in total Asian production of these commodities.

(h) With the exception of overall cereals, rice, pulses, onions and save for overall oilseed cakes and meals and soyabean cake in particular, the overall export of India in all the selected commodities expanded more in quantity than in value terms. This brings us closer to the fact that in general international prices of majority of the selected commodities were unfavourable during the past 15 years. Even though world prices of majority of the commodities recorded an increase after the mid-eighties, this rising trend in international prices could not offset the overall decline in prices brought about by rather sharp decline in international prices witnessed between the early - and the mid-eighties. Consequently, the overall increase in export turned out to be much higher in quantitative terms than in value terms.

(i) Export trade of India for majority of the selected commodities declined during the mid-eighties only to pick up sharply thereafter. This type of trend was noticed both in quantity and value terms of exports. On the other end of the spectrum, in the case of wheat, potato, oranges and cottonseed cake, a major decline in their exports from India was noticed only between the mid-eighties and the early nineties in the face of significant export expansion for these commodities between the early - and the mid-eighties. An explanation for this unseemly trend could be persistently declining export prices of these commodities over the past 15 years. Unfavourable export prices

have not only adversely affected the total value of exports but also total volume of exports.

(j) Perhaps the commodities for which India's trade structure has undergone tremendous change and which of late have shown remarkable growth in their exports are various horticultural products and oilseed cakes and meals. Nevertheless, inspite of the fact that horticultural products are gaining fresh grounds in overall trade policy of the country and that there has been remarkable growth in their exports in more recent times, a continuous decline in India's share in Asia was noticed for various fruits and vegetables like potato and banana exports - both in quantity and value terms, and also for various processed and fresh vegetable exports in value terms. In dismal contrast to this, the share of India in total export trade of Asia grew at a reasonable rate for certain other horticultural commodities like oranges and apples, and at a very high rate for grapes and various floricultural products. As for growth in India's share in total global exports, a persistent decline in her share was only too evident for all the selected horticultural commodities with grapes and floriculture products being the only aberration in this scenario which showed their exports to grow at a very high rate in total world exports. Various oilseed cakes and meals exports of India have presented two differing scenarios in terms of their share in Asia and in the world trade. While on one hand India's share in Asia has fallen in due course of time for various oilseed cakes and meals exports, a positive and significant rate of growth, on the other hand, was noticed when India's share for various oilseed cakes and meals export was reckoned in the world trade over the past 15 years. Other commodities of India which showed their share in total Asian export trade to decline inspite of significant increase in their exports over time were cotton lint and coffee.

(k) The present study envisages a more rapid growth in India's share in the world than India's share in Asia for the exports of commodities like rice and pulses among foodgrains, onions, soyabean and rapeseed cakes among various oilseed cakes and meals, sesame seeds and castor oil.

(l) Another, important feature that emerged from the overall analysis has been a steady decline in Unit value of exports for almost all the selected agricultural commodities over the past 15 years. Notable exceptions to this trend were cereals in general and rice and pulses in particular among foodgrains, onions, apples and grapes among fruits and vegetables, soyabean cake and overall oilseed cakes and meals, which showed either a persistent rise in their unit value of exports or showed a considerable fluctuation in the same over the past 15 years.

(m) During 1979-93 period, all the selected commodities showed much higher instability in their export growth than in their production growth with coffee being the only exception in this scenario which showed higher overall instability in its production growth than in export growth. As for coffee, a similar trend was also noticed when India's share in Asia and in the world was reckoned for production and export growth. In the case of coffee, it is to be noted here that the rate of annual growth was much higher in exports than in production during

1979-93.

Notably, there has been tremendous change in the structure of agricultural production and exports of India during the past decade and a half. At the time when traditional commodities of India such as cotton lint, jute, tea, coffee and tobacco have shown rather slow growth in their exports and, in fact, appeared to have lost their momentum in the international trade, non-traditional commodities such as horticultural products in particular and oilseed cakes and meals in general and also certain other commodities like wheat and pulses among foodgrains and sesame seeds and castor oil among oilseeds have grown in importance and have shown very high growth in their export trade as compared to trade in other agricultural commodities. At the same time, there is also no denying the fact that India's share in Asia and particularly in the total global exports for various horticultural commodities is still meagre. Despite the fact that various fruits and vegetables and floriculture products have recorded dynamic growth rates in their exports, India's share in the world for most of these horticultural product exports has fallen with the course of time. The growth in global exports in horticultural commodities seems to be much faster than growth in the same for India. This unseemly trend is a pointer to the fact that India lags far behind many countries in the world in the export trade of these high value crops. In order to effectively compete in the rapidly expanding international export market, India has a lot of catching up to do. Further, though the share of India in the world agricultural export trade has been showing a falling trend, it is, nevertheless, hoped that the country's share will eventually improve in the near future as a result of the GATT negotiations and also because of several trade policy measures adopted by the Government which aims at giving a real boost to agricultural exports in general and to horticulture, in particular.

CHAPTER V

Future Prospects For Agricultural Exports of India With Special Reference to Non-Traditional Crops

What future prospects of export of agricultural commodities India holds is one of the crucial questions that merits attention and fuller discussion. The past trends show that the country has achieved considerable growth in exports in a number of agricultural commodities, specially in the post economic liberalisation period, but the estimates also show that such growth trends are not devoid of wide fluctuations which puts a shadow of doubt about its future potential. Besides, many of the traditional exports of Indian agriculture, viz., tea, jute etc. have been losing ground to other competitors in the recent period.

One of the reasons for lackadaisical performance of the agricultural exports of India is that there has been no long term stable export policy for agriculture. Agricultural trade flows have been perceived as a residual with the exception of tea, coffee, tobacco and spices. For exportables, the difference between estimated domestic production and estimated domestic consumption has determined the surplus available for exports, i.e., trade flows have been residual in ex ante sense. Since a large proportion of agricultural exports, whether intermediate goods or consumer goods, enter into domestic consumption, the volume of exports can influence domestic price significantly. This concern has more often than not guided India's trade policy in agricultural commodities in the past (Nayyar and Sen, 1994).

5.1 Export Potentiality of India

As for agricultural commodities, there are two important aspects which would largely determine India's potentiality to export in the future. The most important aspect on which future export potentiality of India would depend can be traced in the domestic requirement of various agricultural commodities and their expected production levels in the future. In case India generates sufficient production surpluses of specific commodities after meeting the domestic demand, the residual could be made available for exports provided international prices remain favourable. The future growth in exports for India will also depend on production deficit realised in various developed and developing nations of the world. In fact, production deficit of other countries would act as engine of export growth for India. Nevertheless, how best India can meet the challenges arising out of growing requirements of other countries due to deficit in their production levels would depend on India's export capabilities and available surpluses for exports. In order to assess India's export capabilities, it is worthwhile to first examine what would be the future scenario of domestic requirement of various food items in India.

5.2 Estimates of Domestic Demand for Foodgrains in 2000

Several agencies and research workers have reported various estimates for India's domestic demand¹ for foodgrains for the year 2000. These demand estimates are brought out in Table 5.1(a). It could be readily discerned that there are large variations in demand projections for foodgrains reported by various studies. The demand estimates differ because of differences in factors taken into consideration by a particular research worker while estimating future demand. The total domestic demand for foodgrains for the year 2000 comes out in the range of 220 to 240 million tonnes if we take into account the estimates provided by Planning Commission (1985), Radhakrishna and Ravi (1990), Sarma and Gandhi (1990) and IFPRI (1990). On the other side of the spectrum, the domestic demand estimates for foodgrains reported by Bansil (1996), Praduman Kumar (1996), IARI-IFPRI study and Rosegrant et al (1996) are on the much lower side and range from 200 to 215 million tonnes. In the past National Commission on Agriculture (NCA), 1976 and World Bank (1981) also attempted to estimate foodgrain requirements of India in the year 2000. As per NCA estimates, the domestic demand for foodgrains in the year 2000 is likely to vary between 205 and 225 million tonnes. On the contrary, World Bank reported a much lower figure for the total foodgrain requirement of India and revealed it not to exceed more than 205 million tonnes in the year 2000.

As for demand estimates for foodgrains, Kumar and Mathur (1996) argued that the estimates provided by most of the earlier studies were either overestimates or underestimates. According to them, the demand projections for 2000 reported by Radhakrishna and Ravi (1990) were overestimates because of the use of high expenditure elasticities while estimating demand. The estimates provided by Sarma and Gandhi (1990) were also considered to be on the higher side due mainly to double counting of wasted grains used for livestock feeding. On the other hand, demand estimates reported by Bansil (1996) were viewed on the much lower side since his study failed to take into account the regional variation in consumption pattern and the changes that are likely to take place in the distribution of income. Kumar and Mathur (1996), while justifying their own estimates, revealed that foodgrain demand projections reported by them were more realistic since their study not only considered regional variations in consumption pattern but had also taken into account variations in income distribution apart from taking into consideration the energy requirements and likelihood of changes in consumers' taste and preferences for various variety of food items.

A breakup of demand projections for the year 2000 reported by various research studies in more recent times for various foodgrains is brought out in Table 5.1(b). The demand estimates reported by Mark W. Rosegrant and others appear to be on the higher side for rice and on the much lower side for wheat

1 Domestic demand includes human demand plus demand for other allowances such as seed, feed for livestock, wastage etc.

Table 5.1(a): Comparison of Studies for Demand Projections
for Foodgrain in 2000

Studies	(in million tonnes)	
	Domestic Demand	
National Commission on Agriculture, 1976	205-225	
World Bank, 1981	191-205	
IFPRI Study, 1984	210	
Planning Commission, 1985	240	
Radhakrishna and Ravi, 1990	234	
Sarma and Gandhi, 1990	220	
IFPRI, 1990	227	
P.C.Bansil, 1996	198	
Praduman Kumar, 1996	209	
IARI-IFPRI Study	205	
Mork W Rosegrant et al., 1996	215	

Source: Kumar, Praduman and V.C.Mathur (1996) : Agriculture in Future : Demand-Supply Perspective for the Ninth Five Year Plan, Economic and Political Weekly, 31(39), A-132.

Table 5.1(b): Demand Projections for Various Foodgrains for
the Year 2000

Commodities	(in million tonnes)			
	Demand			
	a	b	c	d
Rice	88.4	82.0	93.0	88.2
Wheat	63.4	75.0	60.1	71.1
Cereals	183.6	-	197.0	191.6
Pulses	21.7	16.5	17.8	17.8
Foodgrains	205.3*	219.7	214.8	209.4

Notes: a) Demand estimates provided by Radhakrishna and Ravi, 1990,
b) Demand estimates provided by Sarma and Gandhi, IFPRI Study, 1990
c) Demand estimates provided by Mark W Rosegrant et al, 1996 IFPRI 2020 vision study
d) Demand estimates provided by Kumar and Mathur, IARI-IFPRI Study, 1996
* refers to human demand only.

compared to the estimates reported by Sarma and Gandhi as well as Kumar and Mathur. If we take into account foodgrain demand projections reported by Radhakrishna and Ravi, we notice that human demand for foodgrains alone is likely to be about 205 million tonnes which constitute about 88 per cent of the total domestic demand for foodgrains for the year 2000. As for pulses, while the domestic demand projections for the year 2000 reported

by Sarma and Gandhi, Rosegrant and others, and Kumar and Mathur are seen to move very close to each other and hover at around 16-17 million tonnes, the projections reported by Radhakrishna and Ravi, on the other hand, turns out to be much higher and stand at 22 million tonnes for human demand alone. However, the demand estimates provided by these research workers clearly show that the total domestic foodgrain requirement of the country in the year 2000 will be within the range of 210-220 million tonnes with 82-93 million tonnes demand for rice, 60-75 million tonnes demand for wheat and 16-17 million tonnes demand for pulses.

5.3 Demand for Agricultural Commodities in 2001 and 2006

Kumar and Mathur (1996) have also reported domestic demand projections for various agricultural commodities of India for the year 2001 and 2006. Their demand projections are based on certain assumptions like a 5 per cent per annum growth in income, a drop in population growth from 1.91 per cent to 1.8 per cent between 1995-2000 and 2000-2010, rate of urbanisation consistent with the historical trends in per capita consumption pattern as noticed in the NSS data and inequality in the distribution of expenditure across income groups. As per their estimates, the total domestic demand for foodgrains will be to the tune of 212 million tonnes in the year 2001 with a breakup of 90 million tonnes of rice, 72 million tonnes of wheat, 32 million tonnes of coarse cereals and 18 million tonnes of pulses (Table 5.1(c)).

Table 5.1(c): Domestic Demand of Various Agricultural Commodities in India for the Year 2001 and 2006

(in million tonnes)

Commodities	Domestic Demand		Percent Increase
	2001	2006	
Rice	89.8	98.8	10.0
Wheat	72.5	80.7	11.3
Cereals	193.9	213.1	9.9
Pulses	18.2	21.0	15.4
Foodgrains	212.3	234.5	10.5
Fruits	52.6	69.1	31.4
Vegetables	91.7	108.5	18.3
Cotton	2.4	2.9	20.8

Source : Kumar, Praduman and V.C.Mathur (1996) : Agriculture in Future : Demand-Supply Perspective for the Ninth Five-Year Plan, Economic and Political Weekly, 31(39), A-133.

During 2001-2006 period, the domestic demand is expected to grow at the rate of 2.11 per cent a year for rice, 2.2 per cent a year for wheat, 1.21 per cent a year for coarse cereals and 2.96 per cent a year for pulses. These rates of growth will lead to an increase in domestic demand for foodgrains to 235 million tonnes by the year 2006 with a breakup of about 99 million tonnes of rice, 81 million tonnes of wheat, 34 million tonnes of coarse

cereals and 21 million tonnes of pulses. Thus, the domestic demand for foodgrains will record an increase of 10.5 per cent between 2001 and 2006 with 9.9 per cent rise in demand for cereals and 15.4 per cent rise in demand for pulses. As for horticultural commodities, while the domestic demand for various fruits will expand from about 53 million tonnes in 2001 to 69 million tonnes in 2006 with an annual compound growth rate of 5.4 per cent, the rise in demand for vegetables will be from 92 million tonnes to 109 million tonnes with an annual rate of growth of 3.5 per cent during the same period. Thus, between 2001 and 2006, total increase in domestic demand will be about 31 per cent for fruits and 18 per cent for vegetables. The domestic demand for cotton is placed at 2.4 million tonnes for the year 2001 and 2.9 million tonnes for 2006. Hence, there will be about 20 per cent rise in domestic demand for cotton in India during 2001-2006 period with annual rate of growth of 3.6 per cent during this period.

5.4 Supply Projections for the Year 2001 and 2006

Demand projections reported by Kumar and Mathur for the year 2001 and 2006 for various agricultural commodities appear to be a formidable challenge to be met since year-to-year fluctuations in agricultural and foodgrain production are reported to be very wide. Recent trends in foodgrains production of India have further raised many queries about our ability to meet the target. The fact that annual compound growth of foodgrains production for the period between 1990/91 and 1996/97 was only 1.7 per cent which was even lower than the annual population growth of 1.9 per cent witnessed during the nineties makes the matter even worse (according to Economic Survey, 1996-97). However, there is no denying the fact that India has enormous potential in her agricultural sector which if tapped in desired manner and direction will surely lead to not only mere fulfillment of our domestic requirements but also generation of exportable surpluses. Though it is well nigh difficult to predict how much India will produce in the future, the production trend over the past decade and a half if extended further to future years nevertheless gives a clear indication that India will be in a position to sustain its population apart from generating surpluses for exports of some of the specific agricultural commodities. We have, therefore, tried to analyse how India's production of various agricultural commodities will look like in the future if past performance of India is taken into account. Towards this end, supply of agricultural commodities is examined for the year 2001 and 2006 under eight different alternative production scenarios depending upon rates of growth in production during different periods of the past. These supply scenarios for various agricultural commodities are brought out in Table 5.2.

Let us first consider scenario I that provides supply projections of various agricultural commodities for the year 2001 and 2006 based on the rates of growth in production during the period between 1979 and 1993 and upon the triennium annual average quantity produced during the terminal years (1991-1993) of the overall period considered. The total supply of foodgrains in

Table 5.2: Production Projections for Various Agricultural Commodities in India for the Year 2001 and 2006 (in million tonnes)

Scenario/Item	Year	Rice	Wheat	Cereals	Pulses	Food-grains	Cotton
Scenario I	2001	102.1	77.6	210.7	15.0	225.4	2.6
	2006	123.4	93.8	246.5	16.4	262.4	3.1
Scenario II	2001	108.9	82.2	221.7	16.1	237.5	2.5
	2006	131.7	99.4	259.3	17.6	276.4	3.1
Scenario III	2001	98.1	75.2	212.8	13.9	226.2	3.2
	2006	116.2	89.2	250.5	14.6	263.9	4.4
Scenario IV	2001	84.4	63.6	183.8	13.6	197.2	2.4
	2006	99.7	75.4	216.3	14.3	230.1	3.3
Scenario V	2001	101.3	76.1	207.9	14.5	222.1	2.6
	2006	121.8	91.0	241.2	15.5	256.0	3.1
Scenario VI	2001	104.3	77.3	211.2	15.1	226.0	2.4
	2006	125.4	92.4	245.1	16.2	260.6	3.0
Scenario VII	2001	103.2	76.7	218.5	14.6	232.7	3.4
	2006	125.5	92.1	261.5	15.8	276.3	4.8
Scenario VIII	2001	84.2	62.2	181.2	13.8	195.0	2.3
	2006	102.4	74.8	216.9	14.9	231.5	3.3

Notes:

- Scenario I - Projections are based on applying annual CGR estimates for the period 1979-1993 on annual average quantity produced during 1991-1993.
- Scenario II - Projections are based on applying annual CGR estimates for the period 1979-1993 on annual average quantity produced during 1979-1993.
- Scenario III - Projections are based on applying annual CGR estimates for the period 1985-1993 on annual average quantity produced during 1991-1993.
- Scenario IV - Projections are based on applying annual CGR estimates for the period 1985-1993 on annual average quantity produced during 1985-1993.
- Scenario V - Projections are based on applying triennium moving annual average CGR for the period 1979-1993 on triennium annual average quantity produced during 1991-1993.
- Scenario VI - Projections are based on applying triennium moving annual average CGR for the period 1979-1993 on triennium annual average quantity produced during 1979-1993.
- Scenario VII - Projections are based on applying triennium moving annual average CGR for the period 1985-1993 on triennium annual average quantity produced during 1991-1993.
- Scenario VIII - Projections are based on applying triennium moving annual average CGR for the period 1985-1993 on triennium annual average quantity produced during 1985-1993.

the year 2001 under Scenario I is estimated to be about 225 million tonnes with 210 million tonnes of cereals and 15 million tonnes of pulses as against total domestic demand for foodgrains of 212 million tonnes with 194 million tonnes of cereals and 18 million tonnes of pulses (Table 5.2 and 5.1(c)). At the prevailing growth in production during 1979-93 period, the total supply of foodgrains is expected to rise to 262 million tonnes in the year 2006 with 246 million tonnes of cereals and 16 million tonnes of pulses. As against this, the total domestic requirement of foodgrains in the year 2006 is estimated to be much lower than the expected supply and will stand at about 234 million tonnes for the total foodgrains with a breakup of 213 million tonnes of cereals and 21 million tonnes of pulses. Thus, so far as cereals among foodgrains are concerned, the estimates of surplus production turns out to be around 16 million tonnes by the year 2001 and 33 million tonnes in 2006 after meeting domestic consumption needs. However, the supply of pulses is estimated to fall short of demand and a deficit of about 3 million tonnes is expected to be witnessed in the year 2001 and of 5 million tonnes in 2006. The task of attaining self-sufficiency in pulses production seems to be pretty difficult. Nevertheless, inspite of deficit in estimated pulses production, India is likely to generate about 13 million tonnes of exportable surplus of foodgrains by the year 2001 and about 28 million tonnes in 2006 if supply Scenario I is taken into consideration. Among cereals the exportable surplus of rice is likely to be much higher than wheat. India is expected to generate exportable surplus of rice to the tune of 12 million tonnes in 2001 and 25 million tonnes in 2006 as against total generated exportable surplus of wheat at 5 million tonnes in 2001 and 13 million tonnes in 2006. As for cotton, under Scenario I the total domestic supply is estimated to be 2.6 million tonnes in 2001 and 3.1 million tonnes in 2006 as against estimated domestic demand for the same at 2.4 million tonnes in 2001 and 2.9 million tonnes in 2006. Thus, India can aim to export 0.20 million tonnes cotton both in 2001 and 2006.

Annual average rates of growth in production during 1979-93 period were applied on annual average quantity produced during the same period in order to obtain projected supplies for the year 2001 and 2006 under Scenario II. The supply projection estimates provided under Scenario II appear to be unrealistic as they are on the much higher side and it is difficult to visualise, based on past experience, that India could achieve the same. On the other hand, Scenario IV provides supply projection estimates based on annual average rate of growth in production during 1985-93 period. These supply estimates are on the much lower side compared to estimates provided under Scenario I and II. As a matter of fact, supply projections estimated under Scenario IV are likely to fall short of the total domestic demand estimates for the year 2001 and 2006 reported by Kumar and Mathur (1996). The fact that the total foodgrain production of India during 1995-96 itself was 185.0 million tonnes amply gives an indication that even the estimates presented under Scenario IV may not be unrealistic. Nonetheless the supply estimates provided under Scenario III can be considered more realistic as they

are more close to the supply estimates of Scenario I and also fall close to the domestic demand estimates presented in Table 4.19(c). The estimation of supply projection for the year 2001 and 2006 under Scenario III is attempted on the basis of annual rates of growth in production during 1985-93 period and taking into account average production during 1991-93 period.

Sometimes the resultant annual growth estimates over the given period of time are erroneous mainly because of very wide year-to-year fluctuations in output growth. If the growth estimates are erratic they will obviously lead to unreliable and unrealistic estimation of future supply projections since future supply estimates are dependent on these growth rates. In order to avoid this to happen we have estimated growth rates on triennium annual moving average production during different periods and then proceeded for the estimation of future supply projections. This exercise appeared to have reduced fluctuations in output growth. The supply projections estimated under Scenario V, VI, VII and VIII are based on rates of growth in triennium annual moving average in production during different periods.

It can be readily discerned from Table 5.2 that the supply estimates provided under Scenario V are very close to domestic demand estimates presented in Table 5.1(c) for various agricultural commodities, particularly for the year 2001, though for the year 2006 the supply projections are on the much higher side than demand projections. Projected supplies under Scenario V are based on rates of growth in triennium annual moving average production during 1979-93 and on the annual average production during 1991-93 period. Supply Scenario VI, on the other hand, is obtained by applying triennium moving annual average rates of growth in production during the period 1979-93 on triennium annual average quantity produced during the same period, i.e., 1979-1993. It is interesting to note that supply Scenario VI resembles supply Scenario III. Like Scenario II, the supply Scenario VII provides us with very high estimates of projected supplies both for the year 2001 and 2006 and, therefore, could be considered unrealistic. Contrary to very high supply projections witnessed under Scenario VII, supply projections under Scenario VIII are on the lower side and even fall much below the domestic demand estimates. The estimation of supply projections under Scenario VII is attempted taking into account rates of growth in triennium annual moving average in production during 1985-93 period and then these rates of growth are applied to annual average quantity produced during 1991-93 period to arrive at projected supplies for the year 2001 and 2006. On the other hand, in the case of Scenario VIII, the rates of growth in triennium annual moving average in production during 1985-93 period are applied to annual average quantity produced during 1985-93 period to arrive at projected supplies for the year 2001 and 2006.

Thus, so far as future projected supplies of various agricultural commodities are concerned, only Scenarios I, III, V and VI could be considered more close to reality as projected supplies in these cases are very close to demand estimates. And, among these supply scenarios, scenario V appears to be the most

realistic one since in this case supply projections are based on estimates of rates of growth in production during the period 1979-93 which duly takes into account fluctuations in output growth.

If supply Scenario V is considered that appears to be the most realistic one it can be noticed that the total expected supply of foodgrains in India will be 222 million tonnes in the year 2001 with a breakup of 208 million tonnes supply of cereals and 14 million tonnes supply of pulses. As against this, in the year 2001, the total domestic demand for foodgrains is estimated to be 212 million tonnes with 194 million tonnes demand for cereals and 18 million tonnes demand for pulses. Thus, while cereals are estimated to generate a surplus to the tune of 14 million tonnes by the year 2001, a deficit of 4 million tonnes is estimated to be seen in the case of pulses during this year. As a result of rise in human population and other expected changes, both demand and supply are expected to expand further so much so that in 2006 the total expected supply of foodgrains will reach 256 million tonnes as against domestic demand for the same of 235 million tonnes. The expected supply of cereals will be 241 million tonnes in the year 2006 in the face of estimated domestic demand at 213 million tonnes during this year. Thus, the estimated surplus of 28 million tonnes of cereals are expected to be available for exports in 2006. However, supply of pulses are again estimated to fall short of demand and a deficit of 5.5 million tonnes are expected to be noticed in the year 2006. Among cereals, the total exportable surplus of rice is estimated to be 11.5 million tonnes in 2001 and 23 million tonnes in 2006 as against estimated exportable surplus for wheat at 3.6 million tonnes by the year 2001 and 10.3 million tonnes in 2006.

Rosegrant and others (1995) conducted a study on food projections for various regions of the world under IFPRI's 2020 vision study which was based on the International Model for Policy Analysis of Agricultural Commodity and Trade (IMPACT). As per their estimates, some of the regions and countries of the world like South Asia, China, South-east Asia, West Asia and North Africa and Sub Saharan Africa put together will face a deficit in wheat production to the tune of 63.7 million tonnes in the year 2001 and 71.5 million tonnes in 2006 (Table 5.3). Since India is likely to generate exportable surplus of wheat to the tune of 3.6 million tonnes in 2001 and 10.3 million tonnes in 2006, it can attempt capture about 5.6 per cent of this potential wheat export market in 2001 and of the order of 14.4 per cent in 2006. Similarly, a deficit in rice production is also expected in various regions of the world like Sub Saharan Africa, West Asia, North Africa and Former Soviet Union. The deficit in rice production in these regions put together will be 8.4 million tonnes in 2001 and 9.4 million tonnes in 2006. India alone can bridge the deficit emanating in these regions of the world with its available exportable surplus of rice and can also save some of the surplus of this commodity to meet the demand of other parts of the world. However, these observations will hold good only if India's domestic demand scenario falls in line with the estimates reported by Kumar and Mathur (1996) and supply position, on the other hand, matches Scenario V presented in

Table 5.2.

Table 5.3: Production Deficit for Various Regions of the World for 2001 and 2006

Commodity	Regions	(Million tonnes)	
		2001	2006
Wheat	South Asia	6.6	8.9
	China	18.3	20.0
	South-East Asia	6.2	6.9
	West Asia and North Africa	31.6	33.8
	Total	63.7	71.5
Rice	Former Soviet Union	0.5	0.8
	Sub-Saharan Africa	3.9	4.5
	West Asia and North Africa	3.8	4.1
	Total	8.4	9.4

Source : Mark W Rosegrant, et al (1995).

5.5 Required Rates of Growth² to meet Demand and Supply

During 1979-93 period, triennium moving average rate of growth in foodgrain production of India was 2.89 per cent per annum with 3.02 per cent per annum rate of growth in cereal production and 1.44 per cent per annum growth in pulses production (Table 5.4). Among cereals, the rate of growth for wheat and rice production was 3.02 per cent per annum and 3.64 per cent per annum, respectively, during the same period. At these rates of growth and depending upon annual average quantity produced during 1991-93 period, we can come across supply projection Scenario V. However, given the fact that India's total foodgrain production stood at 165.0 million tonnes (provisional) during 1995/96, which encompassed production of 62.6 million tonnes of wheat, 79.6 million tonnes of rice and 29.6 million tonnes of coarse cereals with a total of 171.8 million tonnes of cereals as a whole and another 13.2 million tonnes of pulses, amply gives us an indication that in order to achieve future supply projections under Scenario V presented in Table 5.2 India's total foodgrain production should henceforth accelerate from 2.89 per cent per annum to 3.09 per cent per annum to reach the supply projection level of 221 million tonnes for 2001 and to 3.00 per cent per annum to reach the projection level of 256 million

2 The estimated rate of growth is calculated using the formula $r = [(X_t/X_0)^{1/n} - 1] \times 100$ where r = rate of growth, X_t = Supply of or Demand for Commodity for the year 2001 and 2006, X_0 = Supply of Commodity during 1995/96, n = number of years for projected growth.

tonnes for 2006. Similarly, the growth in total cereal production should henceforth accelerate from the level of 3.02 per cent per annum achieved during 1979-93 period to 3.23 per cent per annum to reach the supply target of 207.9 million tonnes for 2001 and to 3.19 per cent per annum to reach the target of 241.2 million tonnes for 2006. Among cereals, the accelerated rate of growth should henceforth be 3.31 per cent per annum instead of 3.02 per cent per annum for wheat and 4.10 per cent per annum instead of 3.64 per cent per annum for rice in order to reach the supply projection targets of 76.1 and 101.3 million tonnes for wheat and rice respectively for 2001; and the rate of growth should be 3.46 per cent per annum for wheat and 3.94 per cent per annum for rice if the supply projection targets of 91 million tonnes and 121.8 million tonnes respectively are to be achieved for 2006. In the case of pulses, the rate of growth should accelerate from 1.44 per cent per annum witnessed during 1979-93 period to 1.58 per cent per annum to reach supply projection level of 14.5 million tonnes for 2001 and to 1.47 per cent per annum to reach supply projection level of 15.5 million tonnes for the year 2006.

On the other end of the spectrum, the domestic demand for India that includes human demand, demand for livestock feed, etc., warrants much lower rate of growth in production for cereals and a very high growth rate for pulses production. In order to meet projected demand targets as outlined in Table 5.1(c), the expected rate of growth turns out to be 2.48 per cent per annum and 2.34 per cent per annum for wheat, 2.03 per cent per annum and 1.98 per cent per annum for rice, 2.04 per cent per annum and 1.98 per cent per annum for total cereals and 5.50 per cent per annum and 5.31 per cent per annum for total pulses and thus giving an average expected rate of growth for foodgrains as a whole at 2.32 per cent per annum and 2.18 per cent per annum for the year 2001 and 2006, respectively.

The total production of cotton in India stood at 2.23 million tonnes during 1995-96. Since the total expected supply of cotton is placed at 2.6 million tonnes for the year 2001 and 3.1 million tonnes for the year 2006, the growth in cotton production should henceforth be 2.59 per cent a year to achieve the supply target for 2001 and 3.04 per cent a year to reach the supply level in 2006. Thus the required rate of growth for cotton production is much lower than the existing rate of growth noticed during 1979-93 period (Table 5.4). Nevertheless, in order to achieve domestic demand target for the year 2001 and 2006, the expected rate of growth should be only 1.23 per cent per year per annum and 2.43 per cent per annum, respectively, which appear to be even lower than the rate of growth required to meet the supply targets.

The foregoing analysis is a pointer to the fact that while various cereals among foodgrains are likely to generate enough exportable surpluses in the year 2001 and 2006, the same would not be the case with pulses during these years. Even to meet domestic consumption needs a rate of growth of 5.50 per cent per annum and 4.31 per cent per annum is warranted to reach the demand targets for pulses in the year 2001 and 2006. Despite the fact that pulses are a major source of protein for a large

section of the vegetarian population of India, there has been sluggish growth in their production. Although Government has now brought pulses under Technology Mission approach with special emphasis on popularisation of cultivation of improved varieties with a package of practices through frontline demonstration, the production prospects nevertheless are expected to take time to improve.

Table 5.4 : Compound Growth Rates of Agricultural Production in India During Different Time Periods (Per cent/Annum)

Commodity	1979-93	1985-93	Triennium Moving Average	
			1979-93	1985-93
Cereals	3.19***	3.31***	3.02***	3.66***
a) Wheat	3.88***	3.48***	3.64***	3.73***
b) Rice	3.86***	3.38***	3.75***	4.00***
Pulses	1.87***	0.98	1.44***	1.55**
Foodgrains	3.08***	3.13***	2.89***	3.49***
Cotton Lint	3.71***	6.51***	3.79***	7.23***
Potatoes	4.60***	4.55***	4.94***	5.02***
Onions	6.08***	4.37***	5.62***	4.36***
Oranges	5.13***	5.68***	5.60**	6.18***
Bananas	4.30***	6.15***	4.51***	7.56***
Apples	3.05***	3.59***	2.46***	4.75***
Grapes	9.36***	16.47***	9.04***	18.78***

Note: *** and ** represent significance at 1 and 5% level of probability, respectively.

5.6 Demand-Supply Perspective for Fruits and Vegetables

With the passage of time horticultural production of India has undergone remarkable change due mainly to significant shift in consumption pattern and as a result of other associated factors like changes in export-import policies, especially in the post liberalization period, and exchange rate adjustment. As a matter of fact until the Fourth plan period horticultural crops did not receive any significant attention. This is evident from the fact that the budgetary allocation for horticultural crops stood at a meagre Rs. 5 lakh in the Fourth Plan. A breakthrough was achieved in horticultural development in the Seventh Plan when the allocation for horticultural development activities went up to Rs. 24 crores from 7.6 crore in the Fifth Plan. Nevertheless development of horticulture was considered as a major thrust area only in the Eighth Five Year Plan when total plan allocation for horticultural development was stepped upto Rs. 1000 crore that accounted for an increase of a whopping 4000 per cent over the Seventh Plan. The Eighth plan, therefore, can be considered as a major milestone in the growth of horticulture in the country. Such increased allocation in plan outlay is a reflection of the importance of horticultural sector in Government's overall policy encompassing country's agricultural economy.

Among various horticultural commodities produced in India, fruits and vegetables in particular have shown tremendous growth in their production in more recent times. During 1979-94 period, while fruit production of India expanded at an annual compound growth rate of 4.78 per cent, the growth in vegetable production was 3.56 per cent a year during the same period (Table 5.5). The rate of growth was found to be slightly lower for fruit production and higher for vegetable production between 1984 and 1994 compared to the overall period between 1979 and 1994. The past six years have witnessed a much higher rate of growth in vegetable production compared to fruit production. In fact, there has been considerable deceleration in the rising trend of fruit production. This is evident from lower rate of growth in fruit production during 1989-94 period compared to 1984-94 period and 1979-94 period (Table 5.5). In contrast to this, vegetable production has shown a much higher rate of growth during 1989-94 period compared to 1984-94 period and period between 1979 and 1994. Between 1989 and 1994, while fruit production grew at the rate of 4.18 per cent a year, the growth in vegetable production was 6.09 per cent a year. In case vegetable production of India continues to grow at this rate, it is quite possible for India to generate enough surpluses of these high value crops for exports in the near future since the required rate of growth in production to meet the domestic demand for the year 2001 and 2006 are on much lower side compared to the existing rate of growth in production. However, in the case of fruit, the supply may fall short of the domestic demand. This stems from the fact that the required rate of growth in fruit production to meet the domestic demand for the year 2001 and 2006 is much higher than the existing rate of growth in production. In order to meet the domestic demand the required rate of growth in production comes out to be of the order of 6.78 per cent a year for fruit and 5.0 per cent a year for vegetable production between the period 1994 and 2001. On the other hand, the required rate of growth to meet domestic demand falls from 6.78 per cent a year to 6.29 per cent a year for fruit production and from 5.01 per cent a year to 4.24 per cent a year for vegetable production if the period between 1994 and 2006 is taken into consideration for such an exercise (Table 5.5).

At the prevailing rate of growth in production during the period 1989-94 and depending upon the annual average quantity produced during 1992-94 period, the total projected supply (Scenario III) will be 43.01 million tonnes of fruits and 97.38 million tonnes of vegetables in the year 2001 and 52.79 million tonnes of fruits and 130.88 million tonnes of vegetables in the year 2006 (Table 5.5). This implies that India will be able to generate exportable surplus of vegetables to the tune of 5.60 million tonnes by the year 2001 and 22.38 million tonnes in 2006. Nevertheless, fruit production will fall short of domestic demand and a shortfall in its production as compared to demand (domestic) in the range of 10 to 15 million tonnes will be witnessed between 2001 and 2006. In the case of Scenarios I and II, not only fruit but the projected supplies of vegetables too are likely to fall short of the domestic demand for the year 2001 and

Table 5.5: Production and Demand for Fruits and Vegetables in India

(Production/Demand/Supply in million tonnes)

	Fruits	Vegetables
<u>Production</u> [@]		
1979	17.52	38.92
1984	19.45	44.20
1989	27.33	50.30
1990	27.84	51.00
1991	29.36	57.76
1992	31.19	64.21
1993	32.45	63.80
1994	33.24	65.14
 Compound Rates of Growth of Production Between		
a) 1979 and 1994	4.78	3.56
b) 1984 and 1994	4.65	4.05
c) 1989 and 1994	4.18	6.09
 <u>Domestic Demand</u> [§]		
a) 2001	52.60	91.70
b) 2006	69.10	108.50
 Required Rate of Growth in Production to meet Domestic Demand		
Between a) 1994-2001	6.78	5.01
b) 1994-2006	6.29	4.34
 <u>Supply Scenario I</u>		
a) 2001	44.78	82.24
b) 2006	56.55	97.96
 <u>Supply Scenario II</u>		
a) 2001	44.39	85.01
b) 2006	55.72	103.67
 <u>Supply Scenario III</u>		
a) 2001	43.01	97.38
b) 2006	52.79	130.88

Source : @ FAO Production Yearbook, various years

§ Praduman Kumar and V.C.Mathur (1996)

Scenario I : Supply projections are based on applying rate of growth in production between 1979 and 1994 on annual average quantity produced during 1992-94 period.

Scenario II : Supply projections are based on applying rate of growth in production between 1984 and 1994 on annual average quantity produced during 1992-94 period.

Scenario III: Supply projections are based on applying rate of growth in production between 1989 and 1994 on annual average quantity produced during 1992-94 period.

2006. Projected supplies under Scenario I are based on the trend rate of growth in production during the period between 1979 and 1994 and the total annual average quantity produced during 1992-94 period. On the other hand, if trend rate of growth in production between 1984-94 period are applied on average annual quantity produced during 1992-94 period, we can come across the projected supply Scenario II. Projected, supply Scenario I reveals a deficit in fruit production to the tune of 7.82 million tonnes in 2001 and 12.55 million tonnes in 2006. Similarly, under Scenario I, a deficit to the tune of 9.46 million tonnes in 2001 and 10.54 million tonnes in 2006 will be noticed for vegetable production. As for Scenario II, the total deficit in production will be 8.21 million tonnes in 2001 and 13.38 million tonnes in 2006 for fruit production and 6.69 million tonnes in 2001 and 4.93 million tonnes in 2006 for vegetable production.

Thus, it is noticed that it is only in the case of Scenario III that India can generate exportable surpluses and that too only for vegetables. If India has to develop its competitive strength in the world market, production of these high value crops should keep pace with the rise in domestic consumption needs, apart from generating significant quantities for exports. Real concerted efforts, therefore, are required to be launched for significant increases in production levels of these high value commodities.

Our estimates for the future projected supplies under Scenario III can be considered overestimates for vegetables and underestimates for fruits in the light of the fact that these are based on production performance of India mainly during the period between 1989 and 1994. And, therefore, real scenario may be considered little removed from the projected scenario. However, the current pace in the rate of growth in vegetable production in India gives clear indication of rise in exportable surpluses of these high value crops in the near future. But, how much exportable surplus will be generated will largely depend on India's ability to tap her potential in horticultural production front.

It has been widely argued that it is the deficit in production or rise in import demand in various regions of the world that will act as the main driving force for the expansion of horticultural production in India. However, the crucial question which could strike one is what will be the extent of deficit in production of these high value crops in various parts of the world and at what rate the import demand in these regions will grow in the future. According to the estimates reported by Nurul Islam (1990), the world import demand will grow at the rate of 3.1 per cent a year for fruits and 3.9 per cent a year for vegetables during 1984-2000 period. The import demand of Japan for various fruits and vegetables is projected to grow at a noticeable rate. The rate of growth in import demand for Japan will be 5.19 per cent a year for fruits and 9.41 per cent a year for vegetables during the same period. Japan, therefore, can serve as a potential export market for India, especially for fruits and vegetables. Further, there will be 4-5 per cent annual growth in import demand for the developing nation's as a whole for both fruits and vegetables. As against this, developed

nations' import demand will grow at the rate of 2.82 per cent a year for fruits and 3.85 per cent a year for vegetables. This indicates that the rate of growth in import demand for developing nations will be faster than developed nations. Islam further points out that the quantum of projected import demand will exceed export supplies by the year 2000³. This will lead to rise in export prices, especially for fruits. Production deficit of other countries and regions and a likelihood of rise in export prices of these high value crops may serve as a catalyst for the significant expansion in the production of horticultural commodities in India.

Notwithstanding the above scenario of exportable surplus of cereals (specially rice and wheat) and horticultural crops (especially vegetables) that is visualised (estimated/expected) to emerge by the turn of the century and thereafter, the crucial factor in the process of realisation of such export would be the international (world market) prices that are likely to prevail for the commodities in question in the period of projections. The multilateral trade negotiations in accordance with WTO, would inevitably change the structure of relative prices for agricultural commodities in the world market. It is necessary therefore to look into and examine the likely trends in world market prices and domestic prices.

5.7 Trends in the Domestic and World Market Prices

In order to assess movement of prices over time in the world and domestic markets, we have estimated rates of growth in price indices for various selected agricultural commodities over the period 1981 to 1993 with 1981-82 as the base period for such as exercise. In the case of world, indices were developed both in terms of unit price in US dollar per tonne and in rupees per quintal using the exchange rate conversion. The rates of growth in prices over the last 13 years in the domestic and world markets are brought out in Table 5.6.

Prices of the commodities enlisted in Table 5.6 are seen to have fluctuated widely over the past decade or so. While on the one hand world prices in dollar terms are estimated to have declined for majority of the selected commodities, a substantial growth in international prices, on the other hand, in rupee terms is only too evident. The reason for world prices showing substantial growth in rupee terms in the face of steep decline in dollar terms can be traced in the devaluation of rupee over time. The money value of Indian currency has depreciated considerably compared to dollar with the passage of time. As a result of this, the exchange rate of rupee per dollar has gone up sharply in due course of time.

3 According to Nurul Islam (1990), in the year 2000, the total projected import demand of various fruits and vegetables will be 95.48 million tonnes as against their projected export supplies of 85.76 million tonnes.

Table 5.6: Compound Growth Rates on Domestic and World Prices Indices for Various Selected Commodities (1981-1993)

Commodities	World Price Indices ^a (1981 = 100)		Domestic Price ^b Indices (1981-82=100)
	US \$ per ton	Rs. per quintal	
Rice	-0.88	9.68***	7.56***
Wheat	-1.20	9.33***	7.41***
Bananas	2.46***	13.38***	8.73***
Tea	-1.48	9.02***	9.38***
Coffee	-7.31***	2.56*	10.54***
Cotton	-1.58	8.90***	8.36***
Jute	-0.99	9.56***	6.71**
Tobacco	0.23	10.91***	9.11***

Sources: 1) World Market Prices (from 1981 to 1993) in US dollars per tonnes for the selected commodities are collected from UNCTAD Commodity Yearbook (various years), United Nations Publications, United Nations, New York and Geneva.

2) Indices of Wholesale Prices of Various Selected Commodities for 1982-88 period (1981-82 as base period) are collected from Chandhok, H.L. and the Policy Group (1990), India Database, The Economy, Annual Time Series Data, Volume I, pp. 378-380; and for the period 1989 to 1993 (1981-82 as base period) are collected from 'Index Numbers of Wholesale Prices in India' Monthly Bulletin (Various Years), Ministry of Industry, Government of India.

- Notes: a) a - Free Market prices are considered as world market prices.
b) b - Wholesale prices are considered as domestic prices.
c) Indices of World Market prices with 1981 as the base year were developed in terms of US dollars per tonne and in rupees per quintal using exchange rate conversion.
d) Rates of Growth are estimated on Indices of World and Domestic Prices.
e) ***, ** and * represent significance of growth rates at 1, 5 and 10 per cent level of probability, respectively.

In dollar terms, all the selected commodities have shown a decline in their world prices with banana and tobacco being the only aberration in this scenario. The world price of banana in dollar terms is estimated to have grown at the rate of 2.5 per cent a year between 1981 and 1993. The rate of growth in world price of tobacco in dollar terms is seen to be very low and insignificant, though found positive. On the average, commodities like rice, wheat, tea, cotton and jute showed 1-2 per cent annual

decline in their world prices in dollar terms during 1981-93 period. The decline in international price of coffee in dollar terms is seen to be too sharp. Its price in dollar terms is estimated to have declined at the rate of 7.3 per cent a year during the given period. On the other end of the spectrum, all the selected commodities showed 9-13 per cent annual rate of growth in their world prices in rupee terms during 1981-93 period with coffee being the only exception which showed only 2.6 per cent annual growth in its world price in rupee terms during the same period. As against world prices, the wholesale prices (domestic price) of various selected commodities in India have increased in the range of 6 to 10 per cent per annum during the given period under consideration. The rate of growth in world prices in rupee terms appears to be much higher than domestic prices for commodities like rice, wheat, banana, cotton, jute and tobacco. It is only in the case of tea and coffee that domestic prices are estimated to have grown higher than world prices in rupee terms. Higher growth in prices in domestic market is noticed even after adjusting the exchange rate through devaluation. Slower growth in the world prices of tea and coffee and higher increase in domestic prices is likely to adversely affect the prospects of exports of these commodities. It is argued by Bhalla (1995) that price increase fueled by indiscriminate periodic rise in administered prices and the high inflation in the Indian economy has considerably reduced the comparative advantage of many crops. However, as the estimates of compound rates of growth of prices during the period 1981-93 reveal, the future prospects of exports of majority of the commodities enlisted in Table 5.6 seems to be bright in view of rapid increase in prices in the world market compared to domestic market.

CHAPTER VI

SUMMARY AND CONCLUSIONS

6.1 Context

Agricultural production and trade of India have undergone dramatic transformation over the past one and a half decades and many structural changes have taken place during this period. The era of liberalization ushered in since 1991 and various trade policy measures adopted by the Government in more recent times have opened up new vistas and opportunities for agricultural exports from India. However, the advent of globalization, liberalization and privatization have also given rise to newer kind of challenges before the country that require some bold initiatives on the part of policy makers. It is widely believed that with the ushering in of the agricultural policy reforms in major industrial countries the demand for agricultural exports from developing countries like India will get a real boost. Nevertheless the possibility of India emerging as a potential exporter of various agricultural goods will largely depend on India's own ability to exploit her potential in the agricultural sector and generate exportable surplus of specific commodities, aside her competitive strength in the world market.

The underlying trend of the past in terms of agricultural exports of India has not been very encouraging. This is despite the fact that agricultural products constitute a significant component of foreign trade of the country. India's share in Asia as well as in the world trade of agricultural commodities has declined over time. The experience of the last one and a half decades reveals a much lower rate of growth in total value of agricultural exports of India compared to growth in world agricultural exports and agricultural exports of Asia. Whereas the value of agricultural exports of Asia and the world are estimated to have grown at the rate of 5.53 per cent a year and 4.07 per cent a year, respectively, during 1979-93 period, the rate of growth in total value of agricultural exports of India remained much lower during this period and stood at only 1.98 per cent a year. As a result of this, India's share in Asia and in the world agricultural exports is estimated to have fallen at the rate of 3.36 per cent a year and 2.01 per cent a year, respectively, during the same period. The declining trend in the share can be attributed not only to the overall nature and regime of trade policies generally adopted by the developed countries, but also to our own policies. Since many of the traditional commodity exports of India such as tea, coffee as well as agricultural raw materials, such as cotton, jute and tobacco have been growing rather slowly and gradually losing their significance in the international trade, it is necessary for India to find its way towards maximizing net returns and foreign exchange earnings through non-traditional agricultural exports. However, the market share loss of traditional commodities like jute, tea and tobacco could be considered disturbing in the light of the fact

that these commodities in the past accounted for a lion's share in total agricultural exports of India. But, the decline in these traditional exports of India could be considered as one end of the spectrum. On the other end, with the passage of time India has also shown dynamic growth in her share in total global exports for various other commodities, both traditional and non-traditional, such as cereals, oilseed cakes and meals, certain oilseed products and floriculture products. Various fruits and vegetables have also shown a steady increase in their exports from India, particularly in the post-liberalization period, though India still lags far behind many countries of the world in the export trade of these high value crops. As a matter of fact, nontraditional items of exports, particularly horticultural products, are seen to have picked up at a much faster pace than that of traditional items of exports. Since India with abundant labour in relation to capital or land enjoys a comparative advantage in labour-intensive horticultural products, the growth prospects for exports of these products are likely to be favourable. It is expected that the country's share in the world trade will eventually rise in future as a result of increased trade in these high value crops resulting from various trade policy measures adopted by the Government in the post liberalization period and in view of GATT negotiations. However, it is well nigh difficult to predict how much India might gain from these developments, as much would depend on the future price mechanism and India's own potentiality to capture the world market.

Under the changed economic scenario witnessed during the early nineties the relevant issues that could strike one are what prospects do the agricultural exports hold and what do the relative potential for exports of traditional agricultural commodities as against the non-traditional ones look like and what steps need to be initiated to realise such potentials. What could be the modus operandi of agricultural trade between India and other developed and developing nations and what would be the future price mechanism. How better endowed India and other developing nations are to mutually cater to their vast expanding market for agricultural commodities and to realise their true export potential in this respect. What prospect future holds in terms of export potential of various high value crops of India, such as horticultural product, in the fast changing international market condition and in the light of agricultural trade liberalization pursued by various developed and developing nations.

In order to address the above issues an in-depth study into the changing pattern and structure of agricultural exports over time is warranted. Thus, as a prelude to have better understanding of the structural changes in agricultural exports, we have tried to analyse and evaluate the pattern of productions and export trade of India in relation to changes that have taken place in the structure of production and export trade of Asia and the world over the past 15 years. Dynamics of changes in the structure of agricultural production and trade in India are the main foci of attention and description of this study. The focus of discussion revolves round the underlying trends in exports in relation to production of certain select agricultural commodities of India.

6.2 Main Findings of the Study

The major observations that can be deduced from evaluating the changing pattern and structure of agricultural production and exports of India during the past 15 years are as follows:

1. A significant increase in the production levels of all the selected commodities was noticed over the past decade and a half, though a time-scale deceleration in the production expansions for some of the commodities like groundnuts, cotton lint and jute was also visible during this period. Most of the selected commodities recorded major increase in their production levels only after the mid-eighties. This held especially true of rice among cereals, all the selected fruits and vegetables save for onion, groundnuts in shell, sesame seed, cotton lint and tobacco. However, despite significant increase in production levels, certain selected commodities showed their share in the total Asian production pool to decline. This unseemly trend was noticed for commodities like oranges and apples among various fruits, groundnuts, cotton lint, tea, coffee and tobacco.

2. The growth of India's share in the world production was much higher than the growth of her share in total Asian production. This held true of all the selected commodities. The same also held true when India's share of exports was reckoned in Asia as well as in the world for various commodities with selected fruits being the only aberration in this scenario. The latter showed their share of exports to grow at a much higher rate in Asia than in the world.

3. Although India's share in the world production for commodities like wheat, potato, bananas, apples, groundnuts in shell and jute had impressive growth rates, it could not boost this country's share of global exports in these commodities and the same were observed to sharply decline over time. The same phenomenon was found to extend to Asia as well for these commodities.

4. A persistent decline was also observed in India's share in the total global production of commodities like pulses, tea, and tobacco though deceleration seemed to rule these decline in some phase or the other during the overall period considered.

5. Despite the fact that the production expansions for certain commodities slowed down after the mid-eighties, it did not really affect their exports and the same were found to expand sharply between the mid-eighties and the early nineties as against the period between the early- and the mid-eighties. This held particularly true of commodities like pulses, jute and coffee. Pulses in particular showed remarkable increase in their exports after the mid-eighties even though their production expansions had very slow growth between the mid-eighties and the early nineties. Contrary to this, in the case of wheat and onions, major increase in both production and export were recorded mainly between the early- and the mid-eighties and, thereafter, the post mid-eighties period for these commodities was marked with considerable deceleration in their production and exports.

6. Jute and fibre product exports of India fell by nearly 70 per cent by the early nineties from its early 1980s level. The fall in jute export of India was noticed in spite of about 15 per cent overall rise in its production level. Similarly, potato, groundnuts, tea and tobacco of India also showed fall in their exports despite achieving significant overall production expansions. An important feature of the jute and fibre products of India was that even though the production encompassing these products fell by about 4 per cent between the mid-eighties and the early nineties, their exports could still show a 10 per cent increase during this period.

7. The overall export trade of India was found to expand much faster than the overall increase in production levels, particularly in the case of pulses among foodgrains, all the selected fruit crops, sesame seeds, cotton lint and coffee. However, cereal exports of India had a very slow rate of expansion despite about 40-60 per cent rise in their production levels over the past 15 years. India's cereal exports failed to grow over time because of their very high domestic demand and took effect only in times of distinct surpluses. Very high overall fluctuations observed in this country's cereal exports also had their basis in this reality.

8. In the case of pulses, the rate of growth for India's share in global export was very high even though this country's share in global production of pulses fell during this time. Similarly, during the same period, a significant growth in India's share in Asia for oranges and apple exports was noticed even in the face of a negative growth in India's share in total Asian production of these two commodities.

9. With the exception of overall cereals, rice, pulses, onions and save for overall oilseed cakes and meals and soyabean cake in particular, the overall exports of India in all the selected commodities expanded more in quantity than in value terms. Obviously, the international prices for majority of the selected commodities were seen to be not favourable over the past 15 years. Though the global prices for the majority of the commodities zoomed after the mid-eighties, it could not be a counter to the rather sharp declines in international prices observed between the early - and the mid-eighties. The net result, therefore, was still an overall decline in international prices over the time under consideration. And, consequently, the overall increase in export turned out to be higher in quantitative terms than in value terms.

10. The export trade of India for the majority of the selected commodities was found to decline during the mid-eighties. However, the post mid-eighties period saw sharp increases in these exports, both in quantity and value terms of trade. The notable exceptions to this trend were commodities like wheat, potato, oranges and cottonseed cake. Their exports, to the contrary, expanded significantly between the early- and the mid-eighties. But this trend could not be sustained, thereafter, and a major fall in India's exports in these commodities was observed between the mid-eighties and the early nineties. This rather unseemly trend could be mainly attributed to unfavourable and wavering nature of international prices observed

over the past 15 years for these commodities. The unfriendly regime of international prices not only affected India's exports in value terms but in volume terms too.

11. It was noteworthy that the biggest impact of structural changes in the aftermath of liberalization was observed on India's trade in various horticultural products and oilseed cakes and meals, the exports of which had remarkable growths, of late. However, notwithstanding the fresh grounds that India has gained in more recent times in horticultural exports, a continuous decline in this country's share of total Asian exports was observed for various fruits and vegetables such as potato and banana, both in quantity and value terms, and for various processed and fresh vegetables in value terms over the past 15 years. Compared to this scenario, India's trade in certain other horticultural commodities like oranges and apples in Asia had fairly reasonable rates of export growth. In fact, India's share of export trade in Asia for grapes and various floricultural products was found to have a very high rate of growth. As for the global trend, India's share in the world exports of horticultural commodities was found to be beset with persistent declines. And, this phenomenon extended to all the horticultural commodities except for grapes and floriculture products which showed their share of total world exports to grow at a very high rate.

12. The various oilseed cake and meal exports presented two contrasting scenarios vis-a-vis India's share of export trade in these commodities in Asia and the world. While India's share of export trade in various oilseed cakes and meals fell in Asia during the past 15 years, the country's share in the global export trade of these commodities was found to expand and had a positive and significant rate of growth. Other commodities of India which showed their share in total Asian export trade to decline in spite of significant increase in their exports over time were cotton lint and coffee.

13. The present study reveals a more rapid growth in India's share in the world than her share in Asia for the exports of commodities like rice and pulses among foodgrains, onions, soyabean and rapeseed cakes among various oilseed cakes and meals, sesame seeds and castor oil.

14. It was observed from the overall analysis that the unit value of exports for almost all the selected agricultural commodities had a steady decline over the past 15 years. Notable exceptions to this trend were cereals in general and rice and pulses in particular among foodgrains, onions, apples and grapes among fruits and vegetables, soyabean cake and overall oilseed cakes and meals, which showed either a persistent rise in their unit value of exports or showed a considerable fluctuation in the same over the past 15 years.

15. Between 1979 and 1993, all the selected commodities showed much higher instability in their export growth than in their production growth. Coffee was the only exception in this scenario and showed its production growth to have higher overall instability than its export growth. India's share of production and export trade in coffee in Asia and in the world also corroborated to a similar trend. Also, in the case of coffee, the rate of annual growth was much higher in exports than in production

during 1979-93 period.

16. As for traditional commodities, the exports of cotton lint and jute presented us with an opposing trend. While India's cotton lint export grew more than two folds in quantity terms between the early eighties and the early nineties, that of jute showed a continuous decline during this period. The decline in jute exports was more sharp in value than in quantity terms of trade and the reason for this could be traced in the falling international prices for this commodity. The major factors responsible for the downward slide in jute exports from India were traced in: (i) lack of demand for raw jute and jute goods in the international market, (ii) falling international prices of raw jute and jute goods, particularly after the mid-eighties, (iii) a gradual shift over other substitutes of jute and allied fibres such as synthetic fibres and paper sack, (iv) greater importance to the export trade of non-traditional commodities such as horticultural ones, (v) international price incompetiveness of Indian jute goods, (vi) higher profitability in the domestic as averse to international markets due to fall in world prices, (vii) steep fall in import demand of USSR for this commodity consequent to its break up and, the change in the political climate (USSR was India's main jute importer), and (viii) the jute economy buckling due to recessionary pressures in the industrial sector. All these factors have together contributed to an overall decline in India's jute export-rated at 70 per cent in quantity and 75 per cent in value terms of trade between the early eighties and the early nineties with the fall being more sharp during the first half of the overall period considered.

17. A phenomenal increase in the value of global vegetable and floricultural exports was noticed over the past decade and a half. While processed and fresh vegetables showed their overall global exports to increase by more than two fold in value terms between the early eighties and the early nineties, the increase in the value of floricultural exports of the world during the same period was nearly three folds. Most of the increase in the value of exports of these commodities was noticed in the second half of the overall period considered, that is, in the post - mid-eighties period. This gives a reflection of increasing importance of horticultural exports in more recent times.

18. Even though fruits and vegetable exports as well as floricultural exports had grown at a high rate between the early - and the mid-eighties, the decline in the value terms of trade of cereals, some of the oilseed cakes, fibre crops and plantation commodities caused the international trade in 20 listed group of agricultural commodities to show an overall decline of 6 per cent in export value. Nonetheless, after the mid-eighties, a resurgence in world exports was noticed for majority of the agricultural commodities resulting in the total value of exports to grow by 34 per cent in early nineties over the mid-eighties level, and by 26 per cent when the trading was reckoned between the initial and terminal periods of the study.

19. As for future prospects of agricultural exports of India, it is estimated that the total expected supply of food-grains will be 222 million tonnes in the year 2001 with a break

up of 208 million tonnes of cereals and 14 million tonnes of pulses. Since the demand for foodgrains for the year 2001 is placed at 212 million tonnes with 194 million tonnes demand for cereals and 18 million tonnes demand for pulses, a deficit of 4 million tonnes will be seen in the case of pulses as against about 14 million tonnes exportable surplus of cereals during this year. For the year 2006, the total available surplus for exports is estimated to be about 28 million tonnes of cereals. However, supply of pulses are again estimated to fall short of demand and a deficit of 5.5 million tonnes are expected to be visualised in the year 2006. Among cereals, the exportable surplus of rice is estimated to be 11.5 million tonnes in 2001 and 23 million tonnes in 2006 as against estimated exportable surplus of wheat at 3.6 million tonnes in 2001 and 10.3 million tonnes in 2006. In the case cotton, the available surplus for exports is estimated to be 0.20 million tonnes both in 2001 and 2006. Fruits and vegetables have presented us with two differing scenarios in terms of their future prospects of exports. While in the case of vegetables, exportable surplus to the tune of 5.68 million tonnes in 2001 and 22.38 million tonnes in 2006 will be generated, fruit production will fall short of domestic demand and a deficit in its production (as compared to domestic demand) in the range of 10 to 15 million tonnes is likely to be witnessed between 2001 and 2006. These observations are pointer to the fact that while various cereals among foodgrains and vegetables, in particular, are likely to generate enough exportable surpluses in the year 2001 and 2006, the same would not be the case with pulses and fruits during these years.

20. Although international prices in dollar terms are estimated to have declined for majority of the selected commodities, the same is not the case when rates of growth in world prices are reckoned in rupee terms due mainly to devaluation of Indian currency over time. As a result of depreciation, the exchange rate of rupee per dollar has gone up sharply in due course of time. This has, consequently, led to substantial rate of growth in world prices in rupee terms. During 1981-93 period, the selected commodities showed 9-13 per cent annual rate of growth in their world prices in rupee terms as against 1-2 per cent annual decline in dollar terms. In general, the rate of growth in world prices (free market price) are estimated to have grown faster than domestic prices (wholesale prices), particularly in the case of rice, wheat, banana, cotton, jute and tobacco. The future prospects of exports of these commodities, therefore, seems to be bright.

6.3 Inferences and Policy Implications

India's structure of agricultural production and exports underwent tremendous changes over the past decade and a half. The period was seen to be marked with India losing her stranglehold on some of the traditional exports and gaining ground in some of the non-traditional commodities in the international market scene. The traditional commodities to have lost their significance in international trade in this context were cotton lint, jute, tea, coffee and tobacco. Not only did these tradi-

tional exports lose in significance, their export trade growth was also observed to be rather slow. Among the non-traditional items, which had substantially higher rates of export trade growth, were the horticultural products, in particular, and the oilseed cakes and meals, in general. Certain other non-traditional commodities, which saw their international trade to have significant upswing, were wheat and pulses among foodgrains and sesame seeds and castor oil among oilseeds. Notwithstanding the recent inroads made by India in some of the non-traditional exports, this country's share of various horticultural commodity exports in Asia and in the world, in particular, is still very insignificant and meagre. Even though India's various fruits and vegetables and floriculture products exports have recorded dynamic growth rates of late, this country's share in the total global export of most of these commodities was still seen to be declining over time. Obviously, the horticultural and floriculture product exports of other countries have had a much faster growth rate than India and hence fall in this country's share in the world exports of these commodities. This unseemly trend is a pointer to the fact that India have a lot of catching up to do with other countries in order to effectively compete in the international market encompassing these valued export commodities.

Agricultural exports of India have always been fraught with high fluctuations. In spite of significant production expansions in many agricultural commodities, India's global agricultural trade has remained at a lower ebb. A lack of vision and a directionless agricultural export planning on the part of our policy planners seem to be responsible for this not so-encouraging scenario. The need of the hour is to launch a concerted move to produce export-driven agricultural commodities in excess of their domestic market demands. Only such an objective that not only generates significant production surpluses in a systematic manner but also ensures stringent matching of international quality for the produce can help remedy this dismal situation. The government should, therefore, endeavour to evolve, initiate and implement a more egalitarian market-oriented agricultural export promotion policy. In line with this objective, a fresh appraisal should be made as regards the possibilities and the direction of agricultural export trade.

India's horticultural exports have forged ahead even in the face of wide international price fluctuations and high burgeoning domestic demand for these high value commodities. This perhaps underscores the fact that India have not spared any efforts at boosting country's horticultural exports. Gifted as India is with diverse agro-climatic regions conducive to cultivation of a vast array of horticultural crops and products, the country can surely produce a wide variety of export-worthy fruits, flowers and vegetables and this strength surely needs to be further exploited. India can surely produce quality horticultural products of international standards and a favourable policy regime conducive to boosting horticultural exports can certainly make us emerge as one of the leading players and major exporters in the international horticultural market scene - a position India should have been justly playing and has the potential to

play. India can definitely have a cutting edge over many of the current player nations in the international horticultural front if our current efforts at boosting our international horticultural trade continue with unflapping zeal.

As for oilseed cakes and meals, the domestic prices have tended to move closely with world prices. But, this has not bestowed unto exporters any significant advantage. Thus, when international prices of oilseed cake rule high, the exporters are not able to extract much advantage out of it since the domestic prices tend to move in tandem with the ruling international prices. The only positive gain from such a scenario is that it discourages wasteful usage of oilseed cakes within the country besides perhaps propelling more and more oilseeds to be brought under solvent extraction since the solvent extracted deoiled meals are internationally more valued than the expeller pressed types. Strict adherence to international quality standards is a must for all oilseed cake and meal exporters and Indian exporters are not oblivious of this reality. The opportunities that have been generated with the dawn of this latter realisation among our exporters in more recent times should not be frittered away in the years to come with lopsided approaches unmandful of international market realities.

With the passage of time, cotton lint export from India grew unabated, particularly in quantity terms. It should be borne in mind that India had been importing cotton until 1977 and it was only from 1978-79 that India emerged as a net exporter of cotton. Once the free trade regime of liberalised economy sweeps the cotton economy, there is every possibility of this cotton and textile industry of India to emerge as a leading player in the world cotton economy.

In brief, it deserves mention that though India's share for most of the selected commodities in the total Asian and world exports encompassing them declined during the past 15 years, a fillip received to their exports in the wake of liberalization of policies also meant deceleration in this falling trend. Notwithstanding the dwindling India's share of world agricultural exports, it is hoped that GATT negotiations and a regime of liberal trade policy measures will propel this country's international market share in these commodities in future, in general. And, the adoption of such international trade friendly measures is likely to benefit India's horticultural exports, in particular.

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