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Trade and Environment - Conflicts and Prospects: A Case Study of Leather Goods, Tea and Cut Flowers

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MOEF IGIDR WORLD BANK

TRADE AND ENVIRONMENT: CONFLICTS AND PROSPECTS

CASE STUDIES OF LEATHER GOODS, TEA AND CUT-FLOWERS

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PREFACE

This study was undertaken as part of the research programme on Capacity Building in Environmental Economics, coordinated by Indira Gandhi Institute of Development Studies, Mumbai, sponsored by MoEF. Among the many themes identified by the Environmental Economic Research Committee (EERC), this study falls under the category of International Issues and Macro-Economic Policies & Structural Adjustment.

The focus of the study is essentially to analyse, on a case study basis the impacts of environmental regulations (both domestic and international) upon the pattern, direction and volume of export trade from India. The three products selected for the case studies are tea, cut flowers and leather and leather goods. The rationale for the choice for these products were, environmental sensitiveness, existence of environmental regulations directly affecting them in production and the relevance of these products in the basket of export trade fro India.

The methodology adopted for this study involved four steps. First, analysis of long time series data on (i) volume of trade (ii) direction of trade and (iii) relative pattern (i.e., relative weightage in the export basket). Second, analysis of various country and commodity specific environmental regulations on a time series basis regarding their (a) dates of introduction and, (b) degree of stringency. Third, linking the environmental regulations with the Indian export trade (specifically in respect of these three commodities). Finally, evaluating the perceptions and experience of the exporters regarding the environmental regulations.

Because of such wide spectrum of issues involved, a large team of specialists was constituted, with specialists, in international trade, environmental economics, econometrics and trade policy formulations. I am thankful to all those scholars who collaborated with this study, whose names are mentioned on the cover page itself.

I am equally grateful to EERC members who provided guidance at various stages of this study (in the two workshops, and also through personal and individual discussions). I would like specifically mention to thank Prof. Kirit Parikh (the nodal

internal member of EERC) and Dr. Anwarul Hoda, the external peer reviewer who went through the draft reports painstakingly and provided valuable suggestions. Special mention also be made to thank Prof. Jyoti Parikh without her encouragement, this study would not seen its date.

I would like to place on record my sincere thanks to Prof. P.R. Panchamukhi, Director of CMDR, who constantly encouraged the entire team during the difficult times of data collection and information gathering, to take courage and complete the study to its meaningful end. Ms. Rajeshwari Mathad and Shri Gururaj Haribhat handled all the difficult computer related tasks and made this report reach this final shape. I am thankful to them.

Dharwad Gopal K. Kadekodi

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GLOSSARY AND ABBREVIATIONS

APEC : Asia Pacific Economic Countries

BOD :Biological oxygen demand

CFC :Chloro-floro-carbon

CIS :Currently industrialized states

CITES : International Trade in Endangered Species

CO : Carbon monoxide

COD :Chemical oxygen demand

CTE :Committee on Trade and Environment

DC :Developed countries

DRC : Domestic Resource Costs

EC :European Commission

ECC : Environmental Control Costs

EEC :European Economic Commission

EERC :Environmental Economics Review Committee

EL :Eco-Labeling

ESC : Environmentally Sensitive Commodities

EU :European Union

FAH :Flower Auction Holland

FAO : Food and Agricultural Organization

FDI : Foreign Direct Investment

FDI :Foreign direct investment

GATS :General Agreement on Trade in Services

GATT :General Agreement on Trade and Tariff

GDP : Gross domestic product

GOI	:Government of India
GOI	: Government of India
IPPC	:International Plant Protection Convention
KFW	: Kreditanstalt Fur Wiederanfban
LDC	:Less Developed Countries
MEA	: Multilateral Environmental Agreement
MRL	:Maximum Residue Levels
NTB	:Non-Tariff Barrier
OECD	: Organisation for Economic Cooperation and Development
OIE	:Office Internationale des Epizooties
PCP	: pentachlorophenol
PETA	:People for the Ethical Treatment of Animals
PETA	:People for the Ethical Treatment of Animals
PPM	:Product and Process Methods
R & D	: Research and development
RCA	: Revealed Comparative Advantage
SAARC	: South Asian Association for Regional Cooperation
SITC	:Standard International Trade Classification
SME	: Small and Medium Enterprises
SPM	: Suspended particle matter
SS	: Suspended substances
TBT	:Technical Barriers to Trade
TDS	:Total Dissolved Solids
TOT	:Terms of Trade
TRIPS	:Trade Related Intellectual Property System
UK	:United Kingdom

UPASI :United Planters Association of Southern India

US EPA : United States Environmental Protection Agency

USA :United States of America

WPA : Wildlife Protection Act

WTO : World Trade Organisation

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EXECUTIVE SUMMARY

Introduction

Environmental regulations cover a variety of facets, from global to national, from national to regional and local issues, from sector to products, from awareness to law. They include, inter-alias, charges and taxes for environmental protection, requirements relating to products including standards and technical regulations, eco-labeling, packaging and recycling requirements, laws regarding labour and hazardousness, and endangeredness. Some of them are of the nature of non-tariff barriers.

Major linkages between environment and trade

Three distinct links between trade and environment are recognizable. They are: environmental policies affecting trade flows; trans-boundary environmental externalities due to trade; trade flows affecting environments and environmental policies. In all these cases, the two-way linkage between environmental and trade is understandable. A related issue is that of relocation of industries that are environmentally sensitive. This can be either trans-boundary transfer or reversing direction of trade due to relocation of industries. Of these major three links, only the first one is addressed in this study with three major exportable commodities as case studies, namely tea, cut-flowers and leather and leather goods.

The choice of the products is deliberate. Tea being one of the oldest and prominent export commodity from India (with strong competition from Sri Lanka and Kenya), is highly dependent on land and water. Therefore, it was thought to be appropriate to study it vis-à-vis land and water related environmental regulations (e.g., pesticide control, water pollution etc.). Essentially it is also a primary product in the list of hierarchy of productions (from primary to tertiary). Cut flower is a young and emerging export product from India. It is both land related and also substantially related to modern capital such as cold storage, cold chamber transport facility, and packaging requirements. Therefore, there are possibilities of environmental regulations affecting them both positively and negatively. Once again, it has links with both primary (i.e., horticulture) and tertiary sectors (i.e., transport, packaging, cold storage, shipping etc.). Leather and leather product sector is based on tanning

which is known to be one of the most water polluting industrial activity. There are a number of water pollution related and packaging and eco-labeling regulations that affect its export performance (e.g., regulations on PCP control, azo dyes, eco-labeling etc.). Leather being a processing industry is somewhat higher in scale as a secondary level industry (in terms of hierarchy of products from primary to tertiary).

Review of Literature

Going by the available empirical and theoretical studies, so far no strong evidence in favour of a negative effect of stringent environmental regulations on exports has been found. Either environmental costs are not significant, or pollution abatement subsidies have come in place. There are some studies to show (with gravity models) that more stringent environmental regulations have increased the levels of exports. Also are studies to say that effects of environmental regulation can be either small or too difficult to detect. Its effect on trade, growth and productivity all seem to be insignificant. Rather, as argued by Porter all such industries who move to more cost-effective abatement processes including reducing emissions can become more competitive via innovations and adaptations..

In a major countrywide study on environmental regulations upon trade performances in developing countries Jha et al, (1999) come to the following major conclusions:

“To conclude, the evidence from these case studies in how foreign environmental regulations impact on a developing country or transition country is mixed. Many of the larger exporting countries claim that the effects have been small, and in most cases manageable for the exporters. In several cases the adoption of the stricter standards not only decrease environmental damage, it also increases efficiency and profits for firms.”

Analysis of Indian trade pattern

The export trade performance of the three products is studies in some detail. In general 20 years time series data are analyzed here. They are analyzed in terms of (a) changing direction of trade (based on time series data) among major importing countries; (b) shifts in the shares between different counties; and (c) the demand

pressures (e.g., income, volume of their imports), dependency ratios and terms of trade as applicable to the importing country; (d) Indian market share (again, depending upon the domestic production and terms of trade. Chapter three is devoted for this analysis of trade performance.

Tea is the major primary export commodity for India although its share in the over all Indian exports is only 1.27% in US $ value terms. The importance of tea in India's exports has been declining over the years. Tea exports accounted for 6.34% of India's total exports in 1980-81 in rupee terms, which gradually declined to around 3 % in 1987-91 period and witnessed a further decrease to around 1% in the years 1992-99. It touched the lowest of 1.12% in 1999. The importance of Indian tea in the world export market has also declined. India used to supply about 33 % of world tea exports in 1980, its share declined to as low as 12 % in 1996. Subsequently its share has increased to about 22% in 1999. India's tea exports were stagnant for most of the eighties; they then declined for most of the nineties. There has been a fair amount of stability in respect of the major markets for India's tea exports. Two indicators that are relevant here are India's Dependency ratio and Market share. Indian dependency on Russian market was at a steady growth from 30% in the year 1980 to 60 % till the year 1989; then it decreased to 36% by the year 1999. Indian dependency on UK showed a decrease from around 19% in the 80s to 10% in 1999. Similar is the case with Egypt. The loss of market share with these major customers was made good by new customers like the United Arab Emirates. There are also year-to-year fluctuations in the importance of the different markets.

The leather industry as one of the major foreign exchange earner of the country has undergone complete metamorphosis during the last two decades. India is one of the major exporters of leather and leather products. Nearly 65 percent of its exports are destined for the European Union. Germany, among the EU countries is the largest importer of India's leather products, accounting for about 20 per cent. A steady shift in the direction of trade has been observed, may be due to liberal environmental regulation and easy market accessibility in UK, USA and France. As per the dependency ratio, India's dependency on the CIS countries has drastically come down. For UK and USA dependency ratio has gone up. Importance of remaining countries as a source for India's exports has either declined or remained same

during the period. The data confirms a steady shift in direction of leather products exports, particularly towards the U.S.A. and the U.K.

Analysis of Environmental regulations

There are three distinct aspects of environmental regulations that need to be studied. First, environmental regulations world over have evolved significantly over time during the last three decades. Secondly, there are a variety of regulations, ranging from voluntary and informatory to prohibitory and mandatory. Thirdly, they have emerged in some instances, at the initiatives of country themselves (e.g., Germany or USEPA), or group or trading bloc initiatives (e.g., OECD or EU). They have also flowed from multilateral environment agreements (MEA) such as SPS and TRIPS regulations in WTO and GATT or CITES. Then there are Indian (domestic specific) environmental regulations. Examples are Indian Water Act of 1974, Air Act of 1981, Environmental Protection Act of 1996, Pollution Control Board's standards and listing of sectors and products in the categories of major polluting industries for priority action. All these components of environmental regulations are reviewed, and the time series information on such regulations has been integrated using (a) multi-criterion and b) factor analysis. Chapter four is devoted entirely for this.

Starting from tanning to packaging, a number of environmental regulations come in to play for leather and leather product industry. This is one sector, in which as much as international regulations; the Indian domestic regulations also affect the industry. The notable Indian domestic regulations are Indian Water Act of 1974, Air Act of 1981 and Environment Protection Act of 1996. Effluents are to be treated before they are discharged in to river or open land.

Research Methodology

The methodology of this study is briefly described here. First, the trade patterns in respect of all the three products are reviewed using a time series data from 1980 onwards. Both the volume and direction of trade are analyzed. The major breaks and shifts in the trade patterns are noted. Then, time series information on environmental regulations in various countries (mainly Germany, USA, the Netherlands, UK, European Union) is analyzed. They are grouped as precautionary, prohibitory,

mandatory, informative, and transparency types. They have been indexed, based on the information about their stringency. Time series of aggregated indices of environmental regulations and restrictions are compiled and analyzed. For this, Multi-criterion analysis as well as Factor analysis was carried out. Subsequently, a trade model is formulated in the traditional sense, using terms of trade, trade related pull and push factors (i.e., demand and supply), and with and without environmental regulation indices. The model is estimated econometrically.

Porter and Linde (1995) argued in favour of the long-term benefits of the regulations in bringing about process innovations and production efficiencies, thereby enhancing trade and welfare. But what will be the effect of such regulations in the short run? Secondly, over time, how does the export sector adjust itself? Will it converge to the long run path as indicated by Porter? In order to answer some of these questions, it may be necessary to add environmental regulations or the cost of the regulations as explicit variables in the model.

A specific hypothesis is formulated in this study. Environmental compliance costs are severe on the primary export commodities, because of which they do seem to reveal negative impact of environmental regulations upon their export levels. Whereas, as one moves to higher and higher order of processed product exports, the environmental compliance costs tend to become reduced and become insignificant. Hence they seem to be capable of internalizing the burden of such costs and emerge with improvements in technology and innovations to gain from trade.

The hypothesis is stated precisely as:

‘As one moves from lower to high value added product exports or from primary to higher and higher levels of processing and manufacturing, the impact of environmental regulations turn to become positive from being negative’.

This hypothesis is tested using an econometrically estimated trade model.

Experience of Indian exporters

In the case of tanneries, the small-scale units face the music of high cost of treatment and lack of financing, lack of technology, and some times even the knowledge about the regulations. They also find it difficult to set up Common Effluent Treatment Plants because of spatial dispersion of the units. Because of which many small-scale tanneries in India continue to have individual effluent treatment plants, however inefficient they may be. Estimates the economic pollution abatement cost of producing kg of processed hide and skin vary between 0.41 to 1.48 percent, where as the same under a common effluent treatment plant technology would be between 0.41 to 0.81. In 1998, there were as many as 1000 small-scale tanneries in India, against just about 75 large units.

However, the tanneries, which have complied with PCP, pH, BOD, COD, TDS, several other chemical regulations etc., have gained better access to world exports. There is a general feeling in the industry that in the long run it is good for the industry. There are some variations in the standards between different countries. Some countries like Italy and USA insist on only pH value regulations. The TDS regulations are not so very important for them. But the Tamil Nadu Pollution Control Board insists strictly on the TDS at 2100 ppm limit and Reverse Osmosis plants. The compliance costs at the Common Effluent Treatment levels is very small. At best, it goes up to 2 - 4 percent of total product costs. But during the last 6 - 8 years the compliance costs have been rising. Secondly, almost all producers are quite aware about almost all the regulations. Thirdly, the regulations did not make the exporters change their importing partners or change the direction of trade. Finally, more than the environmental costs, the overall trade recession has affected the leather exporters from India. Recession in Germany particularly has affected the exports quite significantly.

Tea gardeners and exporters in India invariably feel that it is one plantation activity, which is environmentally extremely friendly. Firstly, this plantation means entirely dealing with green leaves. Second, talking in terms of economic management, it is the non-entry of FDIs in this industry so far. Almost since 8 years the industry has been complying with all the environmental regulations such as EU, CODEX, US Food Regulations, German packaging and eco-labeling regulations and Russian Gosstandart regulations (on the residuals of heavy metals such as cadmium, nickel

etc.). Considerable amount of research also has gone into, by Tea Research Authority and United Planters Association of Southern India (UPASI).

The most important environmentally sensitive issues relating to tea plantation is use of pesticides and land use pattern. The choice before the tea gardens is either to comply with pesticide control levels as stipulated by EU, or go for organic farming. The gardeners say that organic farming will involve an additional cost even up to 100% extra. If the cost of regular Darjeeling tea is Rs. 200-250 per kg, it would be as high as Rs. 400-500 per kg under organic farming. Many German importers are willing to pay this higher price also. Initially when the German importers provided some incentive capital and paid for environmental and social auditing, some of the major Indian exporters switched to (and still maintain) some parts of their tea garden in to organic farming. Otherwise, most others comply with EU pesticide regulations, at much lower levels than the said limits. Yet there are about 11 major planters in Darjeeling area today, following organic farming.

Most tea exporters say that the cost of pesticide controls, complying with other environmental regulations such as maintaining ground water quality, afforestation, soil replenishment, preventing biodiversity loss etc., are still costly, but because of the worldwide compliance, they would also have to fall in line. It is also learnt from the exporters that there are no major scale effects (advantages) in the cost of environmental compliance. The costs on account of these reflect in their pricing depending upon the composition of organic and regular gardening. On top of these are the Eco-labeling and packaging regulations. Therefore, on the whole, environmental regulations seem to have affected the cost and price patterns of tea exports.

As far as cut-flowers are concerned, basically the pesticide control, regulations on harvesting, cold storage and transporting, packaging regulations add to the costs build-ups. According to Chengappa, the cost of cold storage and refrigeration van is about 18-19% of total cost of production. The packaging and freight costs are about 35% of total cost. About 35% of marketing and about 2% of production costs are environmentally related ones. The three major environmentally relevant costs are on use of farmyard manures (ranging from 5-8%), plant protection costs (ranging from 3-5 %) and transport and handing costs (ranging from 3-5 %). The sector, being still in its initial stage, is lacking knowledge about regulations and recommended

practices (almost 55 to 75 percent of respondents views). Furthermore, they also lack advanced modern technology in packing and handling (as expressed by over 75 percent of the respondents).

Econometric models on the effects of regulations on trade pattern

Commonly, most econometric studies on the issue of linkage between trade and environment used 'year specific' (in the case of time series analysis) or 'country specific' (in case of cross-section analysis) dummy variables for environmental regulations in a Gravity model of direction of trade. In this study, two additional types of econometric exercises were carried out. They are the econometric models to (a) identify the shifts or breaks in trade pattern attributable to environmental regulations, and (b) specific econometric model internalizing such breaks along with alternative specifications of the dependent variables (variants of gravity models).

First are the usual gravity type models with exports in value as dependent variable with explanatory variables such as volume of world trade (demand factor), Indian production (supply factor), terms of trade (price factor), and the year of stringent environmental regulation as a dummy variable. The time dummy variables for the years 1984, 1991 and 1996 coincide with some of the major environmental protection moves world over. The environmentally linked dummy variables suggested significant links with the trade pattern. They suggest of depressing the trend in exporting in general. As far as terms of trade is concerned, it seems to act in two different ways for leather goods and tea. For the former, it is a supply price factor, where as it is a demand price factor for tea (i.e., dominated by the London price, rather than the Calcutta price). This is understandable as Indian leather goods have a larger share in world exports, and have been in the business for quite a long time. The World Level Export is a major demand pull factor for Indian exports.

The econometric analysis specifically for export of tea is then carried out in two stages. First is to trace the major shifts in the export behaviour (may or may not be linked to the environmental regulations). Second is to estimate suitable econometric specification of endogeneous variable to explain the trading behaviours. It is first established using Chow's test that there are breaks in the exports to the developed

countries but no such breaks in the exports to developing countries. Also, exports to developing countries fluctuate so much that it was impossible to identify any breaks.

Therefore, the ratio of India's export of tea to developed countries relative to that of developing countries could then assume a good dependent variable. This dependent variable also seemed to be a good variable to separate out the effect of environmental regulations as these have been introduced in only the developed countries. So a priori we would expect that environmental regulations would decrease the value of the dependent variable as the environmental regulations should see a switch in exports from countries which have higher stringent regulations, i.e. the developed countries, to countries which have less stringent regulations, i.e. the developing countries. We also tried to separately examine the affect of the five kinds of environmental regulations to examine which regulations had more bite. The effect of the regulations was initially sought to be captured by combining the different measures obtained from two different analyses (multi-criterion and factor analyses). In one a composite index was derived from four type of environmental regulations-MRL, PR, SPS and GS; in the second, PPM was dropped as it was perfectly correlated with SPS. The other independent variables are the dependency of India's exports on developing countries and on the EU countries. The greater the share of developing countries the lesser will be the impact of environmental measures. The greater the dependence on the countries of the EU the greater will be the impact of EU's environmental regulations. Many measures were introduced in 1992 and our analysis of breaks in the series also showed a break in 1992. We therefore introduced a dummy variable, which is zero before 1992 and 1 after that. We know that income elasticity of demand for tea is low; so changing income between the developed and developing countries would affect the relative share of the two groups. We therefore introduced relative per capita income as an independent variable. Another independent variable introduced is the terms of trade defined as the price in Calcutta relative to that is London. This measures the spread between consumer and producer prices. The larger the spread the smaller should be tea exports as the larger consumer price would tend to depress demand while the smaller producer price would tend to depress supply.

The estimated equation is:

EXPRATIO=0. 291 -0.170*DVDEP+0. 114*EUDEP-0.426*GDPRATIO

(.27) (6.33) (4.71) (2.02)

+0. 217*TOT-0.691*FSCORES + 2.327*D

(4.72) (2.78) (5.71)

R^2 = .958 ; Adjusted R^2 =. 935 ; DW = 1.53

Where,

EXPRATIO = the exports to developed countries relative to those to developing countries;

DVDEP = the dependency of India's exports on developing countries;

EUDEP= the dependency of India's exports on the EU market;

GDPRATIO= the relative per capita income in developed and developing countries;

TOT = relative price of tea in London to that in Calcutta;

FSCORES = the factor scores for environmental regulations; and

D = the dummy for 1992 shift.

The results show that the stringency of environmental regulations (FSCORES) reduces the share of India's exports going to the developed countries as we had expected. The terms of trade (TOT) also has the expected sign as a higher relative price in Calcutta means a smaller gap between consumer and producer prices and has a stimulating effect both on demand and supply. The positive sign on the shift dummy variable D is puzzling at first sight. Our expectation was that our environmental variable would capture only part of the effect of environmental regulations; the dummy would capture other effects. So we had expected a negative sign for the dummy. The positive sign would however bear out what we had learned through our interviews with tea exporters. Most exporters said that they had experienced some difficulty in meeting the environmental standards initially till about 8 years back. Since then, they have been part of the global competitiveness with compliance.

When the different environmental measures were themselves introduced directly into the regressions, only the maximum residue levels (MRL) for pesticides, had a significant effect. The equation with this environmental variable is given below.

EXPRATIO = 0.321 - 0.141*DVDEP + 0.101*EUDEP -0.114*GDPRATIO

(.30) (4.96) (4.11) (4.90)

+0.211*TOT -0 .468*MRL + 2.364*D

(4.74) (3.43) (4.90)

R^2 =.950; Adjusted R^2 = .927 ;DW= 1.80

The main finding that follows is about the relevance of environmental regulations. Tea is a primary export commodity. It has revealed the impact of regulations negatively. In terms of elasticities, however, more than environmental regulations, the dependency ratios, relative prices and income factor are dominant. Hence, one can see the long-term effect to be one of slowly moving towards improved efficiency, environmental transparency and better environmental conditions in the tea garden sectors in India.

In the case of leather and leather goods, different alternative sets of dependent and explanatory variables are considered. Indian major buyers of these products are from European Union. The regulations are also dominated by these countries. Therefore, the ratio of exports to EU to that of non-EU is considered as the dependent variable. A large number of explanatory variables are considered. Among them are, Indian dependency on European Union (EUDEP), Terms of Trade (TOT) defined as the ratio of World price of leather and leather goods exports to Indian price of exported goods, several dummy variables such as dummy variable for the year 1994 (D1994), Environmental regulation index (FSCORE), GDP of European Union, Market share of Indian exports in European Union, and several others. Further, it was felt that there is some kind of correlation between the regulation index FSCORE and many of the explanatory variables such as EU GDP, Indian Output, Imports by Germany and Netherlands specifically, etc. Therefore, it was felt

necessary to test for seperability of these variables. For this, a logarithmic specification with products of such log variables is also attempted. Since, a large number of models are estimated, they are presented in tabular forms.

Explaining Export of Leather and Leather Goods: Linear models

Explanatory Variables		**Dependent Variable**			
		Ratio of Dependency on EU/Non-EU	**Ratio of Exports to EU/Non-EU**	**Ratio of Exports to EU/Non-EU**	**Ratio of Exports to EU/Non-EU**
Constant		107.82(6.06)*	99.01(5.81)*	-299.906(-3.43)*	-302.237(3.78)*
EUDEP				8.32(4.64)*	8.745(5.59)*
TOT				0.228(0.027)	16.247(2.01)*
D1994					25.714(3.02)*
FSCORE		59.63(6.41)*	66.44(7.47)*	28.902(2.66)*	
Reg. Characteristics	Method	OLS	OLS	OLS	OLS
	R^2 Adjusted	0.785	0.833	0.935	0.940
	D.F.	10	10	9	8

Note: EUDEP= Indian dependency on European Union; FSCORE is the composite index of environmental Regulations; D1994 is a time dummy from the year 1994; TOT is the terms of trade for leather goods.

Explaining Export of Leather and Leather Goods: Log models

Explanatory Variables		Log[Export to Germany+ Netherlands]	Log[Export to Germany+ Netherlands]	Log[Export to EU]	Log[Export to EU]
Constant				-4.66 (-8.28)*	-4.058(-72)*
Log[Indian Output]		-0.199 (-11.71)*	-0.233 (-8.60)*		
Log[FSCORE]				1.585 (1.81)*	0.424 (3.32)*
Log[FSCORE]* Log[Imports of Germany+Netherlands]		0.027 (4.42)*	-0.219 (-1.60)*	-0.188 (-1.34)	
Log[Indian Output]* Log[Imports of Germany+Netherlands]		0.063 (24.44)*	0.068 (16.10)*	0.068 (15.71)*	0.063 (24.42)*
Log[FSCORE]* Log[Indian Output]			0.092 (2.24)*		
Regression characteristics	Method	Step-wise	Step-wise	Step-wise	Step-wise
	R^2 Adjusted	0.997	0.998	0.966	0.964
	D.F.	21	20	20	21

On the basis of the econometric exercise, the following major observations can be made. First, one can clearly say that environmental regulations seem to enhance the trade prospects. Clearly, this is an indication that the Indian leather and leather goods sector, being one of the oldest in the export profession, has already taken sufficient leap in complying with the European environmental regulations and has been maintaining the competitiveness. Second, this is also due to very attractive terms of trade, which has a positive effect of Indian exports. Third, Indian dependency on European demand is very important. Therefore, India cannot ignore the environmental regulations from EU countries. Fourth, a surprising finding is about the role of Indian output, which is found to be negative. Perhaps, only with a model

of demands for leather products both within India as against exports, it may be possible to analyse the relative role of domestic production.

Towards policy formulation

The policy implications that follow from this study can be summarised as follows:

First, it is necessary to treat small scale and large scale producers separately while designing the environmental regulations. The primary commodity productions such as agricultural products do reveal higher burden of environmental regulations in the short run. They require additional time to adjust their cost burden, learn new technologies, to collect information regarding such regulations etc. Training is required in packaging, handling, environmental auditing etc They need to be provided lot more training and information to graduate to become competitive. Second, small scale primary product units require higher doses of subsidies in setting up of combined effluent treatment plants, or cooperative cold storage, packaging units etc. Third, the environmental regulations need to be ranked in terms of their negative effects on the society. The industry specific rankings also be worked out (e.g., severity index for each environmental hazard and the rank of it for each industry, say textile, leather tanning, chemicals and so on). Fourth, as one moves from lower level of manufacturing to higher levels of processing and mechanization, the environmental compliance costs per unit of output are declining. Such industries should set up training centers for their own ancillary units, who are either in the small scale sector or they find the cost impact of environmental regulations to be quite high. More thrust need to be given to set up R & D centres by the large scale manufacturing units to develop eco-friendly inputs, techniques and awareness. Finally, there is need for a geographically widely spread out set up of testing centres by the pollution control boards, to enable the small and medium scale units to get their products certified for environmental clearance.

Chapter One: Nexus of Trade and Environment

1.1: Introduction

The study of the effects of environmental measures on market access of developing countries has been one of the major components of the debate on sustainable development. Sustainable development is a larger issue encompassing efficient allocation of resources, domestic and international environmental imperatives, objectives of poverty alleviation and quality of life and environmental protection for the future generation, and so on. Trade has always been viewed as an engine of growth. Thus, the relationship between trade and sustainable development is fundamental to macro-economic and environmental policies. In a nutshell, increase in trade can enhance availability of goods and resources at some efficient rates; can release stress due to resource crunch and environmental degradation; and hence, can make a positive contribution to sustainable development. This is particularly true for countries that are starved of resources but at the same time face increasing responsibility towards environmental protection.

Now comes the question about national and global environmental imperatives in the context of sustainable development. Ever since the first conference on Sustainable Development was held at Stockholm in 1972, environmental regulations and restrictions have been increasingly instituted in many countries unilaterally, some at the instance of OECD and EU. On a factual basis, as far as market access and competitiveness is concerned, compared to developed countries, developing countries are more vulnerable to the adverse effects of environmental measures. Various reasons have been identified. Lack of infrastructural and monitoring facilities, limited technology choices, inadequate access to (and relatively more expensive) environmentally friendly raw materials and information are some of the major ones. Secondly, small and medium enterprises (SMEs) face more formidable environmental compliance costs, while they may otherwise have a comparative advantage in exporting. Thirdly, developing country enterprises lack the skill and technology required for exploiting the positive trading opportunities generated by environmental measures. Fourthly, developing country exports are more vulnerable to market access barriers on account of their scale and sectoral composition. A

connected problem is the diseconomies of scale on account of small domestic markets. Finally, there is some degree of harmonization in environmental matters in the developed countries, but the same cannot be said about developing ones as they have widely differing environmental standards in accordance with their national priorities (Ulph, 1999).

Environmental regulations cover a variety of facets, from global to national, from national to regional and local issues, from product to sector, from awareness to law. They include, inter-alia, charges and taxes for environmental protection, requirements relating to products including standards and technical regulations, eco-labeling, packaging and recycling requirements, laws regarding labour and hazardness, and endangeredness. Such requirements have significant effects on market access of developing countries like India to enter into the import markets that prescribe them. The effects of the regulations could however, be positive or negative. Positive effects, or opportunities, are not always easy to exploit and require expertise, technology and resources that may not always be available. Negative effects relate to expenditure incurred to adapt to new standards etc., to acquire necessary technology and expertise, to overcome non-availability of materials requirements (like prescribed packaging materials) and the administrative apparatus required in exporting countries.

As far as India is concerned, there are a large number of studies, identifying the major environmental requirements that have been viewed in the context of India's export performance (Bharucha, 1994, 1997; Bhaattacharya, 2000; Murty and Prasad, 1999). For instance, regulations on dyestuffs affect textile and leather sectors. As many as 20 azo-dyes are banned in India, mostly based on rodents' studies showing carcinogenic implications. Standards involving use of certain chemicals based on 'precautionary principle' affect textiles in particular. Presence of fomaldehyde, glyoxal and PCP residues in cotton T-shirts led to denial of market access to exporters (Sankar, 2001). The effect is more significant on SMEs, as cost of compliance could be prohibitive. SMEs found it prohibitive to shift from PCP to Busan-30, the latter costing seven times the former. They also found it unviable to

install effluent treatment plants in the tanneries sector and the Government had to come in to help (Sankar, 2001). Tea exports have been affected due to developed countries concern about pesticide content. Although Indian tea exporters adhered stick to much below the maximum pesticide residue levels recommended by USEPA, stricter limits (e.g. 0.01 mg of tetrafidon and 2 mg of ethion per kg of tea) imposed in some European countries became insurmountable; there being, apart from other problems, a cost of $ 234 per analysis (as per the communication received from Indian Tea Association).

Strict regulations in the food processing and agro products sectors in some developed countries throw up questions not only regarding viability of compliance costs but also on their justification on environmental grounds. Ban on use of all hormones, natural and synthetic, in livestock production by EU is an example. The ban is pervasive, not based entirely on scientific principles and may entail trade restrictions of proportions much higher than the risks that non-fulfillment may create. However, India may not be affected on this account as there a limited use of hormones, but restriction on milk and milk products from animals 'not being stall-fed' has led to problems in market access. Marine products have been facing market access barriers on account of metallic, pesticide and antibiotic contents (e.g., more than 0.2% of benzoic content in shrimps from India compared to 0.06% from elsewhere) or handling, processing and storage regulations (e.g., strict EU regulations on packaging, treatment systems and transport arrangements, non use of child labour and hand gloves). India has banned as far back as in 1982 the export of sea cucumber, a very high valued export marine resource. In Andaman and Nicobar islands fishing for sea cucumber is totally banned. Under the Convention on International Trade in Endangered Species (CITES) and Wildlife Protection Act (WPA) of 1972 several other species (e.g., Tridacna spp., hippopus hippopus, dugong dugong, physter macrocephalus) and corals (e.g., antipatharia spp., scierectina spp., mileporidae spp., tubiporidae spp.) are banned. In many instances the national rules follow the European requirements, making demands on land, water, and increased labour costs. For example, the rules for processing of shrimp in India, based on the European requirements for import of shrimps, contain guidelines

such as the size of washrooms for the employees, use of potable water even for cleaning of walls of the factory, non-use of child labour, use of hand gloves, etc.

Market access barriers on account of non-product related production methods (e.g., shrimp harvesting without the use of turtle excluder device) is another emerging trade and environment related concern. While the WTO has ruled against the restrictions, global environmental concerns are sought to be enforced through unilateral trade measures, which may neither be at the root of the environmental problem nor may be the most efficient means for environmental protection. It may also give rise to protectionist tendencies, much against the understanding of the applicability of non-product-related processes and production methods to the multilateral trading system.

There is a host of regulations having cross-sectoral effects. Examples are packaging materials, product charges, deposit-refund systems and take-back obligations or recycling regulations. The European Packaging and Packaging Waste Directive, for example is based, inter alia, on 'polluter pays principle'. By and large these acts and regulations favour the local producers, discriminating the exporters to Europe with a cost that may not be necessary in their own local conditions. Packing tea leaves in air tight aluminum foil based packets, as against baskets made of grass is a vivid example to cite. Such regulations and conditions are perceived more as restrictive trade practices than as tools for achieving global environmental objectives.

Voluntary measures affecting market access of Indian products is yet another set of trade related environment related information and transparency regulations. The most important among these is eco-labeling. Cost of compliance with eco-labeling criteria in the textile and leather sectors have been found to be prohibitive, compounded by the difficulties in accessing technologies, developing testing facilities and problems in verification of compliance (Sankar, 2001). For example, cost of compliance with eco-labeling schemes by Indian footwear exporters may be 33% of the export price. Voluntary arrangements emerging in recent times also may need to be analysed for their market access impacts.

1.2: Linkages between environment and trade

Three distinct links between trade and environment are recognizable. They are: environmental policies affecting trade flows; transboundary environmental externalities due to trade; and trade flows affecting environments and environmental policies. In all these cases, the two-way linkage between environmental and trade is understandable (Uimonen and Whalley, 1997). A related issue is that of relocation of industries that are environmentally sensitive. This can be either transboundary transfer or reversing direction of trade due to relocation of industries.

Neighbouring countries may be sharing several natural resources commonly. Examples are water resources between Nepal and India, natural gas between Bangladesh and India, marine resources between India, Sri Lanka and Maldives and so on. Exploitation of them for trade purposes by one country may have externality effects upon the other country (World Bank, 1992). Such trans-boundary environmental problems can be politically also quite sensitive. This is particularly so with marine resources of India. In this study this aspect of trans-boundary environment-trade nexus is not attempted.

With the opening of trade under globalisation and liberalisation policies, many countries may attempt to ***relax environmental regulations*** to maintain competitiveness. Italy, which is relatively less advanced than other European countries, has much stricter Carbon Tax laws than many other rich EC countries. Relaxation on phasing out CFC emissions by some developing countries under the Montreal Protocol is yet another example. ***Environmental Dumping*** can take place, by opting for dumping prices on environmental resources, so as to reduce costs of exportable goods (Rausher, 1994). Relocation of polluting industries in countries with less stringent environmental regulations can take place. All these are possible instances of trade induced environmental changes in both the exporting and importing countries. Such 'pollution heaven' situations are not taken up in this study. Trade policies, on the other hand, can also bring about several positive changes in environmental standards and quality as in the event of adoption of eco-labeling and product and process standards, and by the importation of environmentally friendly

technologies. According to Perrono and Wingle (1993), increased international trade has very little adverse effect on environmental quality. But in the context of India, trade liberalisation might have led to greater environmental degradation, due to increased production of more and more polluting industries such as leather, leather products, chemicals and pharmaceutical products. In any case, this whole issue of effects liberalisation and globalisation on environmental resources and also the issue of relocation of industries in 'pollution heaven' situation are do not form part of this study.

It is the third issue, namely effects of environmental regulations in importing countries (as well as in exporting countries) affecting the levels, composition of the basket, and direction of trade for exporting countries, that is taken up as the main focus of this study. Examples are stricter Germany Packaging Standards affecting many exportables from India, ban on jute based products affecting livelihood in jute growing areas of India, or EURO standards on automobiles (with strict CO emission standards) affecting exports from India, stricter environmental regulation on import of cut flowers in the Netherlands affecting exports from Kenya (may be very soon from India also) and so on. Such regulations may increase the costs of production in exporting countries. On the other hand, it is also likely that stricter environmental regulations in importing countries can improve the environmental standards in exporting countries, bring in innovations and efficiency in production (Porter and Linde, 1995). But they may also ask for subsidies, concessions etc., from their own governments in order to improve their competitiveness. For instance, Opschoor and Vos (1989) report about 40 different types of pollution abatement subsidies in OECD countries. There is evidence to show that environmental policies have been substantially weakened by the combination of subsidy and trade protection of polluting industries (Grossman and Krueger, 1993). Another possible situation is relocation of environmentally restricted and dirtier industries in countries with less environmental regulations. It is this issue of effects of environmental regulations affecting the trade pattern alone is focused in this study.

1.3: The Case of Indian Exports with Economic Reforms

India has liberalized her trade in many respects, and introduced various trade reforms in recent years. When it comes to changes in the direction of trade, sometimes it is difficult to segregate the trade reforms effects from the effects of environmental regulations. In the last 10-15 years, India has been implementing both trade reforms as well as environmental standards. For instance, India has introduced several tariff and non-tariff reforms in the recent past. The major reforms that took place in the trade sector are: drastic reduction in import and export duties, removal of quota restrictions on a large number of products, and putting out a big list of products under OGL. Simultaneously, India also imposed several environmental standards and regulations through Water Pollution Act of 1974, Air Act of 1981 and Environment Protection Act of 1996.

Apart from gems and jewelry, the major exports from India are primary products such as tea, coffee, jute, flowers and other horticultural products, and processed and manufactured goods such as leather and leather products, pharmaceutical products, chemicals, dyes, textiles and automobiles. Indian share of world trade is 0.73 percent and of world exports 0.63 percent.

As far as environmental agreements are concerned, India is a signatory to all the major ones. In the Inter-governmental Ministerial meeting of WTO countries held at Doha in November 2001, India strongly opposed the inclusion of trade and environment in the agenda of negotiations (specifically regarding SPS)[1]. There is a very diverse set of views about harmonized standards in respect of SPS as against unilateral standards by individual counties (Thamarajakshi, 2002). India has also set up several environmental regulatory organizations, institutions and mechanisms such as Central and State Pollution Control Boards, requirement of environmental

[1] India held the view that many south east Asian countries just do not have the complete knowledge about the sanitary and phyto-sanitary regulations. They need some more time to know them and comply with them. India also took the lead in opposing the inclusion of the so-called Singapore issues in the agenda of the new round but ultimately accepted them as a compromise.

clearance for all sensitive projects, Environmental Impact Assessment for all new and on-going projects, and ISO regulations[2].

1.4: What this study is about

This is a study on a limited aspect of the gamut of trade and environmental nexus. It is essentially intended to study the effects of environmental regulations and standards imposed by the EU and other countries, particularly those belonging to the OECD, upon the trade performances of India. Trade performance has been assessed taking into account both the volume of trade and direction of trade. Specifically, three export products have been studied. They are leather and leather products, tea and cut flowers. The choice of the products is deliberate. Tea being one of the oldest and prominent export commodity from India (with strong competition from Sri Lanka and Kenya), is highly dependent on land and water. Therefore, it was thought to be appropriate to study it vis-à-vis land and water related environmental regulations (e.g., pesticide control, water pollution etc.). Essentially it is also a primary product in the list of hierarchy of productions (from primary to tertiary). Leather and leather product sector is based on tanning which is known to be one of the most water polluting industrial activity. There are a number of water pollution related and packaging and eco-labeling regulations that affect its export performance (e.g., regulations on PCP control, azo dyes, eco-labelling etc.). Leather being a processing industry is somewhat higher in scale as a secondary level industry (in terms of hierarchy of products from primary to tertiary). Finally, cut flower is a young and emerging export product from India. It is both land related and also substantially related to modern capital such as cold storage, cold chamber transport facility, and packaging requirements. Therefore, there are possibilities of environmental regulations affecting them both positively and negatively. Once again, it has links with both primary (i.e., horticulture) and tertiary sectors (i.e., transport, packaging, cold storage, shipping etc.). Details on their trade pattern etc. are presented in Chapter Three.

[2] See Appendix to Chapter Four for a list such regulations and standards

There are three distinct aspects of these regulations that need to be studied. First, environmental regulations have significantly evolved over time during the last three decades. Secondly, as is obvious from the discussion in this introductory section, there are a variety of regulations, ranging from prohibitory and mandatory to voluntary and informatory. Thirdly, they have emerged at the instance of country initiatives (e.g., Germany or USEPA), or group or trading bloc initiatives (e.g., OECD or EU). They have also flowed from multilateral environment agreements (MEA) such as CITES[3]. Then there are Indian domestic specific environmental regulations. Examples are Indian Water Act of 1974, Air Act of 1981, Environmental Protection Act of 1996, Pollution Control Board's standards and listed sectors and products in the categories of major polluting industries for priority action[4]. It is also intended to look at the effects of the environmental regulations and conditions upon global competitiveness in trade. A major contribution that emerges from this study is to view the above-mentioned three aspects of environmental regulation in an integrated manner. The subject is examined from different perspective (country wise, trading union wise and over time) using different econometric methods presented in Chapter Four.

The theoretical foundation regarding gains and losses due to non-tariff barriers imposed for environmental reasons have been studied by a large number of scholars (Siebert, 1973; Ulph, 1999; Barrett, 2000; Porter and Linde, 1995). Therefore, no specific attempt has been made to investigate the theoretical aspects of the trade and environmental nexus. Instead, a review of all the theoretical studies and the most relevant empirical studies is provided in Chapter Two. Chapter Five presents the experience of Indian exporters on the three products, specifically related to environmental regulations.

The methodology of this study is briefly described here. First, the trade patterns in respect of all the three products are reviewed using a time series data from 1980 onwards. Both the volume and direction of trade are analysed. The major breaks and

[3] As far as WTO or GATT are concerned, except for SPS, Agreement on Agriculture, and TRIPS no other additional environment related regulations are introduced. See Chapter four for some details.
[4] See Appendix to Chapter Four for the list. Additionally, there is a list of 64 industrial activities which are classified as "Red Category", based on their emission/discharges and hazardousness.

shifts in the trade patterns are noted. Then, time series information on environmental regulations in various countries (mainly Germany, USA, the Netherlands, UK, European Union) are analysed. They are grouped as precautionary, prohibitionary, mandatory, informative, and transparency types. They have been indexed, based on the information about their stringency. Time series of aggregated indices of environmental regulations and restrictions are compiled and analysed. Subsequently, a trade model is formulated in the traditional sense, using terms of trade, trade related pull and push factors (i.e., demand and supply), and with and without environmental regulation indices. The model is estimated econometrically. A hypothesis is formulated to say that environmental compliance costs are severe on the primary export commodities, because of which they do seem to have revealed negative impact of environmental regulations upon their export levels. Whereas, as one moves to higher and higher order of product exports, the environmental compliance costs tend to become negligible and hence they seem to have internalized the burden of such costs and have emerged with improvements in technology and innovations to gain from trade. The hypothesis is tested using the estimated trade model. All these are presented in Chapter Six. The last chapter summarizes the findings for policy imperatives.

Chapter Two: Review of Literature on Trade and Environment Linkages

2.1: Introduction

The literature on trade reforms and its effects upon national economies is quite rich (Dean, 1992; Jaffe et al, 1995; Jha et al, 1994; Anderson and Blackhurst, 1992). Three different strains of literature exist[5]. They are:

- Studies on the effects of stringent 'environmental regulations and acts' upon exporting and importing countries in terms of levels, direction and quality of commodity traded (van Beers and van den Bergh ,1997; Jaffe et al., 1995);
- Studies on the effects of trade liberalization and globalisation upon environmental conditions in the exporting countries (Khan et al., 2001);
- Studies on environmental dumping and on shifting of locations of export oriented industries to countries with less stringent environmental regulations (Birdsall and Wheeler, 1992; Mani and Wheeler, 1997; Low, 1992).

The focus of this particular study being analyzing the effects of environmental regulations and acts in the importing countries and multi-lateral environment agreements upon exporting developing countries (with specific reference to India), we concentrate mainly on the literature of the first type, but cover marginally the other two situations as well[6].

2.2: The case of Environmental Regulations as non-tariff barriers

The starting point here is that environmental regulations are treated as non-tariff barriers. Here, the commonly held view is that importing and exporting countries incur some welfare loss when environmental regulations, standards and protocols are introduced, otherwise attainable through free trade (Ulph, 1999; Markusen,

[5] Khan et al make further distinction among these three broad categories of situational analysis into six by separating cases of increasing mitigating costs of exporting countries, resource exploitation in resource rich countries (against conservation ethics), etc.

[6] The intention of providing literature survey on all the three aspects is basically, to provide clues for additional research work required to understand the nexus between trade and environment. See Bhagwati (2000) for a discussion on these.

1999). This argument is based on the economic theory of comparative advantage, wherein with restrictions of various types (tariff and non-tariff barriers to trade), the trading countries would lose the comparative gains from trade (Bhagwati, 1993).

The empirical findings on this hypothesis are quite mixed (van den Bergh, 1999). The empirical approach commonly has been to take a look at the costs of compliance of environmental regulations vis-à-vis all other costs, and make judgments regarding the effects of increased costs upon the comparative advantage in trade. Studies by OECD (1978, 1985), based on selected data from OECD countries, are perhaps the first providing some evidence in favour of the negative effects of environmental regulations on trade. The OECD (1978) study also takes account of the effects of inter-industry linkages in calculating Environmental Control Costs (ECC) on output in Japan, the Netherlands, Italy and the United States. Ugelow (1982) summarises the overall results as follows: The increase in prices due to ECC is not highly significant, but is sufficient to trigger some reduction in output and exports.

Murty and Prasad (1998) and Murty and Kumar (2001) provide two separate empirical results on this issue from India. In their 1998 study Murty and Prasad find some evidence on the negative effects of environmental regulations on trade. They take a look at 13 highly water polluting industries in India and their competitiveness in world market. Using time series data from 1973-74 to 1993-94, they estimate the domestic resource costs (DRC) and compare them with the official exchange rates. They find that petroleum, leather, zinc and copper lose their competitiveness if pollution abatement expenditures increase by 5 %. If the pollution abatement costs go up further by 10%, then industries such as sugar, paper, iron and steel also lose their competitiveness. Through an econometric model of export performance as a function of DRC, value of industry's output, and dummy for environmental policy, they find that about 11 water-polluting industries have negative estimates for the environmental dummy, five of them being significant at 5 or 10 percent levels[7]. The second study in 2001 by Murty and Kumar reveals somewhat different result of

[7] Interestingly, the only two industries having positive coefficients of the environmental regulation dummy are Chemicals and Leather. This result is a bit surprising, as we commonly understand that these are he two major industries having significant effects on environmental quality.

performance by the water polluting industries in India. They come up with some evidence to Porter-Linde hypothesis of improving production efficiency with the imposition of environmental standards among water polluting industries in India. Using a panel data for three years from 92 water polluting industries, they find the efficiency of production to be improving with a composite index of regulations on BOD, COD and SS, and Water Conservation Index. The question that arises is whether the water polluting industries are indeed gaining efficiency because of environmental regulations (on BOD, COD, SS) and Water Conservation Act of 1974, and if so, why should they have experienced a downward trend in exporting? There are two possible answers to such a contradiction. First, among the environmentally sensitive industries there are some industries such as Chemicals and Leather which are still affected by environmental regulations and are yet to attempt to improve their efficiency in production. Other industries such as steel are likely to have overridden compliance costs with significant efficiency gains. Second, efficiency gains induced by environmental regulations (a rider from Porter and Linde) may not be sufficient for explaining improvements in trade performance.

One can cite at least three other studies from India on the issues related to trade and environment. Parikh et al (1993) studied the effects of environmental regulations in India upon her export performances with respect to leather and shellfish. Stringent export standards seem to have increased the cost of production, adversely affecting the comparative advantages. According to the survey of exporters reported by them, adhering to German packaging regulations would cost twice the amount as compared to domestic supplies of tannery products. The fish and shellfish exporters, however, till then had not yet come under strict environmental regulations. But with the regulations coming in soon, they are bound to affect the costs of exports. The second study is by Chopra and Agarwal (1999). Having constructed an Environmental Regulation Index, they have tested its effects on two categories of agricultural products, namely, horticultural products and, plantation products (tea and coffee). Their findings about the effects of environmental regulations upon export performance from India are a bit mixed, being positive on exports of plantation products, but negative on horticultural products. The third study by Bharucha (1994, 1997) reviews the Indian experience with exports of refrigerators (for phasing out

CFC's), tea (reducing ethion, child labour and pesticides; adhering to packaging regulations), dyes (ban on benzidine, adhering to Eco-text standards), agricultural products (ban on use of pesticides in food crop production), leather and footwear (elimination of PCP, eco-labeling), and textiles (ban on azo-dyes, Eco-marking). He finds that Indian exporters are aware about environmental regulations, but they will take time to adjust for those. He also notes the lack of institutional mechanism to deal with this emerging trade and environmental problem. The environmental regulations are bound to negatively affect the export performance, unless a balanced approach between development, trade and environment is prescribed for developing countries.

A review of experience with environmental regulations in developed countries may also be useful. Robison (1988) used an input-output framework to trace the effects of environmental costs upon the trade balance in USA, after eliminating all the general equilibrium effects of exchange rate shifts, income changes etc. He comes to the conclusion that marginal changes in abatement costs will affect the U.S. balance of trade; but the impact would be quite small overall. Using an I-O approach he assumes full pass-through of ECC to prices. In this way he claims to generate upper-bound estimates of net trade impacts. In his computations the ratio of abatement cost content of U.S. imports to that of U.S. exports has risen from 1.151 to 1.389 between 1973 and 1982. He concludes that the comparative advantage for USA has shifted away from goods, which have high abatement costs. When the same calculation is done for U.S. trade with Canada, no change in this ratio is found. He hypothesizes that this might be due to similar ECC in the two countries. With a hypothetical scenario of an increase in abatement costs by 1 percent, he estimates for 78 sectors (both manufacturing and non-manufacturing), the impact on the 1977 sectoral trade balance in relative price (including both direct and indirect effects). The impacts on total U.S. sectoral trade (value) range from -0.12 percent (special industry machinery) to -7.08 percent (copper) for merchandise sectors, with an average impact of -2.69 percent. Omitting all mitigating general equilibrium effects, which might have come from exchange rate or income changes, the aggregate effect on the U.S. trade balance is calculated. For 1977, the net reduction is 0.67 percent of the value of U.S. total trade.

Are there counter empirical evidences in developed countries on the 'negative effects of environmental regulations on trade'? Tobey (1990) finds such an evidence again for the USA. He takes a completely different approach to testing whether or not ECC have any impact on U.S. comparative advantage. Following earlier work on shifting patterns of trade by Leamer (1984) and Bowen (1983), he employs a cross-section 'Heckscher-Ohlin-Vanek' (HOV) model. Beginning with 64 agricultural and manufacturing industries, Tobey calculates the total ECC as a percentage of total costs of production. Pollution-intensive industries are those, whose ECC/TC exceeds 1.85 percent, being 24 industries in his data set. Even for these industries, the range is 1.92 to 2.89 percent. These sectors are aggregated into five groups: mining, primary non-ferrous metals, paper and pulp, primary iron and steel, and chemicals. For each of these five groups, net exports are regressed on U.S. endowments of 11 resources (labour, land, capital, and natural resources). Additionally, he includes a dummy variable for ECC stringency as an additional explanatory variable. Presumably, in an HOV model of this type, he is implicitly assuming that more stringent ECC are correlated with environmental scarcity. Thus the dummy variable should have a negative coefficient. Then, this Dummy variable actually does not measure stringency. Secondly, this taxonomy ignores the fact that countries may be presently pursuing non-optimal environmental regulation. In that case stringency is a poor indicator of environmental endowment. If the stringency dummy is correlated with ECC, then this may be a good test of whether relatively high ECC tends to decrease net exports. He finds no significant impact of stringency of ECC on trade patterns[8].

But there are others studies from USA, showing the low cost implications of environmental compliance costs. A paper by Patrick Low (1992), on the basis of data available till then, suggests that pollution abatement and control costs to US firms are small. The weighted average ratio of such costs to output was only 0.54% in 1988. The highest ratio for a single industry was just over 3%. The paper estimates the trade effect of a "pollution abatement and control equalisation tax" on imports entering the US. The analysis focused on Mexico's exports, and demonstrated that

[8] His second test is an omitted variable test. If ECC does have an impact on net exports, then with stringent regulations DCs should have a negative expected sign in the error term, while the opposite is true for countries with lenient regulations (e.g., LDCs). The null hypothesis is that there will be no difference in the expected signs of the error terms. Tobey finds that the null hypothesis can't be rejected.

even under the unrealistic assumption that Mexican industry incurred no abatement costs at all, and that exports were therefore liable for the full equalisation tax, the trade effects of such a measure would be small. But there is a catch in the arguments by Low. The real costs to US industry, however, may be higher than the pollution abatement and control costs. Even though the data cover a broad range of expenditures, including a depreciation allowance for pollution abatement machinery, certain costs appear to be excluded. The capital costs on which the depreciation figure is based relate to end-of-pipe adjustments to installed capital equipment, and not to new machinery. There may also be certain lower cost production processes and techniques which are prohibited and therefore do not appear in the cost data, but which do impose a hidden cost on affected users. This factor could be important, bearing in mind the degree to which US environmental policy depends on direct regulation.

There are many more studies suggesting the contrary empirical findings (or inconclusive findings in both developed and developing countries (Verbruggen et al., 1997; Markandya, 1995). Sorsa (1994) argues that there is little systematic relationship between trade performance and increases in environmental standards or expenditures. With data on trade in environmentally sensitive goods (14 products at 3 digit level and 3 products at 2 digit levels over the past two decades from countries such as Austria, Finland, Germany, Japan, Norway, Sweden and the United States), the developing countries' share in the imports of Environmentally Sensitive Commodities (ESCs)[9] have not been found to decline for the selected European countries. It is found that the higher environmental standards have not affected competitiveness of trade. It is also found that developing countries' Revealed Comparative Advantage (RCAs)[10] increased in most of the selected environmentally sensitive product categories. Correlation analysis showed no negative correlation between trade shares and environmental expenditures in Germany, Japan, and the United States. It is further argued that protection from imports from countries with

[9] ESCs are defined as those having incurred highest pollution abatement and control costs in the US in 1988.

[10] The formulae used for calculating the RCA index is RCAji =(xji/Xjt)/(xit/Xtw) where j is industry, i is country, w world and t total. xji is the value of country i's exports of j and Xjt is the country's total exports of commodity j. The index goes up, for example, when the country increases its share in the world market of the product; it can go down if the country's other exports go up or if the country share in world trade declines. The RCA ignores the impact of some protectionist barriers in distorting trade patterns between alternative source of supply, or trade not taking place because of protectionist barriers.

different standards (non-harmonization) is not justified, nor would it help competitiveness. It is also argued that higher standards can contribute to improving competitiveness in environmentally sensitive goods.

Are there studies with developed and developing countries taken together? van Beers and van den Bergh (1997) takes a fresh look at the data of Tobey (1990) of bilateral trade flows between 23 developing and developed countries with a trade gravity model. Distinguishing two types of environmental regulations (they call them policies) as *broadly* and *narrowly* defined, and distinguishing the industries as 'non-resource based' and 'resource based', they come to the conclusion that 'Non-resource based' industries seem to have shown negative effects of environmental regulations; whereas they do not exert any significant effects on resource based industries. Secondly, whenever, environmental regulations are *narrowly* defined, there seems to be some evidence that they have a negative effects on the exports of the affected industries (be they resource base on non-resource based). Broadly defined environmental policies seem to have a neutral effect on the trade pattern. Based on these findings, they warn that importing countries may not use *narrowly* defined environmental regulations as alternatives to non-tariff barriers.

Doubts have also been raised about the definition of Environmental Control Costs. It has been suggested in a recent work by Chapman (1991) that generally ECC are underestimates of true environmental costs, as they do not include workplace health and safety protection costs. There may be room for more work along the lines of Robison and Tobey, but with better estimates of the actual costs imposed on industries due to environmental regulation. However, it is unclear that this would yield a significant impact on trade patterns, unless it implied radically larger ECC across all regulated industries. A more general point is that pollution abatement and control expenditures may not cover the full cost of internalising the environmental externalities. Full internalisation could entail significantly higher expenditures. Perceptions about the existence or the degree of an externality are likely to differ among countries. In a sense it is a game theoretic problem. Trade restrictions are an economically costly means for one country to use in trying to induce another to internalise pollution externalities, and they do not guarantee success in terms of the

environmental outcome. Co-operation is much more likely to offer a worthwhile result.

Do we have some theoretical foundations on the nexus between trade and environment? There is at least one theoretical work by Siebert (1997) to demonstrate the negative effects of environmental regulations on trade. Using a two commodity two country model, in which one country is small, Siebert argues that 'in the case of small countries, if environmental policy is undertaken, environmental quality will improve but gains from trade will be reduced. With the introduction of environmental policy, resources use in the pollution intensive sector (and its output) will decline. Moreover, the quantities exported and imported will fall, and pollution abatement will increase.

On the other hand, there are at least two different theoretical strains of literature to counter this argument. Fredriksson (1997) develops a theoretical model to explain why increases in the stringency of environmental regulations do not have the expected effects on the patterns of trade. He argues that demand for environmental regulations simultaneously increases pollution tax as well as demands for pollution abatement subsidy and import tariffs in the exporting countries. This enables the exporting countries to have some revenue benefits and the producers get the subsidy benefits (Double dividend argument, Kahn and Farmer, 1999; Pezzey and Park, 1998). The net effect on the direction and quantum of trade is not predictable. The second set of literature refers to added long run competitive advantages emerging from environmental regulations, encouraging innovation among exporting firms (Porter and Linde, 1995; Jaffe et al., 1995; Low, 1992). To quote Porter and Linde (1995):

"*..that properly designed environmental standards can trigger innovation that may partially or more than fully offset the costs of complying with them. Such 'innovations offsets', as we can call them, can not only lower the net costs of meeting environmental regulations, but even lead to absolute advantage'' (p.98).*

The thrust of their argument is that environmental regulations bring about improved efficiency of resource use. Palmer et al, (1995) counter this argument, by showing

how increased stringency of environmental regulations can reduce the profit rate, thereby not making firms to go in for R.& D in any big way. Interviews with several large firms in USA indicated that 'environmental regulations are not cost-free paradigms.

2.3: The Case of Migration of 'dirty industries'

This is all about the second types of trade and environmental nexus. The commonly held view about the process of development in the context of stringent environmental regulations is that dirtier industries migrate to countries with less stringent regulations, commonly known a 'pollution haven', or 'cheap labour haven'. This argument seems plausible because of (a) increasing globalisation and financial market liberalization, and (b) decline of traditional barriers such as tariffs, reduction in high transport and market information cost etc. A large number of studies have, however, come to the conclusion that there is not much evidence to support this line of thinking (Jeffe et al. 1995). Some specific studies however may be reviewed here.

On the question of industrial relocation and environmental policy, Low and Yeats (1992) examine (1) how the environmental policies affect the industrial location and in what magnitude, (2) how the production characteristics of these industries are getting influenced by the locations? They use the actual trade flows and a modified revealed comparative advantage (RCA) model to analyse the pattern of different countries RCAs within specific industries on 43 SITC (environmentally) dirty industries (identified on the basis of pollution abatement and control expenditures in the USA). It is implicitly assumed here that the higher the expenditure on pollution abatement and control, the dirtier an industry. According to them, there are two main lines of analysis concerning trade of environmentally dirty goods-- one relates to the share of such goods in international trade and trends in that share over time; another deals with the geographic and economic characteristics of countries in which this trade originates. The analysis concludes that the increase in the RCA of developing countries was far greater than that of the industrial countries and dirty industries accounted for an increasing share of export of developing countries. There is an overall decrease in the share of exports from dirty industries out of total exports of

industrial countries as well as of such exports in world trade. They also note that net de-concentration has occurred in both polluting and non-polluting industries, but the degree of dispersion was considerably greater in the former. They conclude therefore, that it is the cost factor that emerges from differences in environmental regulations among countries that influences the location of investment in dirty industries.

However, their analysis is inconclusive as to why this happened. The use of trade flow as an indicator of locational changes in dirty industries may become misleading if national patterns of production and consumption are increasing at different rates. Except a brief mention of the possibility that relative labour-intensity could explain dirty industry location (though with weak evidence), this paper does not permit a more thorough analysis of alternative explanation for industry location decisions. Data from US on pollution abatement and control expenditure cannot capture particular instances of environmentally motivated investment decisions. Evidence of dirty industry dispersion examined in this paper is unlikely to be adequately explained by environmental policy. There are several other reasons such as lower labour costs, or high natural resource endowments that may explain the re-location of industries much more strongly than the environmental regulations.

Taking the economic development changes the sectoral composition of production (across countries and through time), the relocation of dirtier industries occurs at least on the basis of broad differences in trends of environmental regulation across differing time periods (during the period of enhanced OECD environment regulation) and the speed of growth of pollution intensive industries due to trade liberalisation Lucas, Wheeler and Hettige (1992) analyse these questions using the data for 80 countries from 1960 to 1988 (US Environmental Protection Agency's Toxic Release Inventory; Output data from US Census Bureau, UN annual report data). Their main findings are summarised here.

1. Effects of Economic Development: The growth in toxic intensity[11] is rapid in the developing countries; that there is no transition to lower the toxic intensity in

[11] Intensity = Industrial emissions/GDP

manufacturing at higher income countries - it declines only because the manufacturing share in GDP declines beyond a certain level of income.

2. OECD environmental regulation & displacement: Results suggest that stricter regulation of pollution-intensive production in OECD countries have led to significant locational displacement, with consequent acceleration of industrial pollution intensity in developing countries.

The authors note that industrial pollution levels depend on both the size of the industrial base and the pollution intensity of the industries concerned. The observed phenomenon merely reflects dispersion or industry expansion, as opposed to displacement. The paper finds only a composition effect, so there is no evidence that the industry has uprooted from industrial countries. Another finding is that the effect of economic growth on pollution changes is significantly smaller in open economies than in closed economies. The elasticity of pollution change with respect to economic growth is substantially smaller in open economies than in closed economies. This is quite surprising because one would expect that a policy change may cause a once-for-all effect in pollution intensity rather than a dynamic effect that would alter pollution income relationship as the results seem to suggest. The results lead to the conclusion that the change of composition of output that economic growth induces is not sufficient to revert the tendencies toward increasing toxic emissions. The only way of achieving this is via technological change that permanently decreases the pollution intensities of industries. However, to focus exclusively on output composition effects does not bring us very far in the analysis of the effect of openness on pollution. Other factors, which the paper does not examine, are technology choice, pollution abatement activity and productive efficiency.

To investigate the degree to which whole industries have been relocated to countries with more lenient regulations, Pearson (1987) points out, there is no a priori reason to believe that increased output in the environmentally abundant country will be captured by multinationals as opposed to domestic firms. There is also no a priori reason to believe that LDC's are relatively environmentally abundant compared to DC's. Pearson notes that empirical investigations of this issue must contend with the

following difficulties: there is no unambiguous definition of ECC; any observed change in foreign direct investment (FDI) is influenced by other economic variables other than ECC; no good data on foreign ECC exist, rendering it impossible to really calculate the impact of differentials in ECC. Pearson (1987) surveyed several studies, all of which tend to support the conclusion regarding insufficient evidence for industrial flight to developing countries.

2.4: Trade liberalization and Effects on environment

The pertinent question here is regarding demands made by the trade liberalisation process upon natural resources and the environment. A paper by Anggito Abimanyu (1996) intends to analyse the different ways in which international trade and trade agreements affect the environment of a country within a regional co-operation effort, and the ways these effects pertain to international environmental policy. It examines how the structure of manufacturing activities varies both across counties and through time, and in conjunction also looks at dirty-industries/product migration from developed countries. The focus is on APEC. The analytical approach employed in this study firstly utilises, actual trade flows of dirty industries and modification of Balassa's (1956,1979) Revealed Comparative Advantage (RCA) model and secondly develops some proximate determinants of variations in the imports of industrial dirty products. His results show that dirty products have expanded faster in developing countries than the average of all industrial countries over the past decade. Testing of the 'pollution havens' hypotheses, however, is hindered by the lack of evidence of freer trade flows due to different environmental standards. The international pattern of dirty-product migration in the APEC region (using a two-stage regression with cross-section data sets from two different years, statistically tested) is that the macroeconomic and import tariffs had the relatively highest significant influence. It has also been concluded, however, that the difference in environmental standards between DC's and LDCs was not a significant variable influencing the location of dirty-product import.

Walter (1982) looks at trends in FDI by firms from Western Europe, Japan and the US (from approximately 1970 to 1978) both in terms of industry mix and destination.

He concluded that although large amounts of overseas production in pollution-intensive industries exist, there is little evidence that it has been influenced by differing ECC. The study concludes that the trends in foreign FDI into the US also provide similar results.

Duerksen and Leonard (1980) determined whether ECC differentials have led to industrial flight towards LDC's by employing trade and investment data. The important results were: host countries which received the most overseas investments in pollution-intensive chemical, paper, metals & petroleum refining were other industrial countries (not LDC's); the percentage of US FDI in pollution-intensive industries in LDCs compared to DC's did not increase significantly. They concluded that there was limited evidence of widespread relocation of US industries to pollution havens. A study on West German FDI conducted by Knogen (1979) also indicates the same result.

Leonard (1988) presented case studies of FDI in Ireland, Spain, Mexico and Romania arguing that the industrial flight and pollution-haven hypothesis, are based on too static an idea of comparative advantage. Examining aggregate trade and investment statistics, Leonard sees no evidence of large-scale industrial flight as a response to US environmental regulations. However, the savings realised from the absence of pollution controls were not substantial enough to alter the locational preferences of multinational firms. Other factors, such as the level of training of labour, infrastructure and stability were much more important in locational decisions. In addition, growing concern by these countries for the environment has influenced their bargaining process with multinationals. Leonard argues that these countries should not be called pollution havens in any sense today.

Another issue in need of further research is whether firms that locate in low income countries are dirtier than they would be if they located in industrial countries. As discussed in papers, particularly those by Birdsall and Wheeler (1992) and by David Wheeler and Paul Martin (1992), there are reasons why firms might wish to eschew this strategy even if it appeared that differential environmental regulation offered a

competitive advantage. Such reasons include fear of liability in the event of an environmental accident, the risk to a firm's reputation from an environmental scandal, the costs of unbundling technology, the demands of consumers ("green consumerism") in export markets, anticipation of more stringent local environmental standards in the future, and the relatively high costs of retrofitting ageing capital equipment instead of starting out with "top of the line" technology. All these considerations would act as disincentives where firms were tempted to differentiate production processes and techniques according to location.

However, as a matter of theory, economists hold that the logic of comparative advantage should cause pollution-intensive industries to move, over time, to low-standard jurisdictions. The dynamics should be most evident in industries where pollution-control costs are above average, meaning that compliance costs feature relatively more heavily in locational decisions. Some studies support this theory. For instance, a 1990 US General Accounting Office study (Report on the Furniture Finishing Industry, Washington D.C., which bears heavy expenses for treating toxic wastes from paints, varnishes & solvents) found some companies moving out of California to avoid the state's strict pollution control requirements. A 1991 OECD analysis also observed that some shift of comparative advantage to countries with lower environmental standards in pollution-intensive textile and leather tanning industries had occurred. A 1993 OECD study concluded that some environmentally dirty activities, particularly in the resource-based sectors (e.g. the Phosphate Fertiliser Industry), had migrated to lower income countries with weaker environmental standards, and that result was a graphical shift in production capacity within sectors with a consequent acceleration of industrial pollution intensity in developing countries.

On the other hand, if environmental compliance costs go up significantly and differentially among countries in the years to come, environmental policy regimes could become an important determinant of the location decisions of firms. Diwan and Shafik (1992) report that while industrial countries are responsible for 75% of world output, they account for 61% of world emissions. Capital stock per capita is fourteen

times higher in industrial than developing countries, but carbon emissions as a portion of capital stocks are one third lower. These figures are suggestive of the use of dirtier technologies in developing countries, at least as far as one pollutant is concerned, but further information is required in order to establish how much of the difference in pollution intensity is attributable to industry composition rather than technological differentiation. Whatever the answer to this particular question, the interesting policy issue is what occurs at the margin, in relation to new investment.

While the developed countries are imposing more stringent environmental standards, the so-called environmentally sensitive industries (dirty industries) are found to be expanding faster in South Asia. It is argued that many dirty industries have migrated from developed countries to this region due to the stringent environmental standards back home (Bharucha, 1994). The expansion of such dirty industries causes long-term environmental damage in the region by polluting soil, water and other natural resources. Mollerus (1994) examined the issue of migration of dirty industries with special reference to SAARC. Export data was examined to identify whether there have been significant changes of world trading patterns of products manufactured by polluting industries for the period 1982-92. A comparison was than made of the trade in product from polluting industries based in North America, the European Union, Japan and SAARC countries. Dirty industries in SAARC are identified on the basis of pollution abatement and control expenditure of US manufacturing industries. This approach was taken because systematic data concerning the pollution control costs in SAARC countries was not available from other sources. He divided the dirty industries of SAARC into four groups. Products from SAARC that are gaining in market share where world trade is increasing (rising stars), gaining in market share where world trade is declining (waning stars), losing in market share where world trade is increasing (missed opportunities) and losing in market share where world trade is losing (retreats). The results indicate that products from half the polluting industries exported from SAARC countries represent a decline in world trade in which SAARC polluting industries are gaining in market share. This shows the significance of dirty industries in the SAARC region.

2.5: Some major conclusions from the literature surveys

Thus, going by the available empirical studies, so far no strong evidence in favour of a negative effect of stringent environmental regulations on exports has been found. As argued by van Beers and van den Bergh (1998), either environmental costs are not significant, or pollution abatement subsidies have come in place (Opschoor and Vos, 1989). Van Beers and van den Bergh (1997) test the data by Tobey (1990) of bilateral trade flows between 23 developing and developed countries with a trade gravity model. According to them, more stringent environmental regulations have increased the levels of exports. Jaffe et al (1995), based on a detailed study and survey of various other studies come to the conclusion that effects of environmental regulation can be either small or too difficult to detect. Its effect on trade, growth and productivity all seem to be insignificant. Rather, as argued by Porter (1991) industries move to more cost-effective processes including reducing emissions, to become more competitive.

In a major countrywide study on environmental regulations upon trade performances in developing countries Jha et al, (1999) come to the following major conclusions:

"To conclude, the evidence from these case studies in how foreign environmental regulations impact on a developing country or transition country is mixed. Many of the larger exporting countries claim that the effects have been small, and in most cases manageable for the exporters. In several cases the adoption of the stricter standards not only decrease environmental damage, it also increases efficiency and profits for firms." Pp. 15.

The country specific experience in this respect is summarized in Box 2.1

Box 2.1: Cross-country Experience with Environmental Regulations

Country	Commodity/Sector	Observations/Findings
Brazil	Natural resource based products; Food products, timber, paper and pulp, textiles footwear	Vulnerable to external environmental requirements. Small and medium enterprises tend to have greater difficulties with compliance than large firms.
China	Cement,	External Regulations have reduced waste, increased profits,
Colombia	Fish, Tropical fruits,	German packaging regulations on fruits and US Tuna-fish embargo had affected exports.
Costa Rica	Fish, natural resources	Not much evidence of environmental regulations affecting trade. Tuna fish embargo of USA has affected the exports of fish.
India	Leather goods and Shell fish, automobile and pharmaceuticals	Costs of exports have gone up. German packaging rules are difficult to implement, as the materials are not available. So is the case with substitute for PCP.
Malaysia	Timber, textiles, air conditioners and electronics	Earnings from exports have gone down.
Philippines	Printing, food processing, pottery, non-ferrous metals	Foreign regulations have not affected their trade.
Poland		Being a country in the process of inclusion to the EU, they have met environmental standards
Thailand	Fish, tuna, shrimps, Fruits, textiles, footwear	Vulnerable to external environmental regulations
Turkey		No problems in applying external environmental regulations as the technologies were readily available.
Zimbabwe	Beef, Live birds, Textiles, footwear	External regulations have affected trade; German packaging rules have affected trade.

Chapter Three: Trade Performance of Leather, Tea and Cut-flower Industries in India

3.1: Introduction

As mentioned in the first chapter, three specific products of direct relevance in Indian exports as well as to environmental regulations are studied. They are tea, leather and leather products, and cut flowers. The reasons for their selection are also already mentioned in Chapter One (specifically Section 1.4). In terms of levels of exports, these three products do not rank very high. But, both tea and leather and leather goods have a long history and reputation in Indian export trade sector. Although a great deal of tea is exported by Sri Lanka and Kenya, the traditional tea consumers all over the world look for Darjeeling tea (traditionally known as Dorje-Ling).

Indian tea export in the year 2000-01 was of the order of US $ 432.5 million, as against the total exports of US $ 44560.3 million. Exports of leather and leather goods stood at US $ 1951.5 million. The traditional trading partners in leather and leather goods or tea have remained fairly the same over the last two decades. In the case of leather and leather goods the major buyers are USA (about 18%), Germany (about 15%), and UK (about 14%). Likewise, Russia (about 27%), UAE (about 14%) and UK (about 11%) are major tea buyers. Cut flowers being a new industry in India, has attained very marginal export share so far (US $ 16 million as against a total world imports of US $ 3739 million).

In the sections that follow we present the trade related scenarios in respect of the three commodities being studied for their response to environmental regulations.

3.2: Leather Products Exports From India: Trends and Patterns

3.2.1: Preamble

Leather industry has a strategic importance in the development process of India. India has a comparative advantage both in production and exports of leather products. Its leading position both in production and exports of the product is mainly attributed to large raw material base, availability of cheap labor and rich craftsmanship. The leather industry as one of the major foreign exchange earner of the country has undergone complete metamorphosis during the last two decades. Now it spreads across different segments from tanning and tawing to leather garments. There are more than 400 enterprises in this sector, mostly small and medium sized. Most of them are concentrated in the South particularly in Tamilnadu. The industry has attained merited recognition in the international market with the export of high fashion leather bags, wallets, travel luggage, belts and leather footwear. European life style has been adopted with Indian leather design and workmanship. The industry occupies a prominent place in the Indian economy because of its massive potential for employment, growth and exports.

The leather industry has evolved from being exporters of raw materials in the sixties to that of high value added finished products in the nineties. Active government support was instrumental for such a change. The industrial, trade and fiscal policies introduced by the Government after 1991 have paved the way for greater technological advancement and international competitiveness of the leather industry. Export of most of the items of leather industry is allowed free of any quantitative restriction or export duty. Export of raw hides and skins and semi-processed leather tanned hides and skins, which required a license earlier, have also been made free (vide GOI's Gazette Notification dated 13th January 2000). Raw materials such as raw hides and skins, wet blue chrome tanned leather, crust leather as well as finished leather are allowed to be imported without any license under the new trade policy. The present liberalized environment provides immense opportunities to tap the vast domestic market, for sourcing exports and to derive competitive advantage in the global market. Recent developments linking trade and environment have

brought new challenges to this growing industry. With problems on the export front like ban on the use of pentachlorophenol (PCP) as preservative and the use of aryl amine group of dyes, the leather industry has to reorient its strategy for export growth. Low quality and poor environmental standards are the major weaknesses of Indian leather industry and its exports. The trends and patterns in the export of Indian leather products are examined hereunder.

The production level and capacity of the industry will have a major influence on the export performance of the sector. The data shown in Table 3.9a discloses that there is a slow and steady rise in the value of output from organized leather industries in India during the last two decades. Tanning and tawing branch accounts for one-third of the sector's production, whereas leather baggage and garments accounts for 21 percent of production. Footwear industries take the remaining share in the sector's production. But data on production of leather industry covers only the organized leather sector. According to one estimate, actual production of Indian leather industry is around Rs 20,000 crores in 1999-2000. Out of it, Rs. 7,000 crores is India's exports during the same period. Hence export intensity of leather industry comes to around 35 percent.

3.2.2: Volumes and Share in Trade:

Table 3.1 presents data on exports of Indian all leather products (61), leather (611), leather manufactures (612) and fur, skins, tanned, dressed leather (613) along with their shares in the world trade from 1980 to 1998[12]. The data recorded here is based on Standard International Trade Classification (SITC). According to the data, there is a steady rise in exports of all the leather products of the world during the period, excepting in the year 1991[13]. But the growth in the value of exports has remained constant after 1995, perhaps due to WTO effect. India's trade in the same 61 SITC category of products has displayed wide fluctuations during the above period. Exports have declined from 1980 to 1983, then moved up till 1990 and again

[12] The numbers in brackets here stand for SITC codes for different products. In the text also, they are referred by same numbers.
[13] All the major data are also shown in graphical forms in Annexure to this report.

declined up to 1993. It has remained almost constant during 1996-1998. There were many kinks in the series mainly in 1983, 1991, 1993 and 1996. In relating to India's share in world's exports of all leather products, the values have shown continuously declining trend from 1993. It underlines the poor record of India's export performance in the sector as a whole. The poor show may partly be due to stricter environmental regulations by the importing nations and inability of industries to find innovative solutions to existing traditional structure.

If we consider leather exports of the world (SITC 611) the data reveals that trend is the same as it has been for all leather products exports (SITC 61). For India, leather exports were jigging up and down, often with sharp turns, taking finally a jagged normal distribution curve. The share in world leather exports, however, has consistently shown a downward trend (except for a small dip in the year 1983). The share that was around 10 percent in 1980 has sharply declined to 2 percent by 1998. It is mainly attributable to poor competitiveness of this industry because of increasing demands on environmental standards and changed comparative advantage for higher value added products. The chilling effect of WTO has also made the exporters to lose before global competitors like China and Italy.

The story of world exports of leather manufactures (SITC 612) is almost the same as leather exports. Trends for the exports of Indian leather manufactures are a little different. The exports have declined from 1981 to 1983, then increased up to 1990 and again declined till 1993. Afterwards it has been increasing (except in 1996). Similar to earlier cases, India's contribution to the exports of the world leather manufactures has been deteriorating from 1985. Broad comparison between 611 and 612 SITC categories of products discloses that exports of leather have gradually been superceded by leather manufactures, which is the largest segment among exports of all leather products from India. In fact, it is an indication of structural transformation in the industry after reforms. The data for world exports of fur, skins, tanned and dressed leather exhibited jagging movement between 1983 and 1988. India's contribution to this 613 SITC category of leather products is nil owing to strict wildlife act and export regulations. Available trend shows that prospects for exports

of 613 SITC category of products are pretty bleak as wildlife protection standards are becoming stricter all over the world.

The above analyses can be complemented with the help of Table 3.2. Indian exports of all leather products reported in Table 3.1 consists many additional items than the SITC item 61, which are shown in Table 3.2. Exports of all leather products in India have shown a stable increase from US $ 426 million in 1980-81 to US $ 1660 million in 1998-99. It has increased at a decreasing rate from 1996-97 to 1998-99, may be due to increasing competition from other leading exporters. There were three kinks in the series, in 1982-83, 1991-92 and 1996-97. Exports as a percentage of total exports in India have remained more or less unchanged during 1980-81 to 1999-00. However a slight improvement is noticed during the period 1987-88 to 1992-93. Contribution of Indian leather industry to total exports is now just 5 per cent.

The unit value and quantum of all leather product exports have been indexed and shown in Table 3.3. The unit value has been accelerating over the period of time except in 1997-98 and 1998-99. But quantum index for the same has shown a highly oscillating pattern. Since the two indices are showing varying tendencies, no inferences can be drawn.

3.2.3: Trade Composition:

The leather industry exports are spread across many segments in India. The overall exports of different segments of all leather products for the last six years are recorded in Table 3.4. There is a clear shift in the composition of exports of leather products. Today the share of value added finished products in the total exports from leather industry is over 80 per cent against 20 per cent in the 1970s. Indian industries are now on the higher rungs of the ladder of comparative advantage. Currently the export basket of leather products consists of leather, leather footwear, footwear components, leather garments and leather goods including saddlery and harness. Exports of finished leather have shown dwindling trend from $ 383 million in 1994-95 to $ 239 million in 1999-2000. Similarly its share has also gone down. To begin with, India was a major exporter of hides, skins and leather to the

industrialized countries but from the middle of the 90s India has been slowly moving higher in the value chain.

Exports of footwear components and its share have remained stable around $ 250 million and 15 per cent, whereas exports of leather garments have a backward bending pattern. It has increased from $ 387.12 million in 1994-95 to $ 425.21 million in 1997-98 and declined to $ 319 million in 1999-2000. However, exports of leather goods have picked up significantly during the last six years. The footwear branch and leather goods segments now account for two thirds of the sector's total export. With the changing global scenario fashion products in footwear and leather products are expected to dominate the export scene. The above analysis indicates that India has been steadily transforming her traditional leather industry into modern sector. India has witnessed growth of modern leather products manufacturing units exclusively for export during the last 10 years.

3.2.4: Direction of Trade, Market Dependency and Share:

India is one of the major exporters of leather and leather products. Nearly 65 percent of its exports are destined for the European Union. Table 3.5 shows the direction of trade in respect of leather and leather goods over a ten-year period. Germany, among the EU countries is the largest importer of India's leather products, accounting for about 20 per cent. The leather industry in India continues to hold Germany, USA, UK, Italy and France as its major markets. Trends are however slowly changing. In 1987-88 exports to the USSR was next to Germany. After the disintegration of the USSR, exports to that region (CIS countries) has been decelerating. Trade with Hong Kong, Netherlands and Portugal has been deteriorating or has stagnated. On the other hand, trade with UK is growing fast in recent years as also with USA. The trends disclose the fact that UK and USA have superseded Italy and CIS in importing Indian leather products. The dominance of Germany as a major market for India's exports is slowly coming down. A steady shift in the direction may be due to liberal environmental regulation and easy market accessibility in UK, USA and France.

Using two ratios namely, *Dependency Ratio* and *Market Share* one can carry further the direction analysis. Dependency ratio is calculated by taking total leather products exports to each country as a percentage of total leather products exports from India. Market share is estimated by taking leather products exports to each country as a percentage of their total imports of leather products. Both ratios are displayed in Table 3.6 and 3.7, respectively. As per the dependency ratio, India's dependency on the CIS countries has drastically come down. For UK and USA dependency ratio has gone up. Importance of remaining countries as a source for India's exports has either declined or remained same during the period. The data confirms a steady shift in direction of leather products exports, particularly towards the U.S.A. and the U.K.

3.2.5: Exponential Growth Rates in Trade:

To examine secular trend behavior of series, which are discussed above, log linear trend equation is fitted to trade series of SITC 61, 611, 612 and 613 for both India and world and annual average percentage rate of growth are estimated over the period 1980-98. All the results are as expected. Indian leather products exports rose at the annual average rate of 8 percent for the entire period. The long-term performance of exports in leather from India is found negative and insignificant. But Indian export of leather manufactures has 8.79 percent of deterministic trend. Trend growth of leather manufactures exports is much higher than growth of all leather products exports in India. Similarly, growth rate of world exports in SITC 61, 611 and 612 trade series is found to be significant for the entire period, whereas growth rate of SITC 613 series has become insignificant. Hence exponential trend analysis has authenticated the shift in comparative advantage from trade in raw hides and skins to leather and leather to leather manufactures.

3.2.6: Observations on Environmental Regulations on Indian leather goods exports

Starting from tanning to packaging, a number of environmental regulations come in to play for this industry[14]. This is one sector, in which as much as international

[14] For a detailed account of various stages in processing, from raw hides and skin level to tanning, to finishing stages, see Sankar (2001).

regulations, the Indian domestic regulations also affect the industry. The notable Indian domestic regulations are Indian Water Act of 1974, Air Act of 1981 and Environment Protection Act of 1996. Effluents are to be treated before they are discharged in to river or open land. The tolerance limits of these are set by the concerned state pollution control boards. Table 3.11 shows the same from Tamil Nadu state.

Sankar (2001) reports that nearly all these parameters are being strictly followed by the tanneries in Tamil Nadu (sample information only). The violations are invariably found in respect of Total Dissolved Solids, and in some cases on Total Suspended Solids. The BOD and COD standards are invariably met. Indian tannery and leather processing industry has already initiated all the steps to meet these requirements. The notable innovations and modernization introduced are installing solid and liquid separation plants (using anaerobic and aerobic processes), individual or common effluent treatment plants, and sludge treatment plants.

As far as exporting of leather is concerned, the external environmental regulations are to be met additionally. In December 1989, the German government decided to ban the use of toxic fungicide pentachlorophenol (PCP). Denmark, Sweden and the United States quickly followed the German ban, although each country has laid down different limits. Unfortunately, this chemical was being used extensively for tanning by the Indian leather industry, which came under intense pressure to change to other fungicides.

Complying with external and domestic environmental regulations has three main problems. Firstly, there is a lack of information about the restrictions in other countries. Second, there is a lack of testing facilities in India. Third, suitable chemicals are also lacking. Although chemicals such as TCMTB and PCMC have been identified as effective substitutes for PCP in tanning industry (relaxing Busan 30), they will have to be imported from Germany or the USA. The cost of this substitute is 10 times higher! It is also likely that chemicals such as Benzidrine dyes used in the leather industry may come for closer scrutiny in the future.

There is also a limit on the use of formaldehyde in excess of 1500 mg/kg. Restrictions on the use of formaldehyde and Benzedrine dyes exist in OECD markets, and the use of eco-friendly chemicals has become mandatory in most OECD countries. In addition, eco-labels demand stringent pollution limits that are difficult and expensive to comply with, and the multiplicity of such labels in different export markets is an additional barrier (ESCAP, 1996).

Jha, Markandya and Vassanaar (1999) note that as far as environmental regulations are concerned, leather is one of the most seriously hit sectors among Indian exports. Besides stipulations on dyes, several other regulations inhibit its performance on the international market. Germany in particular, has banned the use of PCP, while in the EU, the threshold level in this regard is 1000 ppm. Germany also limits the use of formaldehyde. The use of environmentally friendly chemicals has become mandatory, restricting the process by which leather may be manufactured.

Presently most of the tanneries are resorting to the use of an imported substitute, chemical Busan 30, which is acceptable to the external market. On an average, the price of this substitute is ten times higher than the price of PCP. Even though all chemical inputs together account for only about 10 per cent of costs, complying with the eco-regulation is likely to affect the competitiveness of Indian leather.

Adhering to stringent external standards in dyestuffs would require the import of Busan 30. While the cost of compliance in this regard is difficult to estimate, a discussion with exporters revealed that the cost of the test alone is likely to increase the price of shoes by $3-$4 per pair. At the same time, a concern exists that even among imported dyes, the exact composition is not always known. Therefore, even incurring this extra cost would not necessarily guarantee entry into the more stringently regulated OECD markets. Overall, exporters stated that the costs could increase by 10 to 15 per cent.

While the cost of compliance to the standards and testing costs are high, they are particularly onerous for the SMEs, which are responsible for about 70 per cent of the total leather exports from India. Considering that these units face problems of accessing finance and technology to begin with, they are likely to be most affected by the external eco-regulations prevailing in the leather sector.

3.2.7: Future Strategies

Indian Leather industry is passing through a critical stage. Environmental issues are on the agenda of WTO. Leather industry being environmentally sensitive, stricter environmental regulations may act as a trade barrier**.** *India's leather industry is cruelest in the world* claims the US based People for the Ethical Treatment of Animals (PETA) an animal rights group. According to them buying Indian leather goods would be inhuman and outrageous. There is increasing concern in many industrialized countries on how leather is procured in India and China and canvassing against Indian leather products. The dismantling and reformulation of the traditional structure of business has to be radically rewritten in the business designs. It is a high time for Indian leather industry to reorient and restructure its plan for growth. Tanneries need to adapt and change processing units so that they have a ready acceptability abroad. Industries need to broad base their exports to new frontiers to exploit the vast latent potential. Higher quality standards and adherence to eco-regulations are required to be maintained to ward off the threat of increasing competition. Greening the leather industry has become imperative.

Table 3.1: India's Leather Export & their Share in World Market

Year	Leather, Leather Manuf.and dressed furskins (61)			Leather (611)		
	World	India	India's	World	India	India's
	In US $ Million		Share(%)	In US $ Million		Share(%)
1980	5966.51	404.97	6.79	3415.46	341.80	10.01
1981	5515.79	390.54	7.08	3194.08	296.93	9.30
1982	5546.21	382.11	6.89	3451.68	282.11	8.17
1983	5634.98	282.31	5.01	3639.00	216.10	5.94
1984	6221.81	526.49	8.46	4114.68	358.12	8.70
1985	6443.60	533.59	8.28	4184.67	331.49	7.92
1986	7814.70	574.22	7.35	4983.57	366.28	7.35
1987	10666.88	724.32	6.79	6753.66	457.82	6.78
1988	11617.54	776.07	6.68	7751.33	465.51	6.01
1989	11654.30	792.76	6.80	8045.58	459.09	5.71
1990	14409.59	832.34	5.78	10077.96	447.10	4.44
1991	13068.29	650.89	4.98	8836.96	295.75	3.35
1992	14734.82	623.14	4.23	9801.38	311.50	3.18
1993	15651.06	540.80	3.46	10627.19	269.40	2.53
1994	18655.00	624.00	3.34	12982.40	382.40	2.95
1995	23345.00	716.00	3.07	15015.40	370.00	2.46
1996	24655.00	616.00	2.50	15300.30	300.80	1.97
1997	25150.00	618.00	2.46	15371.40	295.90	1.93
1998	21279.00	621.00	2.92	* 14154	281.50	1.99

Table 3.2: India's Leather Exports (In US $ Million)

Year	Leather and Manf_ n.e.s.Dressed Furskin	All Commodities	Share(%)
1980-81	426.30	8484.70	5.02
1981-82	411.80	8703.90	4.73
1982-83	372.50	9107.60	4.09
1983-84	414.80	9449.40	4.39
1984-85	527.50	9878.10	5.34
1985-86	528.50	8904.50	5.94
1986-87	572.20	9744.70	5.87
1987-88	964.40	12088.50	7.98
1988-89	1051.00	13970.40	7.52
1989-90	1171.50	16612.50	7.05
1990-91	1449.20	18145.20	7.99
1991-92	1268.80	17865.40	7.10
1992-93	1277.50	18537.20	6.89
1993-94	1299.50	22283.30	5.83
1994-95	1610.60	26330.50	6.12
1995-96	1752.20	31794.90	5.51
1996-97	1605.80	33469.70	4.80
1997-98	1656.70	35006.40	4.73
1998-99	1660.70	33218.70	5.00
1999-00p	1538.40	37598.60	4.09

Source: Handbook of Statistics on Indian Economy 2000, RBI Mumbai

Table 3.3: Index Number of Export of Leather & Leather Manufactures Excl.Footwear*

Year	**Quantum index** Base 1978-79=100	Unit Value Index
1980-81	54	193
1981-82	80	141
1982-83	76	145
1983-84	81	163
1984-85	103	186
1985-86	91	217
1986-87	88	255
1987-88	99	293
1988-89	107	324
1989-90	106	374
1990-91	105	440
1991-92	103	478
1992-93	113	441
1993-94	117	444
1994-95	146	452
1995-96	162	456
1996-97	119	565
1997-98	146	511
1998-99	152	554

Note: * From 87-88 onwards Index Number is of Leather & Leather Manufactures

Source: Handbook of Statistics on Indian Economy 2000,RBI Mumbai

Table 3.4: Leather Exports from India at Disaggreegated Level (In US $ Million) Lower Values Indicate In %

Category\Year	94-95	95-96	96-97	97-98	98-99	99-2000*
Finished Leather	382.96 23.62	370.36 21.50	301.07 18.75	295.83 17.86	265.20 16.27	239.00 21.36
Leather Footwear	302.49 18.66	329.69 19.14	337.46 21.01	281.90 17.02	290.22 17.80	331.00 29.58
Footwear Component	247.49 15.27	253.72 14.73	222.74 13.87	240.48 14.52	243.74 14.95	230.00 20.55
Leather Garments	387.12 23.88	415.24 24.10	424.38 26.43	425.21 25.67	368.60 22.61	319.00 28.51
Leather Goods	292.04 18.01	353.72 20.53	320.20 19.94	413.28 24.95	462.35 28.36	421.00** 37.62
Total	1711.545	1822.732	1705.847	1756.7	1730.111	1256.62

Source: Council for Leather Exports, India
Note: * India Trades, CMIE Data.
**** Includes Saddlery and Harness**

Table 3.5: Direction of Leather Exports in India (In US $ Million)

Year	C.I.S.	FRANCE	GERMANY	HONG KONG	ITALY	NETHERLAND	PORTUGAL	SPAIN	U.K.	U.S.A.
1987-88	156.10	56.7	209.60	25.10	112.00	16.60	11.50	10.50	98.20	109.80
1988-89	213.60	48.4	201.90	30.20	99.60	16.50	11.80	11.70	119.90	125.60
1989-90	179.00	53.1	249.10	18.80	139.96	18.10	13.60	16.00	135.10	156.20
1990-91	173.00	64	356.00	25.10	173.00	24.30	20.80	25.20	173.50	175.20
1991-92	159.90	61.2	278.30	30.30	123.50	21.70	19.20	27.70	144.90	176.20
1992-93	80.30	78.4	301.20	41.40	121.00	26.50	20.30	32.70	141.30	208.10
1993-94	52.10	61.1	320.30	50.30	129.40	26.90	14.70	25.20	155.70	237.80
1994-95	71.60	82.1	361.20	58.70	192.40	28.50	18.40	35.70	182.10	275.50
1995-96	60.20	88.4	400.00	59.40	220.70	38.40	23.70	50.70	197.60	294.60
1996-97	30.80	71.9	362.00	59.00	182.70	38.30	20.10	46.90	201.20	297.10
1997-98	52.60	75.7	363.10	53.90	221.20	43.40	31.90	54.90	215.80	250.50
1998-99	25.40	77.4	369.20	54.00	199.60	50.20	29.80	70.10	235.50	255.90
1999-2000	31.10	80.5	291.20	52.50	158.50	42.40	24.10	66.20	256.60	250.40

Source: Handbook On Indian Economy 2000,RBI,Mumbai

Table 3.6: Indian Dependency on Leather & Leather Manufactures (in %)

Year	C.I.S.	FRANCE	GERMANY	HONG KONG	ITALY	NETHERLAND	PORTUGAL	SPAIN	U.K.	U.S.A.	total
1987-88	16.19	5.88	21.73	2.60	11.61	1.72	1.19	1.09	10.18	11.39	83.59
1988-89	20.32	4.61	19.21	2.87	9.48	1.57	1.12	1.11	11.41	11.95	83.65
1989-90	15.28	4.53	21.26	1.60	11.95	1.55	1.16	1.37	11.53	13.33	83.56
1990-91	11.94	4.42	24.57	1.73	11.94	1.68	1.44	1.74	11.97	12.09	83.50
1991-92	12.60	4.82	21.93	2.39	9.73	1.71	1.51	2.18	11.42	13.89	82.20
1992-93	6.29	6.18	23.74	3.26	9.54	2.09	1.60	2.58	11.14	16.40	82.81
1993-94	4.01	4.70	24.65	3.87	9.96	2.07	1.13	1.94	11.98	18.30	82.61
1994-95	4.45	5.10	22.43	3.64	11.95	1.77	1.14	2.22	11.31	17.11	81.10
1995-96	3.44	5.05	22.83	3.39	12.60	2.19	1.35	2.89	11.28	16.81	81.82
1996-97	1.92	4.48	22.54	3.67	11.38	2.39	1.25	2.92	12.53	18.50	81.58
1997-98	1.86	4.48	22.54	3.67	11.38	2.39	1.25	2.92	12.53	18.50	81.52
1998-99	1.53	4.66	22.23	3.25	12.02	3.02	1.79	4.22	14.18	15.41	82.32
1999-2000	2.02	5.23	18.93	3.41	10.30	2.76	1.57	4.30	16.68	16.28	81.48

Source:

Handbook On Indian Economy 2000,RBI,Mumbai

Table 3.7: India's Market Share

year	1987-88	1988-89	1989-90	1990-91	1991-92	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99
FRANCE	5.76	4.76	4.47	3.79	3.65	4.63	3.70	3.99	4.16	3.33	3.36	3.63
GERMANY	11.56	11.32	13.69	6.88	9.96	9.88	10.77	10.36	11.03	9.72	10.43	11.02
HONG KONG	3.53	3.26	1.49	1.50	1.28	1.28	1.03	0.98	0.88	0.74	0.78	0.83
ITALY	6.48	5.13	6.08	5.51	4.24	3.82	3.81	3.37	3.61	2.57	2.62	2.86
NETHERLAND	5.73	5.49	5.23	4.73	4.29	4.86	5.52	4.33	5.80	5.70	6.66	9.51
PORTUGAL	3.70	2.79	2.89	2.49	2.25	2.02	1.41	1.30	1.61	1.34	1.38	2.00
SPAIN	2.92	2.56	2.83	3.10	3.11	3.52	3.04	2.55	3.50	3.00	2.74	4.16
U.K.	14.70	17.30	19.61	18.73	17.35	15.96	13.93	13.28	14.34	12.48	11.66	15.76
U.S.A.	7.48	6.77	7.68	7.49	7.41	7.56	6.52	6.16	6.76	6.38	6.10	5.23

Source: International Yearbook Of Trade Statistics (UNO Publication)

Handbook On Indian Economy 2000 (RBI Pubblication)

Table 3.8: Leather Imports of Principal Countries (In US $ Million)

Year	France				Germany				Hong Kong			
	611	612	613	61	611	612	613	61	611	612	613	61
1980	311.02	104.58	92.05	507.64	527.14	166.31	317.59	1011.04	97.83	5.97	125.18	228.97
1981	252.81	95.13	73.28	421.23	407.47	135.70	228.87	772.03	108.37	6.06	144.10	258.53
1982	294.29	113.87	59.42	467.59	454.55	132.55	152.47	739.57	106.86	6.58	122.37	235.82
1983	293.13	106.44	40.64	440.21	491.86	133.09	133.62	758.57	118.77	7.93	259.08	385.78
1984	330.78	96.73	35.22	462.73	561.93	154.81	107.90	824.63	149.37	9.25	191.01	349.62
1985	362.86	115.25	36.06	514.17	560.75	180.85	104.40	846.00	141.67	10.63	133.83	286.13
1986	433.34	1643.33	47.69	2124.35	692.06	267.53	150.04	1109.63	201.51	16.13	149.49	367.13
1987	490.09	195.25	54.37	739.71	838.45	349.65	174.06	1362.16	335.43	28.88	169.73	534.04
1988	516.00	197.43	37.89	751.32	831.87	355.13	130.28	1317.28	478.51	56.17	148.89	683.57
1989	558.64	219.76	26.30	804.70	749.26	401.95	80.32	1231.52	584.77	119.46	148.09	852.33
1990	686.71	256.30	25.75	968.75	1833.22	1010.01	130.56	2973.78	683.56	144.89	132.76	961.21
1991	579.88	257.22	22.99	860.09	812.18	545.08	76.66	1433.92	895.86	209.85	106.31	1212.01
1992	574.84	232.47	24.72	832.02	844.85	549.58	103.28	1497.71	1162.68	298.45	124.12	1585.25
1993	456.60	211.38	19.75	687.73	684.79	481.11	71.48	1237.38	1483.10	426.55	127.47	2037.11
1994	543.60	234.60	19.20	797.40	771.80	506.20	72.70	1350.70	1786.30	384.30	139.00	2309.60
1995	567.90	280.00	20.20	868.10	827.80	554.40	99.50	1481.70	2245.80	393.40	134.60	2773.80
1996	531.70	274.60	21.00	827.30	749.10	549.70	130.50	1429.30	2373.50	490.30	186.00	3049.80
1997	496.00	290.90	36.00	822.90	708.90	513.60	113.20	1335.70	2248.60	479.20	173.80	2901.60
1998	474.30	300.70	23.40	798.40	678.30	484.70	89.50	1252.50	1851.80	377.80	189.70	2419.30

Continued…

Year	Italy				Netherland				Portugal			
	611	612	613	61	611	612	613	61	611	612	613	61
1980	494.97	18.13	196.23	709.33	117.39	36.50	21.22	175.11	38.38	0.75	1.21	40.34
1981	334.49	14.95	162.87	512.31	89.61	27.27	12.31	129.19	35.08	1.67	0.91	37.66
1982	417.52	15.59	130.83	563.95	104.89	23.29	7.50	135.68	34.44	2.96	1.02	38.42
1983	386.89	6.58	103.84	497.31	109.85	19.14	4.90	133.89	38.07	3.12	1.00	42.19
1984	518.31	16.77	149.86	684.94	118.15	21.69	4.34	144.18	60.28	3.48	0.72	64.48
1985	556.81	17.67	185.99	760.47	115.68	22.02	5.28	142.97	85.98	8.21	1.61	95.80
1986	658.33	27.48	265.60	951.41	138.11	31.11	4.88	174.10	130.59	14.58	4.00	149.16
1987	870.31	42.75	385.19	1298.25	170.70	38.65	8.34	217.69	200.15	28.24	5.10	233.49
1988	1052.89	64.95	316.56	1434.40	173.04	40.66	8.39	222.10	259.67	47.22	5.52	312.40
1989	1183.17	107.32	266.10	1556.59	180.80	45.37	7.98	234.14	262.78	51.81	4.34	318.92
1990	1429.97	175.98	197.73	1803.68	229.01	56.56	9.77	295.34	399.68	74.68	4.98	479.34
1991	1052.20	248.46	192.71	1493.36	186.39	63.03	10.26	259.67	350.88	79.38	6.59	436.85
1992	1044.01	316.93	195.34	1556.28	187.84	69.89	10.16	267.88	384.28	100.42	8.34	493.05
1993	974.91	355.96	83.81	1414.68	136.50	57.83	8.47	202.80	333.69	95.58	3.16	432.44
1994	1616.90	490.80	106.00	2213.70	179.30	61.80	13.70	254.80	423.10	122.80	2.10	548.00
1995	1784.10	588.20	122.90	2495.20	175.80	72.60	22.10	270.50	458.00	138.40	5.50	601.90
1996	1861.30	718.80	142.20	2722.30	148.30	70.80	38.50	257.60	430.80	137.20	5.30	573.30
1997	1822.20	724.30	141.90	2688.40	121.90	72.80	26.70	221.40	414.70	141.30	6.00	562.00
1998	1716.40	778.50	115.80	2610.70	115.10	71.90	10.30	197.30	403.50	148.90	4.90	557.30

Continued…

Year	Spain				U.K.				U.S.A.			
	611	612	613	61	611	612	613	61	611	612	613	61
1980	51.65	6.12	34.26	92.02	201.37	34.35	82.97	318.69	234.08	157.94	24.23	416.25
1981	59.32	3.23	32.77	95.31	165.33	33.87	83.26	282.46	380.73	193.04	26.65	600.42
1982	67.07	4.53	12.33	83.93	161.79	37.20	71.50	270.50	341.74	190.11	23.69	555.53
1983	58.20	6.15	14.61	78.96	170.16	32.62	76.14	278.92	322.35	264.93	31.82	619.10
1984	97.11	5.03	15.83	117.97	197.51	35.85	95.52	328.87	432.41	336.02	41.76	810.19
1985	97.67	7.72	14.79	120.17	228.24	39.37	54.99	322.60	424.75	373.99	33.35	832.09
1986	127.05	10.76	43.48	181.28	253.88	48.94	60.70	363.52	436.50	406.74	24.58	867.82
1987	199.65	20.23	49.74	269.62	330.25	72.72	98.71	501.69	597.61	477.32	27.02	1101.94
1988	266.17	21.39	49.76	337.32	340.23	99.26	72.30	511.79	787.07	562.96	20.44	1370.47
1989	319.42	20.31	42.84	382.57	314.32	99.11	52.70	466.13	789.92	557.86	29.20	1376.98
1990	407.44	25.90	32.88	466.21	357.74	137.24	37.01	531.98	720.86	598.98	23.15	1342.98
1991	382.50	25.82	48.77	457.08	266.94	134.69	26.90	428.53	603.69	596.46	19.05	1219.20
1992	384.66	27.25	44.49	456.40	262.27	141.38	31.26	434.91	667.95	661.42	22.45	1351.82
1993	300.05	26.43	18.21	344.69	250.82	192.32	22.02	465.16	778.48	713.52	25.43	1517.43
1994	489.40	32.50	19.50	541.40	290.10	211.00	30.20	531.30	897.90	803.70	32.50	1734.10
1995	538.00	36.40	17.00	591.40	303.30	223.10	36.60	563.00	986.50	765.90	29.50	1781.90
1996	538.30	46.90	14.00	599.20	295.30	253.50	69.70	618.50	951.80	800.00	34.30	1786.10
1997	586.40	56.80	16.10	659.30	315.20	278.60	70.10	663.90	1036.60	801.20	38.10	1875.90
1998	546.10	68.00	16.20	630.30	256.20	258.60	43.80	558.60	1050.20	752.60	26.40	1829.20

Source: International yearbook of Trade Statistics (UNO Publication)

Table 3.9.a. : Value Of Output From Leather & Fur Production (In Crore Rs)

Year	At Constant Prices (Base1980-81)	At Current Prices
1980-81	528	528
1981-82	673	651
1982-83	687	653
1983-84	660	669
1984-85	811	882
1985-86	783	1011
1986-87	785	1060
1987-88	1064	1509
1988-89	1136	1825
1989-90	1337	2370
1990-91	1426	3055
1991-92	1443	3223
1992-93	1640	3576
1993-94*	4894	4894
1994-95	5403	5765
1995-96	5251	5929
1996-97	5652	6483
1997-98	5843	6924
1998-99	6323	7664

Table 3.9.b : India's Leather Production and it's Index Number

Year	Index (Base 1980-81) (Weight=.49)	Index (Base 1993-94) (Weight=.49)
81-82	128.1	
82-83	100.1	
83-84	116.3	
84-85	139.7	
85-86	169.2	
86-87	178.7	
87-88	185.5	
88-89	177.4	
89-90	188.3	
90-91	194.2	
91-92	181.3	
92-93	187.7	
93-94	204.3	
94-95	211.9	86.8
95-96	227.5	98.5
96-97	232	107.8
97-98	229.5	110.2
98-99		119.1
99-00p		135.5

Source: Central Stastistical Organisation,Govt_ Of India, * Data are revised from 93-94 onwards, p Provisional

National Accounts Statistics (91,93,95,96,97,2000 Issues)

***the Base Is Shifted To 93-94 from that Period Onwards**

Table 3.10: Terms of Trade

Year	Indian Unit Value Index of Export of Leather(1990=100)	Index of Free Market Price of Hides & Skins(1990=100)	Terms of Trade
1980-81	*43.86*	*96.50*	*0.45*
1981-82	*32.05*	*94.00*	*0.34*
1982-83	*32.95*	*91.56*	*0.36*
1983-84	*37.05*	*89.18*	*0.42*
1984-85	*42.27*	*86.86*	*0.49*
1985-86	*49.32*	*84.60*	*0.58*
1986-87	*57.95*	*90.19*	*0.64*
1987-88	*66.59*	*96.15*	*0.69*
1988-89	*73.64*	*102.51*	*0.72*
1989-90	*85.00*	*109.30*	*0.78*
1990-91	*100.00*	*100.00*	*1.00*
1991-92	*108.64*	*60.60*	*1.79*
1992-93	*100.23*	*58.60*	*1.71*
1993-94	*100.91*	*75.50*	*1.34*
1994-95	*102.73*	*98.40*	*1.04*
1995-96	*103.64*	*102.50*	*1.01*
1996-97	*128.41*	*78.20*	*1.64*
1997-98	*116.14*	*62.90*	*1.85*
1998-99	*125.91*	*48.60*	*2.59*

Source: Handbook of Statitistics on Indian Economy 2000(RBI Publication)

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Table-3.11: Tolerance Limits for Trade Effluents in Tannery Sector

Sl. No.	Chemical Characteristcs	Discharged into			
		Inland surface water	Public sewerage	Marine coastal areas	On land for irrigation
1.	PH	5.5 to 9.0	5.5 to 9.0	5.5 to 9.0	5.5 to 9.0
2.	Total Suspended Solids in mg/l	100	600	100	200
3.	Total Dissolved Solids in mg/l	2100	2100	-	2100
4.	BOD in mg/l	30	350	100	100
5.	COD in mg/l	250	-	250	-
6.	Chloride (as Cl) in mg/l	1000	1000	-	600
7.	Sulphates (SO_4) in mg/l	1000	1000	1000	1000
8.	Sulphides (as S) in mg/l	2	-	5	2
9.	Oil & Grease in mg/l	10	20	20	10
10.	Phenolic Compounds in mg/l	1	5	5	5
11.	Ammoniacal Nitrogen (as N) in mg/l	50	50	50	-
12.	Total Kjeldahl Nitrogen (as N) in mg/l	100	-	100	-
13.	Hexavalent Chromium (as Cr_6^+) in mg/l	0.1	2.0	1.0	1.0
14.	Total Chromium (as Cr) in mg/l	0.1	2.0	1.0	1.0
15.	Percent Sodium in mg/l	-	60	-	60
16.	Boron (as B) in mg/l	2	2	2	2

Source: Sankar (2001), pp. 140

3.3: Performance of Tea: Export Trend and Patterns

3.3.1: Preamble

Tea production is one of the oldest and most established industries in India and is of considerable importance to the national economy. India is responsible for nearly one third of global tea production, the remaining production taking place mainly in other developing countries in Asia and Africa. The markets of OECD member countries have become increasingly important for Indian tea exports, with about $ 1.10 billion worth of tea being exported to OECD countries each year. OECD member countries, in particular the United States, Japan and members of the European Union account for 40 per cent of global imports. It is therefore vital that India not only retains these traditional markets for its tea, but also out-competes other nations in new markets.

There are some striking facts to be noted about this sector. The world trend in tea export has been growing albeit at a slow rate of about 3.25%. Indian exports, on the other hand, have been widely fluctuating and its share is steadily declining. The major competitors for Indian tea are Sri Lanka and Kenya (TK Kumar and Mittal, 1995). Accordingly, the major trends in price of tea are set in the markets at Calcutta, Colombo, Mombasa and London. But invariably the London market price determines price trends.

Tea is supposed to be extremely environmentally friendly, as it is all green! However, tea gardens use varieties of pesticides to control diseases. Furthermore, they use several chemical treatments during non-productive periods. However, there is some interest in organic farming among the Indian tea gardens, but on a limited scale, as it is highly expensive. The other major regulations that have come to play relate to the use of child labour, eco-labelling, and packaging.

3.3.2: Trends and patterns of Tea Exports

Tea is the major primary export commodity for India although its share in the over all Indian exports is only 1.27% in US $ value terms. India is also the largest tea consumer in the world. Tea consumption in the country has been rising over the years and was around 77% of its production in 2000. The importance of tea in India's exports has been declining over the years. Tea exports accounted for 6.34% of India's total exports in 1980-81 in rupee terms, which gradually declined to around 3 % in 1987-91 period and witnessed a further decrease to around 1% in the years 1992-99. It touched the lowest of 1.12% in 1999. The importance of Indian tea in the world export market has also declined. India used to supply about 33 % of world tea exports in 1980, its share declined to as low as 12 % in 1996. Subsequently its share has increased to about 22% in 1999.

The value of world tea exports has roughly doubled in the last twenty years giving an average annual rate of growth of just under 3.25 percent with much lesss fluctuations (Table 3.11). Indian tea exports in terms of value shows wide fluctuations[15] with export growth rate of around 1%. But the value of Indian tea exports have increased very marginally from US million $ 452 in 1980 to 561 in 1999. Prices have been declining at a rate of about 1.5 percent per year. The price of tea at Calcutta declined from 260.13 cents a Kg. in 1980 to 187.37 cents a Kg. in 2000. The price in London declined from 283.2 cents a Kg. in 1980 to 237.44 cents a Kg. in 1998, though in between the price had been much lower (Table 3.16). The value and price trends together imply an average annual growth in the volume of world tea exports of almost 5 percent. India's tea exports were stagnant for most of the eighties; they then declined for most of the nineties.

The decline in the importance of tea in India's exports is partly because of (i) the slow growth in world demand for tea, and (ii) India's declining tea production. India's tea exports are partly of a premium quality of tea—Darjeeling tea. Indian exporters we interviewed said that a major problem facing exports of Darjeeling tea was a lack

[15] See the graphs shown in Annxure.

of any criteria for labeling a tea as Darjeeling tea so that foreign producers often marketed teas of inferior quality as Darjeeling tea.

There has been a fair amount of stability in respect of the major markets for India's tea exports. The ten major markets throughout this period have been Russia, earlier the Soviet Union, Great Britain, United Arab Emirates, Germany, earlier the federal republic, Iraq, the USA, Japan, Iran, Egypt, and the Netherlands. These ten countries account for over 80 percent of India's tea exports (Table 3.14).

Two indicators that are relevant here are India's Dependency ratio and Market share. Indian dependency on Russian market was at a steady growth from 30% in the year 1980 to 60 % till the year 1989; then it decreased to 36% by the year 1999. Indian dependency on UK showed a decrease from around 19% in the 80s to 10% in 1999. Similar is the case with Egypt. The loss of market share in these major customers was made good by new customers like the United Arab Emirates. There are also year to year fluctuations in the importance of the different markets. But some broad trends are evident. The share of the continental countries and of other developed countries such as Japan and the USA has tended to increase while that of the less developed countries has tended to decline.

In terms of market shares also, India is a major supplier of tea to all these ten countries (Table 3.15). In the case of Russia, India supplies almost 70 percent of that country's imports. In some cases India's share of the imports by a country is relatively small, being about 10 percent. The major long-term changes are a decline in India's share of the Egyptian market and increases in India's shares in the markets of the UAE, Saudi Arabia and the USA.

3.3.3: Quality variations and Access to Markets

There are different kinds of tea like Black Tea and Green Tea. There are three types of Black Tea manufacture – CTC, Orthodox, Legg. Etc.

Category wise exports of tea for India, Sri Lanka, Kenya and World are shown in Table 3.19-a. The percentage of CTC exports among total tea exports is around 55% but with fluctuations. Exports of organic tea was around 44% in the beginning, which

went up to 47% in 1998 and then again came down to 38% in the year 2000. The exports of green tea is around 1% over years except in 1996 (5%). The percentage share of CTC is increasing from 19% of world exports in 1996 to 25% in 2000. Similarly exports of orthodox also has been increasing but exports of green tea has been gradually decreasing from 4% in 1996 to 1.6% in 2000. Indian share in world export of CTC tea was 19 % in 1996, which rose to 25% by the year 2000. Sri Lanka has consistently increased its share of exports of organic tea. Kenya has always concentrated on CTC only, but its share in the world CTC tea exports has declined to some extent.

The quality image of Indian tea has been changing. Consistency in quality and supply is a key factor for Indian tea exports. The industry wants to take a serious note of the need to improve quality.

3.3.4: Observations on Environmental Regulations on Tea Exports

In recent years a common problem which all tea exporting countries have had to face are the increasing environmental rules that tea production has to satisfy in order to be exported. These environmental regulations were broadly speaking of two sorts—general regulations that all tea exports had to satisfy and a much more stringent set of regulations that export of organic tea had to satisfy. Though organic tea commands a premium in the market, particularly in Europe it was also more expensive to produce so that producers are shifting to the production of organic tea only very gradually. Our interviews suggested that roughly ten percent of Darjeeling tea exported was produced by organic methods.

Being mainly a CTC producer, India will be subject to severe competition (with or without WTO regime) from other CTC tea producing countries, who offer at present a very low price. Indian comparative advantage will therefore be mainly in the orthodox tea segment such as Darjeeling tea.

With growing health and environmental concerns, organic teas are expected to grow in export market. Organic tea standards when implemented are seen to have higher yields, as estimated by industry, and attracting prices that are 25 to 100% over conventional products. It is a high end product that can be used to tap specific segments of exports market.

The most widely issued regulations on tea come from EU regarding the use of pesticides[16]. Indian teas have been affected by the developed countries' preoccupation with pesticide content. Germany, for example, has made complaints about the high residue levels of Ethion, Tetradifon and Heptachlor in Indian teas. Complaints have also been received from other OECD importers about Assam, Terai and Booras teas containing high levels of Bicofol.

After studying the impact of eco-regulations on Indian tea exports, the government has banned 12 hazardous pesticides, including DDT, and has restricted the use of some less hazardous, but still harmful pesticides. Steps are also being taken to encourage organic farming, so that Indian tea and agro-products become more acceptable on the international market, while also benefiting the domestic consumer.

In addition, the government has banned the application of DDT, BHC, aldrin, aldrex, endrine, heptachlor, chloradae and tetradifon. Moreover, if chemicals such as thjiomton, dimethoate, malathion, moncrotopos, fenicypermethrin, fenvalerate, fluvalinate, phorat, phosphomidon, formothian, acephate, and carboxin are applied during the plucking season, the government's guidelines provide for discarding the plucking that immediately follows the spraying. One difficulty facing Indian tea producers is that there is only one institute, the Pesticides Residue Laboratory, which can test commercial samples of tea in India.

While the government has been attempting to regulate tea production, problems remain in the area of testing. Government officials contacted in the study state that,

[16] EU norms of pesticide controls are discussed in Chapter Four.

while imposing bans on pesticides and issuing guidelines for tea growing were possible, lack of testing facilities is an important barrier to attaining eco-friendly production of tea.

Although figures on incremental cost were not available for the tea industry, exporters did state that adopting eco-standards on a large scale would increase the cost of production significantly enough to affect their world market for this product. This is particularly true in CTC and orthodox tea, where India's main competitors, China and Sri Lanka, have reported that they are unaffected by these eco-standards. Considering that India's competitiveness in this marker depends on its ability to sell at low prices, complying with eco-regulations may imply a loss of market share. Complying may be more rewarding for high-value Darjeeling tea. Being a premium tea, it is more likely that the cost increase owing to compliance will be met with a price rise.

In early 1994 there were fears that German tea importers would simply stop imports of Indian tea. There is no doubt that unless the Indian tea industry responds to these global concerns and ensures that the residue levels are reduced, exports of Indian tea will be seriously affected. While the tea industry has taken some steps to deal with this problem, questions remain about whether these have been sufficient. The Indian Tea Research Association has issued a range of guidelines encouraging growers to take action to reduce the chemical residue content of their teas. These guidelines advocate spraying under proper supervision, spraying before plucking or spraying immediately after plucking, discarding the tea that is plucked immediately after spraying, the application of prophylactic treatments during the non-productive period, rotation of chemicals and integrated pest management approaches. The guidelines and other information has been disseminated through various workshops and training programmes.

The Bureau of Indian Standards has selected tea as one of the food products eligible for the 'Eco-Mark' certificate, as long as certain conditions are complied with. With an increasing domestic consumption of CTC tea, the export focus for tea should shift

to Darjeeling tea and value added tea products, such as tea bags and instant tea. Indian teas have also been affected by the German Packaging Ordinance, which has required changes in the types of packaging materials used in the tea industry. Aluminum packs, for example, have been replaced by paper packs.

Recent increases in tea production arising from domestic and overseas demand have encouraged producers to clear more areas of forests for tea cultivation. The conversion of forest, however, has led to a range of environmental difficulties, including uncontrolled run-off and landslides. It seems appropriate for the government to legislate to prevent further expansion of tea cultivation and to require plantation owners to reforest existing estates. The expansion of acreage for tea envisaged under the Eighth Five Year Plan should be reconsidered.

Table 3.12: India's Tea Export (in Million US $)& it's Share in World Market

Year	India	World	India's % Share
1980	452.27	1362.25	33.20
1981	442.47	1364.69	32.42
1982	352.14	1533.21	22.97
1983	498.61	1783.41	27.96
1984	643.67	2338.30	27.53
1985	516.71	1982.95	26.06
1986	452.95	1867.22	24.26
1987	458.27	1847.08	24.81
1988	413.30	1856.99	22.26
1989	558.14	1627.82	34.29
1990	584.75	2391.24	24.45
1991	486.02	1881.22	25.84
1992	366.41	2059.91	17.79
1993	330.60	2009.89	16.45
1994	306.93	1882.53	16.30

1995	**345.21**	**2068.71**	**16.69**
1996	**284.27**	**2343.66**	**12.13**
1997	**495.66**	**2407.17**	**20.59**
1998	**513.11**	**2643.15**	**19.41**
1999	**561.05**	**2505.23**	**22.40**

Source: UN Comtrade (WITS) database

Table Table 3.13: Direction of Tea Export from India **(in Millon US$)**

Year	ARE	DEU	EGY	GBR	IRL	IRN	IRQ	JPN	NLD	POL	RUS	SAU	USA	WLD
1980	24.87	16.75	23.26	83.93	8.89	23.48	5.20	2.91	2.42	19.45	135.72	7.42	6.72	452.27
1981	25.18	15.17	23.09	75.49	9.24	17.80	11.75	3.07	3.03	20.17	148.13	6.88	6.66	442.47
1982	6.45	14.31	16.05	75.72	5.47	16.15	8.15	2.80	2.77	30.72	114.17	7.88	4.44	352.14
1983	6.22	12.97	28.91	91.18	5.46	*24.38*	37.27	3.90	3.18	33.06	166.00	9.38	3.68	498.61
1984	11.54	21.71	42.24	103.21	7.97	*31.48*	25.73	4.61	9.07	22.30	252.10	11.59	4.43	643.67
1985	12.45	13.87	34.18	55.39	4.97	*25.27*	15.08	4.28	3.36	7.19	232.71	8.57	3.55	516.71
1986	14.35	15.66	24.10	80.73	5.77	25.98	9.12	5.14	4.67	13.86	201.45	9.35	5.15	452.95
1987	12.30	23.52	10.95	52.23	4.57	67.56	4.48	7.04	5.01	21.44	194.01	9.57	3.81	458.27
1988	9.79	18.21	23.49	49.57	7.60	*15.91*	11.08	7.31	4.82	14.83	174.20	7.36	5.09	413.30
1989	12.86	17.70	16.80	51.84	5.02	36.37	5.92	15.08	4.20	6.25	335.89	10.26	3.70	558.14
1990	16.59	23.18	17.63	62.51	5.47	34.04	0.01	12.21	5.95	22.48	329.19	15.32	4.63	584.75
1991	18.96	23.63	14.75	55.06	6.44	42.94	0.00	7.19	9.96	18.67	233.61	11.34	4.51	486.02
1992	15.12	22.99	19.35	60.39	5.69	27.97	0.00	9.85	8.67	23.56	121.62	13.50	5.84	366.41
1993	36.76	17.66	4.42	43.10	3.32	10.66	0.00	7.76	4.71	25.07	99.92	4.73	10.23	330.60
1994	34.30	22.93	7.68	51.60	4.50	4.73	0.00	8.82	6.56	29.80	86.33	1.47	11.40	306.93
1995	39.14	22.33	9.56	37.43	4.37	1.61	0.09	7.42	6.07	24.03	141.70	3.03	7.98	345.21
1996	33.74	17.84	8.33	40.84	5.91	7.23	0.00	7.59	5.31	15.37	74.85	11.72	9.56	284.27
1997	53.64	27.55	9.93	59.57	6.26	4.35	4.69	15.30	7.37	23.77	195.25	13.20	16.97	495.66
1998	46.09	25.65	8.34	52.42	6.65	12.43	23.39	13.17	6.56	16.99	184.25	16.90	18.26	513.11
1999	50.40	28.05	9.12	57.32	7.27	13.59	25.58	14.40	7.17	18.58	201.46	18.48	19.97	561.05

Source: UN Comtrade (WITS) database

Country Names

ARE	United Arab Emirates
DEU	Germany
EGY	Egypt, Arab Rep.
GBR	United Kingdom
IRL	Ireland
IRN	Iran, Islamic Rep.
IRQ	Iraq
JPN	Japan
NLD	Netherlands
POL	Poland
RUS	Russian Federation
SAU	Saudi Arabia
USA	United States

Table 3.14: Indian Dependency on Tea Exports

YEAR	ARE	DEU	EGY	GBR	IRL	IRN	IRQ	JPN	NLD	POL	SAU	RUS	USA	Total
1980	5.50	3.70	5.14	18.56	1.97	5.19	1.15	0.64	0.54	4.30	1.64	30.01	1.49	79.82
1981	5.69	3.43	5.22	17.06	2.09	4.02	2.66	0.69	0.69	4.56	1.55	33.48	1.51	82.64
1982	1.83	4.06	4.56	21.50	1.55	4.59	2.32	0.79	0.79	8.73	2.24	32.42	1.26	86.63
1983	1.25	2.60	5.80	18.29	1.09	*4.89*	7.47	0.78	0.64	6.63	1.88	33.29	0.74	89.76
1984	1.79	3.37	6.56	16.03	1.24	*4.89*	4.00	0.72	1.41	3.46	1.80	39.17	0.69	89.88
1985	2.41	2.68	6.61	10.72	0.96	*4.89*	2.92	0.83	0.65	1.39	1.66	45.04	0.69	87.08
1986	3.17	3.46	5.32	17.82	1.27	5.74	2.01	1.13	1.03	3.06	2.06	44.47	1.14	91.69
1987	2.68	5.13	2.39	11.40	1.00	14.74	0.98	1.54	1.09	4.68	2.09	42.34	0.83	90.88
1988	2.37	4.41	5.68	11.99	1.84	*10.63*	2.68	1.77	1.17	3.59	1.78	42.15	1.23	89.19
1989	2.30	3.17	3.01	9.29	0.90	6.52	1.06	2.70	0.75	1.12	1.84	60.18	0.66	93.51
1990	2.84	3.96	3.02	10.69	0.94	5.82	0.00	2.09	1.02	3.84	2.62	56.30	0.79	93.92
1991	3.90	4.86	3.04	11.33	1.33	8.84	0.00	1.48	2.05	3.84	2.33	48.07	0.93	91.98
1992	4.13	6.28	5.28	16.48	1.55	7.63	0.00	2.69	2.37	6.43	3.68	33.19	1.59	91.30
1993	11.12	5.34	1.34	13.04	1.01	3.22	0.00	2.35	1.43	7.58	1.43	30.22	3.10	81.17
1994	11.18	7.47	2.50	16.81	1.47	1.54	0.00	2.87	2.14	9.71	0.48	28.13	3.71	88.00
1995	11.34	6.47	2.77	10.84	1.26	0.47	0.03	2.15	1.76	6.96	0.88	41.05	2.31	88.28

1996	11.87	6.28	2.93	14.37	2.08	2.54	0.00	2.67	1.87	5.41	4.12	26.33	3.36	83.83
1997	10.82	5.56	2.00	12.02	1.26	0.88	0.95	3.09	1.49	4.80	2.66	39.39	3.42	88.34
1998	8.98	5.00	1.63	10.22	1.30	2.42	4.56	2.57	1.28	3.31	3.29	35.91	3.56	84.02
1999	8.98	5.00	1.63	10.22	1.30	2.42	4.56	2.57	1.28	3.31	3.29	35.91	3.56	84.02

Source: UN Comtrade (WITS) database

Note:

Dependency Ratio of India on a Country j = $\frac{\text{Indian Export of Tea to a Country j}}{\text{Indian Export of Tea to World}} \times 100$

Table 3.15: Market Share of Indian Tea Exports

Year	ARE	DEU	EGY	GBR	IRL	IRN	IRQ	JPN	NLD	POL	RUS	SAU	USA
1980		23.64		18.16	22.84			4.61	5.57			11.95	4.47
1981		24.31	39.46	25.29	33.54	26.19	28.20	6.14	8.23			10.19	4.36
1982		23.92	18.30	20.64	27.18	42.07	19.33	7.24	8.76			13.35	3.01
1983	15.23	24.17	31.79	25.93	22.61	*97.02*	35.59	9.51	9.01			12.49	2.50
1984		35.06	40.15	15.91	23.56	*61.57*	24.79	7.64	15.83			11.93	1.99
1985		19.71	46.57	12.93	16.65	*59.48*	14.64	5.02	7.04			9.62	1.93
1986		25.00	21.70	21.20	19.71	35.54	19.42	4.83	13.94	18.63		14.40	3.41
1987	30.82	33.49	9.43	15.97	16.61	86.53	9.29	6.72	14.55	27.94		15.03	3.12
1988		29.86	15.50	13.13	28.49	*85.50*	34.71	6.44	12.28	21.07		12.37	3.47
1989		28.96	16.14	14.94	19.95			12.70	12.00	12.95		33.47	2.58
1990		28.68	11.45	16.41	15.93			9.26	11.13	75.07	71.91	20.20	3.27
1991	36.15	27.83	9.50	16.56	22.36			5.20	18.69	36.65		15.22	3.24
1992	46.06	26.32	11.49	18.31	22.41			6.15	14.98	64.20		35.48	3.99
1993	50.12	15.36	4.13	11.72	14.14			5.33	8.68	41.48		10.24	7.40
1994		20.76	8.54	15.74	18.34			5.43	12.91	49.59		4.75	7.51
1995		15.51	8.06	12.58	19.81	5.96		4.04	12.13	36.54		5.50	5.97

1996		11.13	9.61	12.77	23.67	22.84		3.78	11.80	22.05	36.88	18.84	6.57
1997		22.85	9.54	16.90	22.15	15.78		7.82	14.30	31.60	69.44		11.51
1998		19.42	8.37	14.37	24.22	42.27		7.28	11.78	19.58	59.12	27.72	10.03
1999		22.48	9.26	17.73	29.33	27.66		8.06	17.09	31.08	71.01	32.48	12.10

Source: UN Comtrade (WITS) database

Note :

Market Share = Indian Export of Tea to a Contry j x10

Total Export of Tea from World to Co

Table 13.16: Price of Tea (in Cents/Kg)& it's Relative Price (TOT)

Year	Calcutta	Colombo	Mombasa	London	TOT
1980	260.13	141.07	230.66	283.20	6.99
1981	229.86	123.39	205.91	255.77	7.75
1982	241.27	149.62	214.11	252.43	7.85
1983	338.30	249.31	256.95	312.56	6.34
1984	400.01	343.16	385.61	474.64	4.18
1985	305.57	202.03	220.31	275.03	7.22
1986	260.84	133.68	205.88	232.50	8.54
1987	252.51	148.45	144.18	187.91	10.57
1988	207.99	140.73	140.49	184.91	10.75
1989	252.32	158.96	157.76	209.86	9.48
1990	280.89	187.73	148.64	203.18	9.79
1991	212.17	140.24	140.17	180.78	11.01
1992	159.56	136.33	158.39	188.76	10.55
1993	172.97	135.24	146.04	174.77	11.40
1994	142.52	120.45	142.16	165.75	12.03
1995	148.89	121.53	111.21	140.39	14.21
1996	150.05	169.78	127.88	159.39	12.52
1997	207.17	195.11	194.65	215.28	9.28
1998	217.17	208.03	190.53	237.44	8.41
1999	207.74	165.78	180.63		
2000	187.37	186.25	210.87		

Note : TOT = Calcutta's Price / London's Price

Source: UN Comtrade (WITS) database

Table 3.17: Share (in %) of Indian tea exports to total exports

(Value based in Rs. Terms)

Year	%
79-80	5.73
80-81	6.34
81	5.06
82	4.2
83	5027
84	6.53
85	5.75
86	4.63
87	3.84
88	3.44
89	3.31
90	3.29
91	2.75
92	1.81
93	1.52
94	1.18
95	1.1
96	0.87
97	1.44
98	1.62
99	1.12

Table 3.18: Relative share (%) in world market

Country / Year	96	97	98	99	2000
India	14	17	16	15	15
China	15	17	17	17	17
Kenya	22	17	20	19	16
Sri Lanka	21	21	21	21	22

Table 3.19: India Tea scenario (figures in million kgs)

Year	1996	1997	1998	1999	2000	2001
Production	780	810	870	824	846	854
Imports	1	3	9	10	14	16
Exports	162	203	210	192	207	180
Consumption	580	597	615	633	653	673
% of Consumption to Production	74	74	71	77	77	79

Table 3.19 a: Exports of different categories of Tea by major countries (million kgs)

Country	1996			1997			1998			1999			2000		
	CTC	ORT	GR	CTC	ORT	GR	CTC	ORT	GR	CTC	ORT	GR	CTC	ORT	GR
INDIA	87	75	3	113	90	3	108	102	3	124	68	3	124	77	3
SRI LANKA	9	225	0	10	247	0	10	255	0	9	254	1	10	271	1
KENYA	243	1		198	1		262	1		241	1		207	1	
WORLD	469	657	73	477	724	98	532	766	130	524	728	148	497	808	187

ORT=Organic tea, GR=Green tea.

Sources:

1, Hand Book of statistics on Indian Economy, 2000 (RBI publication)

2, Indian Tea Association 2001 status paper (Indian Tea Association)

3.4: Floriculture as a new export-oriented industry in India

3.4.1: India as a Late Starter

Systematic development of floriculture in India took place only about a decade ago. It is estimated that the traditional internal turnover of floriculture items used for *pooja,* festivals and cosmetics is around Rs 215 crores (Singh, 1999). The total retail trade of flowers in India now stands at about Rs. 305 crores (Rs. 205 crores of traditional flowers and about Rs. 100 crores of cut-flowers). Karnataka is a leading state among all the states of India in horticulture. Flower exports from Bangalore have exceeded 1000 tonnes per year. Other States like Tamil Nadu, AP, West Bengal, Maharashtra, Rajasthan, and Haryana have also emerged as major producing states.

Apart from being a land based activity, there is tremendous rural employment potential of this activity. In order to promote this emerging industry the central government allocated Rs. 1200 crores in the Ninth Plan, Rs. 1000 crores for horticulture in its Eighth Plan as against Rs. 24 crores in Seventh Plan. As a result of all these, the area under floriculture has gone up from 7,600 hectares in 1976 to over 40,000 hectares today.

Floriculture exports from India started picking up from 1990. The red revolution came with the help of Dutch consultants who seized the opportunity for selling the expertise, greenhouse technology and especially the planting material. The Israelis came with ultra modern hi-tech technology in irrigation, and fertigation systems and they claimed to run floriculture as an industry and not as conventional agriculture. They, however, went too far ahead in promoting soilless culture or substrate growing which was not really necessary in India. They did not realise the potential of agro-climatic conditions, water, good soil and skilled labour available in India. The mixed euphoria of growing flowers was nursed by big corporate houses for whom investment in floriculture as compared to steel and fabrics was very low. This resulted in a spurt in floriculture units in India, so-much-so that today there are more than 153 export oriented units with an investment over Rs. 1000 crores.

3.4.2: World Scenario about Imports of Flowers

The world consumption of floriculture products is worth approximately Rs 70,000 crores and cut flowers contribute nearly 60 per cent. Consumption of cut flowers world over has risen by 11 per cent since 1985. It is, however, concentrated in three regions: Western Europe, North America and Japan. At the world level the industry is growing annually at a rate of 12 to 15 per cent. In 1986, the world market size was around $ 2.5 billion, which grew to $5.2 billion by 1990. The world consumption of flowers is about $40 billion per year.

The major flower importing countries in the world today are Germany, U.S.A., U.K., France, Netherlands and Japan; together they account for over 75 per cent of world imports. Germany is by far the most important buyer of cut flowers as it alone accounts for over 25 per cent of world imports. In the case of live plants and bulbs also, the above countries form the biggest market, with Germany accounting for 20 per cent share. The import demands have been estimated by major regions of the world and shown in Table 3.20.

Holland is the most important trading centre for floriculture. The total floriculture sale in Holland is about $26 billion per year. Other countries in international trading are Columbia, Israel, Zimbabwe, South Africa, Kenya, Brazil and Costa Rica. Major importers of flowers are Germany, UK, Switzerland, Italy, Sweden, Holland and Russia. In Asia, Japan and Singapore are new emerging markets for imports of flowers.

Table 3.20: Estimated Import Demands (Value in US $ billion)

Demand Estimated	Regions		
	Western Europe	Japan	U.S.A.
1990	12	05	06
1995	15	07	08
2000	18	09	11

As against the demands, the recent trend in imports of flowers can be seen from Table 3.21. Noticeably, the imports are going down very fast.

Table 3.21:World Imports of Flowers (In US $ million)

	1990	**1991**	**1992**	**1993**	**1994**
Live plants/bulbs	4229	3664	3992	2870	3027
Cut flower	4105	3390	3592	3055	3792
Cut foliage	560	471	509	481	—
Total	**8894**	**7525**	**8023**	**6406**	**6819**

As compared to the estimated demands, the export trends have been quite low, almost 39% in 1990's, going down to 23% in 1994. It is a matter of further investigation, if this downward trend is due to environmental regulations and other non-tariff barriers.

As per international trade classification floricultural products encompass the following: -

- Bulbs, tubers and tuberous roots.
- Other live plants (including trees, shrubs, bushes, roots, cutting and slips).
- Cut flowers and flower buds, fresh dried, dyed bleached, impregnated or otherwise repaired.
- Foliage, branches and other ports, tubers and tuberous roots can be planted in pots, boxes or similar containers. Live plants are used for permanent decoration of offices, homes and buildings.
- Cut flowers refer to flower, flower buds with a suitable stem of varying length. They generally mean all cut plant components which are essential for decorative effects of their blossoms. Examples of cut flowers are roses, carnations, chrysanthemums, orchids, gladioli and many other types.

- Cut foliage denotes leaves, twigs, grasses, shoots, etc. It is used with cut flowers for bouquets.

Global trade in floriculture products is recorded in terms of live plants and bulbs, cut flowers and cut foliage.

3.4.3: Export Trends for Indian Cut-flowers

India is undoubtedly emerging as a source of supply to global markets though its share is less than one per cent of the total world's imports, but has a greater potential of reaching 10-15%. Product-wise imports from India by selected countries in recent years are presented in Table 3.22. Interestingly enough, of late much of the demand for Indian flowers come from our neighbouring countries such as Sri Lanka. Sri Lanka imported cut flowers from India to the extent of 53 per cent of its requirements. The Table also highlights the fact that imports of selected countries from India increased from US $ 5.58 million in 1990 to US $ 16.39 million in 1994.

In 1990, total floriculture exports were $2.5 million and in five years touched $9 million. Major buyers are UK, USA, Germany, Netherlands, Switzerland and France. Value of imports by selected countries (shown in Table 3.22) in 1994 was $ 3739 million as against world imports of $ 6819 million, constituting 54.8% of world imports.

Indian exporters have to compete with established countries like Colombia, Malaysia, Kenya and Zimbabwe who are the traditional exporters of flowers. There is an EEC tariff barrier on Indian exports, with an import duty of 20 per cent in summer and 15 per cent in winter. Inspite of all this, the export growth for Indian floriculture was phenomenal at 560 per cent over a decade as compared to Ecuador's 463 per cent, Zimbabwe's 313 per cent and Malaysia's 259 per cent.

India has achieved the distinction of being the biggest supplier to Sri Lanka recently. Indian total exports, which amounted to $ 5.58 million in 1990 has now reached a

high of $ 16.39 million by 1994. Investments worth more than Rs 600 crores have already been made in this sector during 1995-2000 period.

Table 3.22: Import Shares of Floricultural Products from India

(Value : US $ Million)

	1990	1991	1992	1993	1994
Bulbs/Cuttings/Plants					
US					
Total Imports	178.60	194.18	218.60	235.60	259.00
India's Percentage Share	0.00	0.03	0.07	0.41	0.33
Netherlands					
Total Imports	207.17	219.41	248.08	161.39	178.00
India's Percentage Share	0.21	0.48	0.70	0.56	0.57
New Zealand					
Total Imports	0.95	1.47	2.50	2.54	3.76
India's Percentage Share	0.00	1.36	3.20	3.94	2.66
Malaysia					
Total Imports	1.18	2.17	2.62	2.29	1.72
India's Percentage Share	0.00	0.00	0.00	5.68	0.00
Cut Flowers/Foliage					
Germany					
Total Imports	1186.84	1415.60	1503.87	1037.27	1102.80
India's Percentage Share	0.14	0.14	0.13	0.15	0.28
USA - Puerto Rico					
Total Imports	459.73	450.86	488.35	525.09	573.92
India's Percentage Share	0.33	0.48	0.57	0.60	0.37
Netherlands					
Total Imports	244.05	275.02	349.25	327.32	375.57
India's Percentage Share	0.18	0.16	0.18	0.24	0.49
United Kingdom					

Total Imports	324.04	331.38	342.38	315.83	336.07
India's Percentage Share	0.01	0.05	0.07	0.25	0.29
France					
Total Imports	324.79	350.90	335.42	258.68	285.13
India's Percentage Share	0.08	0.14	0.04	0.06	0.09
Japan					
Total Imports	126.97	155.54	140.17	174.35	215.48
India's Percentage Share	0.10	0.08	0.11	0.06	0.11
Italy					
Total Imports	114.76	143.84	143.45	144.05	134.06
India's Percentage Share	0.62	0.69	0.67	0.72	1.00
Austria					
Total Imports	97.80	101.54	103.39	96.46	106.22
India's Percentage Share	0.05	0.05	0.10	0.13	0.14
Canada					
Total Imports	51.89	47.19	50.99	55.61	59.82
India's Percentage Share	0.06	0.08	0.14	0.20	0.18
Denmark					
Total Imports	36.86	39.10	41.39	49.30	49.90
India's Percentage Share	0.06	0.18	0.31	0.39	0.24
Spain					
Total Imports	26.75	37.77	44.53	30.45	29.35
India's Percentage Share	0.75	0.58	0.58	0.62	0.55
Mexico					
Total Imports	2.49	4.09	10.29	14.15	17.13
India's Percentage Share	0.00	0.00	0.00	0.00	4.20
Australia					
Total Imports	7.56	5.54	5.05	4.18	5.50
India's Percentage Share	0.79	1.99	1.78	1.91	2.55

Oman					
Total Imports	2.20	2.24	3.03	2.64	2.39
India's Percentage Share	2.73	5.36	10.56	0.38	1.26
Sri Lanka					
Total Imports	0.01	0.00	0.06	0.27	0.51
India's Percentage Share	0.00	0.00	0.00	44.44	52.94
Total value of	**3394.64**	**3777.84**	**4033.42**	**3184.41**	**3739.21**
Imports by selected countries as listed above					
Imports from India	**5.58**	**8.05**	**9.88**	**11.24**	**16.39**
India's Percentage Share	**0.16**	**0.21**	**0.25**	**0.35**	**0.44**
In the selected countries					

Source: Market News Service (MNS), International Trade Centre, UNCTAD/WTO, April, 1996.

India has recently opened new markets for exports in the CIS countries, Australia (in summer), the Middle East, Russia and the Scandinavian countries. India is also making inroads into the US market.

3.4.4: Case Study of Cut-flower Exporting from India

A study was conducted at University of Agricultural Sciences, Bangalore (Chengappa et al, 1998) about the competitiveness of Indian floriculture vis-à-vis some competitors. In Kenya the export earning have been reported to be growing at a rate of 38%. Almost all the cut-flowers growth in USA is consumed within the country only. Because of greenhouse culture, the costs in USA are enormously higher than in Kenya and India. India still has a comparative advantage in the exports of cut flowers.

Table 3.23: Comparison of costs and returns in Kenya, India and USA (Rs/square meter of land) on floriculture (1997-98)

Item	Kenya	India	USA	
			Cut Rose	Diversified flowers
Production expenses	211 (42)	140.6(32.2)	1626.9(35.9)	3149.9(6.1)
Admin. Expenses	109(21.8)	72.0(16.5)	2011.04(44.2)	1785.1(34.7)
Selling expenses	180(36)	224.56(51.39)	908.35(19.9)	203.4(4.0)
Total costs	500.0(100)	437.16(100)	4546.31(100)	5138.4(100)
Gross returns	1200	940.1	3805.17	5707.0
Net returns	700	502.85	(-)741.14	569.0
Benefit/cost ratio	2.40	2.15	0.84	1.12

Clearly India and Kenya are very high on competition in exporting to countries abroad. The traditional international market for cut flowers is Holland and Europe, while Singapore, Australia and Japan are the new emerging markets. The markets differ in terms of choice of colour of flowers.

3.4.5: On environmental compliance

Exporting of cut flowers is an activity that is subjected to maximum environmental clearances, starting from growing of flowers, to transporting, sorting, to packaging and shipping. Therefore, some details of these are presented here.

To begin with, all the domestic regulations on pesticide controls as listed for tea are applicable to floriculture. Invariably, farmyard manure is to be used in place of inorganic chemical fertilizers.

Marketing is the most sensitive aspect of floricultural exports. The packaging rules and regulations are most binding for cut flowers. For instance, for the Holland market

(Alsmeer Auction Market in Holland) the flowers are to be graded based on length as long, medium and small, and wrapped in cardboard wrappers in bundles of 20 numbers of spikes. The bundles are to be kept in buckets with water and cold storage at 0 to 2 C. Card board boxes of proper sizes are to be used, putting about 400 spikes in one box. For the Japanese market, these regulations are not very strict.

In the Netherlands, the environmental regulations are very strict in the case of cut-flowers. They are driven by eco-labelling initiatives taken by leading exporters and importers. For instance, the Dutch flower auction is conventionally known as Flower Auction Holland (FAH). The FAH classification system for flowers takes into account four major environmental themes, namely crop protection remedies, use of fertilizers, energy use and waste generation. There are three levels of stringencies on these themes. The levels of stringencies depend upon national environmental policy plans. Relative weights are given to these themes at the three levels as shown in Table 3.24. Flowers are then classified into three environmental classes as A, B, and C, based on the aggregate points or weights.

Table 3.24: Relative weights of environmental themes in FAH classification Scheme

Level	Crop protection remedies	Fertilizers	Energy use	Waste
1	1	1	1	1
2	4	2	2	1
3	6	3	3	1
Total points				
Environmental Class A: 10-13 points; Class B: 5-9 points; Class C: minimal requirement to register for all themes.				

Such FAH classification of flowers has been in operation in Holland since 1993. The exporters into Holland are also to comply with these classifications for entering into auction and pricing. Apart from this FAH classification, there is a separate

Environmental Quality Mark for cut flowers, done through a Foundation (Miliekeur). They award Eco-labelling based on eight categories of environmental regulations and considerations. They are resource use, energy use, emissions, nuisance, waste, re-usability, reparability and lifespan. The flower products are examined in five different stages as raw material extraction, production of intermediates, product manufacturing, product use and removal. Such strict eco-labelling procedures have come in a big way blocking export possibilities from India.

Apart from the environmental regulations, the 15% import duty on Indian exports and risks of various types has been affecting Indian export of cut flowers. Some of the major risks are: Risk of consignment not reaching auction house on time (rank 1), risk of improper display of Indian flowers (rank 2), risk of non-payment of actual price (rank 3), risk of delayed payment (rank 4), and risk of consignment being lost (rank 5). Therefore, there is considerable delay in the growth of this industry for export purposes. Also, discrimination in pricing at the international level is being observed.

Chapter Four: Major Environmental Regulations and Acts: A Review

4.1: Introduction

There are two major lines on which the environmental regulations and acts are to be looked into. They are:

- Have the regulations affected the competitiveness of exporting countries, particularly, the developing countries?
- Have the regulations changed the market access due to the non-availability of technology, strictness of regulations acting as non-trade barriers, increasing dependency on import of products required to comply with the regulations?

As far as the first issue is concerned, the fact must be reckoned that environmental regulations in the developed countries have come only after attaining competitiveness of some degree. But developing countries will find it difficult to comply with the regulations as well as to compete with the developed countries. Particularly, small and medium firms will find it more difficult.

Regarding the second issue, some of the major environmental regulations can be grouped into the following categories (Jha et al., 1999):

- Standards and Regulations
- Packaging Regulations
- Recycled content requirements
- Eco-labelling
- Unilateral measures
- NGO actions

In this chapter, some detailed account of these regulations is presented. In doing so, both the domestic and international regulations are reviewed. Subsequently, an attempt is made to list various regulations and produce them chronologically.

4.2: Environmental Regulations under the World Trade Organisation

Fundamental objective of the World Trade Organisation is written in its Preamble concerning the establishment of the WTO as:

"Expanding the production and trade in goods and services, while allowing for optimal use of the world's resources in accordance with the objective of sustainable development, seeking both to protect and preserve the environment and enhance the means for doing so in a manner consistent with their respective needs and concerns at different levels of economic development." (Preamble in the Final Act of the Uruguay Round, 1994, p.9)

In the Final Act of the WTO, environmental aspects of the trade have been enshrined in the paragraphs (b), (d), and (g) of Articles XX of the General Agreement on Tariffs and Trade (GATT). WTO has also empowered the countries to take trade measures based on technical, packaging, labeling and production hygiene standards of the importing countries under (a) Technical Barriers to Trade Agreements (TBT) and (b) Sanitary and Phytosanitary Standards (SPS).

The Marrakesh Ministerial Declaration identified several issues on trade and environment to be considered in the WTO and mandated the establishment of a WTO Committee on Trade and Environment (CTE) to look into these issues. The issues are:

(1) The relationship between the provisions of the multilateral trading system and trade measures for environmental purposes, including those pursuant to multilateral environmental agreements;

(2) The relationship between environmental policies relevant to trade and environmental measures with significant trade effects and the provisions of the multilateral trading system;

(3) The relationship between the provisions of the multilateral trading system and charges and taxes for environmental purposes and requirements for environmental purposes relating to products, including standards and technical regulations, packaging, labeling and recycling;

(4) The provisions of the multilateral trading system with respect to the transparency of trade measures used for environmental measures and requirements which have significant trade effects;

(5) The relationship between the dispute settlement mechanisms in the multilateral trading system and those found in multilateral environmental agreements;

(6) The effect of environmental measures on market access, especially in relation to developing countries, in particular the least developed among them, and environmental benefits of removing trade restrictions and distortions;

(7) The issue of exports of domestically prohibited goods;

(8) Trade-related Aspects of intellectual property rights and the environment;

(9) Services and the environment; and

(10) Appropriate arrangements for relations with non-governmental organisations referred to in Article V of the WTO and transparency of documentation.

The WTO Final Act of 1995 contains the following five major agreements which have relevance to environment and trade. They are:

- Agreement on Agriculture
- Agreement on trade related aspects of Intellectual Property Rights
- Agreements on Subsidies and Countervailing Measures
- Agreement on Technical Barriers to Trade

- Agreement on Sanitary and Phyto-Sanitary Measures

The most relevant of these for trade and environment interface are the Agreement on Technical Barriers to Trade (TBT) and the Agreement on Sanitary and Phyto-Sanitary Measures (SPS). The TBT Agreement now covers both product and process characteristics. It calls for the nations to ensure that 'technical regulation are not prepared, adopted or applied with a view to or with effect of creating unnecessary obstacles to international trade. It also has special and differential treatment provisions for the developing country members.

4.2.1: GATT (1947) and environment

The usual context in which environmental laws came to be questioned before GATT Dispute Settlement System (DSS) were Articles I, III, and XX. Article I codifies the Most Favoured nations (MFN). Article III calls for national treatment on internal taxation and regulation between imported and domestic products so as not to afford protection to domestic production. Article XX exempts certain measures such as those necessary for protecting human, animal and plant life or health from the obligations of the agreement subject to specified general conditions. The relevant part of Article XX is as follows:

(a).... Subject to the requirement that such measures are not applied in a manner which would constitute a means of arbitrary or unjustifiable discrimination between countries where the same conditions prevail, or a disguised restriction on international trade, nothing in this Agreement shall be construed to prevent the adoption or enforcement by any contracting party of measures:….

(b) necessary to protect human, animal or plant life or health;

(c) relating to the conservation of exhaustible natural resources if such measures are made effective in conjunction with restrictions on domestic production or consumption;

The above provision in GATT 1947 has been carried forward unchanged into GATT 1994, which is one of the agreements annexed to the WTO Agreement.

Technical Barriers to Trade (TBT): The WTO Agreement on TBT is a modified version of the 1979 TBT Agreement that was negotiated in the Tokyo Round. The Agreement on TBT refers to environment in Articles 2.2, 2.10 and 5.4. Article 2.2 of TBT provides for technical regulations for fulfilling legitimate environmental objective. Article 2.10 provides for relaxing notification provisions in case of urgent problems like, inter alia, environmental protection. Article 5.4 provides for procedures for relaxing the use of internationally accepted technical regulations for the protection of the environment.

The TBT Agreement recognizes the fact that each country has the right to set the level of (preferably international) standards it deems appropriate. The application of TBT should be on MFN basis, objective-specific and trade non-restrictive. Of the 400 technical barriers notified to GATT since 1980 for its significant trade effects none has been challenged in GATT as being unnecessarily trade restrictive. Developing countries are given a Special and Differential (S & D) Treatment for adjusting to new requirements in export markets; to ensure that preparation and application of technical regulations, standards and conformity assessment procedures do not create unnecessary obstacles to the expansion and diversification of exports from developing country Members (The Final Act, p. 129).

Sanitary and Phyto-sanitary Standards (SPS): Broadly defined, the sanitary measures are those related to human or animal health, while health of the plant is dealt by the phyto-sanitary measures. The protection of fish and wild fauna, forest and wild flora are included and the protection of the environment per se and animal welfare excluded. The SPS Agreement again narrows down the definition into a very limited range of solutions. SPS measures can take many forms viz., requiring products to come from disease free areas, inspection of products, specific treatment or processing of products, setting of allowable maximum levels of pesticide residues or permitted use of only certain additives in food, quarantine requirements, import ban etc. The objective is to protect health within the territory of the importing country.

The 1979 Agreement on Technical Barriers to Trade (TBT) was the precursor of the SPS Agreement encompassing the entire gamut of food safety, animal and plant health regulation under the 1979 plurilateral agreement of GATT. Broadly, the SPS Agreement allows countries to set its own standards based on science. Though countries are encouraged to maintain international standards, it is also permitted to maintain higher national standards based on scientific justification. So long as the approach is consistent and not arbitrary, the member can set higher standards based on appropriate assessment of risk.

Three international standard-setting organisations are specifically recognized in the SPS Agreement. These are: Codex Alimentarius Commission (Codex) under the aegis of WHO/FAO international food safety evaluation and harmonization; the Office Internationale des Epizooties (OIE), the world animal health organization based in Paris, and finally, International Plant Protection Convention (IPPC), a subsidiary of FAO based in Rome with the objectives of developing international health standards for plant imports, particularly on quarantine pests, a “Glossary of Phytosanitary Terms”, basic principles governing phyto-sanitary laws and regulations, and harmonized plant quantifying procedures.

The objectives of the SPS agreement indirectly address to the environmental concern by setting appropriate standards, thereby they emerge as major NTBs in restricting trade. This is because of its technical complexity and particularly deceptive barrier, which is difficult to challenge. SPS is getting more protectionist under WTO. It says “parties are required to regulate very strictly the import and export of plant and plant products, by means, where necessary of prohibitions, inspections, and destruction of consignment:” (Article 6). Thus, a WTO member, who is not a party to International Plant Protection Convention (1951) is affected by trade provisions of the MEA through SPS. It calls for government regulations and import bans regarding food safety and disease-spreading products to protect human, animal or plant life. They are to be based on scientific principles only. Members are required to ensure that SPS measures do not arbitrarily or unjustifiably discriminate between Members where identical or similar conditions prevail.

Agreement on Agriculture: On environmental side, the major benefit of this agreement is the reduction of subsidy under "Amber Box", which will reduce incentive for intensive farming in ill-suited areas. In this agreement, several exemptions are allowed for agricultural operations consistent with the environmental objectives under the "Green Box" and the "Blue Box". One such exemption is for direct payments under environmental programmes up to the full cost/loss of income involved in complying with the programme. Another is for price support under production limiting programs. Since effect of acreage set – aside polices and the like is to raise the value of land, this will offset somewhat the positive environmental effects of other parts of the reforms on the intensity of use of the acres that remain in production.

The Agreement on trade related Intellectual Property Rights (IPRS): TRIPS Agreement of GATT 1994 provides much stricter patent protection to the intellectual properties that is related to trade. Providing effective protection to every area of intellectual properties encourages more investment on R&D and thus better access to new technologies. There may be a possibility of excluding invention from patentability if prevention of their commercial exploitation is considered necessary to protect the environment.

4.3: Regulations specific to the Leather and leather goods industry

A survey of various types of environmental regulations was carried out for leather and leather goods. The information gathered is grouped as (a) Specifications from European Union, (b) Regulations and standards from Germany, (c) Regulations from USA (Appendix-4.2), (d) Regulations from Hong Kong[17](Appendix-4.3). A comparative analysis of some selected country regulations is presented here.

[17] By no means it is claimed here that these are the only region specific or country specific environmental regulations that affect Indian leather industries.

4.3.1: Specifications By European Union

The European Union measures are further classified as (i) Specific measures related to Leather Products (ii) Measures on Related Products, and (iii) General measures, (iv) Other measures. They are shown in tabular forms.

Table-4.1: Specific Measures related to Leather Products

1	Raw hides and Skins, Leather and Fur Skins	Import prohibition for wildlife protection CITES	Since 1984	1997 amended
2	Foot wear	Global quota + auto limitations Surveillance	Before 1988	
3.	Articles of Leather & Leather produces	Use of azo dyes		
		Ban on the use of toxic fungicide, Pentachlorophenol (PCP)	In Dec. 1989 Germany	
4.	Footwear	Mandatory labeling Requirements		Criteria for ECO label is amended on 17 Feb 1999
5	--- DO ---	Ban on use of 5 of the six types of asbestos	1991	
		Remaining use of Chrysotile asbestos	In 1999	As from 2005
6.	Components of Footwear Shoes and Footwear	Mandatory labeling Requirements for	In 1999	Criteria are developed
7.	Leather & Leather Products	Restriction on Chrome, aldehyde, formaldehyde azo dyes, Tributyltin, glyoxal	In 1990's	
8.	Leather	Certification requirements CE/SG marks, CF mark, Quality management system & ISO 14001/ Environmental management systems BS (British standard) 7750	In 1992	

Table-4.2: Measures on Related Products

Sl No.	Items	Nature of Restrictions	Base	Entry into force	Startup /Remarks
1	Raw, hides and skins, leather and fur skins	Import prohibition for wild life protection	CITES	Since 1984	1997 amended
2	Textile and clothing	Health and safety regulations, MFA Quotas and Surveillance			
3	Textile and leather machinery	Global and bilateral quota		Before 1988	
4	Foot wear	Global quota + auto limitations Surveillance		Before 1998	
5	Animal Products	Sanitary Regulations variable levies, import specific controls		Before 1998	
6	Other agricultural products of animal origin	Import controls for wild life protection	CITES	Since 1984	
7	Chemicals	Environmental Related Regulations		Before 1988	
8	Lobster shrimps & Prawn	Environmental Standards-SPS SPS + Genetically modified organisms		1990's	
9	Skins of Seal Pups	Prohibition			

Sources: 1. GATT / WTO Trade Policy Review: various years

1. Indian Leather: various issues

Table-4.3: General Measures

European Union Standards	European standardized bodies
Technical Trade Barriers (standards)	Costly procedures
Sanitary and Phyto sanitary Measures	Since 1964 Fresh meat to Eggs
Strict Inspections	on Animal Health& Animal production
Hormones Directives	A Council Directive March 1988 imposes ban on use of hormonal substances
Hygiene standards	Food
Direction on the Packaging Waste and hazardous waste	Entered into force 1997
Sustainability impact Assessment	Integrated Environmental Article 6th of the 1999 E C Treaty
Mandatory Eco Labeling Requirements	Beef labeling scheme 1997 Genetically modified Organism & Products-2000
ECO label Awarded scheme 1992 Mandatory EU Ecolabels & Certificates	For 12 product groups Before1997 Wool mark, Panda logo of WWF
GSP	Inducements to countries adopting core environmental standards
ISO 14000 series	
14. European Community standards	CE mark 1992 Mandatory health, safety and environmental legal requirements established by the EC for the regulated products
New EU Guidelines	Will come into Proposed to ban effect on July 2002 amino anisidine , 2 –methoxyaniline
15. EU applies regulations to trade in wild fauna and flora since 1984	CIITES Amended in 1997 to introduce stricter trade control measures
16. 17. EU implemented	Montreal Protocol amended in 90's as from 1988
17. 18. EU implemented	Basel convention from 1994 (control of hazardous wasters)
18. 19. EU concluded	international agreements on standards with major fur exporting countries in1998

Table-4.4: Other Measures from EU

- In July1989 Germany, Italy France unilaterally enacted bans on beef delivering from the UK to avert the spread of cow disease.
- EU has banned hormone treated beef altogether
- Animal health inspection of third country herds are requested by EC in1992
- Ban on use of all hormones, natural and synthetic in live stock production by EU
- On footwear, the ecological criteria includes the product itself, as well as production process for inputs and the use of recycled material for the packaging.
- EC has banned the production and trade of asbestos and asbestos containing products in mid 90's
- Criteria for Eco-label to Footwear
    1. Residues in the Final product
    2. Emissions from the production of material
    3. Use of harmful substances (up to purchase)
    4. Use of volatile organic compounds (VOCs)
    5. Electric component
    6. Packaging of the final product

Table-4.5: Environmental Regulations and Standards in Germany

1970s	Environmental debate started
1978	Eco labels introduced Blue Angel 1978 for many products SG – Schad stoff – gepruft for leather / skins 1994
Late 1980's	Environmental policy has taken holistic view of products and their environmental impact overthe entire life cycle
1989	Ban on the manufacture, use and marketing of pentachlorophenol (PCP) under the Hazardous substances Ordinance (HSO) Result : An almost complete phasing out of biozide in the German market
Early 1990s	Regulations on the content of formaldehyde under HSO
1990	Packing ordinance which calls to take back the used product packaging
July 1995	European directive on mandatory labelling of shoes was incorporated in the German law
April 1996	It has been forbidden to produce and import shoes manufactured with dangerous azo dyes under essential commodities ordinance. Use of aromatic amines & Chromium VI also regulated
1999-2000	The recently proposed ecological criteria includes 1. the total energy content of the non-renewable resources 2. Maximum content of toxic heavy metals 3. The total use of VOCS 4. Voluntary guidance to the suppliers in leather exporting countries.
1999	European Eco labels are applied in Germany ISO 14000 series (90's) Panda and Otto WWF labels for shoes

- Green consumerism is a growing phenomenon in Germany. While it increased steadily during 1980's it is now stable at a high level. Between 70 and 80 per cent of the population consider themselves environmentally aware
- The importance of ecolabels for leather product is generally considered to be fairly slight. But cost of getting it is high.

Thus in Germany there is a

- High level environmental awareness
- Environmentally sound behaviour
- Plethora of ecological product labels and environment – related standards

4.4: Regulations affecting tea exports from India

The major environmental regulations affecting tea exports depend on whether the tea is claimed to be organically grown. Organic tea production, instead of relying on pesticides and chemical fertilizers, involves the use of livestock manure, composted crop residues and intercropping for plant nutrients, and natural pesticides (such as neem and rotenone) or predators for pest control. However, the tea produced by this alternative method has to face an entirely different set of stringent requirements for it to qualify as organic tea. The accreditation is done by international agencies. Currently, India accounts for almost 90% of the 2.4 million kg of organic tea produced worldwide annually (Singh, 2002). Low profitability and stringent environmental regulations related to the entire production process act as major deterrents to the widespread adoption of the organic method of production.

In contrast, other tea exports do not face an examination of the entire production process. Information on the environmental measures affecting tea specifically are difficult to isolate as these are generally notified as part of the package of measures affecting agricultural goods as a group. There are mainly 5 different types of environmental measures likely to affect Indian tea exports to the more environmentally aware developed countries. These are (1) Maximum Residue Levels (MRL) of Pesticides; (2) Regulations relating to Product and Process Methods

(PPM); (3) Sanitary and Phyto-Sanitary (SPS) Regulations; (4) Packaging Regulations (PR); and (5) Eco-Labelling (EL). Of these, MRLs of pesticides have a specific application to tea, whereas the other types of environmental measures are more general in nature. Box-4.1 gives an idea of the different types of environmental regulations on tea in some selected countries/region.

Box-4.1: Relevant Environmental Regulations on Tea in Selected Countries/Region

Name or type regulation	Product	Country/Region
Pesticide residue Measures	Tea gardens	European Union
SPM Measures	Tea	"
SPM Measures	Food stuffs	All countries
Excise taxes	Tea & Mate	USA, 1988
0.01 mg of tetrafidon, 2 mg of ethion per kg.of tea	Tea	
Blue Angel Eco-labeling	Tea	Germany
Degriine Punkt packaging	Tea	Germany, 1993 (last stage of packaging ordinance came into force in January 1993)
Greet Dot Packaging: • Maximum avoidance of polystyrene • Compound packaging • No use of PVC & toxic printing ink • Clean marking of plastics • Disposable and recycling materials • No chlorine or chlorine based products	Tea &Food stuffs	Germany
Health and safety regulations	Tea	Canada, 1990
Colouring materials: In marking, packing	Tea	Canada
Phytosanitory regulations	Tea and mate	Australia
Eco-labeling, Marketing and Standards regulations, Packaging regulations	Tea, coffee, extracts	Australia

Sources: Atul Kaushik , mimeographed document (1999);UNCTAD (1999): Profiting from Green Consumerism in Germany, United Nations, Geneva; Bhattacharya (2000); Indian Leather (2000); GATT/WTO: Trade Policy Review, various issues.

4.4.1: Maximum Residue Levels (MRL) of Pesticides in Tea

Pesticides are a crucial component in tea cultivation and their total avoidance is considered to be not feasible on account of the complexity of the pest problem in production of tea. MRLs of pesticides are used as a regulatory instrument to protect human health and the environment from the harmful consequences of excessive pesticide use by tea producers. In 1962 the Codex Alimentarius Commission was set up under the aegis of FAO (Food and Agricultural Organisation) and WHO (World Health Organisation) to develop global benchmarks for food additives, pesticides, chemicals and contaminants in all agricultural commodities including tea. However, the MRLs for pesticides in tea fixed by the Codex are not comprehensive and there is great variation in the levels fixed for different pesticides across countries (Table 4.6).

Table 4.6: Variations in MRLs of Pesticides in Tea across different countries

Pesticide	Maximum Residue Level (in milligrammes per kilogramme)						
	EC	Codex	Japan	Germany	UK	Netherlands	India (proposed)
Cypermethrin		20					10
Deltamethrin		10		5	5	5	5
Dicofol	20	50	3	2			20
Dimethoate	0.2						0.5
Ethion				2	2	2	5
Endosulfan		30		30	30	30	20
Fenaquin							10
Malathion	0.5						3
Methyl Parathion							1
Monocrotophos	0.1						Not recommended
Paraquat	0.1						0.2
Phosphamidon							1
Propargite	5	10					5
Quinalphos	0.1						3

Source: Tea Board, Kolkata; www.fao.org

In the European Union, MRLs of pesticides in cereals and foodstuffs of animal origin were fixed in 1986. For pesticides in and on products of plant origin, MRLs were established in 1990 (Council Directive 90/642/EEC). Subsequent amendments to the 1990 Directive took place in the years 1994, 1995, 1998, 1999 and 2000. Over time, the tendency towards increasing stringency in the containment of the toxicity content in tea is revealed in the downward revision of the MRLs and greater coverage of pesticide types. Table-4.7 gives the MRLs for different types of pesticides in tea as fixed by the European Union in its latest amendment (Directive 2000/42/EC of 22 June 2000).

Table-4.7: MRLs of pesticides in tea fixed by the European Commission by its Directive 2000/42/EC of 22 June 2000

Type of Pesticide	Maximum Residue Level (mg/kg)
Methomyl/thiodicarb	0.1*
Primiphosmethyl	0.05*
Thiabendazole	0.1*
Carbofuran	0.2*
Carbosulfan	0.1*
Benfuracarb	0.1*
Furathiocarb	0.1*
Benalaxyl	0.1*
Metalaxyl	0.1*
Lambdacyhalothrin	1
Propiconazole	0.1*
Cyfluthrin and b-cyfluthrin	0.1*
Ethephon	0.1*
Fenarimol	0.05*
Aldicarb	0.05*
Amitraz	0.1*
Dicofol	20
Benomyl/carbendazim-thiophanatemethyl	0.1*
Chlorothalonyl	0.1*
Quinalphos	0.1*
Chlormequat	0.1*
Fenvalerate and esfenvalerate	0.05*
Fenbutatinoxide	0.1*
Diazinon	0.05*

Disulfoton	0.05*
Endosulfan	30
Mecarbam	0.1*
Phorate	0.1*
Propoxur	0.1*
Propyzamide	0.05*
Triazophos	0.05*
Triforine	0.1*
Methidathion	0.1*

* indicates lower limit of analytical determination

Source: Directive 2000/42/EC of 22 June 2000 in Official Journal of the European Communities, 30.6.2000, L 158/75-76.

4.4.2: Some other Environmental Regulations on Tea in EU Countries

- In the EU as well as in several member states, regulations and symbols have been developed for the product's packaging. Germany allows the use of the Green Dot label on packaging under the Duales System Deutschland (DSD) which covers nearly all types of materials, viz.: glass, paper and cardboard, tin, aluminium, plastics, composite and natural packaging materials.
- The EU regulation on organic production and labeling introduced in 1991 provides consumers with a guarantee of origin, preparation, processing and packaging of agricultural crop products. Much before this regulation, the basic standards for organic production were developed in 1980 in Switzerland. In the Netherlands, the EKO-Quality symbol is the label for organic production. Germany has implemented the EU regulation on Organic Production directly.
- Launched in the Netherlands in 1988, Max Havelaar label was Europe's first fair trade hallmark (for coffee). The environmental conditions of fair trade include: (i) protection of forest and wildlife areas; (ii) prevention of water pollution; (iii) documentation, checking and reduction of pesticide usage; (iv) documentation, checking and reduction of artificial fertilizer; and (v) checking, reduction and composting of waste. Fair trade criteria has been developed for tea and the relevant label for it in the Netherlands, UK, Germany and Switzerland is the TransFair label.

4.4.3: Environmental Regulations in India

The major domestic measures on the environmental regulation front are the Water (prevention and control of pollution) Act of 1974, Air (Prevention and Control of Pollution) Act of 1981 and the 1986 comprehensive Environment and Protection Act. Additionally the Central Pollution Control Board and in turn the State Pollution Control Boards have established the ambient standards for air and tolerance limits for water. For instance, talking about the leather goods sector, the Tamil Nadu Pollution Control Board has declared the tanning industry as a "Red" category industry[18]. The Supreme Court of India has directed the state authorities to implement introduction of either Individual Effluent Treatment Plants (IETP) or Common Effluent Treatment Plants (CETP) in the Tannery sector. Appendix tables show some of the major Indian regulations.

4.5: What have environmental stringency got to do with the direction of trade?

Environmental regulations by importing countries may affect commodity trade in two general ways: (1) the entire volume of trade may be affected uniformly, but differently in the short run as compared in the long run; (2) the direction of trade may shift to countries with less stringent regulations. At least in the short run, the second type of impact is a stronger possibility. Since it is difficult to track the environmental regulations (reviewed in Chapter 4) exactly by date or year of introduction and effectiveness, it will be somewhat difficult to test the second hypothesis.

However, on the basis of broad inklings from the platform of regulations (documented in this Chapter), mapping on to the data on trade flows (both at the aggregate and direction wise and country wise, presented in the Tables in Chapter 3), some indications of their effects on the volume and direction of trade are discernible. Using the dates of major regulations affecting the direction and trend of exports, dummy variables representing the Regulations can be developed.

[18] The tolerance limits on these are shown in Chapter 3.

4.5.1: Indications Reflecting upon Environmental Regulations relevant for Leather goods

A close analysis of the Indian exports of leather and leather goods over the past twenty years reveal the following changes in the trade patterns and direction of trade from India.

The Quantum Index of total exports of leather and leather goods have shown dips in the total exports in the years 1991-92 and 1996-97.

1. the direction of trade to Germany and Italy have similar dips in the years 1991-92 and 1996-97. It is also important to note that the share of Indian exports to these countries are also significant.UK has shown a significant dip in its impoorts from India in 1991-92; where as USA has followed this in 1997-98.
2. A close look at the Dependency ratios reveals that:

   Germany and Italy have registered dips in the export shares in 1991-92; whereas USA has the same in the years 1990-91 and 1998-99.
3. Considering the market shares, one can notice that Germany's share had declined in 1990-91 and 1996-97.whereas that of UK in 1996-97.

4.5.2: Indications Reflecting upon Environmental Regulations Relevant for Tea

A close look at the time series of data on tea reveals the following:

- Indian tea exports have shown a decline in tea exports once starting from 1984, and again from 1991 onwards; However, from 1996 onwards, it has started moving upwards;
- In terms of share of Indian tea in the world, In the years 1984 and 1990, the same has started declining; however, from 1996 onwards, it has shows an upward movement;
- In terms of market shares for Indian tea, Germany had shown a declining trend from 1993 till 1996, since then it has been going up;

- In terms of dependency ratios for India, Russia has shown a declining trend from 1990 onwards till 1996.

All these shifts suggest of major non-trade barriers operating in the years 1984, 1991 and 1996. Many of these shifts are attributable to environmental regulations, if not to other non-tariff barriers.

4.6: Constructing Index of Trade Related Environmental Regulations

The construction of an indicator of increasing stringency of environmental regulations in countries importing Indian tea, leather and leather products and cut-flowers over a period of time has been attempted in the present study. Because of increasing stringency in the importing countries it is important that the environmental regulations indicator captures to the maximum possible extent the impacts on exporters' decisions to convert from a polluting production technology to a non-polluting production technology over a period of time. In the process, it is also possible that the impact of increased stringency may be realized not in a shift in production technologies but in a shift in the direction of exports from regulating countries to non-regulating countries or from stringently regulated countries to less stringently regulated countries. While the former type of shift necessarily involves changes in cost conditions of domestic producers and will be reflected in the quantum of the trade flow, direction remaining more or less unchanged in the long run (or at least reverting back to the original after a temporary deviation), the directional change will imply a tendency of exporters to opt for short term gains and keep costs and technology unchanged.

Empirical studies on the impact of environmental regulations on trade flows are relatively few compared to the theoretical explorations on the subject (van Beers and van den Bergh, 1996). This is partly due to the problems involved in defining and developing unambiguous indicators for environmental regulations – their effects and degree of stringency. The other part of the problem lies in the absence of data, particularly on a chronological basis, relating to changes in the environment at the local/national/regional level. This lack of data is a constraint especially when it comes to developing output-oriented indicators of environmental regulations. Output-

oriented indicators of environmental regulations (e.g. market share of unleaded petrol) are considered as a better proxy for environmental policy strictness than input-oriented indicators (e.g. a nation's expenditure on pollution abatement and control) (van Beers and van den Bergh, 1996). An empirical application of input-oriented indicator of environmental regulations stringency is found in Tobey's (1990) multi-country econometric analysis of the impact of domestic environmental regulations on comparative advantage patterns. On the other hand, van Beers and van den Bergh, (1996) use output-oriented indicators of environmental regulations strictness that are expected to pick up more effectively the concrete effects of environmental regulations. Their broad measure of environmental regulations strictness is based on seven specific environmental indicators: (i) protected area as % of national territory; (ii) market share of unleaded petrol; (iii) recycling rate of paper; (iv) recycling rate of glass; (v) % of population connected to sewerage treatment plant; (vi) change in energy intensity over a period; and (vii) level of energy intensity. Along with this broad measure, the study also develops a narrow measure of environmental policy stringency (based on indicators vi and vii only) to reveal more accurately the private economic costs of environmental regulations imposed on producers. However, both measures of environmental regulations stringency relate to one point of time only, and hence cannot be used in a time-series analysis of the impact of changing stringency of environmental regulations stringency on trade flows. Data problem is a major constraint on any attempt at constructing such output-oriented indicators chronologically.

Another pair of indices of environmental regulations strictness, based on information generated by the GREENTRADE system, is developed by Verbruggen et al (1998). These measures have more relevance in the context of the present study as they are specifically related to trade between the European Union and developing countries. The first index measures the frequency of incidence of environmental regulations affecting trade and is termed the Frequency Index for Environmental Measures (FIEM). The second index, termed the Coverage Index for Environmental Measures (CIEM), measures the value of trade that is affected by environmental regulations. Table 4.8 provides the estimated FIEM and CIEM values for exports from developing countries to the EU market. Again, as in the case of the indices developed by van

Beers and van den Bergh, the FIEM and CIEM measures relate to one point of time and as such cannot be used in a time-series framework.

Table 4.8: Frequency and Coverage Indices of Exports from Developing Countries to the EU Market subject to three types of environmental measures (1992)

Country/Region	All Environmental Measures		Economic Instruments		Standards & Regulations		Quotas	
	FIEM	CIEM	FIEM	CIEM	FIEM	CIEM	FIEM	CIEM
Africa	0.2	0.17	0.02	0.08	0.18	0.09	0	0
Asia	0.24	0.23	0.01	0.02	0.23	0.21	0	0
Latin America	0.16	0.08	0.01	0.03	0.15	0.04	0	0
All dev countries	0.23	0.2	0.01	0.04	0.21	0.16	0	0
Zimbabwe	0.29	0.06	0.01	0	0.28	0.06	0	0
Kenya	0.09	0.03	0.01	0	0.08	0.03	0	0
Philippines	0.29	0.29	0.01	0.01	0.28	0.28	0	0
India	0.2	0.29	0.01	0.02	0.19	0.27	0	0
Thailand	0.23	0.18	0.01	0.01	0.22	0.17	0	0
China	0.19	0.28	0.01	0.02	0.18	0.26	0	0
Brazil	0.17	0.09	0.01	0.03	0.16	0.06	0	0
Argentina	0.11	0.02	0.01	0.02	0.1	0.01	0	0
Colombia	0.25	0.24	0.02	0.22	0.24	0.02	0	0

Source: Verbruggen et al (1998)

The environmental regulations indicator proposed to be used in the present study is based on a ranking method that takes into account not only the different types of regulations in force at a particular point of time but also their evolution over a period. Since the study concentrates on three products – tea, leather and cut-flowers – that fundamentally differ from each other in terms of production and processing technology as well as input intensities, the types of regulations relevant to these the products also differ. For instance, while sanitary and phyto-sanitary regulations or pesticide controls are expected to have a significant impact on the tea trade, for leather products they bear little relevance. Similarly, the chemical-intensive processing requirements and regulations specifying concentration limits of

dangerous chemicals are more important for the exporting leather producers to take decisions that can alter the quantum and/or direction of the leather trade flow.

For the purpose of developing such indicators, the European Union (EU) countries have been sampled as the major trading partners. Environmental consciousness in the EU countries is at a very high level. National policies on the environment in the member countries is partly influenced by EU legislation and regulations. However, on a number of environmental issues EU legislation is yet to be introduced/implemented. Then the national-level legislations address these issues at different levels of stringency. Furthermore, even for the issues which have been addressed by the EU and implemented, national-level legislations are not harmonized among the member countries. This is because of the fact that the individual countries have the freedom to introduce additional/more stringent regulations on top of the EU legislation. In the present study it is assumed that Indian exporters of tea and leather products to the EU are equally concerned with existing national-level regulations (particularly those passed by Germany and the Netherlands, since environmental consciousness is highest in these two countries), as with legislations passed by the EU itself. Thus, the data on different categories of environmental regulations on tea and leather include those sourced from Germany and the Netherlands in addition to the relevant EU regulations. Appendix-4.6 and Appendix-4.7, respectively provide a summary of the different types of environmental regulations relevant to leather (and leather products) and tea introduced by the EU, as also national-level legislations of Germany, the Netherlands and the United Kingdom.

Typically, national-level environmental legislations involve a range of product-oriented policy instruments. These can be broadly divided into the following five categories:

i) ***Direct regulatory instruments*** such as (a) prohibitions, (b) admission and registration procedures, (c) product standards on composition, quality and environmental performance, and (d) take-back obligations. An example of

product-oriented direct regulation is the prohibition on azo dyes content above a specified concentration limit in textiles and leather products.

ii) ***Compulsory information requirements*** (e.g. compulsory labeling of phyto-pesticides and pesticides for non-agricultural purposes)

iii) ***Financial instruments*** (e.g. eco-taxes, deposit refund scheme, etc.)

iv) ***Other information requirements*** (e.g. eco-labelling)

v) ***Voluntary agreements*** (e.g. self-commitments by producers, covenants, etc.)

In most of the EU countries, direct regulatory instruments form the main part of product-oriented environmental legislation (EcoTrade Manual, 1998). Hence, the present endeavor at construction of an indicator of environmental stringency relies primarily on information about such instruments. Since eco-labelling is gaining in importance among the EU countries, it has been included in the exercise as a stringency-determining factor.

4.6.1: Ranking of Environmental Regulations

Ranking of the different product-oriented categories of environmental regulations follow the assumption that stringency of a particular regulation increases equi-proportionately with each successive amendment of that regulation. Admittedly limiting, such an assumption is unavoidable considering the paucity of data on individual regulations and also the impossibility of disentangling the impact of a specific amendment from that of the general trend. Thus, while 0 would signify the absence of a particular regulation and 1 its imposition, each successive amendment would see a jump in the rank value by unitary increments i.e., from 1 to 2, 2 to 3, and so on.

In case of leather and leather products, besides chronological stringency of a particular environmental regulation, the ascribed rank values also seek to capture four D*efining Characteristics* of the regulation viz., (i) *Kind of Regulation* (i.e., whether it is a 'prohibition' or a 'product standard' and so on), (ii) S*tate of Regulation* (i.e., proposed or in force), (iii) *Level/Limit of the Residual/Concentration specified*, and (iv) *General Stringency* of implementation and (v) its chronological

intensification, designated as *Chronological Stringency*. It is possible that increasing environmental concern and consumer awareness in the countries under consideration has influenced standards of implementation in these countries and has made them increasingly stringent over time. Therefore, G*eneral Stringency* (GS) of regulations has been included as a "catch all" environmental regulatory variable, but viewed in two different stages, once at its intensity and second, at its change in the degree of intensification. As for the specifications of residual levels or concentration limits, there is variation across countries as well as between EU regulation and national-level regulations. To overcome this problem, a scaling procedure is followed while assigning rank values whereby the assigned value of a limit specification is scaled up to the times it differs from the highest limit specification across countries. For instance, in case of PCP limits for leather products, the allowable concentration limit set by Germany and the Netherlands is 5ppm, in sharp contrast to the EU specification of 1000ppm. Assuming that exporters would tend to play safe and try to conform to the strictest specification, the assigned value to the particular regulation after scaling would be 200. The final rank value of a particular regulation specific to a particular year is obtained by a simple summing of the values assigned to each of the 5 *Defining Characteristics* of that regulation in the same year. The ranking procedure followed for environmental regulations relevant to leather and leather products is summed up in Table-4.9 and Table-4.10 gives the corresponding year-wise assigned rank values for regulations imposed by Germany and/or European Union.

Table-4.9: Ranking of Environmental Regulations for Leather and Leather Products

Defining characteristic of an Env. Regulation	***Ranking criteria***
Kind of regulation	1 = labeling ; 2 = standards/take-back obligations ; 3 = prohibitions
State of regulation	1 = proposed ; 2 = in force
Concentration limit specifications	1 = highest limit specification across all countries; proportionately scaled value assigned to the lowest limit specification across all countries
General stringency of implementation	1 = low ; 2 = high ; 3 = very high
Chronological stringency	0 = No restriction; 1 = Initial restrictions; subsequent amendments assigned increasingly greater ranks

Table-4.10: Year-wise Rank Values of Environmental Regulations Relevant to Leather and Leather-products

Year	Azo	PCP	PCT, PCB	Flame retard	Cd	Ni	Chr	PR	End. Sp.
1987	0	0	9	0	8	0	0	0	8
1988	0	0	9	0	8	0	0	0	8
1989	0	0	9	0	8	0	0	0	9
1990	0	0	9	0	8	0	0	0	9
1991	0	0	9	0	8	0	0	0	9
1992	0	0	9	0	8	0	0	0	9
1993	0	209	9	0	8	0	0	0	9
1994	0	209	9	0	8	8	0	9	9
1995	0	209	9	0	8	8	0	9	9
1996	0	209	11	0	9	8	0	9	9
1997	9	209	11	0	9	8	8	9	9
1998	10	210	12	7	10	8	8	9	9
1999	10	210	13	7	11	9	8	10	9
2000	10	210	13	7	11	9	8	10	9

Note: Rank values are based on the information given in Table-4.7 (Appendix-4.6)

For tea, the ranking procedure followed, though methodologically similar to the one outlined for leather and leather products, is different in terms of content. The reason is primarily constraint of data. Detailed country-wise information on the *Defining Characteristics* of different environmental regulations related to tea could not be collected from the available sources. Therefore, instead of the five defining characteristics of regulations that form the basis of rank values assigned in case of leather and leather products, only *Chronological Stringency* of the tea-relevant regulations is taken into account. Environmental Regulations on India's tea exports to the European Union (EU) countries broadly fall under 5 categories, both specifically and at the general level: (i) Pesticide residue measures (MRL); (ii)

Packaging regulations (PR) ;(iii) Regulations relating to Product and Process Methods (PPM); (iv) Sanitary and Phyto-sanitary regulations (SPS); and (v) Eco-labeling (EL). Besides the five categories, General Stringency (GS) of regulations is included as the "catch all" variable. Rank values to this variable move up in the years 1986 and 1993 as these years were witness to some important environmental initiatives in the European Union. While in 1986 the Waste Act passed in Germany gave an impetus to environmental legislation in the region, the year 1993 saw some important initiatives taken by the EU like (i) the Green Paper on remedying environmental damage; (ii) setting up of a voluntary Union-wide Ecological Audit and Management Scheme (EMAS); and (iii) start of the Fifth Action Programme on the Environment (1993-2000). For the PPM and SPS regulations, higher rank values are assigned onwards of 1994 since these regulations came into force after the Uruguay Round.

Table-4.11: Year-wise Rank Values of Environmental Regulations Relevant for Tea

Year	GS	MRL	PR	PPM	SPS	EL
1980	1	0	1	1	1	1
1981	1	0	1	1	1	1
1982	1	0	1	1	1	1
1983	1	0	1	1	1	1
1984	1	0	1	1	1	1
1985	1	0	1	1	1	1
1986	2	1	1	1	1	1
1987	2	1	1	1	1	1
1988	2	1	1	1	1	2
1989	2	1	1	1	1	2
1990	2	2	1	1	1	2
1991	2	2	2	1	1	2
1992	2	2	2	1	1	2
1993	3	2	2	1	1	3
1994	3	3	2	2	2	3
1995	3	4	2	2	2	3
1996	3	5	2	2	2	3
1997	3	5	3	2	2	3
1998	3	6	3	2	2	3
1999	3	7	3	2	2	3

Note: Rank values are based on the information given in Table-4.8 (Appendix-4.7)

Based on the rank values of different types of product-specific environmental regulations (Tables 4.10 & 4.11), year-wise ***aggregated index*** measure of environmental stringency are constructed using the following alternative methods:

a. Multi-Criteria Analysis

b. Factor Analysis

4.6.1.1: Multi-criteria Analysis

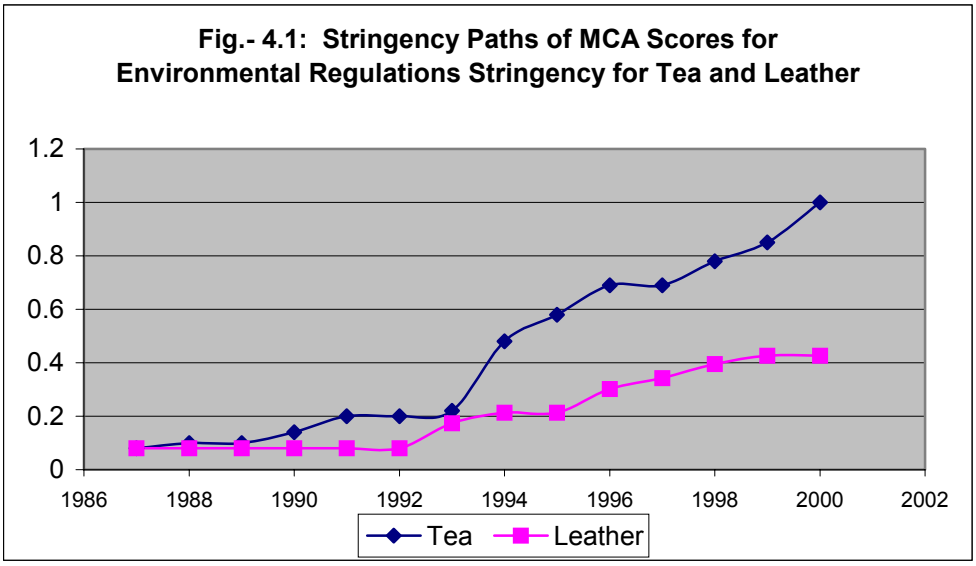
The main objective in using multi-criteria analysis is to arrive at a single index value from the rank values assigned to a set of environmental regulations for each year. This is done with the help of a decision supporting software tool called 'Definite' (Decision on Finite set of alternatives). Essentially, the information on regulations, degree of stringency, etc., as captured by the rank values in Tables 4.10 & 4.11, are aggregated for each year. Aggregation is based on two sets of assumptions: (i) the nature of probabilities or weights to be assigned to different attributes and (ii) the nature of year to year variation in the rankings be graded. For the purpose of the present study, the problem was set up with the year-wise rank values of different environmental regulations for tea and leather separately, treating years as 'alternatives' to be ranked aggregatively and environmental regulations as a vector of different attributes or 'effects'. Standardization of the rank values was done to fit to the hypothesis that strictness of environmental regulations follows a S-shaped path i.e., increasing at an increasing rate in the initial stages and, after a saturation level, increasing with decreasing intensities. Probabilities and priorities were assigned to the environmental regulations depending on the perceived potential of a particular regulation to alter trade quantum or direction. Thus, bans on chemicals(leather)/pesticides(tea) were given the highest priority while measures such as eco-labeling and sanitary methods came quite low in the ladder. Table-4.12 gives the final aggregated scores for Tea and Leather goods, of the various environmental regulations for different years. The aggregated year-wise indices are called 'scores'. For comparison purpose, the estimated values of the scores have been scaled under the assumption that environmental regulations for the two

products possessed the same degree of strictness in 1987, the initial year of the period under study. Figure-4.1 shows the same.

Table-4.12: Year-wise Aggregate Scores of Environmental Regulations

Year	Tea	Leather
1987	0.08	0.08
1988	0.10	0.08
1989	0.10	0.08
1990	0.14	0.08
1991	0.20	0.08
1992	0.20	0.08
1993	0.22	0.17
1994	0.48	0.21
1995	0.58	0.21
1996	0.69	0.30
1997	0.69	0.34
1998	0.78	0.40
1999	0.85	0.43
2000	1.00	0.43

Fig.- 4.1: Stringency Paths of MCA Scores for Environmental Regulations Stringency for Tea and Leather



From Fig.-4.1 it is clear that for both tea and leather, environmental regulations in the aggregate have followed a positive stringency path. Assuming that regulations on both the products started with the same degree of strictness in 1987, there appears to have occurred a marked deviation between the two stringency paths after 1993. In more recent years, while the strictness of leather-specific regulations seem to be leveling off, environmental regulations relevant to tea appear to be still on the increasing mode. It is likely that such a growth pattern of the relative strictness of environmental regulations on a primary product such as tea, as compared to regulations on manufactured leather goods, is mirroring the greater success of producers of manufactured goods in internalizing the economic costs of environmental regulations.

4.6.1.2: Factor Analysis

Factor analysis is an extensively used method of data reduction based on the assumption that covariation among a set of variables can be explained by some underlying common factors. Exploratory factor analysis attempts to reduce a set of say, ten variables into two or three (commonly called as Factors extracted), without losing much of the information inherent in the data. In the present context, while the data set on leather and leather products consists of the rank scores obtained for nine categories of environmental regulations, that on tea involves six categories. A weighted linear combination of the common factors obtained from analyzing the data is taken as the A**ggregate Factor Score Index** of the different categories of environmental regulations. The per cent of total variation explained by each of the common factors is used as their respective weights. Combining them in this manner to derive an aggregate index is justified on the ground that any single factor is unable to explain satisfactorily much of the total variation. Table-4.13 shows the Aggregated Index of Environmental Regulations over time for Tea and Leather Goods. Figure – 4.2 shows their respective stringency paths. As in the case of the MCA scores, the indices have been subject to scaling for purpose of comparison.

Table-4.13: Year-wise Aggregate Factor Scores for Environmental Regulations Stringency for Tea and Leather

Year	Tea	Leather
1987	0.35	0.35
1988	0.35	0.35
1989	0.58	0.65
1990	0.66	0.65
1991	0.95	0.65
1992	0.95	0.65
1993	1.16	0.76
1994	2.02	0.91
1995	2.10	0.91
1996	2.42	1.03
1997	2.42	1.09
1998	2.50	1.25

Fig.- 4.2: Stringency paths of Factor Scores forEnvironmental Regulations Stringency for Tea and Leather

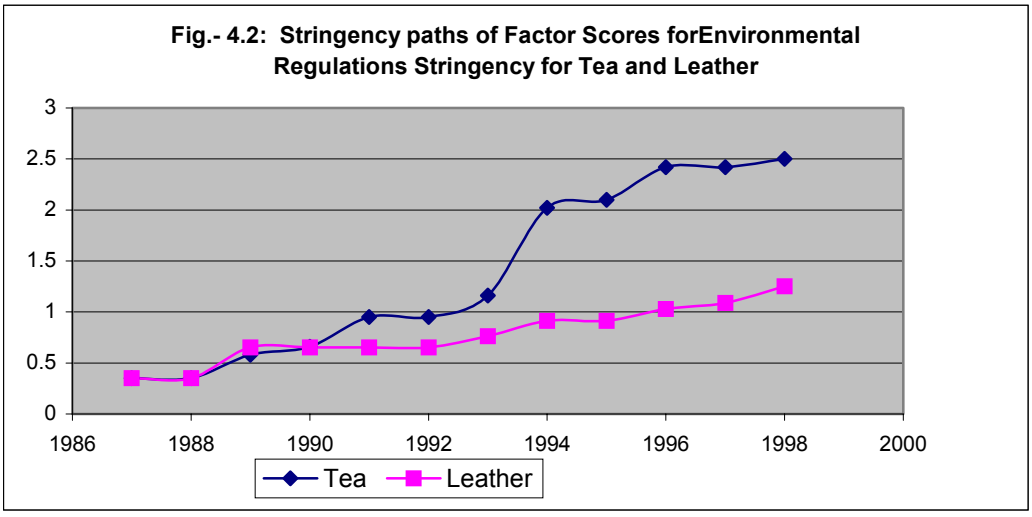


Fig.4.2 gives the stringency paths of environmental regulations on tea and leather obtained from aggregate factor scores. The pattern of growth in the stringency scores for both tea and leather is observed to be broadly similar to the pattern revealed in Fig.-4.1. Differences in the degree of stringency between regulations on tea and regulations on leather appear after 1990 and have become increasingly large after 1993. The consistency of both types of index measures is a positive outcome insofar as it contributes to the robustness of the ranking approach.

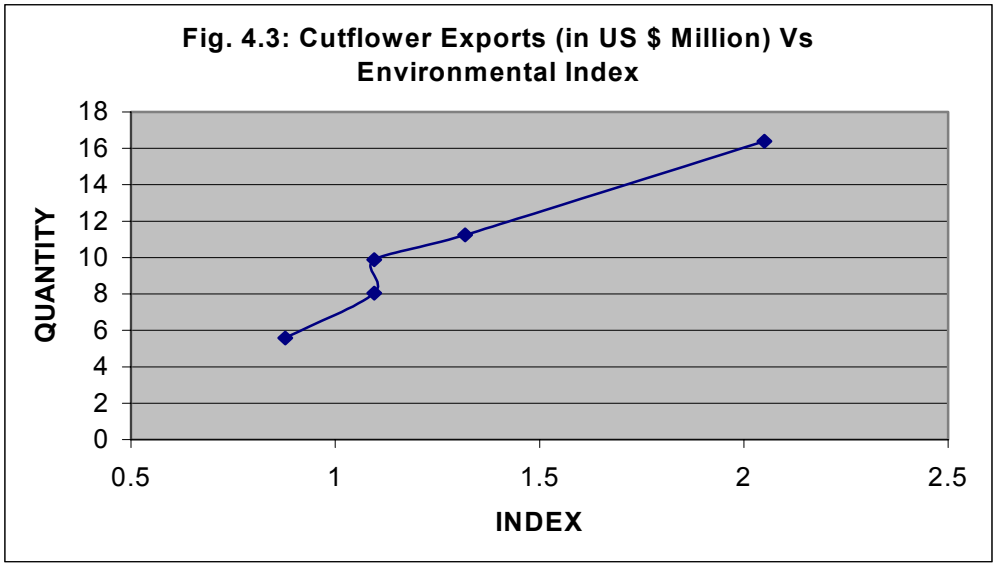
4.7: Environmental Regulations Stringency and Exports of Cut Flowers

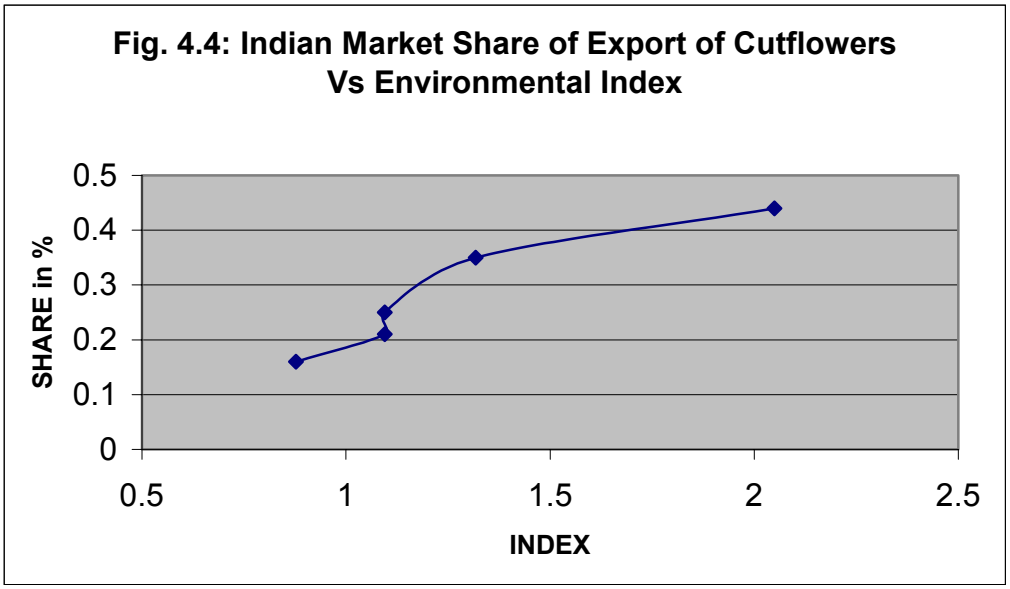
In the case of cut flowers, lack of sufficient information on environmental regulations specific to the product inhibited the construction of a separate index measure of strictness. As a proxy, a weighted average index measure is derived from the stringency indices obtained for tea and leather. Considering the 'primary" nature of cut flowers, the weighting procedure involves a greater weightage to the stringency index obtained for tea. The weighted index measure is plotted with total Indian exports of cut flowers as well as with its market share in world exports. The plotted path is expected to reveal the shift in the trade flow of Indian cut flowers because of increased stringency of environmental regulations in the European Union. Table-4.14 gives the weighted index measure obtained for cut flowers.

Table-4.14: Stringency Index of Environmental Regulations with India's Exports and Market Share for Cut Flowers

Year	Environmental Index	Indian Exports in US $ Million	Market Share
1990	0.8775	5.58	0.16
1991	1.095	8.05	0.21
1992	1.095	9.88	0.25
1993	1.3175	11.24	0.35
1994	2.05	16.39	0.44

Figures 4.3 and 4.4 show that, both in terms of total exports and market share, the trend in cut flower exports from India experienced a marked shift in the year 1992. The positive trend of the path beyond the shift point is a likely indication that Indian exporters of cut flowers have managed to internalize, at least in part, the costs imposed on them by the environmental regulations.





These aggregate regulation indices over time for the three products are now employed in the next chapter in the econometric analysis of the effects of environmental regulations on the pattern of exports form India.

Appendix-4.1: Measures applied to sensitive exports from Asia

Production/Measure	PR	ST	RR	TC	DR	EL	ML	VA	GP	CS
Flowers		X								
Tuna	X	X				X				
Shrimps	X	X								
Fruits		X								
Asbestos and products	X	X								
Organic chemicls	X	X					X	X	X	
Fertilisers		X		X			X			
Paints,varnishes	X	X				X				
Cosmetics										X
Detergents	X	X				X	X	X		X
Insecticides,fungicides	X	X					X	X	X	X
Plastics	X	X	X			X		X	X	X
Leather and products										
Footwear						X				
Tyres		X	X	X		X				
Tropical timber		X						X	X	
Wood and products		X	X			X				
Pulp and Paper		X	X			X				
Textiles/clothing	X	X	X			X	X			
Airconditioners		X	X			X	X		X	
Refrigerators etc.		X	X			X	X	X	X	X
House Appliances		X	X			X	X	X		
Batteries etc.		X	X		X	X	X	X		
Vehicles		X	X	X		X		X	X	

Source: ESCAP (1996) Enhancing Trade and Environmental Linkages in Selected Environmentally Vulnerable Export-Oriented Sectors of the ESCAP Region, Studies in Trade and Investment 21. United Nations, New York

Legend:

PR - Prohibitions
ST - Standards and regulations
RR - Recycling/reuse measures
TC - Taxes and charge
DR - Deposit refund schemes
EL - Eco-labelling
ML - Mandatory Labelling
VA - Voluntary agrrements
GP - Governments procurement
CS - Controlled substances

Appendix-4.2: International standards on environmental management

ISO number	Document
14001	EMS-Specification
14004	EMS-General guidelines
14002	EMS-SME guidelines
14011.1	Guidelines for EA- General Principles
14011.2	Guidelines for EA- Audit proceedures Part1: Auditing of EMS
14011.3	Part 2: Compliance Audits
14012	Part 3: Audit of an environmental statement Guideline for EA- Qualification Criteria for Environmental Auditors
14013	Guidelines for EA- Management of environmental system audit programmes
14014	Guidelines for initial enviromental review
14015	Guidelines for environmental site assessment
14020	Basic principles of all EL
14021	EL - Self Declaration and environmental claims-Terms and Definitions
14022	Environmental Labelling symbols (Type11)
14023	EL - Testing and Verification Methodologies
14024	EL- Guiding principles, practices and criteria for certification programmes- guide for certification proceedures
14031	Generic environmental performance evaluation
14032	Industry- Specific environmental performance indicators
14040	LCA- General Principles and Practices
14041	LCA- Life Cycle inventory Analysis
14042	LCA- Life Cycle impact assessment
14043	LCA- Life Cycle improvement assessment
14050	Environmental Management - Terms and Definitions
14060	Guide for inclusion of environmental aspects in product standards

Appendix-4.3

The Central Pollution Control Board (CPCB) selected the following 18 categories of major polluting industries for priority action:

1. Aluminium smelting
2. Basic Drugs & Pharmaceuticals Manufacturing
3. Caustic Soda
4. Cement (200 TPD and above)
5. Copper Smelting
6. Dyes &n Dye Intermediate
7. Fermentation (Distillery)
8. Fertiliser
9. Integrated Iron & Steel
10. Leather Processing incl. Tanneries
11. Oil Refinery
12. Pesticide Formulation & Manufacturing
13. Pulp & Paper (30 TPD and above)
14. Petrochemical
15. Sugar
16. Sulphuric Acid*
17. Thermal Power
18. Zinc Smelting

* Excluded from the list while implementing the first irem of a 15-point programme formulated by MOEF.

Appendix-4.4: Environmental Regulations in the United States of America

1.	Meat	Import controls under Meat Import Act 1964 amended in 1979 + Voluntary Export Restraints (VERs)
2.	Textile & Clothing	MFA + Bilateral Agreements
3.	Agriculture and Food	Quantitative restrictions + SPS measures
4.	Fish and Wildlife	Health and safety measures + SPS
5.	Foot wears	Autolimitation + Countervailing duty + VERs + High Tariff 1987
6.	Leather Bags	Auto limitation
7.	Live animals	Sanitary Regulations 1991
8.	Chemicals	Pollution Control and health / safety standards 1991

U.S. Environmental Treaties and Laws with a Potential bearing on Imports.

- The Endangered Species Act (ESA) implements in the United States the Convention on Inter national Trade in Endangered Species of Wild Fauna and Flora (CITES) signed in March 1973 by 116 countries CITES is an international co-operative mechanism for the protection of threatened and endangered plants and wildlife from over-exploitation due to inter national trade.
- The Wild Bird Conservation Act requires that all imports of species of exotic birds are biologically sustainable and that imported birds are not subject to inhumane treatment.
- The Lacey Act Amendments of 1981 requires that all imports of wildlife into the United States are done in a humane and healthful manner.

- The Pelly Amendment to the Fishermen's Protection Act requires the Secretary of the Interior to make a certification to the President any time he determines that nationals of any country are engaged in taking or trade undermines the effectiveness of an international programme for the conservation of endangered or threatened species.
- The Migratory Bird Treaty Act (MBTA) several treaties that provide for cooperation in the conservation and management of migratory birds in the United States, Mexico and Canada, and prohibits the importation of specific migratory birds.
- The United States is a signatory to the new Protocol for Specially Protected Areas and Wildlife (SPAW), an addendum to the Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region.
- The Marine Mammal Protection Act (MMPA) prohibits the importation of marine mammals and marine mammal products, subject to certain limited exceptions.
- The Dolphin Protection Consumer Information Act (DPCIA) specifies a labeling standard for any tuna product exported from or offered for sale in the United States.
- The African Elephant Conservation Act Prohibits African elephant ivory imports from all countries that do not meet strict criteria for management of the ivory trade.
- In 1975, the U.S. Congress enacted the Energy Policy and Conservation Act which includes the Corporate Average fuel Economy law (CAFE) of 1975.
- The Gas Guzzler Tax, as specified in the Energy Tax Act of 1978, is levied on individual passenger cars with fuel economics of less than 22.5 miles per gallon.
- The Luxury Excise Tax, introduced in the Omnibus Budget Reconciliation Act of 1990, includes a 10 percent excise tax on the value of new Cars above $ 30,000.
- High Seas Driftnet Fisheries Enforcement Act.
- Section 609 of Public Law 101-162.
- Section 8 of Fisherman's Protective Act 1967.
- International Tropical Timber Agreement 1994.

Appendix-4.5: Environmental Regulations in Hong Kong

Hong Kong's External trade regime is open and strictly Most Favoured Nation (MFN) based with no tariffs on imports and exports. Trade measures applied in Hong Kong to some leather related products are as below:

1. Meat, Fish & Dairy products	Health and Sanitary controls:	Before 1988
2. Textlie & Clothing	Quantitative Restrictions (QRs):	Before 1998
3. Ozone Depleting Substances :	QRs	
4. Technical Barriers to Trade	: ISO and WHO guidelines	
5. Colouring materials & chemicals:	Import prohibition + Environmental related testing	
6. Dangerous goods:	Special labeling and marking	

Hong Kong operates various trade prohibitions, restrictions and control on health, security and environmental standards.

Appendix-4.6: Overview of Direct Environmental Legislation Relevant to Leather & Leather Products

Item	Country/Union	Standard	Status	Legislative Referrence	Comments
Azodyes	European Union	Prohibition above limit concentration of 30 ppm	Under Consideration	Proposal 1999/0269 19th amendment of 76/769(December 99)	Proposal has been accepted by the Europen Commision. The EU legislation will probably be similar to the German legislation.
	Germany	-do-	Prohibition	4th & 5th act amending the German Commodity goods Act of 23December, 1997	Manufacture & import is prohibited as from April 97, remaining stocks can be traded within Germany only upto end of 98.
	Netherlands	-do-	Prohibition	Dutch Food & Commodities Act, 23rd April, 1998	Import is completely prohibited as on 1st September 97.
	United Kingdom	-do-	Waiting for EU legislation	--------	--------
Pentachlorophenol (PCP)	European Union	Maximum 0.1% by weight (1000 ppm)	Implemented	Directive 91/173/EEC of 5th April, 91	applicable to "substances & preparations "
	Germany	Maximum 5mg/kg (5 ppm)	Implementation of National Legislation	Chemicals Act of 14th October, last amendment on 98	applicable to "any product ". Further, more than specified limit of PCP, PCP sodium, all PCP salts & their compounds in products is prohibited
	Netherlands	Maximum 5 ppm	Implementation of National Legislation	Food & Commodities Act of 23rd September, 97	applicable to "any product ". Further, more than specified limit of PCP, PCP sodium, all PCP salts & their compounds in products is prohibited

	United Kingdom	max 1000 ppm	Implementation of EU Legislation	The Environmental Protection (Contols on Injurious substances) Regulations, 93.	--------
Poly chlorinated biphenyles & teriphenyles	European Union	Maximum 50 ppm	Implemented	Directive 85/467/EEG of 1st Oct. 1985, Last amendment : Directive 89/67/EEG of 21st December 89	relevant for substances and preparations
	Germany	Maximum 50 ppm	Implementation of EU Legislation	..Dangerous Substances Act of 26/8/1986 last amendment Bundesgesetzblatt 99 ..Chemicals Act of 19/07/96. Last amendment Bundesgesetzblatt 1998.	all articles
	Netherlands	Maximum 0.5 ppm	Implementation of National Legislation	..Dangerous Substances Act, PCB,PCT & Chloroethene of Decre of 18th April 1991. Last amendment 16th November 1993.	all articles
	United Kingdom	Maximum 50 ppm	Implementation of EU Legislation	Dangerous Substances and Preparations Regulation 1994.	relevant for substances and preparations
Flame Retardants	European Union	Prohibition	Implemented	Directive 83/264/EC of 16th may 1983.	all articles except for use in fire protective clothing
	Germany	-do-	Implementation of EU Legislation	german Commodity Goods Act of 23rd December 1997.	all articles except for use in fire protective clothing
	Netherlands	-do-	Implementation of EU Legislation	..Textile Articles Decree of 18th July 1974. Last amendment 1st December 1986.	all articles except for use in fire protective clothing

	United Kingdom	-do-	Implementation of EU Legislation	The Dangerous Substances & Preparations Regulations 1985.	all articles except for use in fire protective clothing
Cadmium	European Union	paints/stabiliser: Maximum of 100 ppm	Implemented	Directive 91/338/EC.of 12th July 1991	Textile, leather, plastic, rubber and metal products & prohibition will not apply to products which are coloured or used as stabiliser for safety reasons.
	Germany	-do-	Implementation of EU Legislation	..Dangerous Substances Act of 26/8/1986 Last amendment Bundesgesetzblatt 1999. ..Chemicals Act of 19/7/1996 Last amendment Bundesgesetzblatt 1998.	Textile, leather, plastic, rubber and metal products & prohibition will not apply to products which are coloured or used as stabiliser for safety reasons.
	Netherlands	-do-	Implementation of EU Legislation	Cadmium Decree, Dangerous Substances Act of 28/10/1994. Last amendment on 1st June 1999.	Textile, leather, plastic, rubber and metal products & prohibition will not apply to products which are coloured or used as stabiliser for safety reasons.
	United Kingdom	-do-	Implementation of EU Legislation	The Environmental Protection (Contols on Injurious substances) No.2 Regulations, 93.	Textile, leather, plastic, rubber and metal products & prohibition will not apply to products which are coloured or used as stabiliser for safety reasons.
Nickel	European Union	Maximum release of 0.5 micro grm/ sq. cm /week nickel to skin	Implemented	Directive 94/27/EC of 30th June 1994.	nickel & its products are not allowed in articles like buttons, zippers in clothing which come in direct contact with skin
	Germany	-do-	Implementation of EU Legislation	Seventh amendment of German Commodities Goods Act.	nickel & its products are not allowed in articles like buttons, zippers in clothing which come in direct contact with skin

	Netherlands	-do-	Implementation of EU Legislation	amendment of "Warenwetbesluit Algemene Chemische Productveillig heid" to be published in feb. 2000	nickel & its products are not allowed in articles like buttons, zippers in clothing which come in direct contact with skin
	United Kingdom	-do-	Implementation of EU Legislation	Implementation of EU Directive.	nickel & its products are not allowed in articles like buttons, zippers in clothing which come in direct contact with skin
Chrome	European Union	No legislation	No legislation	-----	----
	Germany	0.1 micro grams/ sq.cm	implemented	German Commodity Goods Act of 23rd December 1997.	relevent for leather & textile materials
	Netherlands	No legislation	No legislation	-----	----
	United Kingdom	No legislation	No legislation	-----	----
Endangered Fauna	European Union	Prohibition	Implemented	..Base regulation No. 36226/82 of December 3, 1982 on international trade in endangered wild Flora & Fauna . .. Executive regulation no. 3418/83 on required documents on international trade in endangered wild Flora & Fauna .	The EU regulations contain some protective measures which do not exist under CITES which deal with .. Prohibition of commercial activities ..requirement of documents for all three appendices .. Additional species in Appendix 1,2,3
	Germany	-do-	Implemented	..Federal law on protection of nature 1989. ..Federal regulation on protection of species.	German legislation is stricter than CITES and EU legislation additional species are listed in appendices

	Netherlands	-do-	Implemented	Law on endangered exotic animal & plant species of August 1st, 1995.	Netherland legislation is stricter than CITES and EU legislation additional species are listed in appendices not only import, export and possession of certain species is prohibited but also the possession and transport.
	United Kingdom	-do-	Implemented	The Control on trade of Endangered Species Regulation of 29th May 1997.	UK's legislation is stricter than CITES and EU legislation additional species are listed in appendices not only import, export and possession of certain species is prohibited but also the possession and transport.
Packaging	European Union	A recovery rate of 50 to 65 % of packaging materials. Maximum allowable level sum of concentrations of 250 ppm has existed since July 1999. This ws further lowered 100 ppm as on 1st July 2001.	Implemented	Directive 94/62/EC on packaging and packaging materials.	refers to all kinds of goods
	Germany	in addtion to EU legislation on limit of presence of Cd to 100 ppm maximum & also packaging to achieve minimum volume & weight & take back obligations.	Implemented	----	refers to all kinds of goods
	Netherlands	..65% of Packaging mterial to be recovered. .. Atleast 45 % of materials should be recycled with a minimum of 15 % for each material.	Implemented	-----	refers to all kinds of goods

	United Kingdom	Regulations stipulate 40% national recovery & 8% recycling for year 98-2000 as a standard & respectively 50% & 15% for year 2001.	Implemented	-----	refers to all kinds of goods
Ecolabelling	European Union	European Ecolabel established in 1992 ; since 1999 there has been an EU Ecolabel for leather footwear; no label for other leather products.	Implemented	Directive 880/92/EC of of 23rd March 1992.	applies to all countries in EU
	Germany	TOXPROOF ecolabel for leather products.	Implemented	-----	more a health label than an Environmental label with emphasis on testing of harmful chemicals
	Netherlands	"Milikeukeur" ecolabel since 1992; applies to footwear, seating with leather upholstery etc.	Implemented	-----	more a health label than an Environmental label with emphasis on testing of harmful chemicals
	United Kingdom	Implementation of EU ecolabelling	Implemented	-----	leather are not yet covered.

Appendix-4.7: EU and National-level Environmental Legislations on Tea

Item	Country/Region	Standard	Status	Legislative Reference	Comments
MRL	European Union	Given in Table-	Implemented	86/362/EEC of 24 July 1986* 90/642/EEC of 27 Nov. 1990* 94/29/EC & 94/30/EC of 23 July 1994* 95/38/EC & 95/39/EC of 22 Aug 1995* 96/32/EC & 96/33/EC of 18 June 1996* 98/82/EC of 29 Oct 1998** 2000/42/EC of 22 June 2000**	Successive directives apply for different types of pesticides; directives of 1994,1995,1996 specify a cut-off date for fixing of MRLs at the appropriate lower limits of analytical determination as 30 June 1999; 97/71/EC** of 18 Dec 1997 has amended this to 1 July 2000
PR	European Union	A recovery rate of 50 – 65% of packaging materials	Implemented	94/62/EC on packaging and packaging waste; entered into force in Aug 1997	Member states given until mid-1996 to introduce the obligations of the directive into their national legislations
	Germany	60-70% recycling quotas for packaging materials	Implementation of national legislation	Packaging Ordinance, 1991	

	The Netherlands	65% recovery rate; 45% rate of recycling	Implementation of national legislation	Regulation on Packaging and packaging Waste of Aug, 1997	Regulations became more stringent as from 30 June 1999 with maximum limits of lead, chrome, cadmium, mercury or compounds of these in packaging reduced to 250 ppm-weight
	UK	-	-	-	Take-back obligations arise for a large part from the obligations of the EU directive on packaging
EL	European Union	EU ecolabel award scheme	A voluntary scheme	Council Regulation 880/92 of 23 March 1992	Except for foods, drinks and pharmaceuticals, no other products are excluded
	Germany	Blue Angel	Oldest and most important official label	Established in 1978	Except for foods, &pharmaceuticals, no other products are excluded
		Trans Fair	Administered by producer's organization	Introduced in 1993	Covers tea
	The Netherlands	Milieuke-ur	Official	Established in 1992; extended to food products since 1995	Scope of the label confined to the nation's borders

		Max Havelaar	Administered by producer's organization	Established in 1988	Europe's first fair trade hallmark; covers tea

Notes-MRL: maximum residue levels of pesticides; PR: packaging regulations; EL: ecolabeling

* Council Directive

** Commission Directive

Source: *Eco Trade Manual: Environmental Challenges for Exporting to the European Union*, Compiled by KommaNet BV, August 1998.

Chapter Five: Experience of Indian Exporters with Environmental Standards[19]

5.1: Preamble

What are the effects and experience from the manufacturers in dealing with the regulations in India? This question is addressed in this chapter. To understand and analyse this, a distinction must be made between primary, secondary and tertiary sectors, and between large, medium and small-scale units. The primary production processes are by and large land and water based, such as crop agriculture, horticulture, plantation etc. The secondary processing involved relatively much less of land and water, but more of plant and machinery, technology, credit facilities, and skilled labour. The tertiary activities consist of trade, shipping and transport, communication etc., having much less to do with land and water, also with chemicals etc., (except for motor oils used in transport), but requiring still higher order of skill, credit facilities.

The small-scale units face the music of high cost of treatment and lack of financing, lack of technology, and some times even the knowledge about the regulations. They also find it difficult to set up Common Effluent Treatment Plants because of spatial dispersion of the units. Because of which many small-scale tanneries in India continue to have individual effluent treatment plants, however inefficient they may be. For instance, Sankar (2001, pp.159) estimates the economic pollution abatement cost of producing kg of processed hide and skin as varying between 0.41 to 1.48 percent, where as the same under a common effluent treatment plant technology would be between 0.41 to 0.81. In 1998, there were as many as 1000 small-scale tanneries in India, against just about 75 large units.

Keeping these issues in mind, information and data on the experience with regulations in the three sectors under this study are analyzed here. Based on a detailed questionnaire and interviews with as many 20 exporters covering all the

[19] This chapter heavily draws the information and data gathered during the interviews and questionnaire responses from the industries.

three sectors, and also holding discussion with the knowledgeable people in the industries, the emerging impression about the Indian industry's experience, and the manner with which they are able to cope up with the regulations and maintain exporting are analyzed and presented here.

5.2: Dealing with Tea exports

Tea is a plantation activity, much close to the traditional crop agriculture. Tea gardeners and exporters in India invariably feel that it is one plantation activity, which is environmentally extremely friendly. Firstly, this plantation means entirely dealing with green leaves. Second, talking in terms of economic management, it is the non-entry of FDIs in this industry so far. Almost since 8 years the industry has been complying with all the environmental regulations such as EU, CODEX, US Food Regulations, German packaging and eco-labeling regulations and Russian Gosstandart regulations (on the residuals of heavy metals such as cadmium, nickel etc.). Considerable amount of research also has gone into, by Tea Research Authority and United Planters Association of Southern India (UPASI).

The most important environmentally sensitive issues relating to tea plantation is use of pesticides and land use pattern. The choice before the tea gardens is either to comply with pesticide control levels as stipulated by EU (discussed in Chapter Four), or go for organic farming. The gardeners say that organic farming will involve an additional cost even up to 100% extra. If the cost of regular Darjeeling tea is Rs. 200-250 per kg, it would be as high as Rs. 400-500 per kg under organic farming. Many German importers are willing to pay this higher price also. Initially when the German importers provided some incentive capital and paid for environmental and social auditing, some of the major Indian exporters switched to (and still maintain) some parts of their tea garden in to organic farming. Otherwise, most others comply with EU pesticide regulations, at much lower levels than the said limits. Yet there are about 11 major planters in Darjeeling area today, following organic farming.

An equally serious problem in tea plantation from an environmental point of view is that of land use. Since plantation requires some parts of lands to be left fallow by rotation, there is every possibility that land is misused for plantations only.

Other wider environmental concerns of the industry include depletion of ground water in tea garden areas, loss of biodiversity, deforestation, and soil degradation. The industry is trying to abate these issues as well. There is also a new issue regarding trade marking of tea from certain specific regions of tea gardens. The Geographical Indication Bill has been passed by the Parliament in 2001, but the Act still pending. Because of this, India is unable to fight the unfair trade in Darjeeling tea coming from Kenya or elsewhere.

Most exporters say that the cost of pesticide controls, complying with other environmental regulations such as maintaining ground water quality, afforestation, soil replenishment, preventing biodiversity loss etc., are still costly, but because of the worldwide compliance, they would also have to fall in line. It is also learnt from the exporters that there are no major scale effects (advantages) in the cost of environmental compliance. The costs on account of these reflect in their pricing depending upon the composition of organic and regular gardening. On top of these are the Eco-labeling and packaging regulations mentioned in Chapter Four. Therefore, on the whole, environmental regulations seem to have affected the cost and price patterns of tea exports.

5.3: Leather exporting: Implications of environmental regulations

The extent and magnitudes of both domestic and external environmental regulations have been already viewed in the last chapter. Are there some clues regarding the cost implications of such regulations in the leather sector? A study by Sankar (2001) provides some data on these, which are reproduced here. They are based on detailed investigation on the components of all costs of leather processing, including environmental management costs. Based on a sample of 12 units, Sankar has deduced the following average abatement costs patterns. They are shown at different scales of the capacity of hides and skin processing plants, in terms of

stages of processing (as from raw skin to finished leather), and distinguishing between skin and hides. Table 5.1 shows these in a summary form.

Table 5.1: Pollution Abatement Costs in Leather Sector

At different stages		**Pollution Abatement Cost**		
		per kg of Hides and skin processed (Rs.)	**Share in Sale (%)**	**Share in Gross value added (%)**
Installed capacity in kg of hides and skin per day	300-1000	0.739	0.334	1.167
	1000-3000	0.555	0.300	0.988
	3000-6000	0.472	0.278	0.332
	1500	0.399	0.165	0.311
Stage and process	Raw to semi-finish	0.511	0.294	0.490
	Raw to finish (VT)	0.386	0.228	0.531
	Raw to finish (CT)	0.779	0.363	1.437
	Semi-finish to finish	0.597	0.323	0.905
Type of raw material	Skin raw to finish (CT)	0.802	0.366	1.509
	Skin semi-finish to finish	0.685	0.272	0.660
	Hide semi-finish to finish	0.552	0.341	0.935

Source: Sankar (2001). Pp. 169

Three major observations can be made on the cost data shown in the table. First, there is a significant economies of scale in applying environmental abatement measures in this sector. Pollution abatement costs decline from Rs. 0.739 per kg of hides and skin processed in a 300-1000 kg sized processing plant to Rs. 0.472 with 3000-6000 sized plants. Second, as one moves from lower order of processing, to higher order of processing the share of environmental abatement costs decline. In

other words, the most affected stage of processing is at the raw skin and hides level, next is the semi-finished stage, and finally at the finishing stage. Third, as a share of the sale value or value added, the environmental regulation costs are not very significant. They are much less that one percentage point.

These facts are very important for drawing some generalizations regarding how the industry has been able to cope up with the regulations. Our interviews with selected manufacturers provide some clues.

The tanneries, which have complied with PCP, pH, BOD, COD, TDS, several other chemical regulations etc., have gained better access to world exports. There is a general feeling in the industry that in the long run it is good for the industry. There are some variations in the standards between different countries. Some countries like Italy and USA insist on only pH value regulations. The TDS regulations are not so very important for them. But the Tamil Nadu Pollution Control Board insists strictly on the TDS at 2100 ppm limit and Reverse Osmosis plants. The compliance costs at the Common Effluent Treatment levels is very small. At best, it goes up to 2 - 4 percent of total product costs. But during the last 6 - 8 years the compliance costs have been rising. For instance, local dyes used to cost just about Rs. 200 per kg, whereas the imported ones cost Rs. 2500. Then the compliance costs shoot up to 5-10 %. Secondly, almost all producers are quite aware about almost all the regulations. Thirdly, the regulations did not make the exporters change their importing partners or change the direction of trade. Finally, more than the environmental costs, the overall trade recession has affected the leather exporters from India. Recession in Germany particularly has affected the exports quite significantly.

In another study by ESCAP, reducing water pollutants in leather production was estimated to increase price by 1.5%. The cost of treating wastewater per kg of raw hides was estimated at Re.1.00, as compared to a price of finished leather of Rs.631, and the average cost per tannery for wastewater treatment could be Rs.735, 000, a large sum for a small unit (ESCAP, 1996). The cost of using of the PCP

substitutes is roughly ten times greater than using PCP. It also appears that other chemicals, such as the Benzidine dyes used in the production of leather products, are likely to come under closer environmental scrutiny in future (Jha, 1994)[20].

5.4: Experience with exporting Cut flowers

The analysis of cut-flower industry is based on secondary data only. But as noted earlier in Chapter three, exports in this sector are growing in importance. For instance, nearly 35 commercial floriculture projects have come up in and around Bangalore, mainly for exporting. Estimates are that, by the end of Tenth Five Year Plan period, as many 10,000 floriculture and horticulture units will have spread all over the country.

As far as environmental regulations are concerned, basically the pesticide control, regulations on harvesting, cold storage and transporting, packaging regulations add to the costs build-ups. According to Chengappa (1998), the cost of cold storage and refrigeration van is about 18-19% of total cost of production. The packaging and freight costs are about 35% of total cost. About 35% of marketing and about 2% of production costs are environmentally related ones. Some average cost patterns are presented here in Table 5.2, taken from the same study.

Table 5.2: Cost and benefit analysis of rose production by a representative corporate export house.

S. No.	Item	Value (Rs/stem)	%
Production cost			
1.	Plant material	0.58	6.25
2.	Plant nutrient	0.06	0.64
3.	Plant protection (chemicals)	0.20	2.14
4.	Labour	0.44	4.64
5.	Interest on establishment cost	1.40	15.08
6.	Sub total	2.68	28.75

[20] Experience from Pakistan (Khan et al, 2001) also indicate that the mitigating costs in leather processing is never too high , as to adversely affect the export performance.

S. No.	Item	Value (Rs/stem)	%
Marketing costs			
7.	Packaging	0.40	4.64
8.	Freight	2.80	30.06
9.	Local transport	0.32	3.32
10.	Handling charges	1.44	15.61
11.	Misc. exp.+ insurance	1.64	17.62
12.	Sub total	6.60	71.25
Total Marketing cost		**9.28**	
Average price in Alsmeer		**12.00**	
Net profit		**2.72**	

Source: Changappa (1998), pp.63

Some of the major findings from Chengappa (1998) are summarised here. The three major environmentally relevant costs are on use of farmyard manures (ranging from 5-8%), plant protection costs (ranging from 3-5 %) and transport and handing costs (ranging from 3-5 %). The sector, being still in its initial stage, is lacking knowledge about regulations and recommended practices (almost 55 to 75 percent of respondents views). Furthermore, they also lack advanced modern technology in packing and handling (as expressed by over 75 percent of the respondents).

Therefore, though it is a primary sector (like tea or crop agriculture) this sector in India has not yet faced the full implications of domestic and external environmental regulations. But the time is not too far when such constraints begin to make their impact felt, as expressed by some respondents in our interviews.

Appendix-5.1

Feedback Questionnaire used by the Study on the Effects of Trade Related Environmental Regulations on Export Performance

Name of your company/concern
Address/Phone number/fax number/email etc.
Please list the precise items you normally export
Since when you /your company is in export business?
What percentage of your products is export oriented (as against for domestic market)?
To which countries you normally export your products?
Are you aware of various environmental regulations introduced by many importing countries? If so,
Can you list some of the environmental regulations that you feel are affecting your export performance?
Since when do you think your exports have been affected by environmental regulations from importing countries?
Among the many, which particular environmental regulation, according to you, seem to affect your exports the most?
Can you give the effects of environmental regulations upon your exports, in percentage terms for different years?
Because of environmental regulations in some country, did you have to switch the exports to some other country having less regulations/restrictions?
Since when you think that you have effectively implemented

compliance to the environmental regulations?
Did you have to invest heavily on new technology, equipment etc., in order to comply with the regulations? If so, how much additional cost you had to incur as percentage of your total product costs?
Do you think your export performance has gone up due to the new technology (also compliance)? If so, how much in percentage terms?

Appendix-5.2

Persons Interviewed for Information on Effects of Environmental Regulations

Leather and Leather Products	
Name and Designation	Exporting Unit/Organization
Mr. K.S.Ramanathan Assistant Director	Council for Leather Exports (CLE) Chennai, TamilNadu
Mr. A. Sahasranaman Programme Coordinator	UNIDO Regional Programme Centre for Pollution Control in the Tanning Industry in South East Asia, TNPCB 1st Floor, 100 Anna Salai, Guindy, Chennai-600032, TN
Mr. K.V.Emmanuel National Expert in Environmental Engineering	-do-
Mr. S.Md.Hassan Secretary (i/c)	The All India Skin and Hide Tanners and Merchants Association, Leather Centre, 53 Raja Muthiah Road, Periamet, Chennai, TN

Mr. Saluddi Bari (Hon. Secretary)	Finished Leather Manufacturers Association (FLMA), CMDA Tower-II, Gandhi-Irwin Road, Egmore, Chennai, TN
Mr. Satish Bhurde (in charge of tannery unit)	Namaste Tannery 1099, K.G.Halli, Bangalore-45
Mr. Anand (Head)	Anjana Leather Corporation K.G.Halli, Bangalore-45
Mr. S.Masood Ahmed (Head)	Mysore Super Reptiles Corporation 1/79, Gandhinagar, K.G.Halli, Bangalore-45
Mr. Manjunath (Chemist)	Common Effluent Treatment Plant K.G.Halli, Bangalore-45
Tea	
Mr. M.Dasgupta Dy. Secretary	Indian Tea Association, Kolkata, West Bengal
Mr. Kaushik Basu Secretary	Darjeeling Planter's Association, 6 Netaji Subhash Road (BCCI Building), Kolkata-700001, West Bengal
Dr. S.Sarma	Tea Research Authority (TRA), 113 Park Street, Kolkata, West Bengal
Mr. Ashok Lohia	Former President of Darjeeling Planters' Association, Sycotta Tea Co. Ltd. Kolkatta
Mr. K.S. David and Mr. Vimalesh Sharma	Goodricke Group Ltd. Kolkatta

Mr. S.S. Dogra	Tata Tea Ltd. Kolkatta
Mr. Alok Vira	George Williamson Assam Ltd. Kolkatta
Mr. Guru baxani	Duncan Tea
Cut Floweers	
Ramson Nursary	Bangalore; exporting flowers worth Rs. 50-60 thousand.

Chapter Six: A Model of Trade with Environmental Regulations

6.1: Introduction

The purpose of this chapter is to trace the effects of environmental regulations on trade through an econometric model in the short and long run. Environmental regulations may act either as non-tariff barriers or promoters of trade. As reviewed in the literature in Chapter Two, Porter and Linde (1995) argued in favour of the long-term benefits of the regulations in bringing about process innovations and production efficiencies, thereby enhancing trade and welfare. But what will be the effect of such regulations in the short run? Secondly, over time, how does the export sector adjust itself? Will it converge to the long run path as indicated by Porter? In order to answer some of these questions, it may be necessary to add environmental regulations or the cost of the regulations as explicit variables in the model.

Environmental regulations as seen from the review in Chapter Four are, by and large in qualitative terms. Only in the cases of PCP, SPM, BOD or COD and few other environmental measures, quantitative parameters are specified by few countries. Therefore, generally, it is felt to be difficult to index them into one or more quantitatively measurable variables. So far the attempts on this front is by way of introducing as dummy variables (van Beers and van den Bergh, 1996,1997,1998). Commonly, most studies use 'year specific' (in the case of time series analysis) or 'country specific' (in case of cross-section analysis) dummy variables in a Gravity model of direction of trade. As far as the effects of regulations are concerned, they are assumed to reflect on the cost levels. If time series and cross section wise data on cost of environmental compliance are available, it may be possible to model the trade behaviour with such cost variables, which is the most appropriate methodology.

Several alternative ways of formulating a trade related models exist (Ulph, 1999; Low, 1997; Rauscher, 1997; Tobey, 1990; Xu, 2000; Chopra and Agarwal, 1999). The most standard approach will be to follow the Heckscher-Ohlin framework, and set up a model of trade with basic factors of productions as endowments (Tobey,

1990). Given the database, and the questions raised earlier, this production function approach is not feasible, unless environmental regulations are used just like neutral or non-neutral technical shift variables. The second alternative is to formulate gravity type models, in which trade flows are explained by forces of supply and demand, again, with and without environmental regulations either as exclusive variables or as shift dummy variables (van Beers and van den Berch, 1998). A third approach will be a Cost-benefit model of production and trade with and without environmental regulations (Palmer et al., 1995). Finally, one can also construct a game theoretic model of trade with compliance and non-compliance as strategies between the trading partners.

In this study, after considering the fact that the database is a time series of trade and related factors along with typologies of environmental regulations, it is felt that the gravity models of supply and demand with different specifications on the regulations are most appropriate. Econometric models have been estimated to explain exports of tea and leather and leather goods only. In the case of cut flowers, the same could not be done for want of a long time series of data[21].

6.2: The theoretical underpinning

Consider the trade prospects in a two-country two-commodity framework (Heller, 1968). Given the trading optimality conditions such that as compared to the 'no trade situation', a country can gain from trade with international 'terms of price trade' (TOT) by exchanging some commodity (to be called as Exportable commodity) through exports and importing another commodity (to be designated as Importable commodity). This is depicted in Diagram 6.1, with the TOT_0 as the initial terms of trade, by point 'A' as production equilibrium on the production possibility curve ZX, and point 'B' as consumption equilibrium at which the highest utility is attained. Clearly, such a production and consumption mix amounts to exporting some of the Exportable commodity against which some Importable commodity to be imported.

[21] However, some clues regarding the effects of environmental regulations on exports of cut flowers are already discussed in Chapter Four. Indian cut-flower industries seem to have internalized the effects quite well.

Now consider the Porter hypothesis discussed in Chapter Two. With environmental regulations the country will have innovated and improved its production efficiency in the commodity under export. This is equivalent to a shift in the production possibility curve to ZY from its initial situation of ZX, in favour of possibility of producing more of the Exportable commodity. Accordingly, with the same TOT_0, now designated as TOT_1 the efficient production point will have shifted to 'C' and consumption point to ' D'. This also demonstrates that the country will gain with the external (and also perhaps internal) environmental regulations in the long run. More of Exportable will be produced and exported, and the overall welfare is also higher at 'D'.

What if, the costs of compliance of environmental regulations are high, at least in the short run? Assuming that the cost of environmental regulations affect the exportable commodity, the terms of trade will have shifted against it. This is shown with the terms of trade $TOT_{2,}$ making the cost of the Exportable commodity higher. With this price line, the production point will shift to 'E' from 'A', and consumption from 'B' to 'F'. Clearly, there will be considerable drop in welfare due to this cost of compliance. However, if the costs of environmental regulation are not very high, and the country is able to introduce innovations and improvements in efficiency in production (driven by regulations), perhaps in the long run, it is possible to reach the higher production possibility curve ZY, attain a production at 'G' with the terms of trade TOT_3 (re-designated from $TOT_{2)}$, with an equilibrium consumption at 'H'. But, it can be seen that the overall welfare gain from the pure Porter hypothesis is lost, as this new trading is at the high cost of complying with environmental regulations. Only in the situation of zero cost of compliance, the 'pure Porter' efficient production, trade and consumption equilibrium would have been attained. Therefore, the dynamic movement from H to D is a matter of the relative cost of compliance of environmental regulations.

The notions developed here are summarised in a mathematical model here. Let the country be producing only two commodities, Exportable (E) and Importable (I). Let P = P {E, I) be the production possibility function, with E= Exportable commodity and I= Importable commodity. Le U = U {E, I) be the consumption utility or welfare function

for the country. The terms of trade be expressed as: P_E .EE + P_I .II = B; B representing the total volume of trade (i.e., value of imports and exports); EE = Export of Exportable; and II = Import of Importable; P_E is the price of Exportable; P_I is the price of Importable. It is assumed here that the country aims at maintaining the current account volume of trade.

The usual equilibrium condition for the optimum production and consumption are given by:

$$- [\partial I / \partial E]_{Production} = - [\partial I / \partial E]_{Consumption} = - [\partial II / \partial EE]_{Exchange} = P_E / P_I$$

Rate of transformation in production and rate of substitution in consumption are equal to the ratio of relative prices.

Under the Porter hypothesis there is going to be a technical efficiency in the Exportable. This is depicted by setting the production possibility function P as:
P = P {α.E, I}, where α >1, is an indicator of efficiency improvement. There will be a shift in the production of Exportable for the same levels of inputs. It is assumed that α is greater than unity. Likewise, the impact of environmental compliance cost will change the terms of trade. The price of exportable will have shifted by a factor β, where β is greater than or equal to unity. It is assumed that environmental costs raise the price of Exportable by the same margin.

The corresponding terms of trade expression will be:

$$\beta .P_E .EE + P_I .II = B$$

Hence the new equilibrium condition can be stated as:

$$\alpha [\partial I / \partial E]_{Production} = - [\partial I / \partial E]_{Consumption} = - [\partial II / \partial EE]_{Exchange} = \beta P_E / P_I$$

Therefore,

$\beta/\alpha = - [P_I / P_E] . [\partial I / \partial E]$ = Ratio of Value of marginal imports to marginal exports. In a way, β/α is a measure of net cost impact of environmental regulations. In the event, no innovations and improvements in efficiency take place (i.e., $\alpha = 1$), it is a measure of pure cost effect of regulations.

The following possibilities are possible then. If $\beta/\alpha > 1$ (i.e., relatively increased costs of Exportables), then, there will be a relative reduction in exports, and hence trade loss from environmental regulations; if $\beta/\alpha < 1$, then, the relative costs of environmental regulations will have been overcome by innovations and improvements in efficiencies in the production of Exportables, and hence there is an induced expansion of Exportables.

Thus, it is important to look at the magnitude of the environmental costs vis-à-vis all other costs, and the rate of innovations and efficiency improvements in the production of Exportables, both in the short run and in the long run, which can possibility explain the movement from the lower level of equilibrium point H to a higher one D. Our preliminary scrutiny of cost data (presented in Chapter Five and elsewhere in this study) suggests that the environmental compliance costs are heavily felt in primary product exports. For instance, in the case of Cut-flowers, the cost of pesticide controls, air-conditioning, packaging, etc. add up to about 25% of the total cost of exporting such flowers. In the case of tea, the impression one gets from the views of the exporters is that strict organic tea farming add to the costs enormously[22]. Otherwise, in the regular tea gardening also the costs varying from 10-20%. In the case of tannery products, however, these costs are much lower, in the range of 1% (Sankar, 2001).

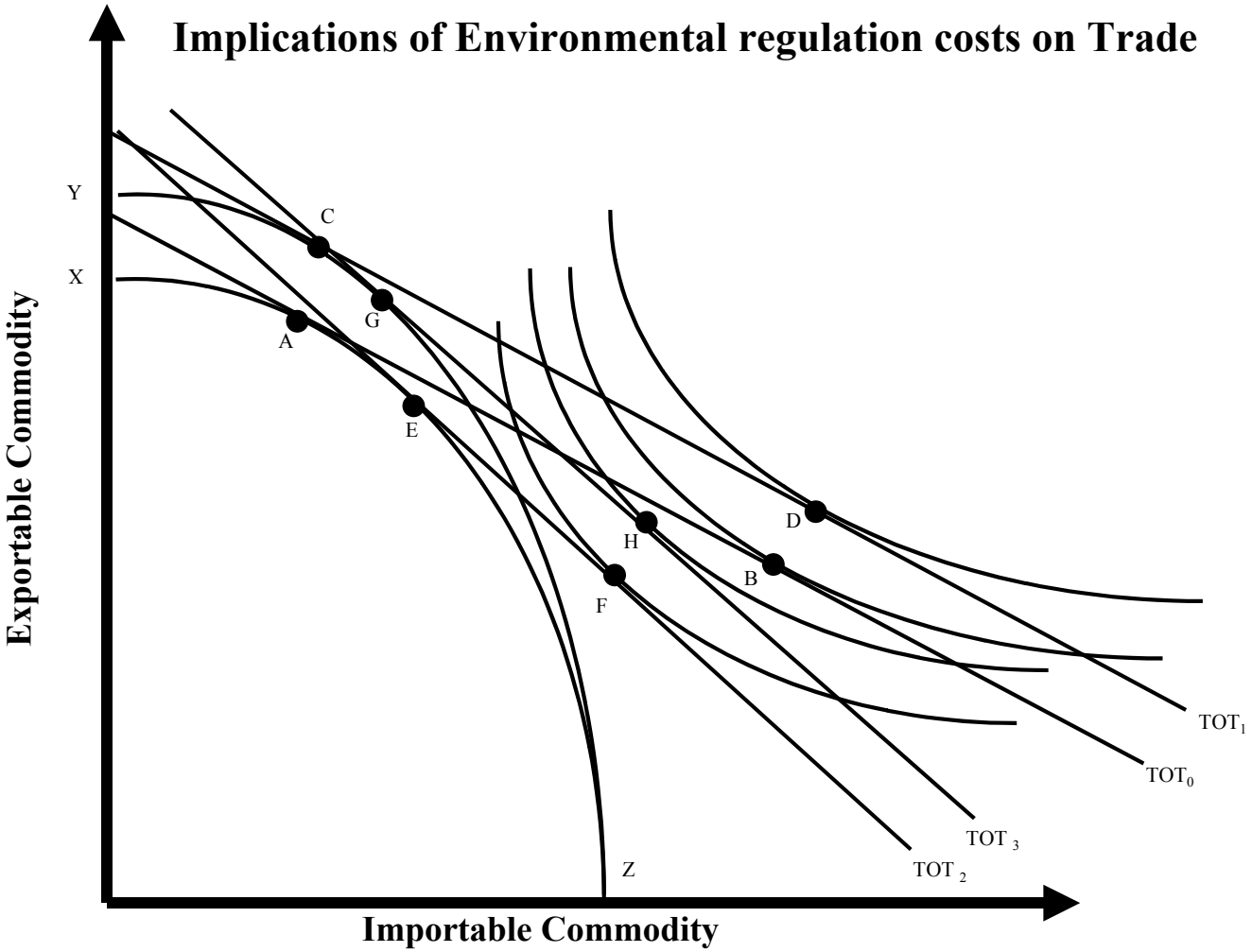
We formulate the following hypothesis in this study:

'As one moves from lower to high value added product exports or from primary to higher and higher levels of processing and manufacturing, the impact of environmental regulations turn to become positive from being negative'.

[22] Some details of these data and impressions are presented in Chapter Five.

By the term ‘impact’, it is meant reflections on the welfare losses.

The logic for this hypothesis is as follows: At the primary product levels, as compared to the costs, compliance to environmental regulations is more costly (as a share of total cost of production or sales). As one moves to higher and higher order of production, processing and manufacturing, the environmental compliance costs drop in their shares. Furthermore, such industries become more and more



competitive in the long-run as they have more access to better technologies (Jaffe et al. 1995; Porter, 1991).

6.3: Specification of An econometric model of trade with environmental regulations

In order to analyse the impact of regulations and to test the above mentioned hypothesis, ideally, one should have data on environmental regulation vis-à-vis all other costs for different product exports over time. Within the framework of this research such cost data are not forthcoming. Therefore, only the indices of environmental regulation as proxi variables for environmental regulation (or some kind of non-tariff barrier) costs introduced in the model here.

Specification of the Models

In the framework of a standard trade related Gravity model, the following variables are considered in the model.

EXP_{jt} = Export of the commodity to country j from India in the year t (US$ Millions)

$WEXP_{jt}$= World export of the commodity in the year t (US $ Million)

GDP_{jt} = Per capita (PPP) GDP in constant prices of country j in the year t (US$)

$TIMP_{jt}$ = Total import of commodity by country j in the year t (US$ Million)

$OUTPUT_t$=Gross output of commodity in India in the year t in constant prices (Rs. Crores)

TOT_t = Terms of trade for the commodity for India in the year t

EX_t =FE rate for India in the year t

MS_{jt} = Market share of country j in the year t defined as EXP_{jt} / $TIMP_{jt}$

$DEXP_{jt}$ =Dependency ratio on country j in the year t defined as EXP_{jt} / Σ EXP_{jt}

$D1_t$, $D2_t$,$D3_t$ …= Time dummies to represent environmental regulations, agreements

$ENVINDEX_t$ = Environmental regulation index at time t, as constructed in Chapter Four.

Major Model Specifications

Supply-Demand specification: Two alternatives are considered here.

Supply

$DEXP_{jt}$= f { GDP_{jt} , $TIMP_{jt}$, $OUTPUT_t$, TOT_t , EX_t , $D1_t$, $D2_t$,… or $ENVINDEX_t$}

$DEXP_{jt}$= f { GDP_{jt} , MS_{jt} , $OUTPUT_t$, TOT_t , EX_t , $D1_t$, $D2_t$, or… $ENVINDEX_t$.}

Here, both $TIMP_{jt}$ MS_{jt} are treated as pull factors for Indian exports, used as explanatory variables and the Dependency ratio $DEXP_{jt}$ is the indicator of exports as the dependent variable.

Demand

MS_{jt}= f { GDP_{jt} , $TIMP_{jt}$, $OUTPUT_t$, TOT_t , EX_t , $D1_t$, $D2_t$, or $ENVINDEX_t$ }

MS_{jt}= f { GDP_{jt} , $DEXP_{jt}$, $OUTPUT_t$, TOT_t , EX_t , $D1_t$, $D2_t$,or $ENVINDEX_t$}

In this case, alternatively $TIMP_{jt,}$ $DEXP_{jt}$ are used as explanatory variables with MS_{jt} as the dependent variable.

Variants of this model are:

Supply

EXP_{jt} = f { GDP_{jt} , MS_{jt} , $OUTPUT_t$, TOT_t , EX_t , $D1_t$, $D2_t$, or $ENVINDEX_t$ ….}

Demand situation

EXP_{jt} = f { GDP_{jt} , $TIMP_{jt}$, $OUTPUT_t$, TOT_t , EX_t , $D1_t$, $D2_{jt}$, or $ENVINDEX_t$ …}

This is a model linking the levels of exports EXP_{jt} with levels of domestic production, total import of the commodity by any country (as pull factors), the terms of trade, the exchange rate; with and without time dummies for environmental regulations.

Regression models were estimated precisely specifying on the lines as mentioned above. However, it was not possible to establish the complete supply-demand models. The reasons are many. Firstly, the dependency ratio (a supply factor) and Market share (a demand factor) are highly correlated, hence it was not easy to identify the supply and demands separately. Secondly, terms of trade, GDP, exchange rate, Indian productions, GDP of importing country or region (such as European Union) and such other variables were showing insignificant coefficients (and at places wrong signs). Therefore, no further attempts were made to explore such models. Instead, three different types of econometric exercises were carried out. First, some simple specifications with exports in value as dependent variable are modeled to get some clues for better specifications. They are presented in Table 6.1. In this model all the data used are taken from chapter three. The dummy variables for environmental regulations are based on major shifts shown export data (anlysed already in chapter three). Subsequently, more specific models are developed separately for export of tea and leather and leather goods separately later on.

Table 6.1: Simple Gravity Models Exports of Tea and Leather goods

Expl. Variable	Dependent Variable (in values)		
	Export: Leather	Export: Tea	Export: Tea
Constant	96.580(1.77)*	364096.4(2.02)*	219455.72(1.57)
World Export	0.03761(8.01)*	0.029(0.35)	0.097(1.6)
TOT	265.217(5.11)*	-27105.074(-3.02)*	-21531.28(-2.73)*
EX Rate	Not significant	Not significant	Marginally significant
Indian Output	Not significant	527.646(1.97)*	572.421(2.11)*
D1991	-474.109(-6.89)*	-94298.32(-2.01)*	-104097.2(-2.2)*
D1996	-432.715(-6.61)*	-153840.4(-1.76)*	-190162.1(-2.27)*
D1984		71023.44(1.23)	
Comments	D1995 is also significant in another specification; D1989 is not significant	1.World export is significant in another specification; D1984 is significant in another ; D1989 and D1995 not significant	

Note: D1991, 1996, 1984 are some of the major shift dummy variables.

The time dummy variables for the years 1984, 1991 and 1996 coincide with some of the major environmental protection moves world over[23]. The impression one gets is that some of the dummy variables, which are related to the major events of environmental regulations are quite significant. This is indicative of such regulations having depressed the trend in exporting in general. As far as terms of trade is concerned, it seems to act in two different ways for leather goods and tea. For the former, it is a supply price factor, where as it is a demand price factor for tea (i.e., dominated by the London price, rather than the Calcutta price). This is understandable as Indian leather goods have a larger share in world exports, and have been in the business for quite a long time. The World Level Export is a major

[23] These events have been discussed in Chapter Four already.

demand pull factor for Indian exports. Some further analysis for the two products are now.

6.3.1: Econometric Analysis for Tea

We then, carried out the econometric analysis in two stages. First is to trace the major shifts in the export behaviour (may or may not be linked to the environmental regulations). Second is to estimate suitable econometric models to explain the trading behaviours.

The effect of environmental factors on export performance depends on how environmental effects influence the system and whether the goods are final goods or intermediate goods. People's tastes could change so that they prefer environmentally safe goods. This would lead to a shift in the offer curve of the exporting country leading to a reduction in both the quantity of the good imported and the price paid for it. If, however, regulations are imposed they would affect the supply curve of exports from the exporting country. While regulations would tend to raise the cost of production the net effect is more complicated.

Compliance with environmental regulations requires skilled labour[24]. Since the developed countries are more abundant in skilled labour and the developing countries more abundant in unskilled labour, environmental regulations would enhance the effects of factor difference and lead to larger trade. Thus quantity traded may increase. But there would be two different effects on price; price would tend to decrease because supply has increased and tend to increase because the cost of production has gone up. If the environmental regulations require the use of more expensive intermediate goods, which are environmentally safer then the quantity traded would decrease and the price would increase. So a priori it is difficult to predict the effect of environmental factors on volumes and prices of the export good.

[24] Maintenance of water treatment plant or incineration plant etc. require specially trained technical people.

We also know that environmental regulations on tea are part of general regulations on agricultural goods and are not identified with a very great degree of precision. We therefore, first test for the presence of environmental effects by seeing whether there are any breaks in the series of India's exports of tea and its price. Using the Chow test we find that there is a break in the quantity of tea exports to the developed countries. The results show that as far as the volume of tea exports is concerned there is a break in the exports to the developed countries but no break in the exports to developing countries. Unfortunately exports to developing countries fluctuate so much that it is impossible to identify any breaks; but this also means that we really cannot rule out the presence of breaks. As far as price is concerned again we find a break.

Many changes have been occurring in the world tea market as was noted in earlier Chapter Three, including both income and price elasticities of tea as also the affect of the price of coffee, which also fluctuates considerably depending on the coffee harvest. We, therefore, modified the model specifications to suit for tea exports. If we took the ratio of India's export of tea to developed countries relative to that of developing countries we could then assume that this dependent variable would be independent of overall conditions in the world tea market and in the world economy as many of these would equally affect both developing and developed countries. This dependent variable also seemed to be a good variable to separate out the effect of environmental regulations as these have been introduced in only the developed countries. So a priori we would expect that environmental regulations would decrease the value of the dependent variable as the environmental regulations should see a switch in exports from countries which have higher stringent regulations, i.e. the developed countries, to countries which have less stringent regulations, i.e. the developing countries. We also tried to separately examine the affect of the five kinds of environmental regulations (mentioned in Chapter Four) to examine which regulations had more bite.

The effect of the regulations was initially sought to be captured by combining the different measures obtained from two different analyses (multi-criterion ad factor

anlyses). In one a composite index was derived from four type of environmental regulations-MRL, PR, SPS and GS; in the second, PPM was dropped as it was perfectly correlated with SPS.

The other independent variables are the dependency of India's exports on developing countries and on the EU countries. The greater the share of developing countries the lesser will be the impact of environmental measures. The greater the dependence on the countries of the EU the greater will be the impact of EU's environmental regulations. Many measures were introduced in 1992 and our analysis of breaks in the series also showed a break in 1992. We therefore introduced a dummy variable, which is zero before 1992 and 1 after that. We know that income elasticity of demand for tea is low so changing income between the developed and developing countries would affect the relative share of the two groups. We therefore introduced relative per capita income as an independent variable. Two other independent variables introduced are the relative price of tea to coffee and the terms of trade defined as the price in Calcutta relative to that is London. This measures the spread between consumer and producer prices. The larger the spread the smaller should be tea exports as the larger consumer price would tend to depress demand while the smaller producer price would tend to depress supply.

The modified specification for tea is as follows:

EXPRATIO=F (DVDEP, EUDEP, GDPEATIO, TOT, RPRC, FSCORES, D),

where EXPRATIO = the exports to developed countries relative to those to developing countries;

DVDEP = the dependency of India's exports on developing countries;

EUDEP= the dependency of India's exports on the EU market;

GDPRATIO= the relative per capita income in developed and developing countries;

TOT = relative price of tea in London to that in Calcutta;

PRRC = the price of coffee relative to that of tea;

FSCORES = the factor scores for environmental regulations; and

D = the dummy for 1992 shift.

In some of the regression equations, the scores for the separate measures replace FSCORES.

The estimated equation is:

EXPRATIO=0. 291 -0.170*DVDEP+0. 114*EUDEP-0.426*GDPRATIO

(.27) (6.33) (4.71) (2.02)

+0. 217*TOT-0.691*FSCORES + 2.327*D

(4.72) (2.78) (5.71)

R^2 = .958 ; Adjusted R^2 =. 935 ; DW = 1.53

The results show that the stringency of environmental regulations (FSCORES) reduces the share of India's exports going to the developed countries as we had expected. The terms of trade (TOT) also has the expected sign as a higher relative price in Calcutta means a smaller gap between consumer and producer prices and has a stimulating effect both on demand and supply.

The positive sign on the shift dummy variable D is puzzling at first sight. Our expectation was that our environmental variable would capture only part of the effect of environmental regulations; the dummy would capture other effects. So we had expected a negative sign for the dummy. The positive sign would however bear out what we had learned through our interviews with tea exporters. Most exporters said that they had experienced some difficulty in meeting the environmental standards initially till about 8 years back. Since then, they have been part of the global competitiveness with compliance.

When the different environmental measures were themselves introduced directly into the regressions, only the maximum residue levels (MRL) for pesticides, had a significant effect. The equation with this environmental variable is given below.

EXPRATIO = 0.321 - 0.141*DVDEP + 0.101*EUDEP -0.114*GDPRATIO

(.30) (4.96) (4.11) (4.90)

+0.211*TOT -0 .468*MRL + 2.364*D

(4.74) (3.43) (4.90)

R^2 =.950; Adjusted R^2 = .927 ;DW= 1.80

The main finding that follows is about the relevance of environmental regulations. Tea is a primary export commodity. It has revealed the impact of regulations negatively. In terms of elasticities, however, more than environmental regulations, the dependency ratios, relative prices and income factor are dominant. Hence, one can see the long-term effect to be one of slowly moving towards improved efficiency, environmental transparency and better environmental conditions in the tea garden sectors in India.

6.3.2: Performance of Leather Exports

In the case of leather and leather goods, different alternative sets of dependent and explanatory variables are considered. As discussed in Chapter Three, Indian major buyers of these products are from European Union. The regulations are also dominated by these countries (already discussed in Chapter Four). Therefore, the ratio of exports to EU to that of non-EU is considered as the dependent variable. A large number of explanatory variables are considered. Among them are, Indian dependency on European Union (EUDEP), Terms of Trade (TOT) defined as the ratio of World price of leather and leather goods exports to Indian price of exported goods, several dummy variables such as dummy variable for the year 1994 (D1994), Environmental regulation index (FSCORE), GDP of European Union, Market share

of Indian exports in European Union, and several others. Only the relevant and significant econometric models are presented in Table 6.2. Further, it was felt that there is some kind of correlation between the regulation index FSCORE and many of the explanatory variables such as EU GDP, Indian Output, Imports by Germany and Netherlands specifically, etc. Therefore, it was felt necessary to test for seperability of these variables. For this, a logarithmic specification with products of such log variables is also attempted. Only the relevant and useful models are presented in Table 6.3.

Table 6.2: Explaining Export of Leather and Leather Goods :Linear models

Explanatory Variables		**Dependent Variable**			
		Ratio of Dependency on EU/Non-EU	**Ratio of Exports to EU/Non-EU**	**Ratio of Exports to EU/Non-EU**	**Ratio of Exports to EU/Non-EU**
Constant		107.82(6.06)*	99.01(5.81)*	-299.906(-3.43)*	-302.237(3.78)*
EUDEP				8.32(4.64)*	8.745(5.59)*
TOT				0.228(0.027)	16.247(2.01)*
D1994					25.714(3.02)*
FSCORE		59.63(6.41)*	66.44(7.47)*	28.902(2.66)*	
Reg. Characterists	Method	OLS	OLS	OLS	OLS
	R^2 Adjusted	0.785	0.833	0.935	0.940
	D.F.	10	10	9	8

Note: EUDEP= Indian dependency on European Union; FSCORE is the composite index of environmental Regulations; D1994 is a time dummy from the year 1994; TOT is the terms of trade for leather goods.

Table 6.3: Explaining Export of Leather and Leather Goods: Log models

Explanatory Variables		Log[Export to Germany+ Netherlands]	Log[Export to Germany+ Netherlands]	Log[Export to EU]	Log[Export to EU]
Constant				-4.66 (-8.28)*	-4.058(-72)*
Log[Indian Output]		-0.199 (-11.71)*	-0.233 (-8.60)*		
Log[FSCORE]				1.585 (1.81)*	0.424 (3.32)*
Log[FSCORE]* Log[Imports of Germany+Netherlands]		0.027 (4.42)*	-0.219 (-1.60)*	-0.188 (-1.34)	
Log[Indian Output]* Log[Imports of Germany+Nethrelands]		0.063 (24.44)*	0.068 (16.10)*	0.068 (15.71)*	0.063 (24.42)*
Log[FSCORE]* Log[Indian Output]			0.092 (2.24)*		
Regression characteristics	Method	Step-wise	Step-wise	Step-wise	Step-wise
	R^2 Adjusted	0.997	0.998	0.966	0.964
	D.F.	21	20	20	21

On the basis of the econometric exercise, the following major observations can be made. First, one can clearly say that environmental regulations seem to enhance the trade prospects. Clearly, this is an indication that the Indian leather and leather goods sector, being one of the oldest in the export profession, has already taken sufficient leap in complying with the European environmental regulations and has been maintaining the competitiveness. Second, this is also due to very attractive

terms of trade, which has a positive effect of Indian exports. Third, Indian dependency on European demand is very important. Therefore, India cannot ignore the environmental regulations from EU countries. Fourth, a surprising finding is about the role of Indian output, which is found to be negative. Perhaps, only with a model of demands for leather products both within India as against exports, it may be possible to analyse the relative role of domestic production.

6.4: Some Conclusions regarding effects of regulations on trade

The estimated models suggest that whenever, environmental regulations are imposed in the short run on the primary goods productions (such as tea), it will have some negative impact on the trade prospects. This is primarily so, because of relatively high costs of compliance irrespective of scale economies. However, at the processed and manufactured goods levels, the relative impact on trade prospects is much lower. This is basically because of relatively low burden of compliance costs. Indian leather goods industries for instance, seem to have internalized the compliance costs very easily (mainly due to low cost burden, and also because of common effluent treatment plants) and have been facing the international trade competition.

As far as cut-flower exporting is concerned, as long as the compliance costs on cold storage, cold chamber transport facilities are available, the industry seem to take the comparative advantage of exporting (as shown by the cost-benefit analysis in Chapter Three).

Chapter Seven: Conclusions and Policy Implications

7.1: Introduction

Production processes the world over do not necessarily internalize all the production or consumption externalities they create. This is equally so with environmentally negative externalities. Conventionally, such negative externalities are handled by introducing command and control systems, in which environmental standards, rules to follow them, regulations to control them, charging fees, imposing penalties or even severe punishments such as closure and many such other instruments are used.

With growing concern about environmental protection, safety and sustainability of natural resources, countries after countries have introduced more and more environmentally relevant regulations. This is more so, ever since the Stockholm Conference on Sustainable Development held in 1972. But when it comes to a trade regime, non-compliance with any of the environmental standards (or concerns) can affect the trade pattern adversely. Moreover, trade itself can affect the environment adversely. Also possible are several market solutions such as relocation of dirty industries, pushing trans-boundary environmental problems to the neighbouring countries and so on. Broadly speaking, three distinct types of trade and environmental linkages are discernable. They are:

- Environmental policies and regulations affection trade flows from exporting countries;
- Trade patterns affecting the environment of the importing as well as exporting countries;
- Trans-boundary environmental externalities including relocation etc.

All these three linkages or conflicts have become more and more significant, with the process of globalisation and liberalization. This study concentrated on the first of the three linkages mentioned above, for the reasons explained in Chapter One.

Environmental regulations, be they in the importing countries or exporting countries, are treated as some kinds of non-tariff barriers.

Given the growing environmental problems all over the world, it is inevitable that control and safety measures are to be introduced. As reviewed, in Chapter four, one gets the impression that three distinct types of regulatory interventions and protocols are acting today. They are:

- Domestic environmental standards; India has set up environmental standards through various Acts, and also identified the environmentally sensitive industries.
- Country specific environmental regulations and safety nets for trade related activities; For instance Germany took the lead in introducing many stringent environmental restrictions on the use of several chemicals, on eco-labelling, on packaging etc. European Union followed the same suit for most of their members.
- Multi-lateral environmental agreements: WTO, GATT, CITES have brought agreements among all the member countries on sanitary matters, intellectual property rights, protection of endangered species and so on.

7.2 Objectives of the Present Study

This study took a look at the relevant environmental regulations regarding export trade from India in respect of three products, namely tea, cut-flowers and leather and leather goods. Secondly, it also anlysed the experience of the exporters through interviews and questionnaire surveys. Thirdly, among the exportable commodities, given the fact that different production processes are employed with different degree of factor uses (i.e., land, capital, labour, natural resources etc.), a theoretical model of effect of environmental compliance costs upon trade is formulated. Further a hypothesis (modified from the original Porter hypothesis) on the pattern of trade in response to the degree of environmental regulations (via the compliance costs) is formulated. This is stated as:

As one moves from lower to high value added product exports or from primary to higher and higher levels of processing and manufacturing, the impact of environmental regulations turn to become positive from being negative'.

The reason for the choice of the three specific export oriented products chosen are:

- Tea falls strictly under plantation activity, which is land based, and hence is part of agriculture. Agriculture generally is a low value added activity. Pesticide control, use of water, eco-labeling and packaging etc., are the major environmental regulations affecting this industry.
- Cut-flower exporting is a new and emerging industry under recent globalisation and liberalisation process in India. It is also land based and hence has agricultural linkage, but is also based on processing requiring capital investments on cold storage and protected quick transportation. Eco-labeling, pesticide control, SPS regulations, controlled packaging, storing and transportation are the major regulations (mainly coming from the Netherlands, called Flower Auction Holland regulations).
- Export of leather and leather products depend upon on tannery processing which is strictly a manufacturing activity. A variety of restrictions on use of chemicals, dyes, water and SPS regulations come in the way of environmental regulations in the processing stage.
- Finally, as far as India is concerned, all the three products are export oriented.

7.3 Major Conclusions

The conclusions drawn in this study are based on (a) collecting information on experience of the exporters in complying with the external and internal environmental regulations (b) econometric analysis of trade and environmental regulatory data and indicators.

Experience of Indian exporters

In the case of tanneries, the small-scale units face the music of high cost of treatment and they lack of financing and access to technology, and some times even the knowledge about the regulations. They also find it difficult to set up

Common Effluent Treatment Plants because of spatial dispersion of the units. Because of which many small-scale tanneries in India continue to have individual effluent treatment plants, however inefficient they may be. Otherwise, the compliance costs at the Common Effluent Treatment levels is very small. At best, it goes up to 2 - 4 percent of total product costs. But during the last 6 - 8 years the compliance costs have been rising. There are as many as 1000 small-scale tanneries in India, against just about 75 large units.

However, the tanneries have started with complying with PCP, pH, BOD, COD, TDS, several other chemical regulations etc.. They are able to gain better access to world exports. There is a general feeling in the industry that in the long run it is good for the industry. Secondly, almost all producers are quite aware about almost all the regulations. Thirdly, the regulations did not make the exporters change their importing partners or change the direction of trade. Finally, more than the environmental costs, the overall trade recession has affected the leather exporters from India. Recession in Germany particularly has affected the exports quite significantly.

Tea gardeners and exporters in India invariably feel that being a plantation activity, it is environmentally extremely friendly. Almost since 8 years the industry has been complying with all the environmental regulations such as EU, CODEX; US Food Regulations; German packaging and eco-labeling regulations and Russian Gosstandart regulations (on the residuals of heavy metals such as cadmium, nickel etc.). Considerable amount of research also has gone into, by Tea Research Authority and United Planters Association of Southern India (UPASI).

The most important environmentally sensitive issues relating to tea plantation is use of pesticides and land use pattern. The choice before the tea gardens is either to comply with pesticide control levels as stipulated by EU, or go for organic farming. The gardeners say that organic farming will involve an additional cost even up to 100% extra. It is also important to note that there are about 11 major planters in Darjeeling area today, following organic farming. Most of the tea gardeners comply

with EU pesticide regulations, at much lower levels than the said limits. Other than pesticide residual control measures, other environmental regulations such as maintaining ground water quality, afforestation, soil replenishment, preventing biodiversity loss etc., are also applicable and they are still costly. But because of the worldwide compliance, they would also have to fall in line. It is also learnt from the exporters that there are no major scale effects (advantages) in the cost of environmental compliance. The costs on account of these reflect in their pricing depending upon the composition of organic and regular gardening. On top of these are the Eco-labeling and packaging regulations. Therefore, on the whole, environmental regulations seem to have affected the cost and price patterns of tea exports.

Cut-flower exporting is a new venture, having picked dup just over the last 6-8 years. Basically the pesticide control, regulations on harvesting, cold storage and transporting, packaging regulations add to the costs build-ups. The cost of cold storage and refrigeration van is about 18-19% of total cost of production. The packaging and freight costs are about 35% of total cost. About 35% of marketing and about 2% of production costs are environmentally related ones. The three major environmentally relevant costs are on use of farmyard manures (ranging from 5-8%), plant protection costs (ranging from 3-5 %) and transport and handing costs (ranging from 3-5 %). The sector, being still in its initial stage, is lacking knowledge about regulations and recommended practices. Furthermore, they also lack advanced modern technology in packing and handling.

Empirical model of trade with regulations on environmental standards

The empirical work involved two different major tasks. First, some kind of aggregative picture of the environmental regulations are to be found. Since they vary across the countries, and have different degree of stringency at different point in time, this aggregation process was not easy. Most commonly used method is treat them with some dummy variables. In this study, with two different econometric approaches, namely Multi-criterion approach and Factor analysis, two different time series of aggregated Regulation indices were generated.

When it came to linking trade patterns with the environmental regulations, once again different types of econometric specifications had to be made.

The usual Gravity type models suggest that the volume of trade in tea and leather and leather products are responding to:

- Terms of trade,
- volume of world trade (a demand factor),
- Indian production levels (Supply factor), and
- the years (dummy variables) of stringent environmental regulations

The environmental regulations seem to depress the trend in exporting in general. As far as terms of trade is concerned, it seems to act in two different ways for leather goods and tea. For the former, it is a supply price factor, where as it is a demand price factor for tea (i.e., dominated by the London price, rather than the Calcutta price). This is understandable as Indian leather goods have a larger share in world exports, and have been in the business for quite a long time. The World Level Export is a major demand pull factor for Indian exports.

Further econometric investigations on tea and leather exports led to the following major conclusions.

In the case of export of tea, there are clear evidences that there are clear breaks in the export pattern to developed countries but not to developing countries. Exports to developing countries fluctuate quite widely without giving any clues for the reasons.

The ratio of exports to developed to developing countries are clearly explainable by :

- the dependency of India's exports on developing countries (negatively);
- the dependency of India's exports on the EU market (positively);
- the relative per capita income in developed and developing countries (positively);
- relative price of tea in London to that in Calcutta (positively);
- the factor scores for environmental regulations based on MRL, PR, PPM, SPS and EL (negatively); and
- the dummy for 1992 shift (significantly for the shift for developed countries, at the onset of globalisation)

The results show that the stringency of environmental regulations reduces the share of India's exports going to the developed countries as we had expected. The terms of trade (TOT) also has the expected sign as a higher relative price in Calcutta means a smaller gap between consumer and producer prices and has a stimulating effect both on demand and supply. The positive sign on the shift dummy variable D is puzzling at first sight. The positive sign would however bear out what we had learned through our interviews with tea exporters. Most exporters said that they had experienced some difficulty in meeting the environmental standards initially till about 8 years back. Since then, they have been part of the global competitiveness with compliance. In terms of elasticities, however, more than environmental regulations, the dependency ratios, relative prices and income factor are dominant. Hence, one can see the long-term effect to be one of slowly moving towards improved efficiency, environmental transparency and better environmental conditions in the tea garden sectors in India.

In the case of leather and leather goods, different alternative sets of dependent and explanatory variables are considered. Indian major buyers of these products are from European Union. The regulations are also dominated by these countries.

Therefore, the ratio of exports to EU to that of non-EU is considered as the dependent variable. They are explained by:

- Indian dependency on European Union
- Terms of Trade (TOT) defined as the ratio of World price of leather and leather goods exports to Indian price of exported goods,
- several dummy variables such as dummy variable for the year 1994 (D1994), Environmental regulation index
- GDP of European Union,
- Market share of Indian exports in European Union.

On the basis of the econometric exercise, the following major observations can be made.

- First, one can clearly say that environmental regulations seem to enhance the trade prospects. Clearly, this is an indication that the Indian leather and leather goods sector, being one of the oldest in the export profession, has already taken sufficient leap in complying with the European environmental regulations and has been maintaining the competitiveness.
- Second, this is also due to very attractive terms of trade, which has a positive effect of Indian exports.
- Third, Indian dependency on European demand is very important. Therefore, India cannot ignore the environmental regulations from EU countries.
- Fourth, a surprising finding is about the role of Indian output, which is found to be negative. Perhaps, only with a model of demands for leather products both within India as against exports, it may be possible to analyse the relative role of domestic production.

7.4 Towards Some Policy Conclusions

Generally, it is risky to make very assertive policy recommendations based on just three product study. After all, environmental regulations are not designed just for these three products specifically studied here. But such studies backed up by field level surveys and record of experience (as was also done by Porter and Linde, 1992) can lead to more concrete policy recommendations. None-the-less, the policy implications that follow from this study can be summarised as follows:

First, it is necessary to treat small scale and large scale producers separately while designing the environmental regulations. This is primarily because of the scale effects in complying with environmental regulations (just as other non-tariff barriers). Most of Indian exports, be they heavily burdened with environmental regulations or not, are in small scale. The other major problem with them is lack of proper information regarding such regulations (it took 6-8 years for the leather tanneries or handloom textile units to get to know about them). Training the small scale units on environmental regulations, development of attainable abatement technologies will be necessary.

Second, the primary commodity productions such as agricultural products do reveal higher burden of environmental regulations in the short run. Apart from uncertainly of weather, they face uncertainly of demand factors such as prices. Take the case of the major glut that took place in the Indian onion market, about four years back. Exporting of onion can be an option, as much as mangos during the glut years. But the traders require timely information regarding demand pattern and markets, and the regulations that they have to go through. In the short run, such major changes in the decision and direction of market change is possible only with well developed information system attached to Agricultural Produce Market Corporations. In any case, the primary goods producers require additional time to adjust to their environmental compliance cost burden, learn new technologies, to collect information regarding such regulations etc. Training is required in packaging, handling, environmental auditing etc. They need to be provided lot more training and information to graduate to become competitive. Special credit facilities may have to

be created for establishing combined effluent treatment plants, or cooperative cold storage, packaging units etc.

Third, the new and emerging primary sectors such as cut-flower exporting are finding it difficult to compete with the Kenyan and Dutch flower producers. Some immediate action is required on the part of the government to educate and train such industries to enter into international competition. Creation of cold storage and transport facilities for flowers, fruits, seeds can be encouraged in the private sector.

Fourth, the environmental regulations need to be ranked in terms of their negative effects on the society (separately for the consumer and for the producer). The industry specific rankings also be worked out (e.g., severity index for each environmental hazard and the rank of it for each industry, say textile, leather tanning, chemicals and so on). The concerned pollution control boards and export regulatory authorities (e.g., FAH) need to announce these rankings from time to time for public information. They can also issues, following the German example, different types of labelings such as Gold, Green, yellow, brown and black. This should also form part of consumer education and awareness.

Fifth, as one moves from lower level of manufacturing to higher levels of processing and mechanization, the environmental compliance costs per unit of output are declining. Such industries should set up training centers for their own ancillary units, who are either in the small scale sector or they find the cost impact of environmental regulations to be quite high. More thrust need to be given to set up R & D centres by the large scale manufacturing units to develop eco-friendly inputs, techniques and awareness.

Sixth, there is a need for a geographically widely spread out set up of testing centres by the pollution control boards, to enable the small and medium scale units to get their products certified for environmental clearance.

Seventh, Indian leather industry (with a wide range of scales) need to work together to remove apprehensions about the environmental effects of manufacturing leather and footwear. Together with the scientific community, the industry also needs to work on environmental criteria for eco-labelling and the adoption of eco-friendly technology in hide and skin processing and the manufacture of leather. Indeed, many eco-friendly techniques exist, but these need to be disseminated more widely.

Eighth, in India, Central Pollution Control Board (CPCB) has identified 16 consumer product categories for the development of ECO MARK. They are paper, soaps, food, lubricating oils, packaging materials, drugs pesticides, textiles, plastic products, cosmetics, electric/electronic goods, batteries, paints and powder, coatings, aerosol propellant and wood substitutes. After thorough review, leather and leather products have been also included under the scheme considering its mass consumption and its adverse impact on environment. All these industries need to be exposed to the comparative advantages of complying with external regulations, and yet to be in the forefront of exporting. For this, apart from the CPCB and their counterparts in the states, the Chambers of Commerce and industries may have to carry out many more case studies to establish the impacts of environmental regulations in the short run a and in the long run.

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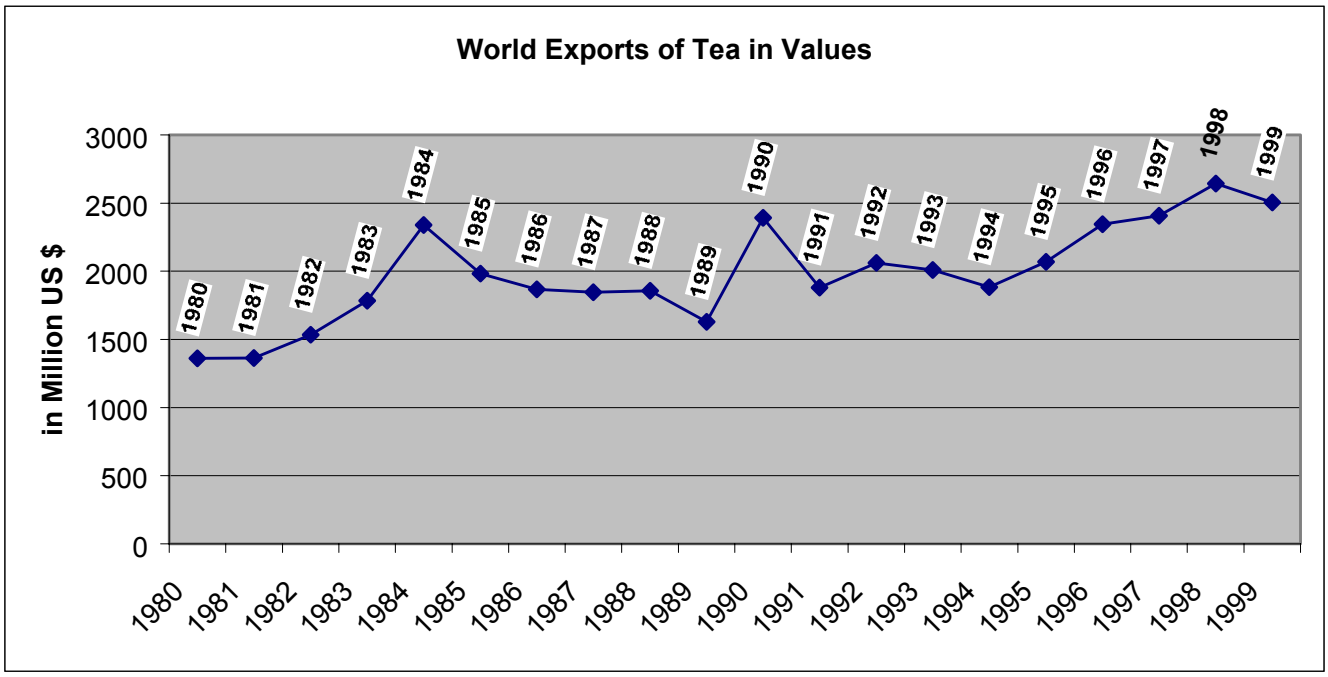
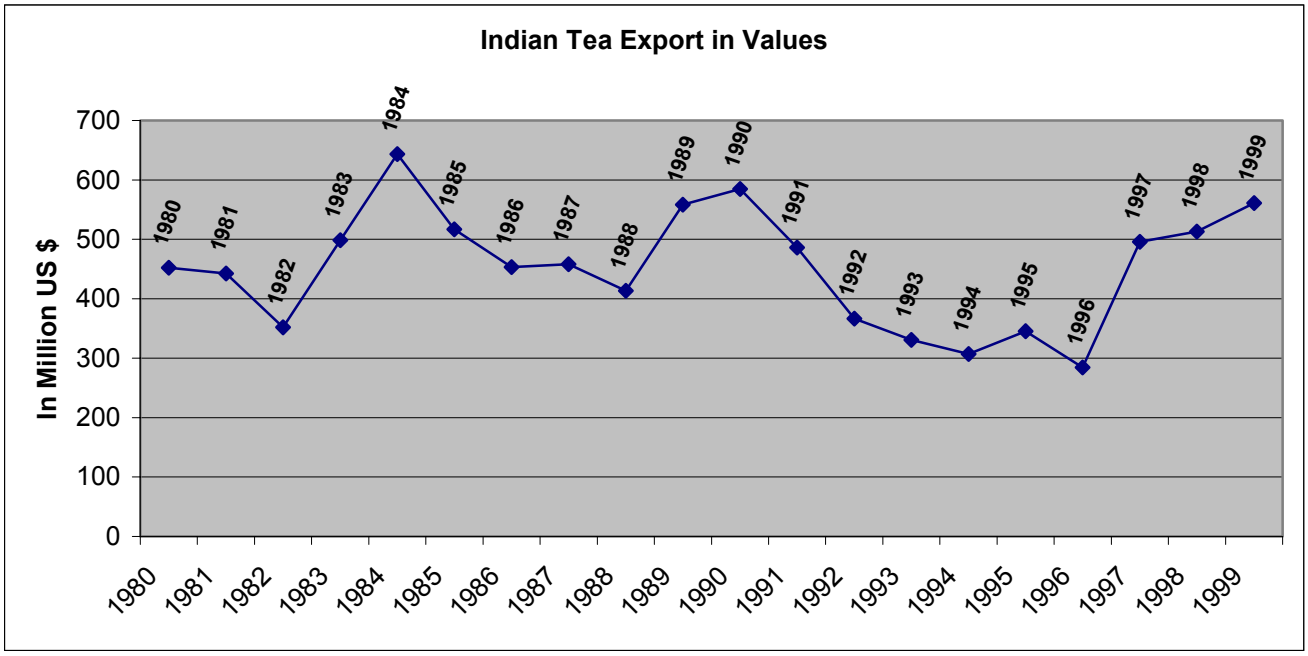
Annexure: Graphs and figures





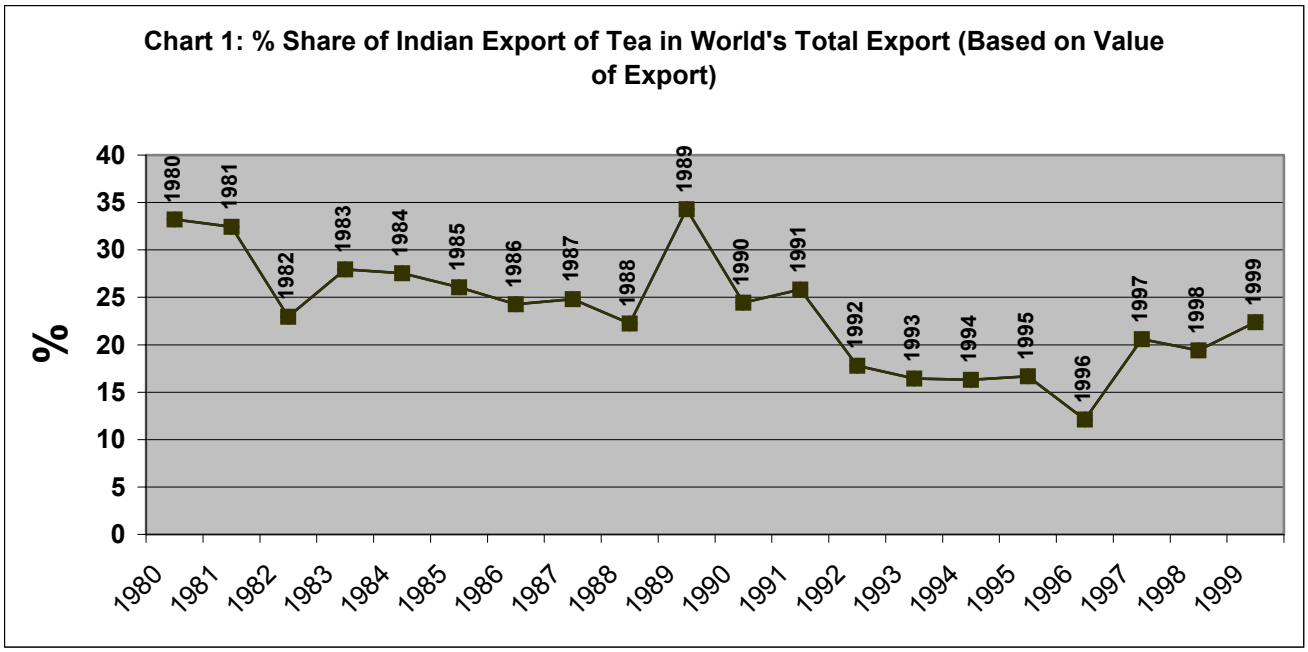
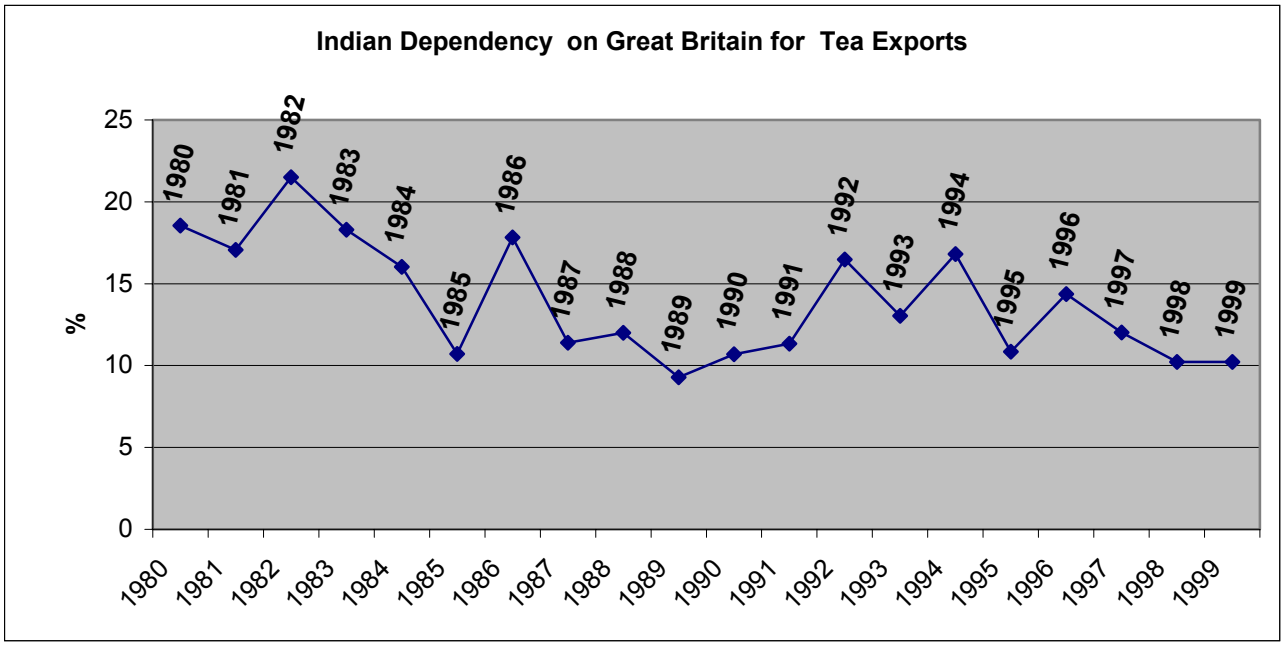
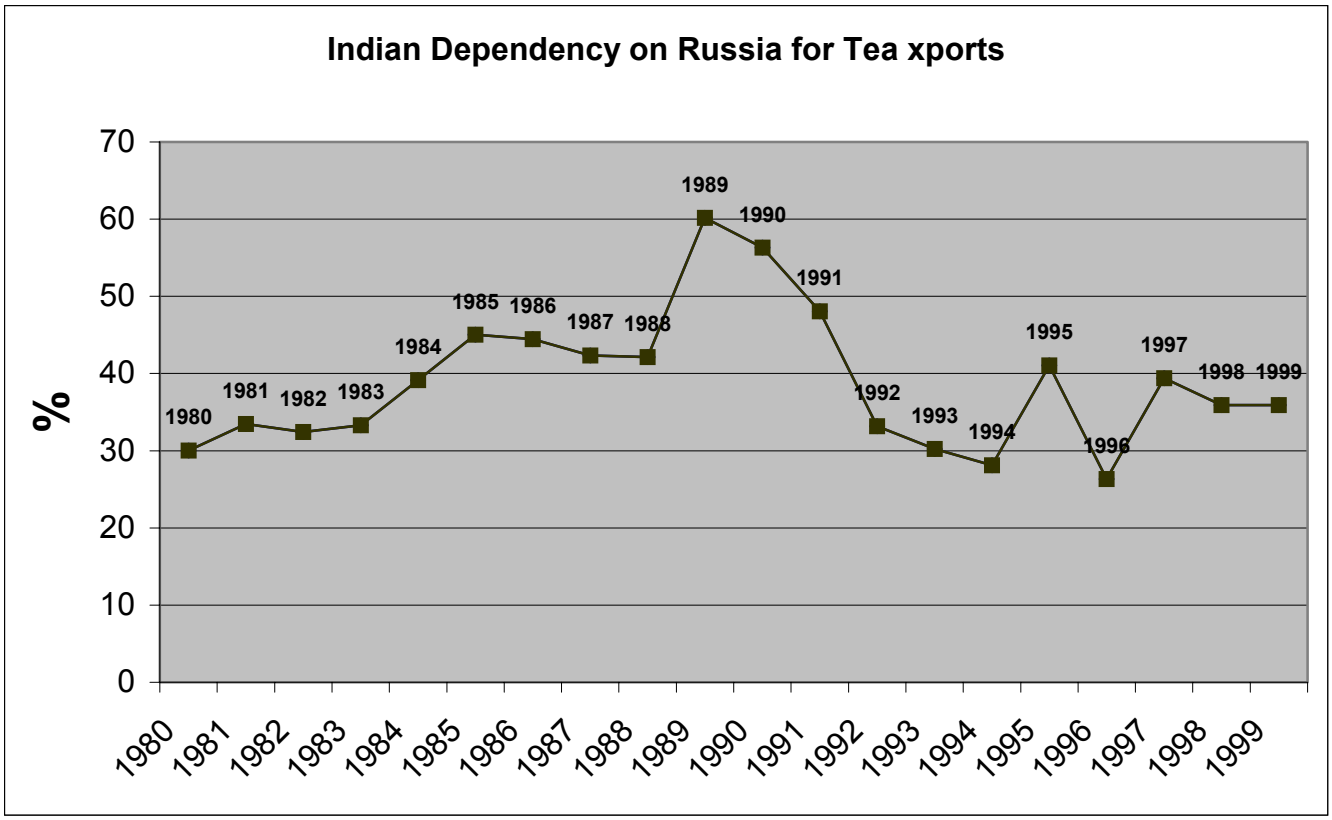
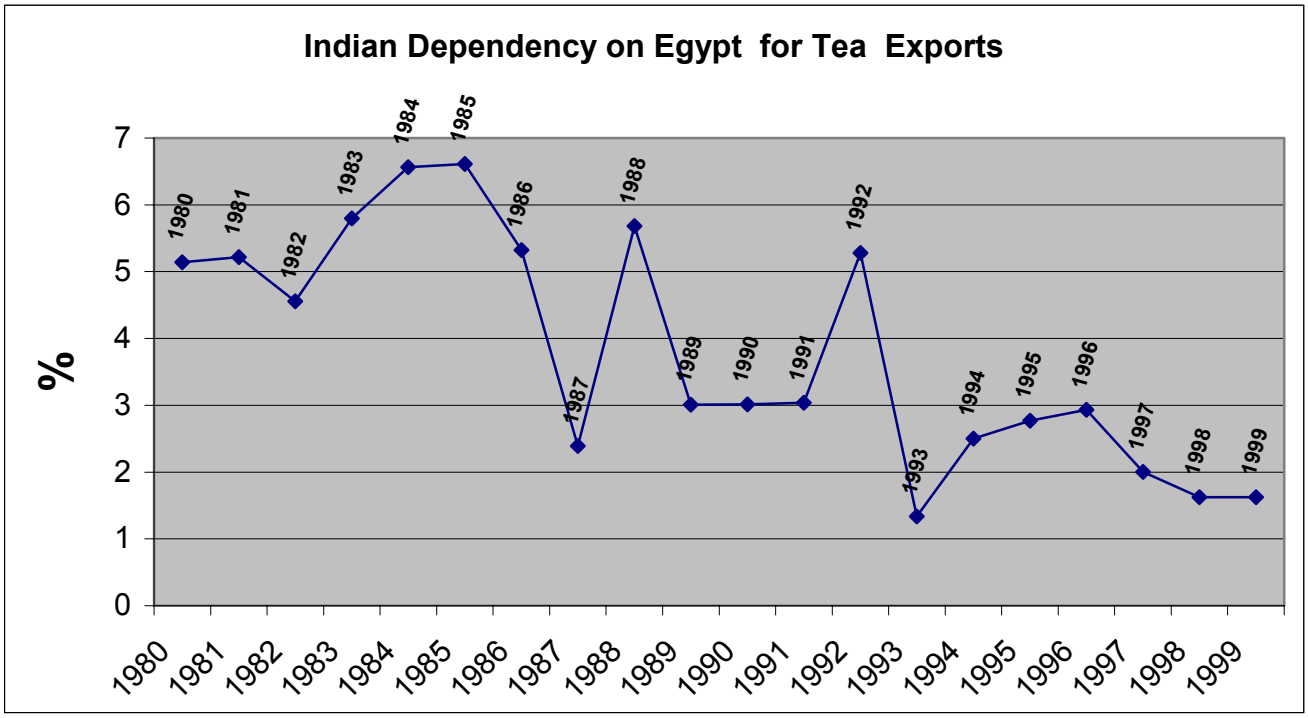
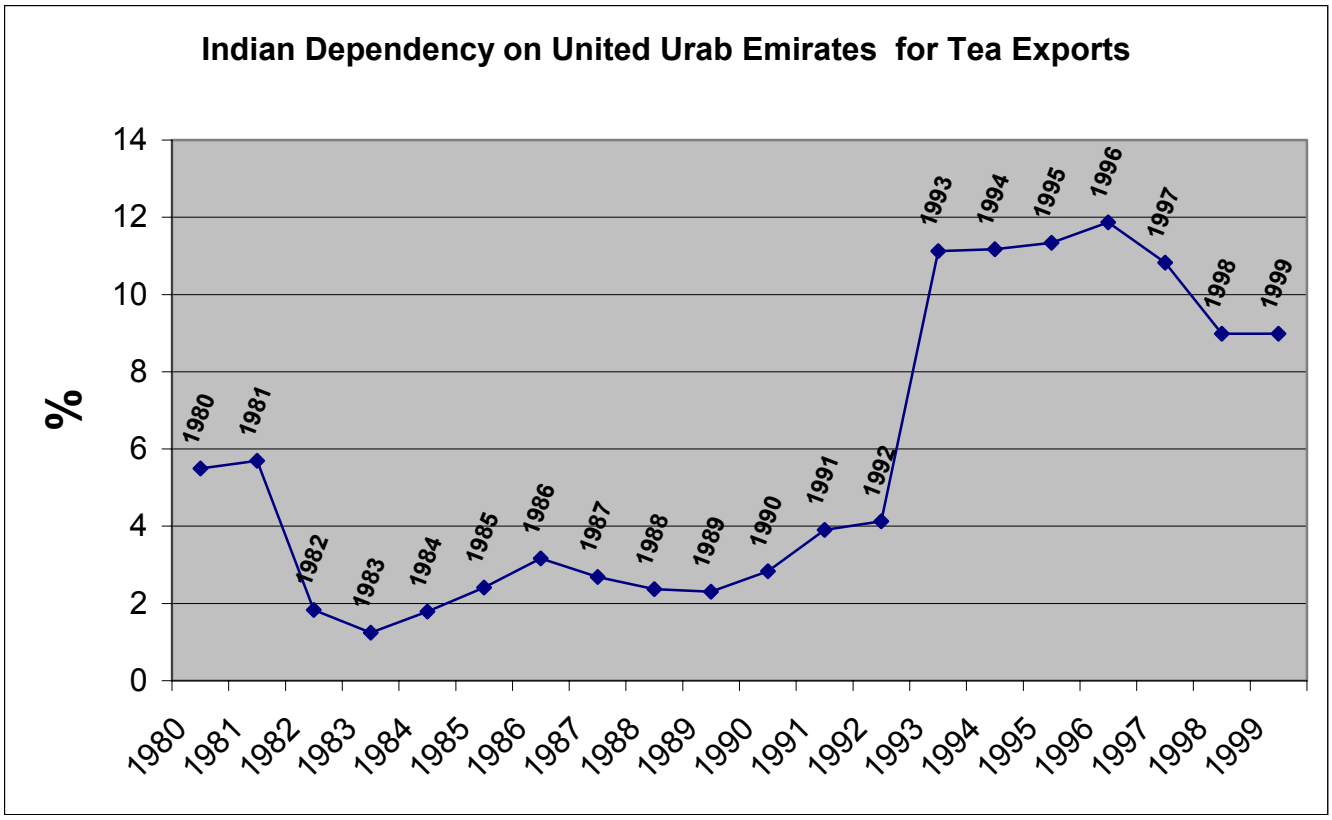


Chart 1: % Share of Indian Export of Tea in World's Total Export (Based on Value of Export)
%
40
35
30
25
20
15
10
5
0
1980
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999


Indian Dependency on Great Britain for Tea Exports
%
25
20
15
10
5
0
1980
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999


Indian Dependency on Russia for Tea xports
%
70
60
50
40
30
20
10
0
1980 1981 1982 1983 1984 1985 1986 1987 1988 1989 1990 1991 1992 1993 1994 1995 1996 1997 1998 1999
1980 1981 1982 1983 1984 1985 1986 1987 1988 1989 1990 1991 1992 1993 1994 1995 1996 1997 1998 1999

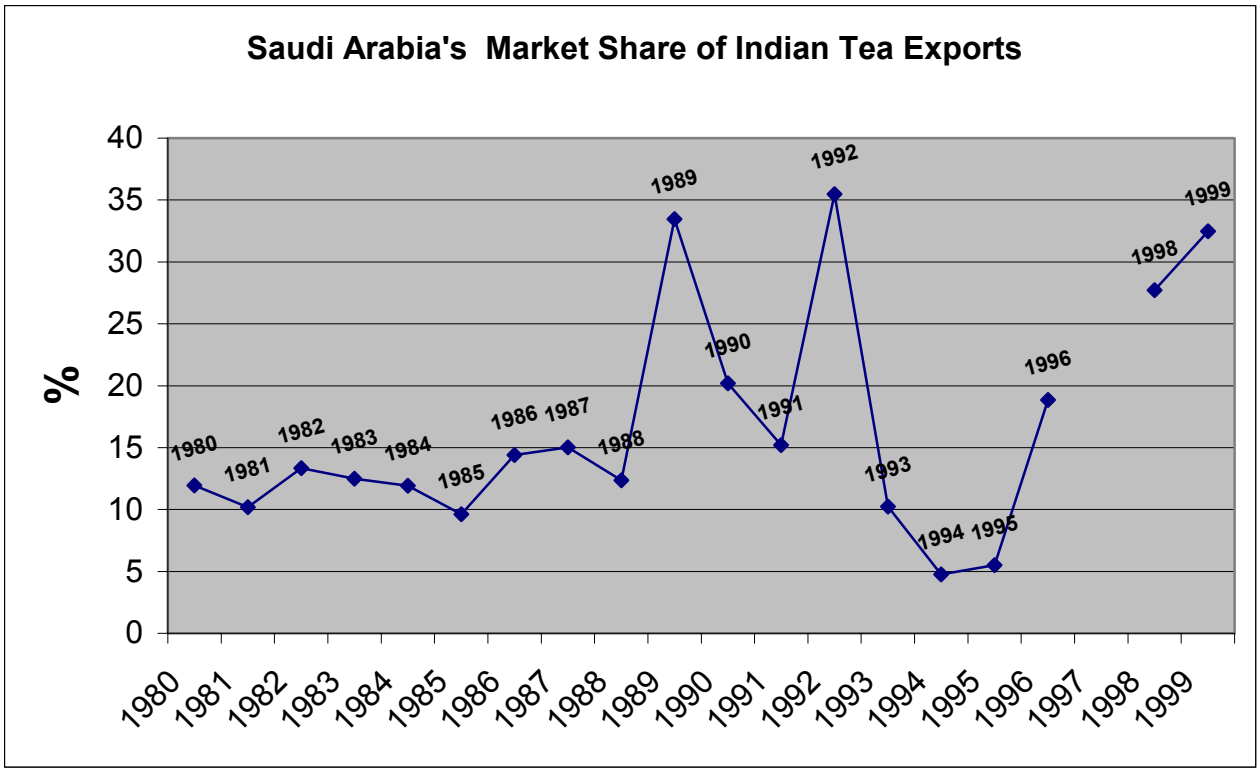

Indian Dependency on Egypt for Tea Exports
%
7
6
5
4
3
2
1
0
1980 1981 1982 1983 1984 1985 1986 1987 1988 1989 1990 1991 1992 1993 1994 1995 1996 1997 1998 1999
1980 1981 1982 1983 1984 1985 1986 1987 1988 1989 1990 1991 1992 1993 1994 1995 1996 1997 1998 1999

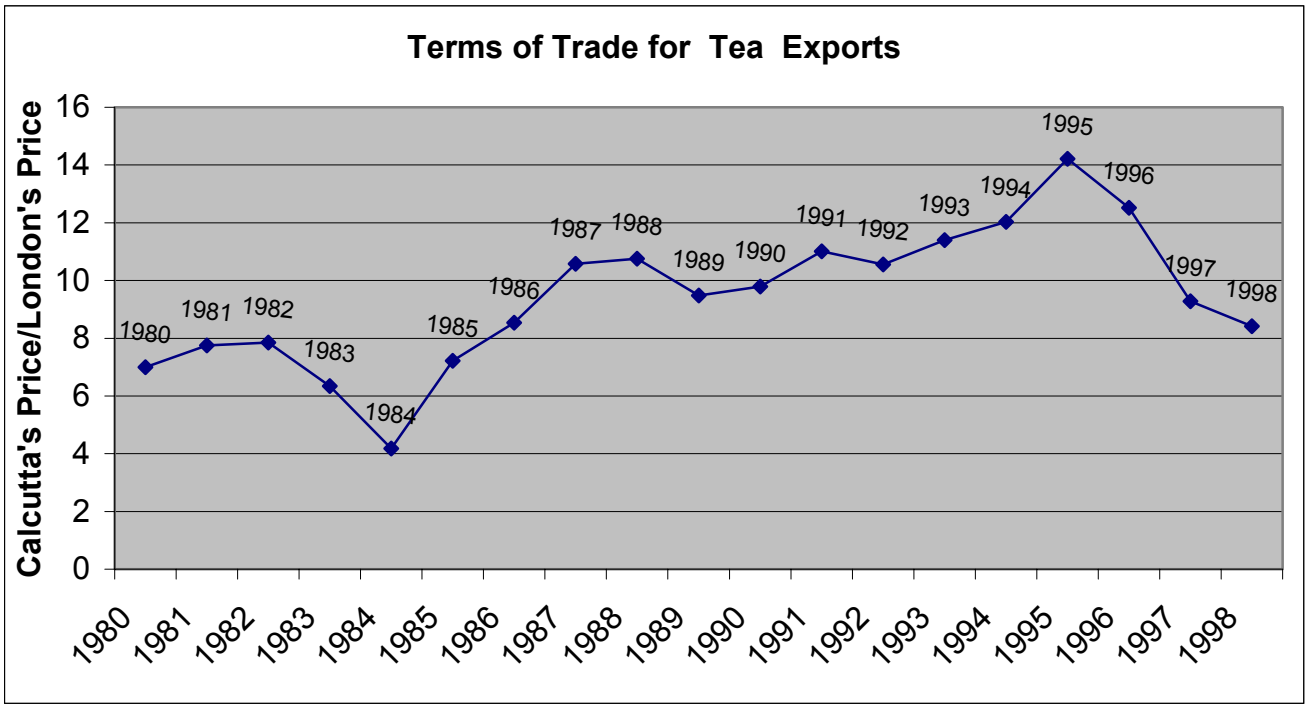

Indian Dependency on United Urab Emirates for Tea Exports
%
14
12
10
8
6
4
2
0
1980 1981 1982 1983 1984 1985 1986 1987 1988 1989 1990 1991 1992 1993 1994 1995 1996 1997 1998 1999

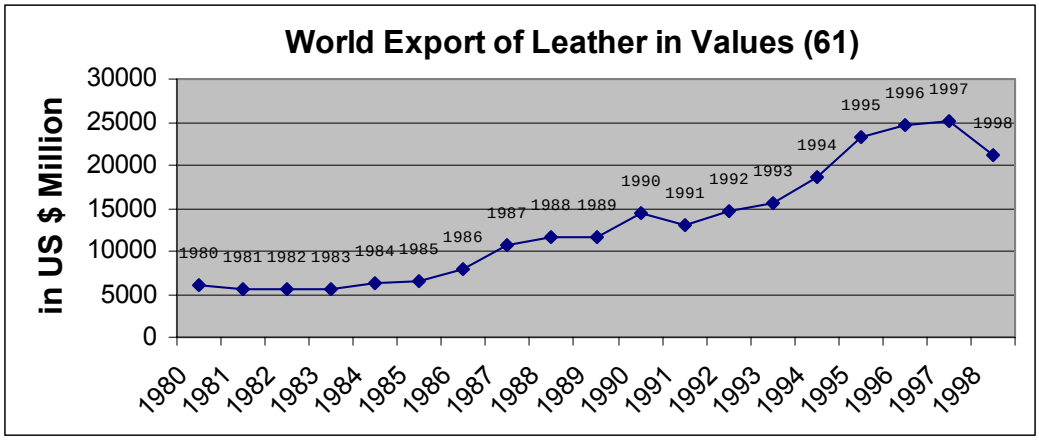

Germany's Market Share of Indian Tea Exports
%
40
35
30
25
20
15
10
5
0
1980 1981 1982 1983 1984 1985 1986 1987 1988 1989 1990 1991 1992 1993 1994 1995 1996 1997 1998 1999

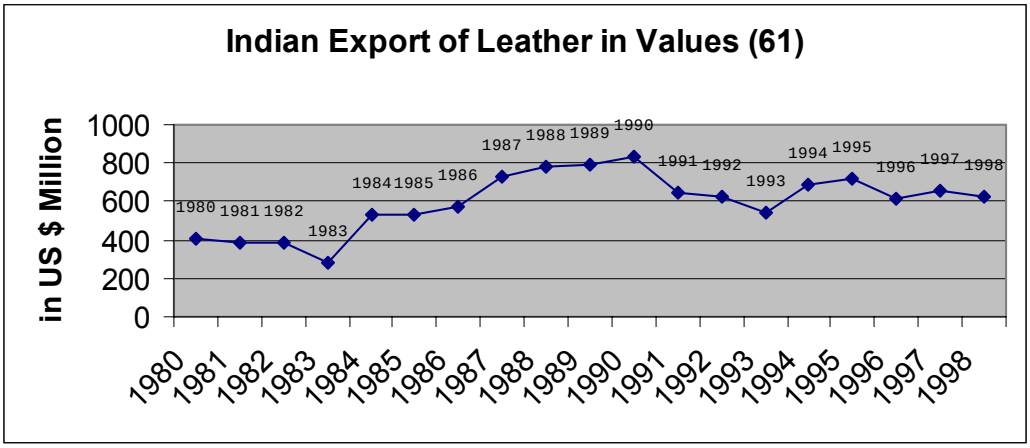

Great Britain's Market Share of Indian Tea Exports
%
30
25
20
15
10
5
0
1980
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999

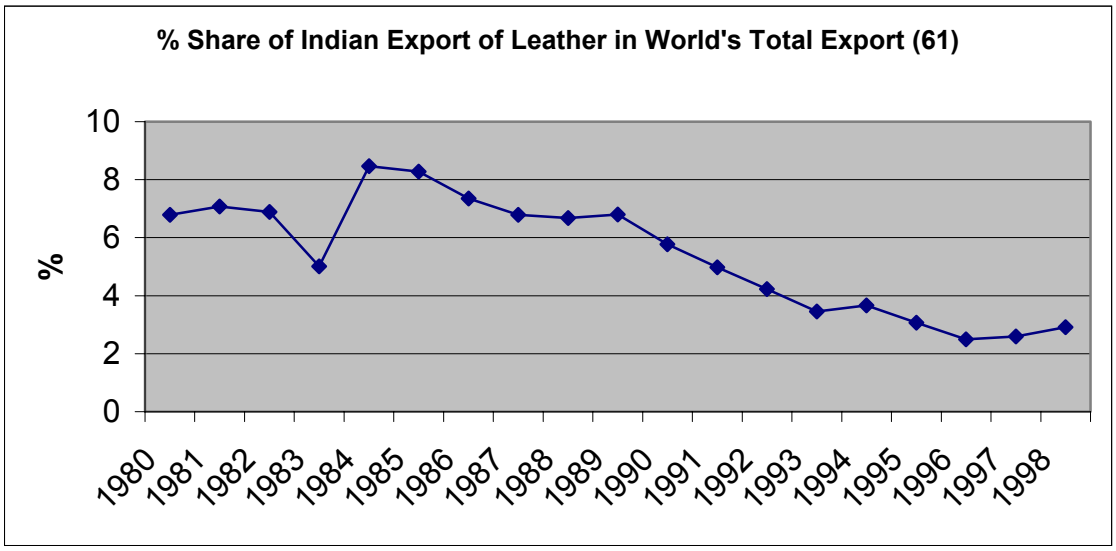

Ireland's Market Share of Indian Tea Exports
%
40
35
30
25
20
15
10
5
0
1980
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999

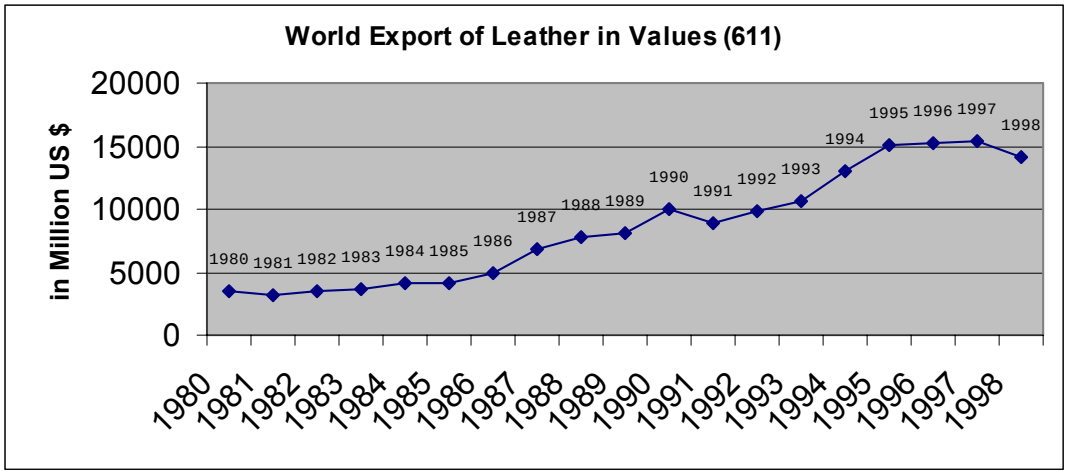

Saudi Arabia's Market Share of Indian Tea Exports
%
40
35
30
25
20
15
10
5
0
1980
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999

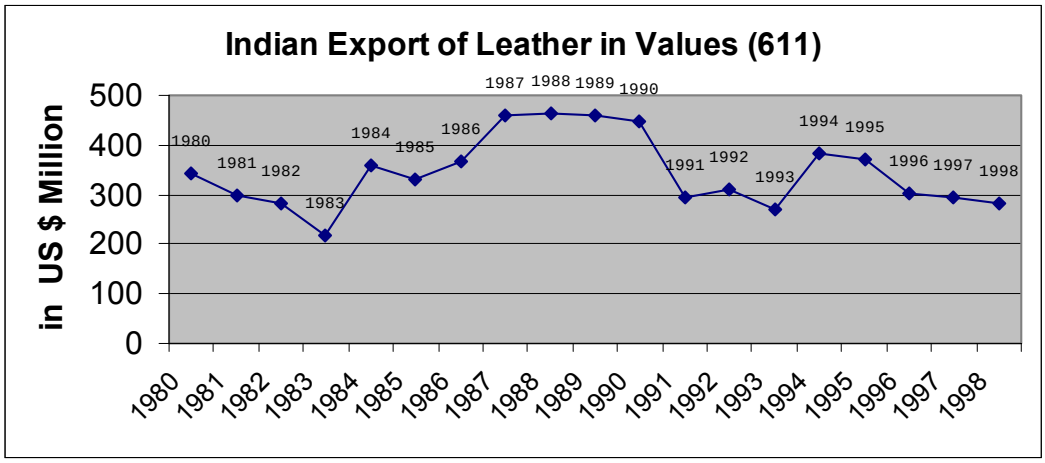

Terms of Trade for Tea Exports
Calcutta's Price/London's Price
16
14
12
10
8
6
4
2
0
1980
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998

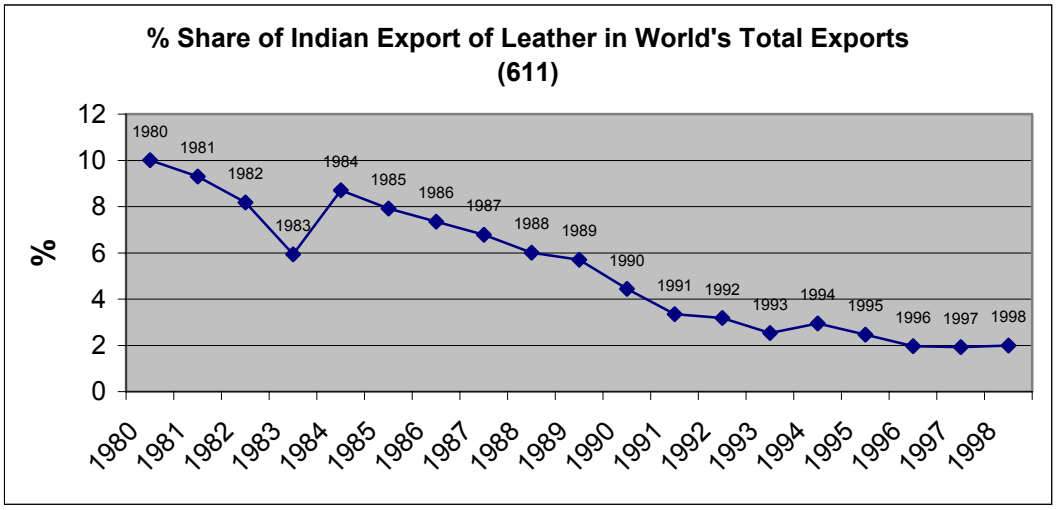

World Export of Leather in Values (61)
in US $ Million
30000
25000
20000
15000
10000
5000
0
1980 1981 1982 1983 1984 1985 1986 1987 1988 1989 1990 1991 1992 1993 1994 1995 1996 1997 1998

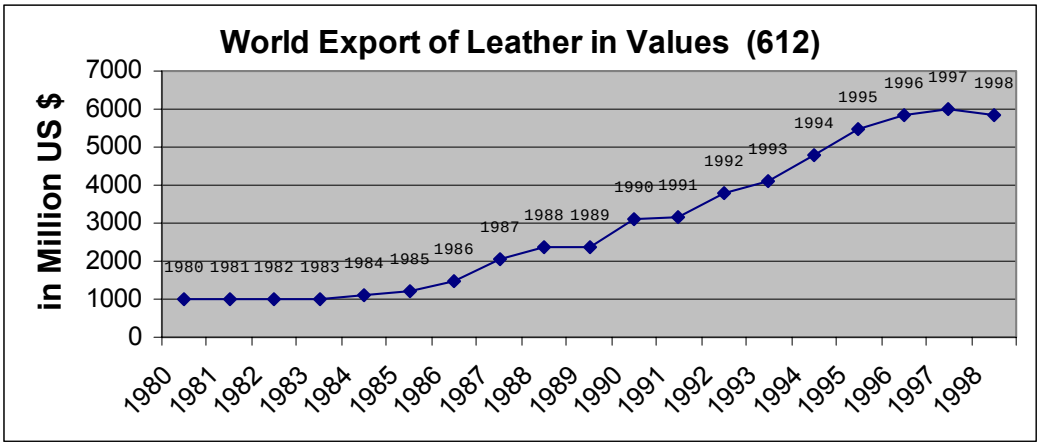

Indian Export of Leather in Values (61)
in US $ Million
1000
800
600
400
200
0
1980 1981 1982 1983 1984 1985 1986 1987 1988 1989 1990 1991 1992 1993 1994 1995 1996 1997 1998

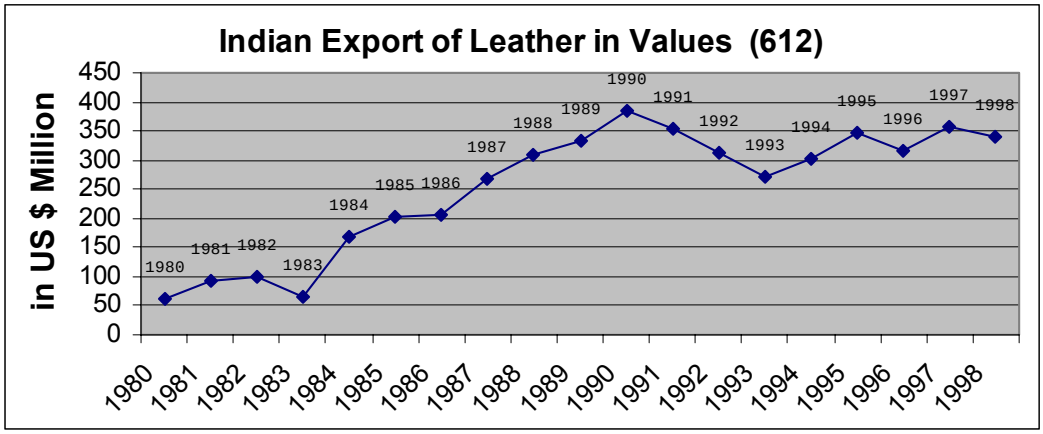

% Share of Indian Export of Leather in World's Total Export (61)
%
10
8
6
4
2
0
1980 1981 1982 1983 1984 1985 1986 1987 1988 1989 1990 1991 1992 1993 1994 1995 1996 1997 1998


World Export of Leather in Values (611)
in Million US $
20000
15000
10000
5000
0
1980 1981 1982 1983 1984 1985 1986 1987 1988 1989 1990 1991 1992 1993 1994 1995 1996 1997 1998

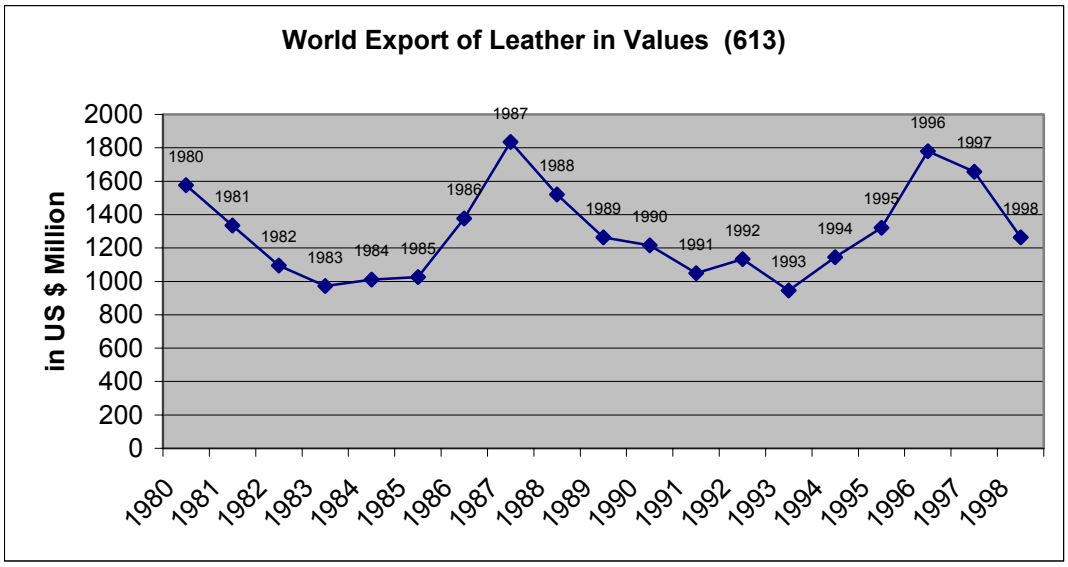

Indian Export of Leather in Values (611)
in US $ Million
500
400
300
200
100
0
1980 1981 1982 1983 1984 1985 1986 1987 1988 1989 1990 1991 1992 1993 1994 1995 1996 1997 1998

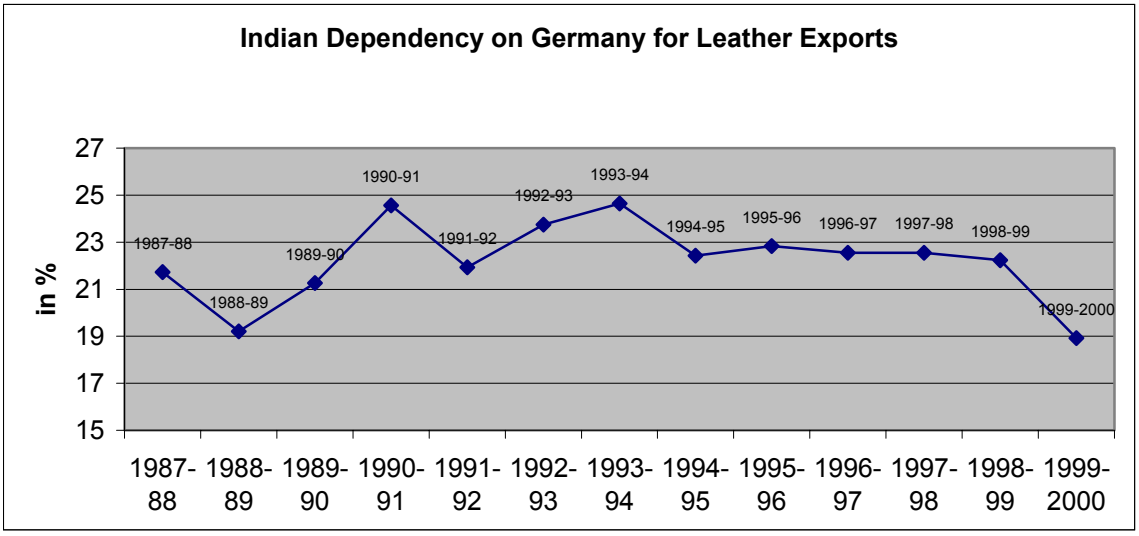

% Share of Indian Export of Leather in World's Total Exports (611)
%
12
10
8
6
4
2
0
1980 1981 1982 1983 1984 1985 1986 1987 1988 1989 1990 1991 1992 1993 1994 1995 1996 1997 1998

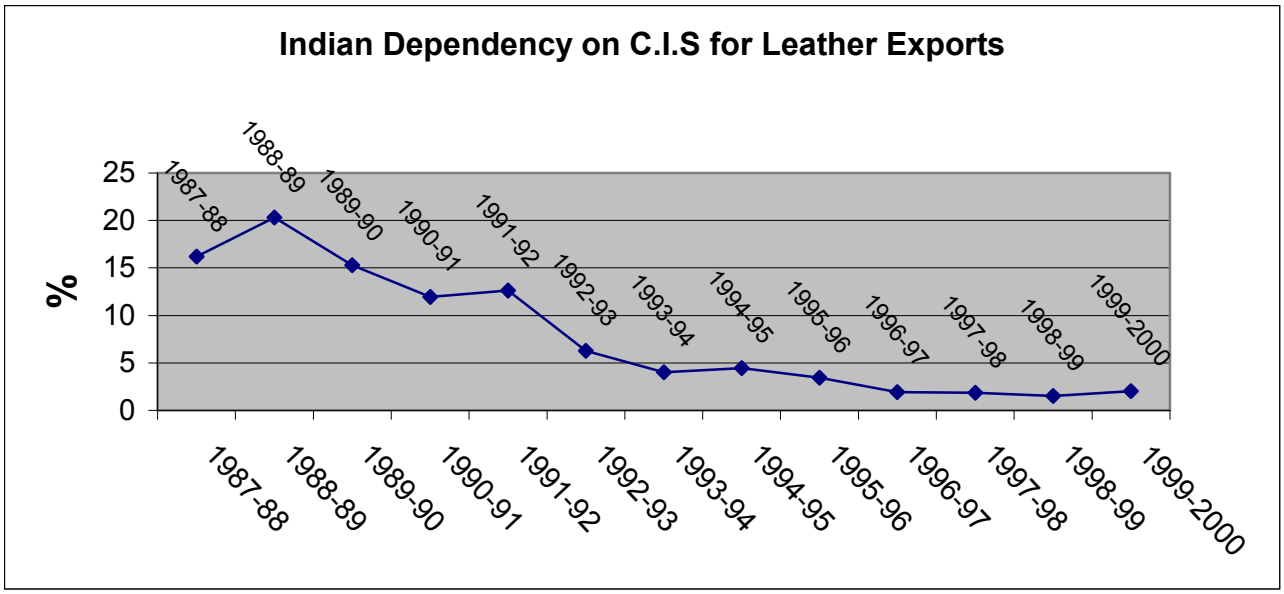

World Export of Leather in Values (612)
in Million US $
7000
6000
5000
4000
3000
2000
1000
0
1980 1981 1982 1983 1984 1985 1986 1987 1988 1989 1990 1991 1992 1993 1994 1995 1996 1997 1998

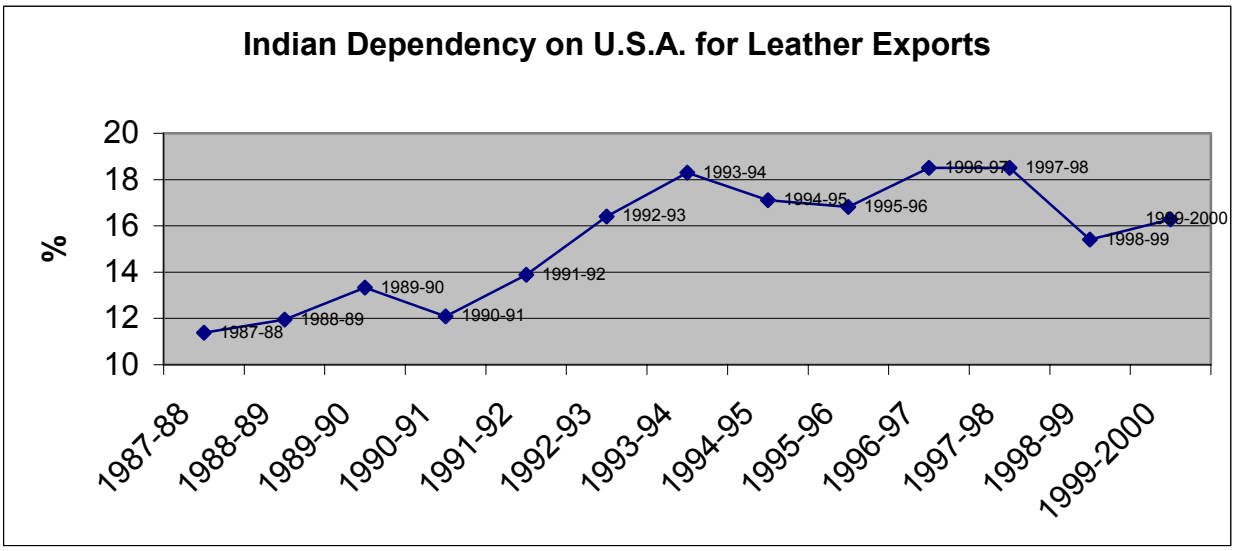

Indian Export of Leather in Values (612)
in US $ Million
450
400
350
300
250
200
150
100
50
0
1980 1981 1982 1983 1984 1985 1986 1987 1988 1989 1990 1991 1992 1993 1994 1995 1996 1997 1998

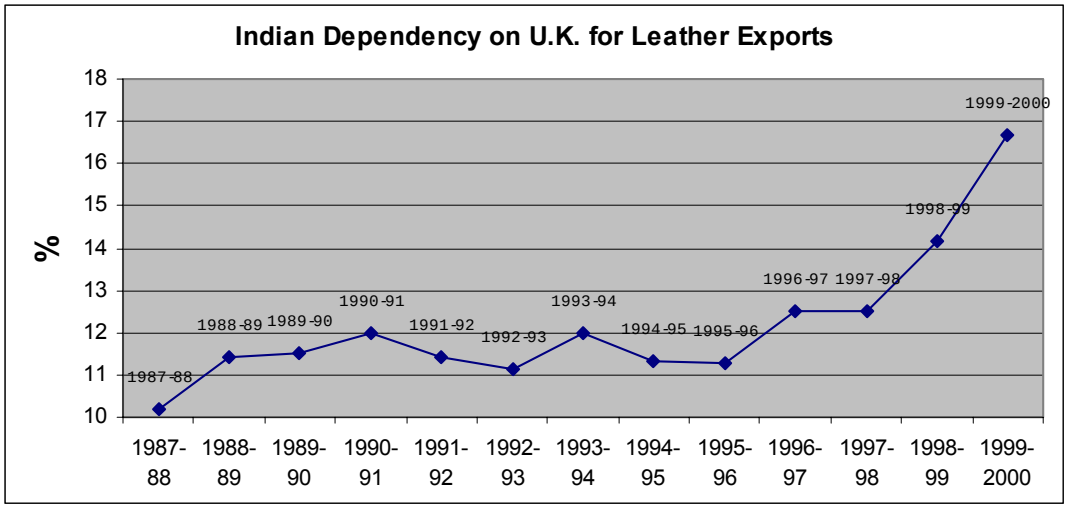

Indian Share of Leather Export in World's Total Exports (612)
%
18
16
14
12
10
8
6
4
2
0
1980 1981 1982 1983 1984 1985 1986 1987 1988 1989 1990 1991 1992 1993 1994 1995 1996 1997 1998

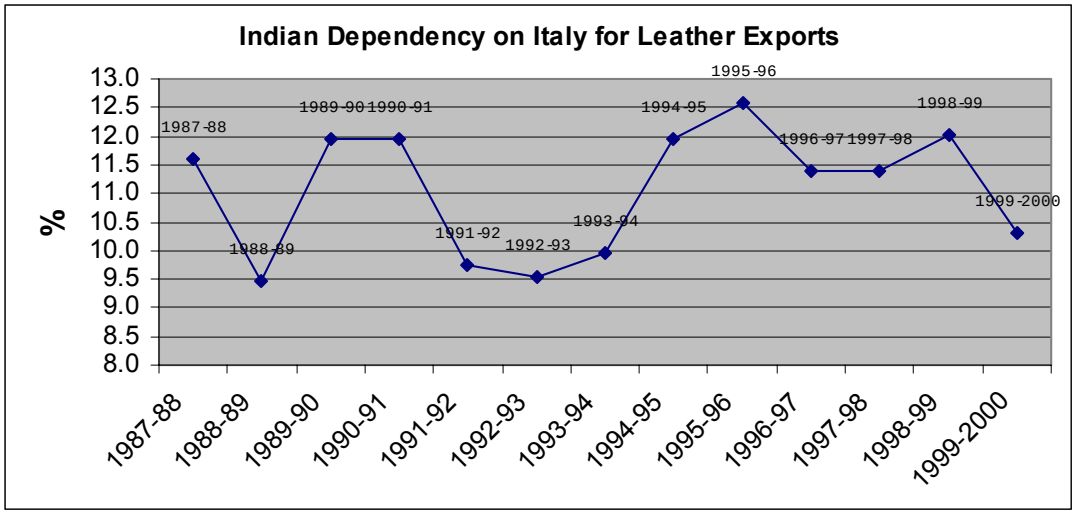

World Export of Leather in Values (613)
in US $ Million
2000
1800
1600
1400
1200
1000
800
600
400
200
0
1980
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998

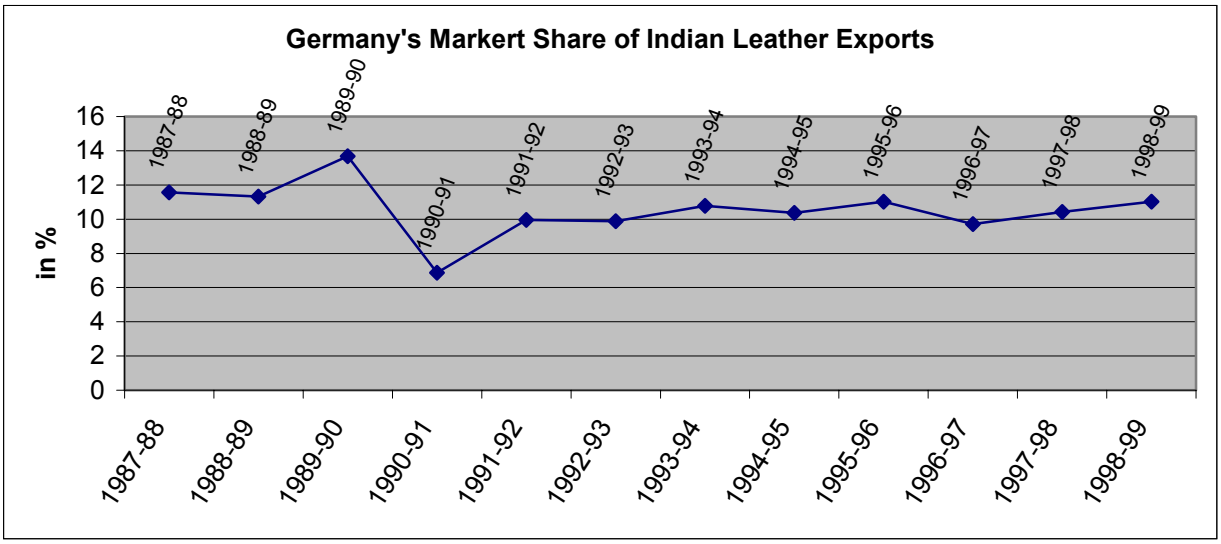

Indian Dependency on Germany for Leather Exports
in %
27
25
23
21
19
17
15
1987-88
1988-89
1989-90
1990-91
1991-92
1992-93
1993-94
1994-95
1995-96
1996-97
1997-98
1998-99
1999-2000
1987-88
1988-89
1989-90
1990-91
1991-92
1992-93
1993-94
1994-95
1995-96
1996-97
1997-98
1998-99
1999-2000

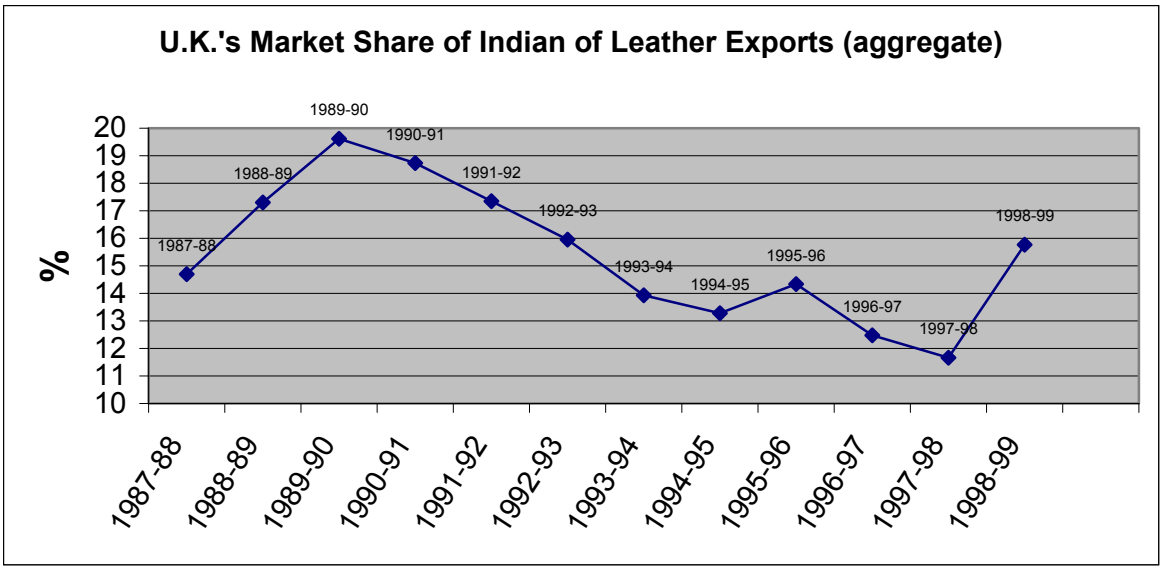

Indian Dependency on C.I.S for Leather Exports
%
25
20
15
10
5
0
1987-88
1988-89
1989-90
1990-91
1991-92
1992-93
1993-94
1994-95
1995-96
1996-97
1997-98
1998-99
1999-2000


Indian Dependency on U.S.A. for Leather Exports
%
20
18
16
14
12
10
1987-88
1988-89
1989-90
1990-91
1991-92
1992-93
1993-94
1994-95
1995-96
1996-97
1997-98
1998-99
1999-2000

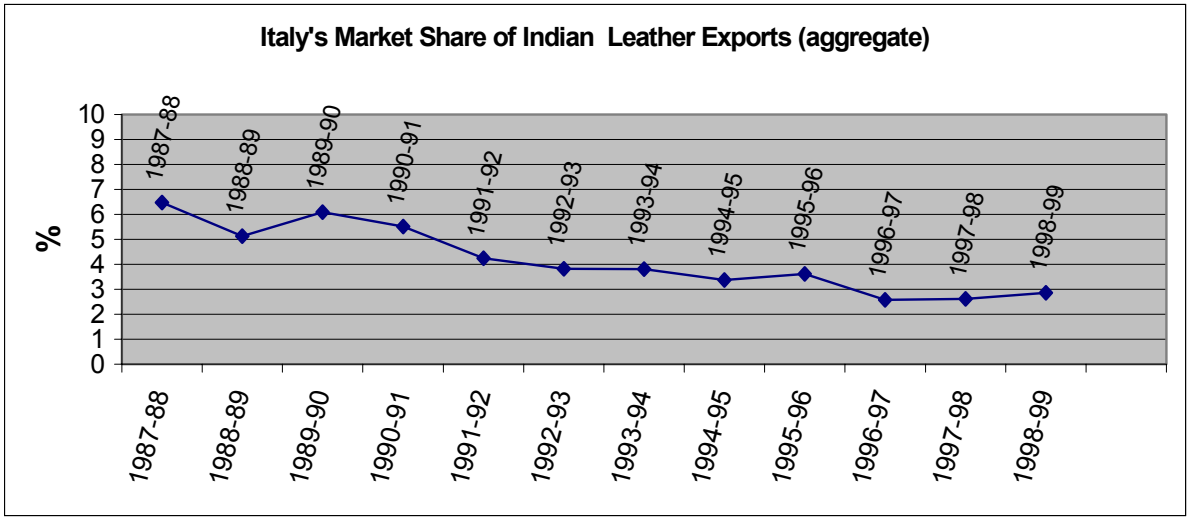

Indian Dependency on U.K. for Leather Exports
%
18
17
16
15
14
13
12
11
10
1987-88
1988-89
1989-90
1990-91
1991-92
1992-93
1993-94
1994-95
1995-96
1996-97
1997-98
1998-99
1999-2000

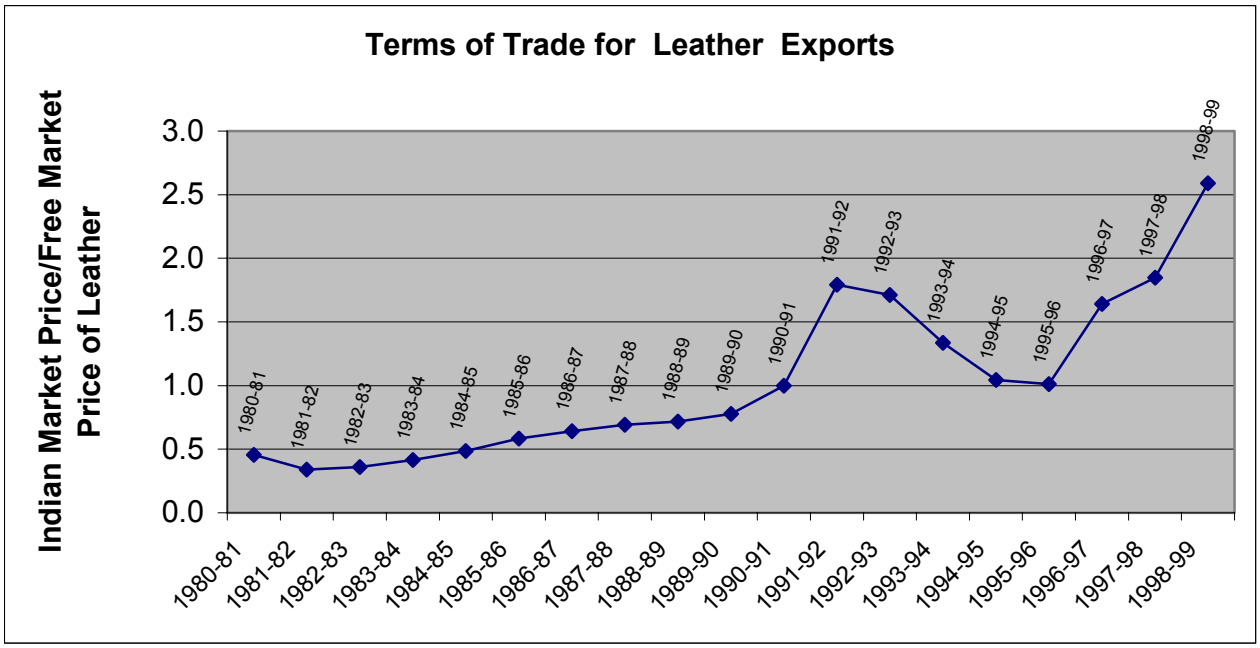

Indian Dependency on Italy for Leather Exports
%
13.0
12.5
12.0
11.5
11.0
10.5
10.0
9.5
9.0
8.5
8.0
1987-88
1988-89
1989-90
1990-91
1991-92
1992-93
1993-94
1994-95
1995-96
1996-97
1997-98
1998-99
1999-2000


Germany's Markert Share of Indian Leather Exports
in %
16
14
12
10
8
6
4
2
0
1987-88
1988-89
1989-90
1990-91
1991-92
1992-93
1993-94
1994-95
1995-96
1996-97
1997-98
1998-99


U.K.'s Market Share of Indian of Leather Exports (aggregate)
%
20
19
18
17
16
15
14
13
12
11
10
1987-88
1988-89
1989-90
1990-91
1991-92
1992-93
1993-94
1994-95
1995-96
1996-97
1997-98
1998-99


U.S.A.'s Market Share of Indian Leather Export (aggregate)
%
0 1 2 3 4 5 6 7 8 9 10
1987-88
1988-89
1989-90
1990-91
1991-92
1992-93
1993-94
1994-95
1995-96
1996-97
1997-98
1998-99


Italy's Market Share of Indian Leather Exports (aggregate)
%
10
9
8
7
6
5
4
3
2
1
0
1987-88
1988-89
1989-90
1990-91
1991-92
1992-93
1993-94
1994-95
1995-96
1996-97
1997-98
1998-99


Terms of Trade for Leather Exports
Indian Market Price/Free Market Price of Leather
3.0
2.5
2.0
1.5
1.0
0.5
0.0
1980-81
1981-82
1982-83
1983-84
1984-85
1985-86
1986-87
1987-88
1988-89
1989-90
1990-91
1991-92
1992-93
1993-94
1994-95
1995-96
1996-97
1997-98
1998-99