

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

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## Introduction

Environmental regulations cover a variety of facets, from global to national, from national to regional and local issues, from sectors to products, 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 deployment of labour, and laws to deal with hazardous substances, and endangered species. Some of them act as non-tariff barriers.

## Major Linkages between Environment and Trade

Three distinct links between trade and environment are: environmental policies affecting trade flows; trade flows affecting environments and environmental policies; and trans-boundary environmental externalities due to trade. A related issue is relocation of industries in 'pollution havens' away from environmentally sensitive regions. This can reverse the direction of trade. Of these three major 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 products is deliberate. Tea is one of the oldest and most prominent export commodities from India (with strong competition from Sri Lanka and Kenya). Its production is highly dependent on land and water, and it is hence considered a primary product. 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.). Cut flowers belong to a category of young and emerging export products from India. Its production depends on land, and substantially on modern capital such as cold

storage, cold chamber transport facilities, 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 and soil polluting, and odor producing activity. There are a number of water pollution related as well as packaging and eco-labeling regulations (e.g., regulations on PCP control, azo dyes, eco-labeling etc.) that affect the export performance of the industry. Belonging to a processing industry, leather is a secondary level industry.

## Review of Literature

Going by the available empirical and theoretical studies, no strong evidence in favour of a negative effect of stringent environmental regulations on exports has been found so far. Either environmental cost is 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. Other studies have also established that effects of environmental regulations 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 and Linde in 1995, all such industries that move to more cost-effective abatement processes, including reduction of emissions, can become more competitive via innovations and adaptations.

A major countrywide study on environmental regulations on trade performances in developing countries, came to the following conclusions:

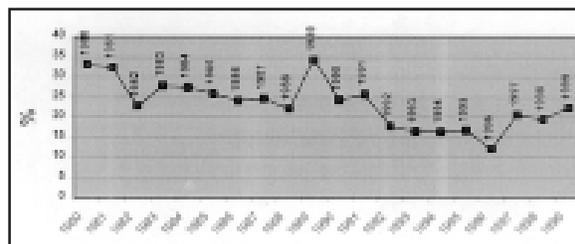
“To conclude, the evidence from these case studies on ‘how foreign environmental regulations impact on a developing country or transition country’ is mixed. Many of the larger exporting countries claim that the effects have been small, and in most cases manageable for the exporters. In several cases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

### Analysis of Indian Trade Pattern

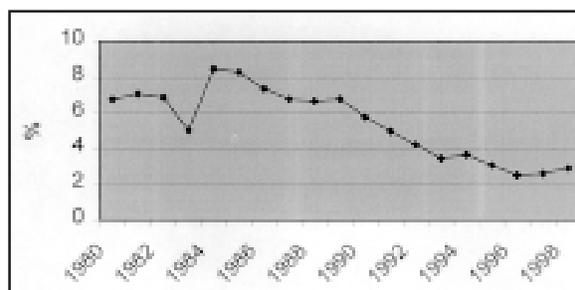
The export trade performance of the three products is studied in detail. Time series data for 20 years are analyzed in terms of (a) changing direction of trade among major importing countries; (b) shifts in the shares between different countries; (c) the demand pressures (e.g., income, volume of their 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.

Tea is the primary export commodity for India, although its share in over-all Indian exports is only 1.27 percent in US \$ value terms, which has been declining over the years. Tea exports accounted for 6.34 percent of India’s total exports in 1980-81 in Rupee terms, which gradually declined to around 3 percent between 1987-91, and witnessed a further decrease to around 1 percent in the years 1992-99. It touched a low of 1.12 percent in 1999. As seen in Chart 1, the importance of Indian tea in relation to world exports has been declining since 1989. However, there has been a fair amount of stability in 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 the Russian market was at a steady growth from 30 percent in 1980 to 60 percent till the year 1989; then it decreased to 36 percent by the year 1999. Indian dependency on the UK showed a decrease from around 19 percent in the 80s to 10 percent 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 these export indicators over the years.

**Chart 1: % Share of Indian Export of Tea in world's Total Export (Based on Value of Export)**



**Chart 1: % Share of Indian Export of Leather in world's Total Export (61)**



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 of trade. A steady shift in the direction of trade has been observed, possibly due to liberal environmental regulations and easy market accessibility in UK, USA and France. India’s dependency (as per the dependency ratio), on the erstwhile centrally planned economies has drastically come down. For the UK and USA, the dependency ratio has gone up. The importance of the remaining countries as a source for India’s exports has either declined or remained the same during the period of 1980s. The data confirms a steady shift in the direction of leather products' exports, particularly towards the U.S.A. and U.K.

### Analysis of Environmental Regulations

Environmental regulations the world over have evolved significantly over time, especially during the last three decades. There are a variety of regulations, ranging from voluntary and infromatory, to prohibitory and mandatory. They have emerged in some instances, at the initiatives of country themselves, or as a result

of group or trading bloc initiatives. They have also flowed from multilateral environment agreements (such as SPS and TRIPS regulations under WTO, or CITES). There are also Indian (domestic specific) environmental regulations. Indian regulations follow from the Water Act of 1974, Air Act of 1981, Environmental Protection Act of 1986, and Pollution Control Board's standards and list of sectors and products in the categories of major polluting industries for priority action. All such components of environmental regulations are reviewed, and the time series information on them has been indexed using (a) multi-criterion and (b) factor analysis.

Starting from tanning to packaging, a number of environmental regulations come into play for leather and the leather product industry. This is one sector, in which Indian domestic regulations affect the industry as much as international regulations. Effluents are to be treated before they are discharged into rivers or open land. Exports of cut flowers governed by strict regulations on packaging, preservation during transit, eco-labeling, and restrictions on the use of pesticides and fertilizer at the horticultural stage. The tea industry also has to comply with water and land related environmental regulations, as well as regulations related to packaging. Environmental regulations vary from country to country. They also differ, in terms of introducing stringency over time. For an exporting country such as India, it is therefore, necessary to take a close look at a variety of such regulations over time in different importing countries.

### Methodology

The methodology of this study is briefly described here. First, the trade patterns of all the three products are reviewed using 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, and 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, 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 in a major study in 1995 argue about the long-term benefits of the regulation forcing and motivating process innovations and production efficiencies, thereby enhancing trade and welfare. But what will be the effect of such regulations in the short run? A related question is: how does the export sector adjust itself over time? Will it converge to the long run path as indicated by them? In order to answer some of these questions, it may be necessary to add indices of environmental regulations or the cost of the regulations as explicit variables in a trade model.

A specific hypothesis is formulated in this study. Environmental compliance costs are severe on the primary export commodities, because of which export levels are affected. One can notice that for higher and higher order of processed product exports, the environmental compliance costs tend to become low and insignificant. Hence, they seem to be capable of internalizing the burden of such costs and emerging 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

#### **Tanneries**

In the case of tanneries, the small-scale units bear the burden of high cost of treatment and

lack of financing, technology, and sometimes, even lack of knowledge about the regulations. They also find it difficult to set up Common Effluent Treatment Plants (CETP) because of spatial dispersion of the units. Small-scale tanneries therefore, continue to have individual effluent treatment plants, however inefficient they may be. Pollution abatement costs of producing one kg of processed hide and skin vary between 0.41 to 1.48 percent, whereas the same under a common effluent treatment plant technology would be between 0.41 to 0.81 percent. 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 and taken measures for Pentachlorophenol, pH, biological and chemical demands on Oxygen, total dissolved solids, 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, regulations are good for the industry. There are some variations in the standards between different countries. Some countries like Italy and USA insist only on pH value regulations. The total dissolved solids (TDS) regulations are not 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 aware about the relevant 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 in particular, has affected the exports quite significantly.

### **Tea**

Tea gardeners and exporters in India feel that this is one plantation activity, that is environmentally friendly above all. Tea means green biomass. There is no direct foreign

investment in this industry so far. Since almost 8 years, the industry has been complying with multiplicities of 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 research has also been carried out by the Tea Research Authority and United Planters Association of Southern India.

The most important environmentally sensitive issues relating to tea plantation are the 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 opt for organic farming. The gardeners say that organic farming will involve an additional cost, of even up to 100 percent 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 using organic farming. Many German importers are willing to pay this higher price. Initially, when the German importers provided some incentive capital and paid for environmental and social auditing, some of the major Indian exporters switched to organic farming in parts of their tea gardens and continue to maintain these parts. Most others however, comply with EU pesticide regulations, at much lower levels than the said limits. Yet, there are currently about 11 major planters in the Darjeeling area who practice organic farming.

Most tea exporters find these environmental regulations such as pesticide controls, maintaining ground water quality, afforestation, soil replenishment, preventing biodiversity loss, etc., costly, but because of the worldwide compliance, they have had to implement them. 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. Added to 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 Flowers

As far as cut flowers are concerned, the pesticide control, regulations on harvesting, cold storage and transporting, as well as packaging regulations add to the cost build-ups. The three major environmentally relevant costs are use of farmyard manure (ranging from 5-8%), plant protection costs (ranging from 3-5%) and transport and handling costs (ranging from 3-5%). The cost of cold storage and refrigeration vans is about 18-19 percent of the total cost of production. The packaging and freight costs are about 35 percent of total cost. About 35 percent of marketing and about 2 percent of production costs are environmentally related. Since the sector is in its initial stages, there is a lack of knowledge about regulations and recommended practices (based on almost 55 to 75 percent of respondents' mixed views). Furthermore, they also lack advanced technology in packing and handling (as expressed by over 75 percent of respondents).

## Econometric Models on the Effects of Regulations on Trade Pattern

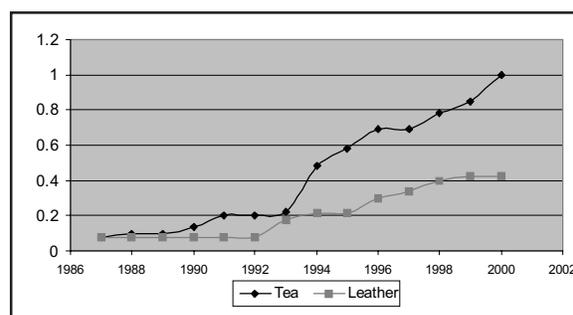
As against standard methods of formulating Gravity models linking trade and environment (e.g., with 'year specific' dummies in the case of time series analysis, or 'country specific' in case of cross-section analysis), specific econometric exercises were carried out. They are: econometric models to (a) identify the shifts or breaks in trade pattern attributable to environmental regulations, (b) link trade with such breaks along with alternative specifications of the dependent variables (variants of gravity models), (c) construct time series composite indices of stringencies in environmental regulations, and finally, (d) link trade patterns with those composite environmental regulations, along with other explanatory factors.

First are the usual gravity type models with exports in value as the 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 exercise revealed that the time

dummy variables for the years 1984, 1991 and 1996 coincided with some of the major environmental protection moves world over in those years. They suggest links between declining trends in exports with such regulations. As far as terms of trade for leather goods and tea are concerned, it seems to act in two different ways. For the former, it is a supply price factor, whereas in the case of tea it is a demand price factor (i.e., dominated by the London price, rather than at Kolkata). 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 composite index of stringency of environmental regulations in importing countries with respect to tea and leather and leather goods exports can be viewed in Chart 3 below. For both tea and leather, environmental regulations in the aggregate have followed a positive stringency path. Though they followed roughly the same trend till about 1993, in more recent years the strictness of leather-specific regulations seem to be leveling off, whereas the same on tea appear to be increasing. 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, but not the primary commodity producers.

**Chart 3: Stringency Paths of Composite Indices of Environmental Regulations for Tea and Leather**



## Tea

To analyse the effects of environmental regulations on the export of tea, an econometric model was estimated in which the ratio of Indian tea exports to developed and developing countries is taken as a dependent variable. A-priori, one would expect a switch in Indian exports away from countries with stringent environmental regulations (i.e., developed countries) to those that having less stringent regulations (i.e., developing countries). A composite index of stringency was derived from four different types of environmental regulations- maximum residue levels of pesticides, packaging regulations, Sanitary and Phyto-Sanitary standards and general stringency. Other independent variables used in the model are: the indices of dependency of India's exports on developing countries and on the EU countries, a dummy variable for major shifts in environmental regulations since the Rio conference (with a value zero before 1992 and 1 after that), relative per capita income of developed to developing countries, and the terms of trade defined as the price in Kolkatta (i.e., a producer price) relative to that in London (i.e., a consumer price).

The major finding is that the stringency of environmental regulations reduces the share of India's exports going to the developed countries. The terms of trade effect is such that a higher relative price in Kolkatta means a smaller gap between consumer and producer prices and has a stimulating effect both on demand and supply. The shift of trade pattern around 1992 (as viewed from the significant dummy variable) is a reflection that most exporters who had experienced some difficulty in meeting the environmental standards initially till 1992 have been able to withstand the global competitiveness with compliance.

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 trade 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.

## Leather And Leather Goods

Major buyers of Indian leather 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 for the econometric model. The explanatory variables used are,; Indian dependency on European Union, Terms of Trade 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, index of stringency of environmental regulations, GDP of European Union, Market share of Indian exports in European Union, and several others.

On the basis of the econometric exercise, the following major observations can be made on the export of leather and leather goods from India. First, one can clearly say that environmental regulations seem to enhance Indian 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 a 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 have a positive effect on Indian exports. Third, Indian dependency on European demand is very important. Therefore, India cannot ignore the environmental regulations from EU countries.

## Towards policy formulation

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

- It is necessary to treat small scale and large scale producers separately while designing the environmental regulations.
- The primary commodity exports such as agricultural products (e.g., cut flowers, and to some extent tea) do reveal a higher burden of environmental regulations in the short run. They require additional time to adjust their

- cost burden, learn new technologies, and collect information regarding such regulations, among other activities that will help boost exports.
- Training is required in packaging, handling, environmental auditing etc., Such personnel need to be provided more training and information to graduate to becoming competitive.
  - 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.
  - Environmental regulations need to be ranked in terms of their negative effects on society. The industry specific rankings also need to 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).
  - As one moves from lower levels 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, that are either in the small-scale sector, or they will find the cost impact of environmental regulations to be quite high. More thrust needs to be given to set up R & D centres by large-scale manufacturing units to develop eco-friendly inputs, techniques and awareness.
  - Finally, 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.