An Expository Analysis on Environmental Compliance of Indian Leather Industry

Roy, Chandan Roy

Kaliyaganj College

March 2013

An Expository Analysis on Environmental Compliance of Indian Leather Industry

Chandan Roy

Assistant Professor & Head, Department of Economics, Kaliyaganj College

Email : chandanroy70@gmail.com

1. Introduction

Indian Leather industry is recognized as the most promising foreign exchange earning sector since early '70s of the previous century. In terms of percentage share, leather export earnings accounted for 8% of the total foreign exchange earning sector, even in 1998-99, when the first environmental ban[1] was imposed by its major export absorbing country, Germany. However, even after ten years (CLE, 2008-09) with annual earnings of 7 billion USD, the Industry has reached such a stupendous height of success, which made it the 6th largest foreign exchange earning country in the world. On one side, the export generating potential to boost the growth rate of the economy and on the other side the pollution intensive nature of the industry – has made this sector distinct. The Indian Leather Industry has been hit by several environmental bans and regulations since'90s. The ways of compliance adopted by Indian Leather sector has helped the industry in restructuring its technology and consequentially an apparent growth in exports sector has been experienced. The export earning of the Indian Leather and Leather Manufacture has almost quadrupled from 1987-88 to 2010-11. From 964.4million US$, the export earning reached to 3789million US$ during this period. This stupendous performance challenged many so called hypotheses which show a trade-off between environmental compliance and export competitiveness (Chakraborty, 2011). This paper will make an expository analysis on how that environmental compliance affected Indian Leather Industry.

[1] See details of Environmental bans imposed by Germany in Tewari, M & Pillai, P (2005): Global Standards and the Dynamics of Environmental Compliance in India's Leather Industry, Oxford Development Studies.

2. Literature Review

Sankar(2006) has shown that if a country is required to meet an environmental standard which is higher than that appropriate for the country, the social cost of compliance becomes higher too. In fact the situation turns into worse compared to that under autarchy with existing domestic environmental regime. In fact, Chakraborty & Chakraborty (2007) explain that efficiency level of firms have decreased in the post 1998 period, using the all India farm level data for leather sector during 1995-2003. This suggests that adoption of higher environment standard requirement erodes the technical efficiency and thereby the export competitiveness of the firm.

According to Mikic and Wermelinger (2010) the underlying reasons behind the enhanced level of stringency in the leather sector through out the world has been two-fold :

(i) Technological innovations in the EU and US have transmitted a strong and strict environmental framework to the developing nations. In post-WTO phase the lower environmental compliance in the developing countries is believed to act as a hidden subsidy to the local firms. Along with that growing income of the consumers provided additional rationale to government intervention on environmental standards.

(ii) Several developing countries including India started raising its control over the chemical effluent generation within the domestic territories (Tewari and Pillai, 2005) in response to the environmental bans imposed by EU countries. Commentators opined that several developing countries were forced to upgrade their production processes to comply with stringent quality requirements in apprehension of loosing their export markets. The introduction of several domestic bans and imposition of private standards in recent period further compounds the problem (UNIDO, 2010).

Indian leather sector is one of the important manufacturing sector identified by National Manufacturing Competitiveness Council (NMCC, 2006), whose export- units consists of tiny, cottage, small and medium scale enterprises. The small and medium-sized firms especially suffer from: (i) lack of information, (ii) inadequate testing facilities, (iii) difficulties in obtaining alternative technologies or chemical inputs (OECD, undated) and (iv) high per unit costs of compliance (EXIM, 2006). The export intensity of the sector has increased over the years (Barua and Chakraborty, 2004), thereby raising the importance of compliance with guaranteed standards on chemicals (Deloitte, 2009).

Roy(2000) has shown uncertain Quality Standard due to 'fragmentation of firms' and the Environmental Regulations are the major external factors which substantially influence the export prospects of the firms of Indian leather industry. Among the others, environmental regulation becomes the most significant "non-tariff barrier"(NTB) for the leather industry in 1990s. But whether the domestic firm will accept this environmental compliance in this era of cut throat competitions depends upon several issues. Henrique & Sadorsky (1996) indicate that a firm's decision to comply with regulation is connected to non-compliance threat perceived by the firm.

Sankar (2006) has observed that the compliance level in India has increased over the years for several industries including leather. However, concerns have been raised that too much emphasis on environmental standards might lead to loss of comparative advantage for Indian exports (Mukhopadhyay and Chakraborty, 2005), although the apparent export trend in leather sector during the post-ban imposed era witnesses a bright scenario.

3. Objective & Methodology

The Leather industry has shown its power of resilience to withstand the environmental compliance. On one hand, this apparently bright export scenario (as cited by Council of Leather Exports), on the other hand the environmental compliance endeavours exercised by this pollution intensive industry, have motivated the author to priorities this issue for analysis. This paper will trace few relevant matters of environmental standards imposed on Leather Industry and the consequential follow up actions taken by the Leather Industry thereof. My specific objective in this paper is to carry out an expository analysis of the whole environmental compliance phenomenon and its long drawn impact on the Indian Leather Industry.

Section 4 will discuss the nature of two consecutive international bans along with other domestic environmental compliance faced by the leather industry as a whole. Section 5 explains the pollutions in leather processing industries in successive stages of production and the associated abatement measures to control the level of pollution. Section 6 discusses the impact of environmental compliance on export sector of the industry. Section 7 concludes the discussion with major findings and policy suggestions.

4. International Environmental Bans & Domestic Compliance

In 1989, Germany had imposed a ban on all items in which the PCP (pentachlorophenol) content is more than 5ppm (mg/kg), as PCP, which was widely used as an anti-fungal preservative in different industries including Leather industry, was suspected to be carcinogenic. Instead of making it a stringent international imposition, Germany passed this new standard as domestic legislation aimed at protecting the health of its own citizen. Thus under Article-20 of GATT/WTO this approved restriction had turned out an equivalence of environmental ban to all the exporting nations including India, which used to export 18% of its total leather export to this particular destination. German ban was supported by Denmark, Holland, Netherlands, Luxemburg, USA, Japan and most of the European countries besides France. PCP was the cheapest anti-fungal preservative which costs about Rs. 30/kg. According to many analysts, the alternative to PCP was TCTMB (Thiyocyano Methyl thiobenzo thiazole) and PCMC (Parachlorometacresal) which cost as much as Rs. 390/kg and Rs. 445/kg. According to secondary information, the world's largest manufacturers of these alternative chemicals are BASF, Hochest, Zschimmer and Schwarz, all of which are German companies. This clearly indicated a trade oriented approach which was masked by its health concern regulations.

After 5 years, the second ban on Azo-dye came into effect on 1994-95. A class of 22 Azo – amine dye was suspected to be carcinogenic by German Health Ministry and hence restriction was imposed on the products which use these dyes. Like PCP, Azo-amine Dyes is also an easy to produce chemical that is widely used in dyeing industry. The PCP ban was narrower product related ban that involved the elimination of a single chemical for which substitutes were locally available (may be at a higher cost); but the devastating and broader was Azo dyes ban, because the substitute was not available and it affected a multiple allied sectors. It has been argued that the Azo dyes ban was not compatible with WTO framework (Mohanty and Manoharan, 2002).However, after announcing the bans, Germany gave all parties one year to adjust to new regulations. But to speed up the compliance, German port authorities began testing the consignments of leather and textiles and rejected them which contain PCP (in 1990s) and later for Azo dye in 1995-96.

These environmental standards arrived at the same time when Indian Leather Industry was coping with domestic crisis triggered by the Indian Supreme Court's ruling against effluent

discharge by tanneries. In 1995, the Supreme Court had ordered to shut nearly 37% of India's Leather tanneries for their failure to treat effluent discharge as required by law. It was followed by another Supreme Court legislation in 1996 which made compulsory attachment of the Lather tanneries either to a Common Effluent Treatment Plant (CETP) or Individual Effluent Treatment Plan (IETP) to continue production.

4.1 Domestic Compliance

Indian Ministry of Commerce and Environment & Forests passed a ban on production of PCPs in 1991, (just two years after the German ban on PCP) and on 112 Azo Dyes that had the potential to generate the banned 22 dyes in 1997 (three years after the German ban on Azo dyes). As a matter of fact, Indian domestic bans were wider than German. India did not ban only the products that use PCP and Azo Dyes, but also those products which had the potential to generate those. In case of Azo Dyes, Indian bans were passed despite strong opposition from Dye Manufacturers Association of India (DMAI), the apex industry association of chemical companies which would be directly affected by the ban. However, Indian Government was capable to tackle those situations.

By 2002 the first ISO 17205 certified leather testing laboratory in Asia was established in India. It was founded by GTZ, a German Government funded development Agency. It helped a large number of domestic firms to have an access in world class leather testing centre. Along with that new certification technologies specified under the ISO and DIN systems became available, which were not locally available before. This undoubtedly brought down the real cost of environmental compliance to a large extent and helped the industry to gain advantage in export frontier. Thus the whole industry has come under the arena of environmental compliance, which was assumed to upgrade the so called poor 'brand image' of leather industry in international market.

4.2 Bilateral Agreement

Indian Government has bilaterally negotiated with Germany for another additional year of transition after the latter allowed one year of adjustment following the environment ban. This

eased some of the losses of the Indian exporters by reinstating rejected shipment. This short run measure gave some time to readjust and restructure the industry in desired direction.

The strategies chosen by the Government in the long run were lowering cost of compliance through technology transfer and policy readjustment. Indian Ministry of Commerce reduced import duties on dyes and Chemicals from a high of 150-200% to a base rate of 20%. This relieved the critical situations of those Chemical industries which came under the arena of such domestic environmental ban. Council of Leather Exports (CLE) made a list of international chemical companies – dominated by a dozen of German Firms (many with subsidiaries in India) whose products were PCP and Azo Dye free. The Government also negotiated extensive technology transfer from Germany and thus the world class testing centre was established in India in 2002.

The structural readjustment in leather industry was as follows:

(i) More than 95% of the tanneries in India have been equipped with pollution control devices. The clustered manufacturing has resulted in Common Effluent Treatment Plants (CETP). Thus there are 19 CETP operational in India, of which 14 are in Tamil Nadu. This spatial concentration has helped them to make a consolidated effort in achieving their goal.

(ii) In Tamil Nadu Rs. 225 crores have been invested in pollution control devices since 1990s.

(iii) In order to comply with legal compliance, the tanneries in Tamil Nadu had attempted to meet zero liquid discharge norms which were even not enforced in industrialized nations. This raised the cost of production around 12%.

(iv) Government of India started assisting the CETP (Common Effluent Treatment Plant) by providing capital grants up to 75% level of investment cost which would meet the environmental compliance.

However, whether these structural adjustments were sufficient enough to sustain the export access to the industrialized nations is a matter of debate. We would analyze the situation of Indian Leather Industry compared to its larger foreign competitor, China. We will attempt to analyze whether Indian compliance endeavour could upgrade its export status in the subsequent sections. But before that, we will show how the pollution takes place in several leather processing stages and how effective was the abatement measure.

5. Pollution in Leather Processing Stages & Abatement Measures

From raw hides to finished leather there exist three gross stages of leather processing. First stage (pre-tanning stage) involves production of hides and skins which depends on domestic stock of bovine animals, sheep and goats. The second stage includes conversion of raw hides into leather. This tanning stage is the most polluting stage and 80% of industry pollution occurs at this stage. However, actual pollution loads depend upon the levels of environmental standard and the extent of compliance attached with it. The third stage (post tanning) is a less polluting, labour intensive and high value added segment.

5.1.1 Pre-tanning Stage

There are six subsequent stages, e.g., desalting, soaking, limimg, deliming, bating and pickling under the Pre-tanning Stage.

In desalting stage, hides are cured by salt to remove excess water from them. In soaking, the hides are soaked in clean water to remove salt and increase of moisture enable the skin for further treatment. After soaking, liming is done, which primarily removes the hairs, nails and other keratinous matters. After liming, deliming is done; where the pH factor of the collagens is brought down to a lower level so that enzymes can act on it.

Depending on the end use of the leather, hides may be treated with enzymes to soften them in a process called 'baiting'. Then hides and skins are treated with a mixture of common salt and sulphuric acid so that mineral tanning can be done. This stage is known as pickling. The pollutants in this stage are shown in Table 1.

Table 1: Pre- Tanning Stage & Pollutants

Pre-tanning Stages of Production	Pollutants
Salting & Soaking	Salt, hide surface impurities, dirt, globular protein, substances dissolved in water
Liming	Suspended solids, sulphides, nitrogenous

	metals
Deliming & Baiting	Calcium salt, sulphides residuals, degraded proteins & residuals, proteolytic enzymatic agents
Pickling	Chrome, Chloride & Sulphates

Source: Central Pollution Control Board

5.1.2 Tanning Stage

This stage is known as the highest pollution creating zone. The pollution load from tanning activity has been estimated to be 50% more in weight than that of the hides processed (Gjerdaker, 1998). The tanning in India was done mostly through mineral tanning methods. In mineral tanning, chromium (chromium sulphate) is used after pickling. Once the desired level of penetration of chrome into substance is achieved, the pH of the material is raised again to facilitate the process, known as "basification". In chromium tanning all the chemicals are water soluble but not all are absorbed by hide. Thus the effluent contains a lot of chrome and other fixing chemicals. Apart from that, hexavalent form of chemical, chrome VI, is known to be carcinogenic. Even though most tanneries use chrome III, it can transform into Chrome VI when reacting with oxygen under high temperature (Tewari & Pillai, 2004).

On the other hand the alternative method i.e., Vegetable tanning, where tannin presents in bark and leaves of many plants are used, deposits solid wastes as effluent. Tannins bind to collagen proteins in the hide and coat causing them to become less water soluble and more resistant to bacterial attack. Vegetable tanned hide is also flexible and used in luggage and furniture. Thus the organic process of production is also a pollution creating activity but of less harmful type.

Table2 depicts the average pollution load imposed by the tanneries in India (see Rajamani, 2001), where the cleaner technologies could reduce the pollution load in the range between 40-75 percent.

Table 2: Average Pollution Load in Indian Tanneries

Pollution Parameters	Pollution Load/ kg	% reduction due to cleaner technologies
Biological Oxygen Demand	70	50-60

(BOD) 5 days@ 20C		
Chemical Oxygen Demand	180	60-75
Chloride	270	40-50
Dissolved Solids	600	40-45
Suspended Solids	100	NA
Sulphides	4	50-60
Total Chromium in terms of BCS	40	45-50

Source : Rajamani S (2001)

5.1.3 Post Tanning Stage

After tanning, the hides are split horizontally into an upper layer called, the grain and a layer from the flesh side called the split. These layers are separately processed further, sometimes re -tanned and then pressed for water, stretched and dried. Depending on finishing desired, the hide may be waxed , rolled, lubricated, injected with oil, split, shaved and dried and given surface treatment to give texture, look and shape to finished leather. The post tanning stage does not involve pollution level at an alarming level.

5.2 Environmental Measures Adopted in Leather Tanning Industry

The Central Pollution Control Board (CPCB) has delegated its authorities to the State Pollution Control Boards (SPCB) in each state so that the national environmental laws and environmental standard can be strictly adhered. The SPCB could make enquiries to any industries about the compliance of the Act. Not only that, SPCB can punish any industry in case of non-compliance, which can be a monetary penalty of Rs. 10,000 or imprisonment of 3years. In case of continued non-compliance, an additional daily fine of Rs 5000 can be imposed. Until 1988, the only enforcement tool of SPCB was criminal prosecution, which was revised by 1988 amendment. The State Pollution Control Boards has got the authority to shutdown the companies in case of non compliance. In 1990s Supreme Court has been involved in large scale environment related measures several times. In April 1995, the apex court of our country has ordered rehabilitation of 538 tanneries located in 3 clusters in Calcutta, which used to generate around 30mld (milliliters per day) effluent. Calcutta Leather

Complex was formed accordingly at Bantala and a CETP was installed to treat the effluent from the complex. In 1996, Supreme Court has ordered the closure of all tanneries in Tamil Nadu that had not set up pollution control system.

The distribution of tanneries in India reflects some spatial concentration in state like Tamil Nadu, West Bengal, Uttar Pradesh, Punjab, Haryana and Maharashtra. Since tanning is the most polluting-intensive stage of leather production, the states with tanning industries become sources of pollution generation originated from this industry. The spatial concentration of the tanning firms help them to derive scale advantage incase of initiating any environment related measures. It gains the advantage of mobilizing raw hides from entire country with the powers of technology and resources. Table-3 illustrates the concentration of tanning industries in few states of India and the associated leather goods industries have natural correlation with that. These establishments were initiated from the British Period in India and connection of ports or river-based transportation had another point of justification behind this establishment. We have also incorporated the current available production statistics (2008-09) of those states of the country in sectors like, Leather footwear and Leather garments and Leather goods and the corresponding export statistics generated by those states.

Table 3: State-wise Tanneries & Production units in Indian Leather Industry (2008-09)

States	Numbers of Tanneries	% of Tanneries	% share in total Export Earning	Production Places	Leather Foot wear Units	Leather garments & leather goods Units
Tamil Nadu	934	44.6	34.88	Chennai, Amber, Ranipet, Vaniyambadi, Trichi, Dindigal	160	598
West Bengal	538	25.7	15.76	Kolkata	230	436
Uttar	378	18.0	28.25	Kanpur, Agra,	268	22

Pradesh				Noida		
Maharashtra	33	1.60	5.21	Mumbai	20	48
Karnataka	16	0.80	1.61	Bangalore	48	40
AP	24	1.15	0.06	Hyderabad	128	10
Punjab	79	3.8	1.25	Jalandhar	163	08
Haryana	18	0.8	4.86	Ambala, Guragaoun, Panchkula, Karnal	30	01

Source: Central Pollution Control Board, Council of Leather Exports(2008-09);

From the table-3, it is clear that spatial concentration of tanneries and production units have taken place in three states namely, Tamil Nadu, Uttar Pradesh and West Bengal. From this 2008-09 statistics, per tannery export generation (FOB Value of Exports/Number of tanneries). According to this, Tamil Nadu's export generation capacity is the highest (34.88%) , followed by Uttar Pradesh (28.25%) and West Bengal (15.76%). However, the management of environmental norms can be better illustrated by per tannery export generation ratio. The tannery export generation ratio is however highest in Uttar Pradesh (1.99), followed by Tamil Nadu (0.99) and West Bengal (1.99). The export propensity of production units also follows the same trend, highest in Uttar Pradesh (2.6), followed by Tamil Nadu (1.2) and West Bengal (0.6). Though most of the success analysis and discussion in Indian tanneries centered on Tamil Nadu, Uttar Pradesh has shown efficiency in tannery export ratio and export propensity to production units.

The remedial actions against environmental pollution in tanning industries as adopted by the Government are hereby summarized:

(i) Chrome Recovery: Chrome has been extracted from the chrome liquor produced during chroming process and the residual water was used for other purposes apart from drinking. 20% of the extracted chrome was also reused under this plan of action.

(ii) CETP – Common Effluent Treatment Plants was established in the entire tannery cluster. The total dissolved solids in Tannery effluent was high because common

salt was widely used for processing raw hides and skins. There were 19 CETPs operational in India and out of that 14 were operational in Tamil Nadu. More than 150 Individual Effluent Treatment Plant (IETP) was operational in isolated tanneries and locations, where the common facilities were not possible.

(iii) Zero Liquid Discharge Technology: By implementing the reverse osmosis system of recovery of water from tannery effluent, this technology was adopted in south Indian tanneries, i.e., 120 individual units and 14 effluent treatment plant.

(iv) Water Conservation & other Pollution Control Methods :

a. All the tanneries have installed water meters and flow meters to measure actual consumption and waste water discharge.
b. Consumption of water reduced to 22m³/ tones of hides/skins.
c. Ground water quality being monitored to strengthen wherever the treated effluents are applied on land for irrigation.
d. Deployment of qualified and well trained staff for observation and monitoring of ETPs/ CETPs.
e. Separate energy meter for ETPs/CETPs
f. Replacement of open anaerobic lagoons with cleaner technology options.
g. All the large tanners units (processing more than 5 tonnes/day of hides /skins) have undertaken environmental audit on annual basis.
h. Central Leather Research Institute is attempting to create a database for the resource and terms of transfer of technology for reusing the tannery waste.

The main focus of Indian environmental regulation centered on water pollution, rather than problems related to air pollution and solid wastes. Moreover, no international environmental regulations were imposed on tanning industry, which made the enforcement and governance of environmental regulations weak and fraudulent in Indian tanning industry (Schjolden, 2000). There are certain domestic standard for pH, total suspended solids, sulphides and chrome that the tannery effluent shall not exceed, which takes care of the negative externalities generated by the tanning industry within the domestic territory. Tanneries are required to treat their effluent before letting it out either to their sewer system or to a river. Compared to the foreign environmental standard to be kept for the discharged effluent of tanneries, India's regulations are almost at par, though less stringent of German restriction incase of total chrome, and Italian restriction in case of sulphides. (see table 4)

Table 4: Environmental Standard for Tannery Discharged Effluent imposed by Leather Producing Countries

Countries	pH	COD	Suspended Solids	Sulphides	Total Chrome
	mg/litre	mg/litre	mg/litre	mg/litre	mg/litre
Argentina	5.5-10	250	NA	1	0.5
Brazil	5.0-9.0	NA	NA	0.2	2.5
China	6.0-9.0	300	200	1	1.5
Denmark	6.5-8.5	NA	30	2	0.2
Germany	6.5-10	250	NA	1-2	0.5-1
India	**6.5-9.0**	**250**	**100**	**2**	**2**
Italy	5.5-9.5	160	40-80	1	2
Poland	5.5-9.0	150	35	0.2	NA

Source: UNIDO (1999)

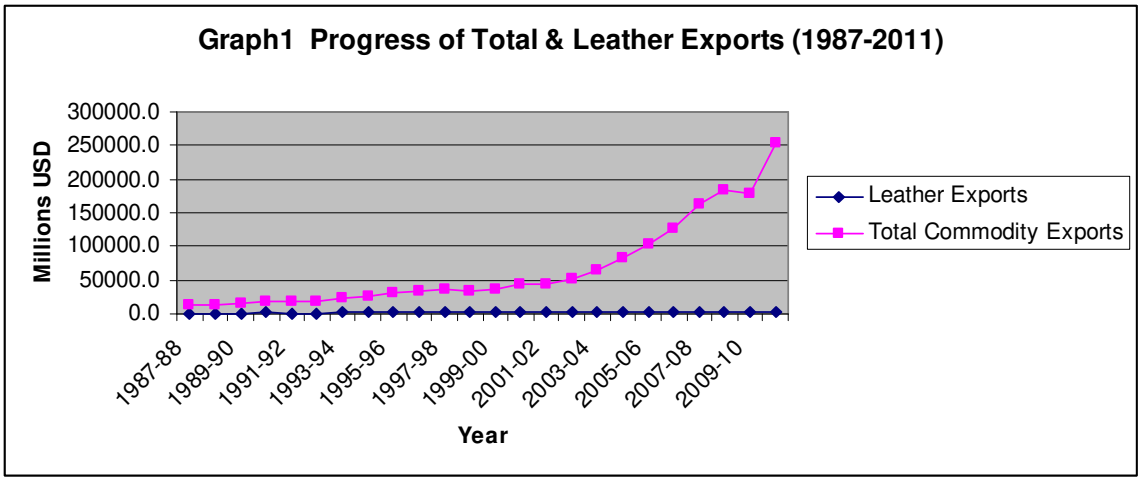
6. Impact of Environmental Compliance on Export Prospects

Export prospects of Indian leather will be studied in this section as a consequential impact of two environmental bans imposed by Germany in 1989 and 1994 and the corresponding environmental compliance implemented by the Government in India.

6.1 Export Performance of Indian Leather in Pre & Post Banned Period

Leather and Leather Manufacture exports have a significant contribution in India's total export basket in 1987-88, i.e., in the pre- ban situations. The consecutive environmental bans imposed by Germany were in 1989 and 1994. It has been observed that Indian Leather has started losing its position in the domestic market export basket in the post 1989 period. From a percentage share of 7.9% in 1987-88, the domestic export share has drastically fallen down to 4.8% in 1996-97 and then to 1.5% in 2010-11. Thus the significance of Leather in the domestic export basket is on the wane during this post banned period.

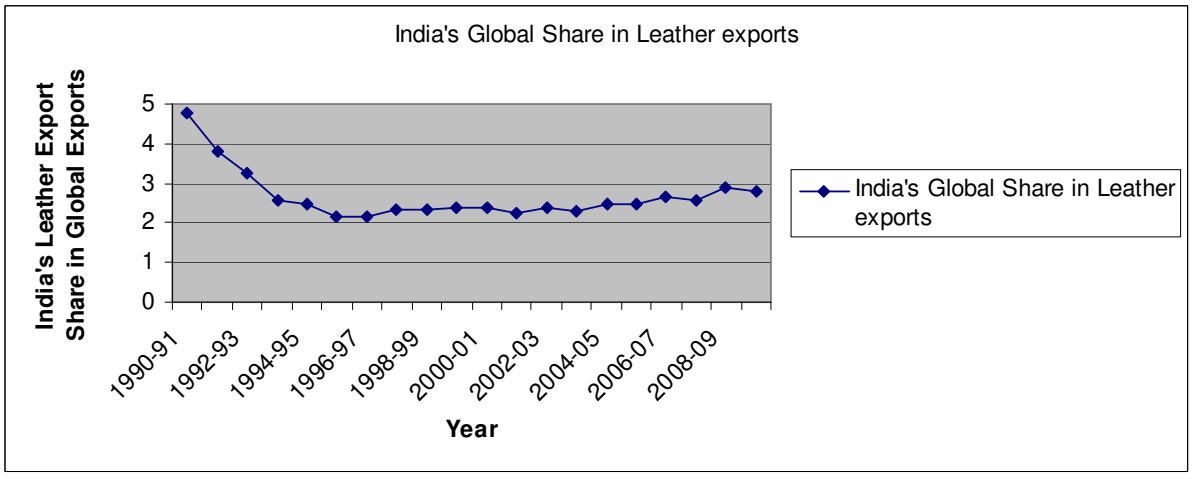
Graph 1 : Comparison of Trends between Total & Leather Exports



Source: RBI bulletin (http://www.rbi.org.in/)

India's share of exports also followed a consistently downward slope in the world share of export since 1991. From 4.75% share of global leather exports, Indian leather exports share drastically falls to2.15% of global leather exports in 1997 and then marginally upgrades to 2.9% of global leather exports in 2009. This indicates at a time the failure of export oriented units of Leather Industry to comply with international environmental standard along with other quality standard and speedier progress of its giant foreign competitor China in keeping those standards. India, consistently lost its export market during the phase while China started grasping those market with accelerated pace (See Graph 3).

Graph 2: Declining Trends of India's Share in Global Leather Exports (1990- 2009)



Source : RBI Bulletin (available at http://www.rbi.org.in/)

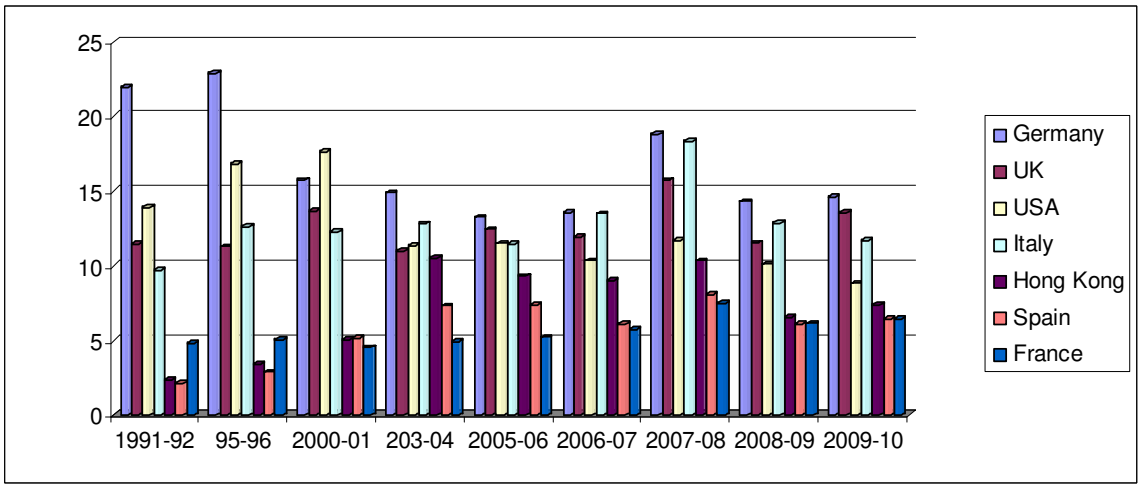
Speedy Environmental compliance is one of the major factors behind this accelerated performance of China which also pushed the export prospect of Indian leather export in jeopardy. Trends in export share of major developing countries in leather and leather product reveals China's export share in the global imports have risen from 23.58% to 28.04% during 2005-2009, while India has just maintained a marginal upward trend, i.e., from 2.52% to 2.95% during 2005-2009. Brazil and Hong Kong have shown a declining trend, while Vietnam has shown a rising trend.

Graph 3: Trends of Leather Export Share in World Import of Leather (2005-2009)

The success of China's export partially hinges on its way of treating the environmental standard. China imposes a pollution charges to those who contravenes the environmental standard of discharge norm. Again 80% of these charges are going back to those enterprises for pollution control (Wang, 2001).In addition to that, China had internationally registered the certification of trade mark (i.e., genuine leather mark) with 14 countries in 1994. From July 2003, it has pushed for Genuine Leather Mark Eco Leather. The GLM Eco Leather requires few conditions, which the Chinese Leather sector has committed to meet, e.g., (i) to enable the domestic leather industry to adapt international rule; (ii) to adopt the national standard for testing of physical and chemical indexes and (iii) German standard for testing of special chemicals.

However, India's policy response to the challenges of environmental standard was reactive rather than pro-active, lacking long-run perspective. The speed of response was relatively slower in realizing the potential supply of raw hides, tannery modernization and restructuring of manufacturing units. Compared to India, China was quick to grasp the international market by exploiting its export opportunities. India's export access to leading destinations like, Germany, USA and Italy has declined during 1991-2000, which ensures the lack of environmental compliance by the large number of domestic firms.

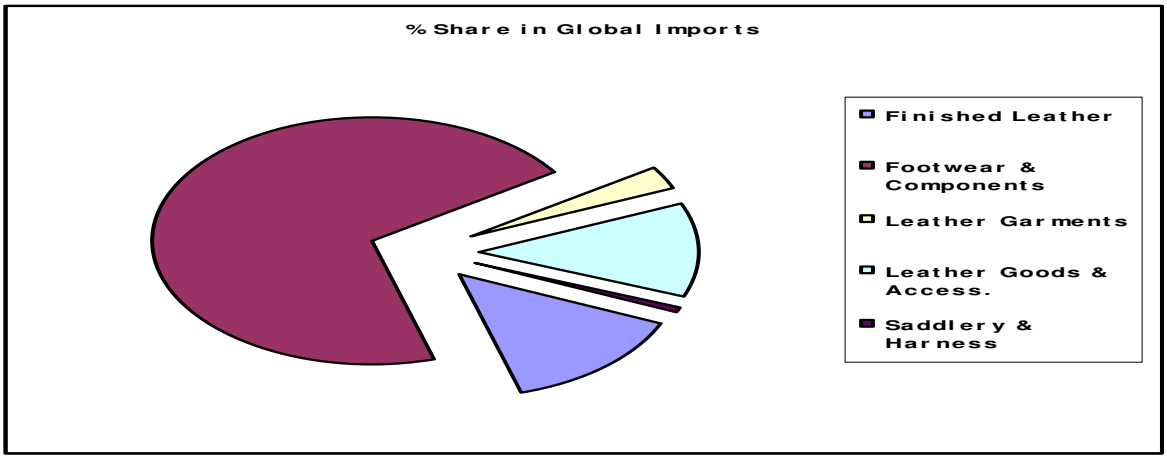
Graph 4: India's Export Share of Leather & Leather Manufacture to Different Destinations



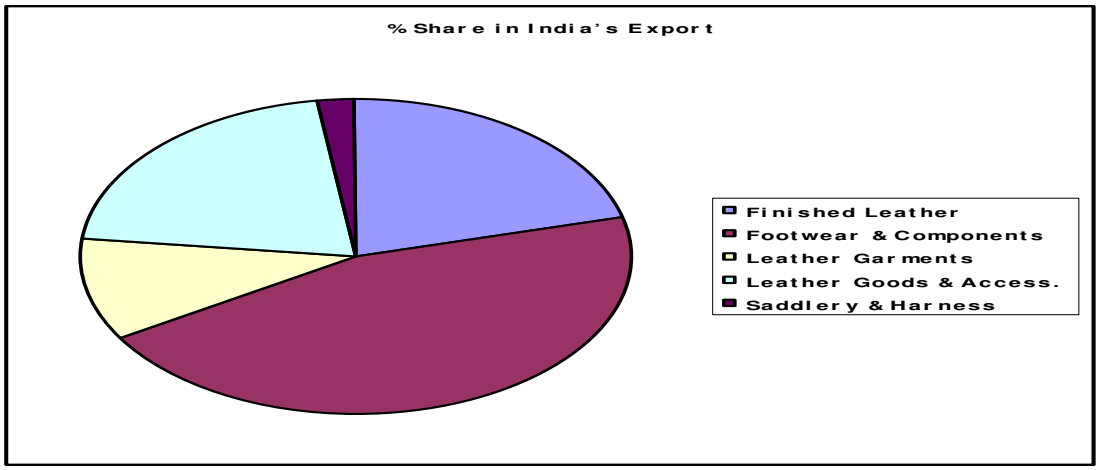
Source: Foreign Trade & Balance of payments, CMIE (various issues), Annual Report, DIPP, Ministry of Commerce & Industry(Various issues)

However, the chronic debt crisis of European Union in recent past makes the buyers reducing their orders from the developing nations. As US and EU are the major buyers for Indian Leather and Leather manufacture, therefore the export prospect of the industry is expected to face another major blow in the coming years. The supply side standard-related issue is expected to convert into demand deficit difficulty. On one hand, the very recent depreciation of domestic currency and the associated rise in import cost, on the other hand this demand shrinkage uncertainty- these twin problems will damage the growth of Indian Leather exports in coming days. China, (the highest leather exporting country) has started exploring emerging markets in Asian, African and Latin American countries, where stringent environmental standard is not yet a major trade barrier.

Graph 5: Comparison of Global Leather Imports vis-à-vis India's Exports (2006)



(a) Global Share of Imports of different components of Leather



(b) India's Share of Exports of different components of Leather

Source: http://www.leatherindia.org/exports/global-trade-leather-products-2006-2010.asp

Among different components of Leather export, Leather Footwear and Footwear Component capture the highest share of export earnings in global imports as well as India's export earnings. India's export performances during last five years in different leather components can briefly give an idea of its relevant status in the world market. The major destinations of Indian Leather exports during 2006-10 are Germany (14.34%), UK(12.80%), Italy(11.52%), US (8.72%), Hong Kong (8.11%), France(6.52%) Spain (6.31%), Netherlands (3.98%) and Belgium (2.02). Thus USA and EU together absorb 74.32 % of Indian Leather exports. Since penetration in both these markets in post WTO situations require fulfillment of environmental as well as other standards (i.e., quality, labour etc.), the higher growth of leather exports in these destinations can help us to infer about favorable impact of environmental compliance of Indian Leather industry on foreign markets.

Table 6: Growth of Leather Exports in Major Importing Countries (2006-2010)

Countries	Finished Leather	Leather Footwear	Footwear Components	Leather Garments	Leather Goods &Gloves	S & H	Total
Germany	-6.43	**2.81**	**37.66**	13.25	25.67	36.28	19.78
UK	Neg	**-7.10**	**Neg**	-10.17	12.67	13.43	9.91
Italy	-12.59	**15.67**	**-14.37**	1.25	16.45	40.26	6.21
USA	-31.5	**-9.59**	**10.23**	-50.82	-0.50	2.92	3.78
Hong Kong	-24.46	**-3.15**	**13.65**	6.79	44.72	Neg	-4.65
France	12.54	**6.98**	**-15.44**	28.64	32.53	28.49	21.34
Spain	-8.13	**7.99**	**NEG**	-11.38	15.0	36.42	22.78
Netherlands	Neg	**26.52**	**Neg**	24.34	Neg	44.09	35.18
Belgium	Neg	**13.99**	**Neg**	4.92	Neg	31.94	19.85
China	-5.41	**NEG**	**-17.03**	-	188.67	Neg	13.36
WORLD	-13.26	21.88		38.30	6.48	1.28	

Source: CLE (online, available at :http://www.leatherindia.org/about-council/industryatGlance.asp)

Table-6 portrays an export growth matrix of Leather components in all the major destinations according to their merit of export absorption. In ten major export absorbing destinations, the growth rates are rather meager in top five ranking destinations. Leather Footwear and Footwear components are the principal sectors in India's export basket. During last five years Indian leather footwear industry has shown a negative growth in export markets like, USA, Hong Kong, UK. In most significant export destination, i.e., Germany, the export growth rate is also very sluggish during this period. The average annual growth of component wise Leather exports reveals that Footwear sector experiences an average annual growth of 8% during 2006-2011., while overall export growth of Leather has shown some ups and down.

Table 7: India's Exports of Leather and Leather Products during 2006-11

	(Value in Million US$)					
	2006-07	2007-08	2008-09	2009-10	2010-11	**CAGR 06-10**

Finished Leather	724.00	807.19	673.37	627.95	810.92	**2.85%**
Footwear	1236.91	1489.35	1534.32	1507.59	1732.04	**8.78%**
Leather Garments	309.91	345.34	426.17	428.62	400.83	**6.73%**
Leather Goods	706.28	800.46	873.44	757.02	814.91	**3.65%**
Saddlery & Harness	82.33	106.18	92.15	83.39	86.15	**1.14%**
Total	3059.43	3548.51	3599.46	3404.57	3844.86	**5.88 %**
% Growth	11.15%	15.99%	1.44%	-5.41%	12.93%	
Source: DGCI&S						

7. Conclusion

Environmental standards in leather industry have been imposed by the developed nations as a non-tariff barrier in 1989, just five years before the birth of WTO, whose main goal was to knock down the trade barriers and expand multilateral trade. Impositions of environmental standard were taken by the Leather Industry in India as a major challenge. The institutional supportive actions have helped the domestic industry to survive against the most stringent non-price barriers, environmental standard. Producing a pollutant free commodity is one challenge but producing through pollution free process was a greater challenge faced by the Indian Leather Sector. The former helped the sector to survive at the face of stiff competitions in the external sector. However, the latter challenge which was severe was successfully handled by the industry. CPCB emphasizes in their consecutive Annual Reports how Indian Leather tanning Industry has successfully controlled its effluent generation through common effluent treatment plants as well as few individual effluent treatment plants and is expected to meet the standard of zero discharged norms very soon. The rising trend in leather exports at the backdrop of successful environmental compliance substantiates the positive association between pollution cleaning efficiency and export level. Hence, increasing rate of adoption of cleaning technology is always expected to raise the level of exports of Leather industry for Indian firms.

References:

Akbostanci, E, Tunc, G. I & Asik, S. T. (2004) : Pollution Haven Hypothesis and the Role of Dirty Industries in Turkish Exports, ERC Working Paper in Economics, Middle East Technical University, Turkey.

Bellisi, F., Lerher, D & Tal Alon (2005): Comparative Advantage – The Impact of ISO 14001 Environmental Certification on Exports, Environment Science Technology, Vol 39, No.7, 2005.

Chakraborty, P. & Chakraborty, D. (2007) : Environmental Regulation and Indian Leather Industry, Economic & Political Weekly, May 12, 2007, pp 1669-1671

Chakraborty, P.(2011) : Environmental Standard and Trade- Evidence from Indian Textile & Leather Industry, Ph D Thesis, Graduate Institute, Geneva.

CPCB (1999-00 to 2008-09) : Annual Report, Central Pollution Control Board, Ministry of Environment & Forests, Government of India (online available at http://cpcb.nic.in/annualreport.php)

CSO (2000) : CSO Staff Papers, Vol. 1, No. 2 on Environmental Pollution

Dannish Technological Institute (1992): Possibilities for a Reduction of Pollution Load from Tanneries, Final Report, Nordic, Council of Ministers

EXIM Bank (2006): Indian Leather Industry- Perspective and Export Potential, Research Brief, No. 22, March ,2006.

Fisher, H & Pearce, D.(2009): Salinity Reduction in Tannery Effluent in India & Australia, ACIAR, Impact Assessment Series, Report No. 61. http://aciar.gov.au/files/node/11131/IAS61.pdf

Henriques, I & Sadorsky (1996): The Determinants of An Environmentally Responsive Firm : An Empirical Approach , Journal of Environmental Economics and Management, Vol 30, No. 3, pp-381-395.

Hettige H, Mani, M & Wheeler, D (1997): Industrial Pollution in Economic Development – Kuznets Revisited, development Research Group, World Bank, Dec 1997.

Hettige H, Martin P, Singh M and Wheeler D (1995): The Industrial Pollution Projection System, World Bank, Policy research Department, Working Paper, February.

Heyes A G (1998): Making Things Stick: Enforcement and Compliance. Oxford Review of Economic Policy, Vol 14, No. 4, pp 50-63.

IICI (2008): The Indian Leather Industry, Indo Italian Chamber of Commerce & Industry, Short Market Overview, June, 2008.

IILF (2012) : A Report, India International Leather Fair, Chennai Trade Centre, Jan 31-Feb 3, 2012,(http://www.clri.org/LERIG2012/Report%20on%20Theme%20pavilion_IILF%202012_1.pdf)

India Leather Summit (2011): A Report, Indian Leather Summit, New Delhi (http://www.leatherindia.org/documents/pdf/Special-feature.pdf).

Indian Standards Institutions (1977) : Guide for Treatment and Disposal Effluent of Tanning Industry, New Delhi, India.

Italian Trade Centre (2010): Indian Leather and Tanning Industry – Profile 2010, ITALIA
http://italiaindia.com/images/uploads/pdf/leather-industry-in-india-2010.pdf

Karel Kubec (2000): Report on Recommendations on Cleaner Productions and Process and Improving the Quality of Leather, UNIDO, March 2000.

LERIG (2012) : A Report on the Annual Event , Jan 2012, CSIR-CLRI

Ludvik, J. (2000): The Scope for Decreasing Pollution Load in Leather Processing, UNIDO.

Maria, A(2003) : The Cost of Water Pollution in India, Paper presented at the conference on Market Development of Water & Waste Technologies, Environmental Economics, 30-31Oct, 2003.

Mikic, Mia and Martin Wermelinger (Eds.) (2010), "A study by the Asia-Pacific Research and Training Network on Trade", Asia-Pacific Research and Training Network on Trade (ARTNeT), Bangkok: UNESCAP.

Mohanty and Manoharan (2002): "Analysis of Environment related Non-Tariff Measures in the European Union Implications for South Asian Exports", RIS Working Paper, No. 38, New Delhi, India

Nihila, M. (1993) : Development Process and Status of Women : Tanning Industry in Tamil Nadu, EPW, Oct 9, 1993, pp 2220 – 2228.

NMCC (2010): Productivity & Competitiveness of Indian Manufacturing Sector – Leather and Leather Products, National Manufacturing Competitive Council, Government of India.

Porter, M.E. & C Vander Linde (1995) : Towards a New Conception of the Environment Competitive Relationship, Journal of Economic Perspective, Vol :9 (4), pp 97-118.

Prasad, P. M. (2006) : Environment Protection - Role of Regulatory System in India, Economic & Political Weekly, April 1, 2006, pp 1278-1288.

Rajamani, S. (20010: Tannery Waste Management & Technological Options for Up gradation of Environment System for Tanneries in Kanpur, Proceedings of Leather Research Industry Get-Together, Kanpur, Chapter, Aug 22, 2001

Roy C (2000) : A Study on the Prospects of Indian Leather Exports, M. Phil Dissertation (unpublished), Jadavpur University, 2000.

Roy C (2012): A Study on Environmental Compliance of Indian Leather Industry & Its Far reaching Impact on Leather Exports, Foreign Trade Review, Vol XLVII, No. 2, p 3-36.

Rugman A.M. & Verbeke (1998) : Corporate Strategy and International Environmental Policy, Journal of International Business Studies, Vol: 29, No. 4, pp 819-833.

Sankar U (2006): Trade Liberalization and Environmental Protection- Responses of Leather Industry in Brazil, China and India, Economic & Political Weekly, June 17, 2006.

Sankar, U (2006): Trade and Environment- A Study of India's Leather Exports, Oxford University Press.

Sanyal, S., Banerjee. S & Majumder S (2010): India's Leather in the World Market- Exploration of Recent Trends, Trade and Development Review, Jadavpur University Vol 3, Issue 1, 2010.

Schjolden, A(2000) : Leather Tanning in India- Environmental Regulation and Firm's Compliance, FIL Working Paper, No. 21, 2001

Staffin EB (1996) : Trade Barrier Or Trade Boon ? A Critical Labeling and its Role in the Greening of World Trade, Columbia Journal of Environmental Law, Vol 21, No. 2, pp 205-286.

Sujataha V (20020: Leather Processing- Role of Indigenous Technology, Economic & Political Weekly, Nov 23, 2002

Tewari, M & Pillai, P (2005): Global Standards and the Dynamics of Environmental Compliance in India's Leather Industry, Oxford Development Studies. (http://iegindia.org/workpap/wp255.pdf)

Thyagargan G, Srinivasan A V & Amudeswari (Eds) (1994) : Indian Leather 2010: A Technology, Industry and Trade Forecast, Central Leather Research Institute, Madras.

UNEP (1991) : Tanneries & Environment – A Technical Guide to Reducing the Environmental Impact of Tannery Operations, United Nations Environment Programme.

UNIDO (2000): Demonstrations and Propagations of Cleaner Technologies ajd Improvement of OSH Practices and Effluent Treatment Plant, United Nations Industrial Development Organization.

World Bank, Environment Department (1996): Pollution Prevention and Abatement- Tanning and Leather Finishing, Technical Background Document.