

# Impact of Textile in Environmental ISSUES and Environmental Legislation (Part II)



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Today people have started looking for "Green Products" everywhere. In terms of textile products, the purchasing decision of consumers were previously based upon comfort, style, aesthetic appeal, etc, but now more on eco-friendliness of the products. Many clothing companies have started providing clothes made from eco-friendly fabrics, and the demands for these green products are also increasing.

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India is the first country that has integrated the protection and improvement of the environment in its constitution. With the rising trade barriers and growing environmental importance under trade, every year the Gol is coming with new objectives, initiatives and targets to face off the problems of ITI. This growing support from government is fuelling the industry to adapt them to latest technology and label them environmentally benign. As the country lacks the needed internationally compatible technology, it is seeking for transfer of technology. The following are some major market segments which are revealed by the study as the most promising business opportunities:

- Wastewater Treatment & Pollution Control
- Solid and Hazardous Waste Management (recycling, minimization concepts etc)
- Water and Air Monitoring Testing and Analysis
- Environmental Consulting Services
- Environmental Impact Assessments
- Environmental Audits
- Environmental Policy and Regulatory Consultancy
- Energy Conservation
- Environmental Management Systems & Environmental Training
- Supply & Manufacture of Environmentally Friendly Chemicals (dyes, dyestuff, enzymes etc)
- Textile Printing, Design & Packaging Technology
- Concept of eco-textiles

### Environmental Legislation

India is the first country that has integrated the protection and improvement of the environment in its constitution. The various environmental legislation and regulations dealing with protection and improvement of the environment are briefly listed below. There are no specific environmental laws for textile industry sector alone. However, there are industry specific standards, which the textile industry is required to comply with while setting up or

Indian  
Environmental  
Legislation

Figure 4: Indian  
Environmental  
Legislation

Water pollution  
Air pollution  
Noise pollution  
Environmental Protection  
Hazardous substance  
Ozone layer depletion  
Eco-Mark

operating an industrial unit. The regulatory authorities are Ministry of Environment and Forests (MoEF) and Central Pollution Control Board (CPCB) at central level and State Pollution Control Board (SPCB) at state level. Enforcement is done by SPCBs.

## Water Pollution

The following is the legislation related to water pollution:

- The Water (Prevention and Control of Pollution) Act, 1974, as amended up to 1988
- The Water (Prevention and Control of Pollution) Rules, 1975
- The Water (Prevention and Control of Pollution) (Procedure for Transaction of Business) Rules, 1975
- The Water (Prevention and Control of Pollution) Cess Act, 1975, as amended by Amendment Act, 1991
- The Water (Prevention and Control of Pollution) Cess Act, 1978

The Water (Prevention and Control of Pollution) Act, 1974, as amended up to 1988 was promulgated to provide for the prevention and control of water pollution and the maintaining or restoring of wholesomeness of water, for the establishment, with a view to carrying out the purposes of prevention and control of water pollution, for conferring on and assigning to such boards powers and functions relating thereto and for matters connected therewith. The Water (Prevention and Control of Pollution) Act establishes an institutional structure for preventing and abating water pollution. It establishes standards for water quality and effluent. Polluting industries must seek permission to discharge waste into effluent bodies. The CPCB was constituted under this act. The following are the Minimal National Standards (MINAS) for dye and dye intermediates for wastewater disposal as stated under the CPCB.

If the treated wastewater is disposed of into inland surface water then some of the parameters limits should be fixed by the local authorities so that the parameter with limits shall not exceed under minimum dilution condition of recipient water bodies. The water consumption pattern varies widely from one industry to another. In the same industry also, the rate of water consumption often changes due to frequent changes of the feed material, synthesis reaction and desired products. The change of product pattern needs cleaning and washing which consumes substantial quantity of water.

The water usage in the industry is mainly for the following purposes:

- Synthesis of the dyes and dye intermediates
- Steam generation and cooling system
- Washing and rinsing of reaction kettles filter press, floors etc. - domestic and other miscellaneous activities.

The large dye manufacturing industries in Maharashtra and Gujarat have installed wastewater treatment facilities. The treatment system and

Parameter	Limits, unless otherwise stated	Parameter	Limits, unless otherwise stated
pH	6.0-9.0	Copper	2mg/l
Colour, Hazen Unit	400 mg/l	Lead	0.1 mg/l
Suspended Solid	100 mg/l	Mercury	0.1 mg/l
BOD	100 mg/l	Manganese	2 mg/l
Oil and Grease	10 mg/l	Nickel	2 mg/l
Phenolic Compounds	1 mg/l	Zinc	5 mg/l
Cadmium	0.2 mg/l	Chromium Hexavalent	0.1 mg/l

Source: CPCB, India

performance of one of such units in Gujarat with some parameters is presented in table shown below. The data indicate that the waste water is responsive to biological treatment. However, the parameters are quite high in comparison to above standards mentioned. In general the small and medium scale industries have no organized treatment facility.

Parameter	Wastewater	
	Untreated	Treated
pH	1.9	6.0-8.0
TDS	3670mg/l	6650mg/l
Suspended solid	370mg/l	200mg/l
BOD	350mg/l	275mg/l
Oil and Grease	20mg/l	10mg/l
Phenolic compounds	10.8mg/l	4mg/l

Also the parameters show that the wastewater treatment plants are not according to the requirements. The volume of wastewater can be reduced by proper control of fresh water consumption. The pollution load can be reduced by recovery of chemicals and solvents as far as practicable. Spills, leakage, overflows etc. may not be allowed to join the wastewater stream.

The production process equipment should be modified so as to generate less waste. The raw materials used in the synthesis may be substituted by choice of more readily biodegradable chemicals. The standards can be technically achieved by proper management and treatment of the wastewater. The industries not only need consultation for improving the efficiency of treatment plants, but also the standards are to be revised.

The production process equipment should be modified so as to generate less waste. The raw

The Water (Prevention and Control of Pollution) Cess Act provides for the levy and collection of cess or fees on water consuming industries and local authorities. The Water (Prevention and Control of Pollution) Cess Rules contains the standard definitions and indicate the kind of and location of meters that every consumer of water is required to affix.

### **Air Pollution**

The following describes the legislation relating to air pollution:

- The Air (Prevention and Control of Pollution) Act, 1981, as amended by Amendment Act, 1987
- The Air (Prevention and Control of Pollution) Rules, 1982

This Act was passed for the prevention, control and abatement of air pollution. This law defined an air pollutant as any solid, liquid or gaseous substance present in the atmosphere in such concentration as may be or tend to be injurious to human beings or other living creatures or plants or property or environment.

In this Act, the power to declare air pollution control areas has been given to the state government after consulting the State Board. By this, it may control or even prohibit burning of certain materials in those specific areas.

This Act requires approval prior to operating any industrial plant. Government may suggest "control equipment" prior to giving its consent to any industry for its operation. It may include chimney etc. In case there is any new technology for emission control, then the Board may insist on this to being installed. Standards specific to industries

have been specified. Penalties were for a minimum of six months imprisonment to a maximum of seven years and fine up to Rs. 5,000 (€ 250) for every day during which contravention continues after conviction for the first such contravention. This law makes it clear that when offences are committed by a company, its director, manager, secretary or other officers could be held guilty and punished accordingly. Thus,

1. Air (Prevention and Control of Pollution) Act provides for the control and abatement of air pollution. It entrusts the power of enforcing this act to the CPCB.
2. Air (Prevention and Control of Pollution) Rules defines the procedures of the meetings of the boards and the powers entrusted on them.
3. Air (Prevention and Control of Pollution) Amendment Act empowers the CPCB and SPCBs to meet grave emergencies of air pollution.

As the industries are running on age-old processes, outdated technology, fuel, coal as their source of energy where there are no proper installations for measurement and treatment of emissions like SO<sub>2</sub>, oxides of nitrogen, suspended particulate, etc it becomes harder and impossible to fulfill the norms of the legislative standards.

### **Environment Protection Act**

The following are the act and rules related to environment protection:

- The Environment (Protection) Act, 1986
- The Environment (Protection) Rules, 1986

The Act was enacted to "provide for the protection and improvement of environment and for matters connected therewith." This act defined environment which includes "water, air, and land and the inter-relationship which exists among and between "water, air and land, and human beings, other living creatures, plants, micro-organisms and property." It also defined a hazardous substance as "any substance or preparation which, by reason of its chemical or physical-chemical properties, or handling, is liable to cause harm to human beings, other living creatures, plants, microorganisms, property or the environment." This law enlists general powers of the central government which included "all such measures as it deems necessary or expedient for the purpose of protecting and improving the quality of the environment and preventing, controlling and abating environmental pollution."

This law requires that all companies must have some sort of a Spill Prevention Control and Countermeasures Plan (SPCC). Environmental auditing is required by this law started in 1993. This report is to be submitted to the SPCB. The law indicates that penalty for contravention of the act may be punishable by imprisonment up to seven years or fine up to Rs 100.000 (€ 2.500). Additional fine of up to Rs 5,000 (€ 1 25) for every day of violation.

### **Hazardous Substance**

The following is the legislation related to hazardous waste:

- Hazardous Wastes (Management and Handling) Rules, 1989
- Manufacture, Storage, and Import of Hazardous Chemical Rules, 1989

- Hazardous Wastes (Management and Handling) Amendment Rules, 2000 Draft Notification
- Manufacture, Storage, and Import of Hazardous Chemical Amendment Rules, 2000 - Draft Notification
- Public Liability Insurance Act, 1991
- Public Liability Insurance Rules, 1991

The Ministry of Environment and Forests came out with Hazardous Wastes (Management and Handling) Rules, July 1989 under the Environment (Protection) Act, 1986. The main purpose for promulgation of these Rules was for management and handling of hazardous substances.

The basis of any environmental pollution has been the generation and disposal of hazardous substances. To regulate them, all the above regulations have been promulgated. Proper disposal is probably the most important aspect of any industry. For this reason, guidelines have been issued under this set of rules.

### **Occupier/Generator of Hazardous Wastes**

These rules apply to listed hazardous wastes. The occupier or generator is required to take all the necessary steps for proper handling and disposal of these chemicals. The occupier or generator is also responsible for collection, reception, treatment, storage and disposal of these wastes either himself or through the operator of a facility. The generator is allowed to store a maximum quantity of 10,000 Kilograms or a truck load, whichever is less of his hazardous wastes on-site for a maximum period of 90 days. They may extend the storage period under unforeseen circumstances on a case-by-case basis. The occupier/generator may be allowed to store their hazardous wastes only in closed specified containers in the designated protected area.

When the hazardous waste is to be shipped for disposal, it must be done through the use of manifest. This allows tracking the waste from the point of its production until its final disposal, sometimes referred to as "cradle to grave."

### **Transportation of Hazardous Waste**

The Board is required to register the authorized transports for transportation of hazardous wastes only in specified transport vehicles. This is required to make sure that the transporters of the waste, such as drivers and helpers, are sufficiently trained to respond to any spill, accident or any other emergency situation that may develop during the transit of the vehicle.

The law specifically prohibits import of hazardous wastes for dumping and disposal into the country. However, import of such wastes may be allowed for processing or re-use as raw material. This must be approved by the board before the import of the chemical occurs.

### **Owner/Operator of Hazardous Waste, Storage, Treatment and Disposal Facility**

The Board is required to issue License to the owner/operator of Hazardous Wastes.

Management facility for storage, treatment and disposal after having verified their technical, financial, and managerial capabilities.

These sites are on an approved location taking into consideration factors such as the damage to the environment in case of a spill or any other accident. Licenses to such sites are to be given after due inspection of the facility at the time of construction and operation and also closure of landfill facility.

The Board has the authority to identify and establish standards for Principal Organic Hazardous Constituents (POHC) for stack emissions. Also, it monitors the stack emissions, effluent and ground water quality regularly.

Each hazardous waste management facility must have an approved emergency/contingency Plan that must have been duly approved by the board. The board is required to inspect the facility after any incident for appropriate measures taken in order to avert such incidents and also to make sure that the emergency/contingency plan is modified accordingly.

The purpose of this Act is to provide public liability insurance for the purpose of immediate relief to the persons affected by accident occurring while handling any hazardous substance and for matters connected therewith or incidental thereto.

The Act defines an "accident" as involving a fortuitous, sudden or unintentional occurrence while handling any hazardous substance resulting in continuous damage to any property but does not include an accident by reason only of war or radioactivity.

This Act also claims that the owner liable for death or injury to any person, damage to any property resulting from an accident, is required to take out insurance policies. This insurance is required within a period of one year from such commencement. Minimum amount of insurance is the paid up capital of the undertaking handling any hazardous substance or Rs.5 crore (€ 1, 2 million) maximum. Penalty for not taking insurance coverage is imprisonment for one year and six months and fine of not less than Rs. one lakh (€ 100,000) or both. This act also includes the list of chemicals with quantities for application of Public Liability Insurance Act. It also lists chemicals which are extremely hazardous.

The above act description reveals that the industry not only has to comply with the norms but also has to take the liability of persons. Due to the increasing environmental problems and international pressure the regulations are still becoming stringent and the companies are left with only options for reducing and abating the hazardous waste.

## **Noise Pollution**

The legislation under this includes solely the newly established:

### **Noise Pollution (Regulation and Control) Rules, 2000**

With the perception of increasing ambient noise levels in public places from various sources, inter-alia, industrial activity, construction activity, generator sets, and other mechanical devices have deleterious effects on human health and the psychological well

being of the people. The Government has considered necessary to regulate and control noise producing and generating sources with the objective of maintaining the ambient air quality standards in respect of noise.

This draft of Noise Pollution (Control and Regulation) Rules, 2000 was published under the notification of the Government of India. Some of the main elements are:

- The state government may categorize the areas into industrial, commercial, residential or silence areas/zones for the purpose of implementation of noise standards for different areas.
- The state government shall take measures for abatement of noise including noise emanating from vehicular movements and ensure that the existing noise levels do not exceed the ambient air quality standards specified under these rules.
- The ambient air quality standards in respect of noise for different areas/zones shall be such as specified in the table below.
- The noise levels in any area/zone shall not exceed the ambient air quality standards in respect of noise as specified in the table
- The authority shall be responsible for the enforcement of noise pollution control measures and the due compliance of the ambient air quality standards in respect of noise.
- A person may, if the noise level exceeds the ambient noise standards by 10 dB (A) or more given in the corresponding columns against any area/zone, can make a complaint to the authority.
- The authority shall act on the complaint and take action against the violator in accordance with the provisions of these rules and any other law in force.

Silence zone is defined as an area comprising not less than 100 metres around hospitals, educational institutions and courts. The silence zones are declared as such by the competent authority. The city of Kanpur mentioned under the environmental problems, a major armament and textile centre, with a wide range of textile industries where the noise levels in the city are alarmingly high in commercial areas, far exceeding the prescribed limits. According to the CPCB, Kanpur, the average noise levels in commercial areas during the day is 80, whereas according to standards it should not go beyond 65.

### Ozone Depletion

The legislation refers to the:

#### Ozone Depletion Substances (Regulation) Rules, 2000

Ozone (O<sub>3</sub>) is a form of oxygen in the atmosphere about 20 kms above the earth's surface that efficiently screens out almost all the harmful ultraviolet rays of the sun. This radiation has the potential to cause skin cancer, eye damage; suppress body's immune system; decrease crop yield; cause damage to forests and affect ocean life. In accordance

with the National Strategy for Ozone depletion substances (ODS) phase out the Government of India - MoEF, have framed

Table 3: Ambient Air Quality Standards for Noise

Area Preference	Category of area/ zone	Limits in db (A)	
		Day time	Night Time
		6.00-22.00	22.00-6.00
A	Industrial	75	70
B	Commercial	65	55
C	Residential	55	45
D	Silence	50	40



comprehensive draft rules, covering various aspects of production, sale, consumption, export and import of ODS. Some of the important provisions of the proposed draft ODS rules, are as follows:

#### **ODS Producers**

- Compulsory to register with MoEF
- Restriction on production levels as per "base level" and reductions specified.
- Ban on creating new capacity or expansion of capacity
- Export restricted to countries who are signatory to Montreal Protocol
- Quantity produced in excess of maximum allowable consumption for the respective years, if any, to be for export purposes only.

However, depletion of ozone layer is still a cause for concern as ODS continue to be used in developing countries in refrigeration and air-conditioning, preparation of foam and spray products, fire extinguishing, and as solvents in electronics and other industries. In the textile industry chlorinated solvents like dichloromethane in tetrachloroethylene, trichloroethylene and methylene chloride are often used in fabric scouring, dye carrier, cleaning purposes etc. Now with the regulations coming into picture, the industries are left to abate the impact of all these substances and seek for possible substitutions and alternatives.

#### **Heavily affecting the dye industry**

India is the second largest exporter of dyestuff and dye intermediates among developing countries. The SME account for about 25% of dyes production and 65% of dye intermediates production. It also accounts for about 50% of total dye exports. The ban of azo dyes is affecting these companies as they have mastered the technology for relatively simple dyes such as azo dyes as well as for extremely sophisticated vat and disperse dyes.

Apart from this it is also now under pressure from global recession and due to environmental concerns.

#### **Obstacles to access certain textile products**

The textiles which contain certain banned dyes will not access the EU market. The industries that are not aware of this fact have to see their products coming back into their lobbies. Thus the industry has incurred losses and also the exports declined. At the early stages when the German Act was issued, the testing methods for the banned substances were not made public. When the German Act banning azo dyes was enacted in 1994, many industries have begun testing their products for banned dyes before exporting. This incurred high cost production. Those who neglected faced the return of goods. Due to increase in cost of production and many rejections of export some industries decided to use dyes imported from Germany, which were about 3 to 5 times higher than the price of domestic dyes. This greatly increased product costs. To their frustration, the companies found that although the German dyes might meet environmental requirements, their colour properties were not satisfactory. Although this contingent measure was taken to prevent losses such as return of goods, fines or

even onsite destruction, the use of expensive imported dyes greatly increased product cost and affected the price and the overall competitiveness of the Indian products.

### **Public Pressure**

With the environmental and health impacts caused by the ITI made the consumers to realize and act accordingly, this had also led to an end to some companies. The Govt initiatives to educate the layman towards environment protection through various programmes are leading to public pressure. The Govt under legislation is also providing an easy access to lodge the complaints against the industries polluting the environment.

### **Eco-Mark**

To increase consumer awareness, the Government of India launched the eco-labelling scheme known as 'Eco mark' in 1991 for easy identification of environment-friendly products. The inclusion of textiles under ECOMARK as the eco-label is bringing new competition for the domestic industries. As who ever acquires the label will be the leading players in the domestic market lobby. Any product which is made, used or disposed of in a way that significantly reduces the harm it would otherwise cause to the environment could be considered as an Environment-Friendly Product. The textiles with other products also form the integral part of it. The standards specified under the ECOMARK scheme are all environmentally-friendly. To acquire it, the industry has to cross all the hurdles of environmental standards. The criteria follow a cradle-to-grave approach, i.e. from raw material extraction, to manufacturing, and to disposal. The 'Ecomark' label is awarded to consumer goods" which meet the specified environmental criteria and the quality requirements of Indian standards. Any product with the Ecomark will be the right environmental choice.

#### **Objectives of it include:**

- To provide an incentive for manufacturers and importers to reduce adverse environmental impact of products.
- To reward genuine initiatives by companies to reduce adverse environmental impact of their products.
- To assist consumers to become environmentally responsible in their daily lives by providing information to take account of environmental factors in their purchase decisions.
- To encourage citizens to purchase products that has less harmful environmental impacts.
- Ultimately to improve the quality of the environment and to encourage the sustainable management of resources.

The criteria are based on the cradle-to-grave approach, i.e. from raw material extraction to manufacturing and to disposal. The basic criteria cover broad environmental levels and aspects, but are specific at the product level. A product is examined in terms of the following main environmental impacts:

- That they have substantially less potential for pollution than other comparable products in production, usage and disposal.

- that they are recycled, recyclable, made from recycled products or biodegradable, where comparable products are not;
- that they make significant contribution to saving nonrenewable resources including nonrenewable energy sources and natural resources compared with comparable products;
- That the product must contribute to a reduction of the adverse primary criteria which has the highest environmental impact associated with the use of the product, and which will be specifically set for each of the product categories.

The product general requirements deal with the issues of compliance of the pollution control acts; raising environmental awareness among consumers etc., in addition to safety, quality and performance of the products.

With Product Specific Requirements the following issues will be taken into account

- production process including source of raw materials
- use of natural resources
- likely impact of the environment
- energy conservation in the production of the product
- effect and extent of waste arising from the production process
- disposal of the product and its container
- utilization of "Waste" and recycled materials
- suitability for recycling or packaging and
- biodegradability

According to this scheme any industry to get certified their products has to fulfill all the requirements of the environment as indicated above under product requirements. The textile sector under this scheme is being given special requirements and standards. Under its various notifications, one of the major one is the notification of March 26, 1997 seeking to prohibit handling of 74 more azo dyes, in response to German ban on dyes. The dyes have been regarded as carcinogenic to humans. The prohibition applies to the manufacture, processing, treatment, package, storage, transportation, use, collection, destruction, and conversion, offering for sale, transfer or the like of such substance. With the proposed ban of 74 azo dyes, the number of banned hazardous azo dyes goes up to 116.

As the Government of India is very much concerned about the environment and is also allocating a budget for the environmental protection activities, the above said regulations had also led to shut down of many industries not complying with norms. The figures in table 4 outline the major industries categorized by the environment department as highly polluted to less polluted:

### **Increasing Consumer Awareness**

The growing awareness concerning the garments quality (colour stand, washing characteristics, etc), and their impact on skin is lost in reliability of certain brands of garment industries. Also the Govt initiatives to educate citizens about the scheme of eco-labelling will lead to growing shift in the market. All these factors leaving the companies to produce according to consumers demand.

## Impact of EU Environmental Standards

Various environmental regulations and standards concerning textile and clothing have aroused tremendous concern world-wide. Some countries have begun to amend and upgrade their own legislation and regulations, while others are actively doing research in the field. Generally speaking, the EU nations have widely differing environmental standards in accordance with their national priorities. The most influential ones are the German Act of 1994 forbidding azo dyes and the eco-labelling standards concerning textiles such as Oeko- Tex. These environmental standards and requirements have some positive and negative impacts on international trade in textiles.

Effectiveness	Category	Type of Industry	Business Nature
Highly Pollutes	RED	Dyes, dye intermediates, Synthetic fibre industry, Textile Processing industries	Major exchanging industries Foreign earning
	ORANGE	Cotton Spinning and Weaving	
Less Polluted	GREEN	Cotton & Woolen hosiery, apparel, handloom, powerloom	

The German ban had led to a substantial impact on India's export. India's export of the products using German-banned dyes accounts for 38% of the total export of textiles and clothing. The major exports include cotton

garments & fabrics, silk garments & fabrics, carpets, rugs and some chemicals. With this new regulation from Germany, India had reacted actively mainly through legal means and upgrading the capability of adjusting to this new situation. And thus, the Gol- MoEF promulgated a notification in March 1995, that the use of 74 categories of azo dyes would be banned nation wide and the import of dyes strictly controlled. But the situation has not shown much improvement as many small industries are bound to old processes. The following are some of the impacts which are caused and likely to cause to the ITI with EU environmental regulations coming into play.

### Conclusion

The Indian environmental legislation is very stringent but poorly enforced. Although these policies are good enough considering the Indian conditions, the standards are to be revised for the various wastes generated. As the nation lacks in expertise in the environmental sector, for revising the standards consultation from European experts become vital. With the eco-friendliness being the growing password for the global market, the Indian industries are left with no option to follow the requirements of international standards. Thus Upgradation of various processes, products and machinery and related areas for disposal of waste becomes desirable.

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