

INDUSTRIAL

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ECOLOGY: A NEW PLATFORM FOR ENHANCING SME SOCIAL RESPONSIBILITY

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Industrial ecology is an important complement to economics. “Whereas conventional economics deals with the flow of money through the economic system, Industrial Ecology or the “economics of resources” deals with the flow of resources (material, land, energy etc) through the economic system”.

The principle basis of Industrial Ecology is that, to develop sustainable societies, it is necessary to perceive the system as a whole, understand the “flows” of resources through the system and design new socio-economic systems rather than just treat “end-of-pipe pollution”. The economic planning processes should involve an understanding of how resources flow through the system. The word “resources” refers to material, energy, human and other identified resources and not just to monetary resources, as it is usually understood.

When societies became conscious about the effects of the degradation caused to the environment by Human activity, the first strategy that was conceived was that of building filters to ensure that the waste from industries did not “leak” into the environment. Analysis showed that better strategies were required because, the process of building filters was only often just transferring the pollutant from one medium to another (maybe, from water to land). Secondly, the process of building filters was not very economical as there was no savings accruing from the process.

Industrial ecology is a discipline that seeks to restructure the industrial system with the aim of:

- Optimizing use of resources – – reduce, recycle, emulate the natural food webs - EIPs
- Closing material loops – emulating nature, where the waste of one activity (or organism) becomes the feed for another activity
- Dematerializing the system. Reducing the total materials used in the system (material, energy, land, manpower etc)
- Reducing dependence on fossil fuels

The scope of industrial ecology is not just restricted to Industry. It encompasses the entire spectrum of human activity. The scope could be depicted as in Figure 1 below.

Figure 1. The scope of industrial ecology

Human Living

- Food
- Shelter
- Clothing
- Communication
- Temperature control

Waste Recycled

- waste to agriculture/industry
- waste to environment
- produce (labor) to living/ agri/industry industry

Agriculture

- food crops
- cash crops
- forestry
- animal breeding
- fishing

Resources:

- material
- energy
- land
- manpower

Waste Recycled

- waste to industry/human living
- waste to environment
- produce to agriculture/industry/
living

Industry

- large scale/small
- cottage scale
- infrastructure

Waste Recycled

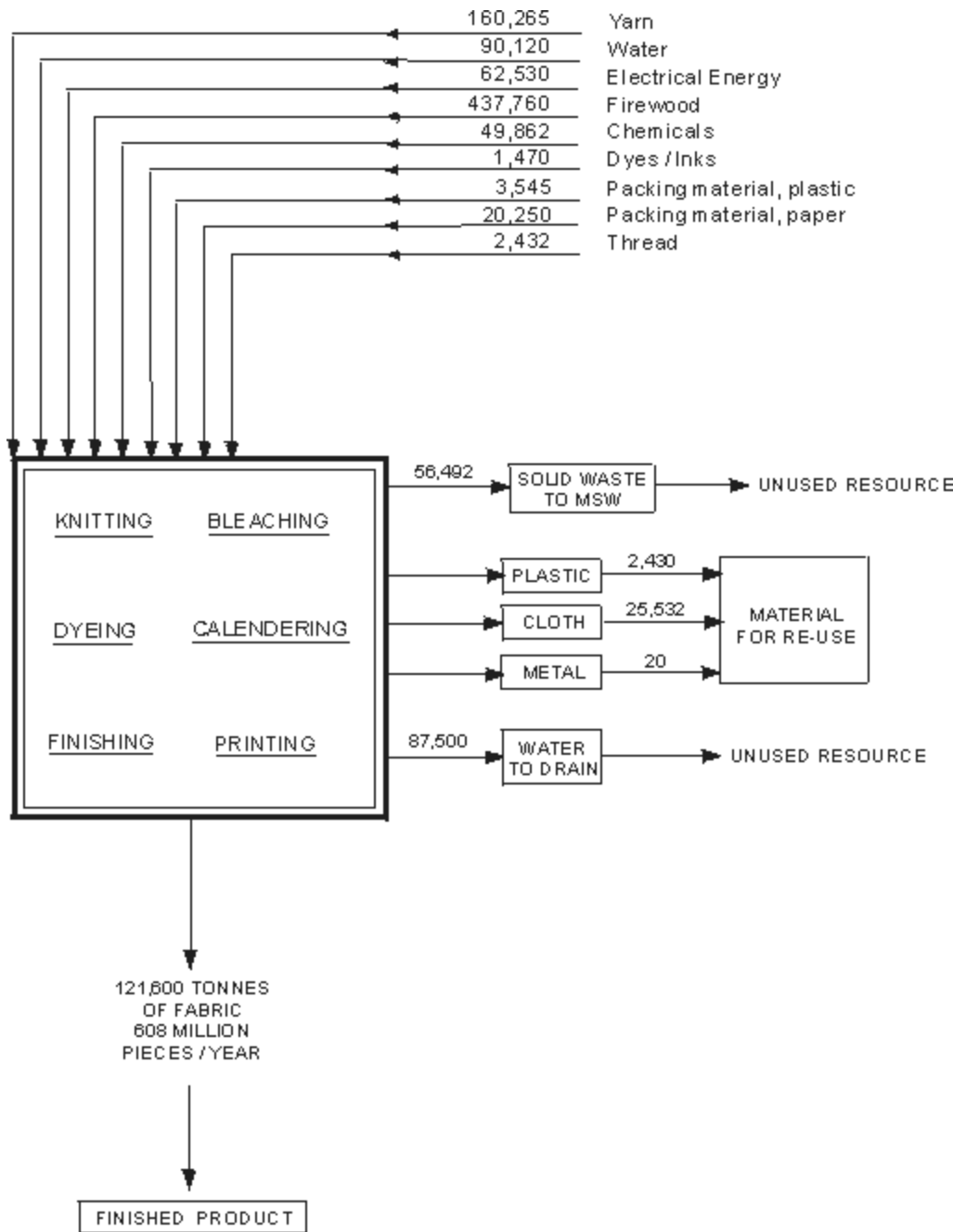
- waste to agriculture/living
- waste to environment
- produce to industry/ agriculture/
living

Better resource utilization means sustainability in the long run and greater profits in the short run.

Industrial Ecology advocates a resource planning process that leads to efficient production, the reduction of un-recyclable waste, and the creative use of recyclable waste. For example, wastes resulting from household activities could be recycled for use in agriculture or industry, or for enriching the environment. Similarly, wastes originating from agriculture or industry can be recycled to benefit other industries, or other agricultural production, or the households.

The principles of industrial ecology are best applied at the community level involving all enterprises and households belonging to the community's entire geographic area, or at an industry- sectoral level comprising a cluster of enterprises. It is capable of being easily integrated into the planning processes for regional development.

A case study was carried out in the town of Tirupur in the south of India, to cite an example, where the entire material flowing through the textile industry (comprising over 4000 small units producing knitted T Shirts) was carried out. The material flow clearly showed what resources the industry was consuming and what resources were being wasted. Based on this, plans were worked out to reduce (or recycle) some of the scarce resources. The material flow results are shown in Figure 2



What Can SMEs Do With Industrial Ecology?

An important strategy to enhance the competitive advantage of SMEs in the global market could be to organize production in complementary clusters. Inter-firm linkages that improve the efficiency of production and reduce wastes are extremely relevant for enhancing the value chain in the International Solidarity Product Networking of SMEs.

Some of the possible strategies that could be contemplated are (these are not meant to be exhaustive):

- Effective sharing of resources (such as by having common steam generation for better economies of scale)
- Common Effluent treatment plants
- Co-location of industries that can use each others' wastes
- Replacing a current raw material with another that is a waste from another industry in the region
- Replacing current energy sources with more environment friendly sources (such as solar energy)
- Planning new industries, leveraging the wastes available in a particular region (material or energy - For example, if there is a thermal power plant in a region, a new industry that uses the wastes energy could be planned)

The principles of Industrial Ecology are equally applicable to agriculture. In most developing countries, agriculture is the main source of employment and livelihood for the greater portion of the population. Agriculture uses tremendous amount of water and land, resources that is getting scarcer throughout the developing world, but often produce low-value products. Industrial ecology based planning can help developing countries better leverage scarce resources (such as water and land) and minimize losses arising from the unplanned use of recyclable wastes. In particular, the wastes of agriculture could be well used by the industry and agro-industrial complexes could be developed as a planned strategy.

In sum, therefore, industrial ecology is an indispensable tool of SMEs for enhancing their social responsibility towards: **producers** (greater consciousness in using biodegradable & recyclable materials, lesser waste, more profits); **consumers** (better quality products); the **environment** (lesser toxic wastes); and **society** at large (more socially responsible enterprises, healthier environment).