

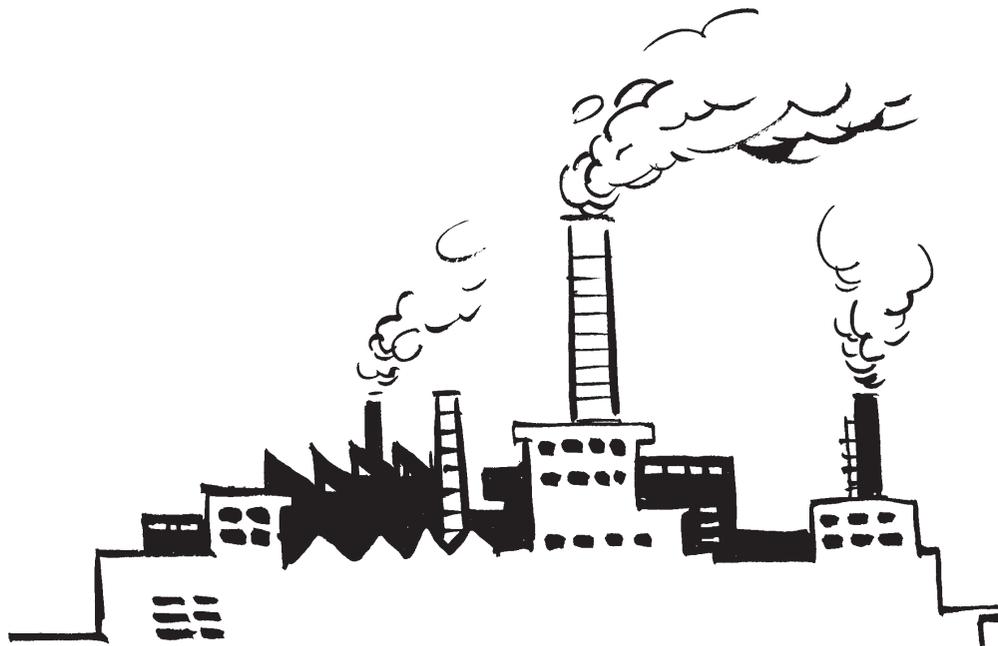
# 6

## Industry

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### STRUCTURE

- 6.1 Introduction
- 6.2 Objectives
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- 6.4 The Shoe Story
- 6.5 Green Corporates
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## 6.1

It is a significant achievement that India is one of the 10 most industrialized nations of the world. Industrial activity is essential to generate goods for the development of a nation, to meet the needs of the people, and to generate employment. At the same time, it must be accepted that industrial activities release pollutants that contaminate air, water bodies and land, and adversely affect the quality of human and other life.

While industries are vital for development, it is equally important to be aware of the impacts of industries on environment. A proper understanding of this can help ensure that these impacts are minimized.

## 6.2

On completion of this unit, you should be able to:

- Explain the impact of industrial processes on environment.

### **6.3 HOW INDUSTRIES AFFECT THE ENVIRONMENT**

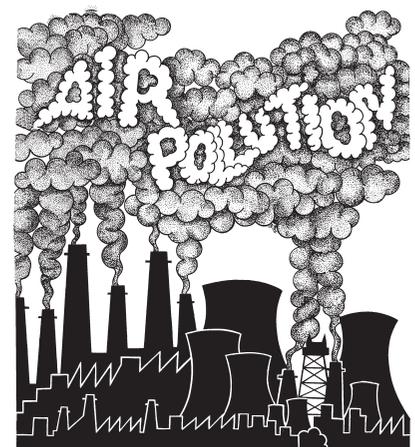
Industrialization has been the hallmark of development. Industrialization has made some countries more 'developed' and prosperous than others. Industrialization has also meant more employment, more products, more services as well as more pollution, more waste and more environmental degradation.

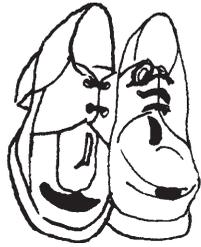
A manufacturing industry basically takes in raw material, processes it, and puts out both the product (which is the desired result of this production process) and the by-products (including pollution, which are a necessary but undesired outcome of the production process). In the process of production, the industry consumes raw materials needed for production, as also energy, water, etc. The product is then packaged and transported to where it will be sold. The product may then be used by consumers.

In this process how do the industries impact the environment? First and the most obvious impact is the pollution that industries let out—water and air pollution, wastes and solid wastes. The other kinds of environmental impacts include the impact of extraction and mining of raw material and the processing of it. Further if the raw material is transported from its origin to a distant place, then this takes its own toll on the environment.

In the production process an industry may consume water, electricity or other power sources. This also has an impact on the environment. Similarly, the packaging and the use of a product also affects the environment.

Thus in the manufacture of a product, environment is affected when the raw material is taken out from the environment, further due to the pollution of air, water, land etc. during the manufacturing process and finally wastage at the consumer end.





## **6.4 A SHOE STORY**

Eighty per cent of athletic shoes in the United States are not used for their designed purpose. According to surveys, US women own between 15 and 25 pairs of shoes, men 6 to 10 pairs.

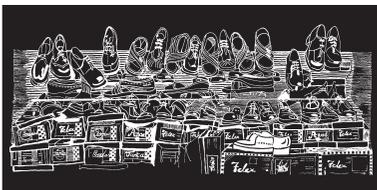
My two shoes weighed about a pound and were composed of dozens of different, mostly synthetic, materials. Like almost all athletic shoes sold in the US, they were manufactured overseas by an obscure firm contracting to the company whose name and logo actually appeared on the shoes. These shoes were assembled in a Korean-owned factory in Tangerang, an industrial district outside of Jakarta, Indonesia. But almost all of the components were made elsewhere.

My shoes had three main parts: the logo-covered upper, the shock absorbing midsole and the waffle-treaded outsole. The upper had almost 20 different parts. It was mostly cow leather. The cow was raised, slaughtered, and skinned in Texas. Most of the carcass became human and pet food. The hide was cured with salt and stacked with 750 others in a 20-foot container and carried by freight train from Amarillo to Los Angeles. From there it was shipped to Pusan, South Korea. Most US hides are exported for tanning as labour costs and environmental standards are lower overseas.

Tanning usually is 20-step process with large spinning drums and solutions of chrome, calcium hydroxide and other strong chemicals. Workers in Pusan loaded the tanned leather onto an airplane headed for Jakarta, while the tanning plant discharged hair, epidermis, leather scraps, and processing chemicals into the Naktong river.

Except for the leather, my shoes are made from petroleum-based chemicals. The mid-sole was a custom designed EVA (ethylene vinyl acetate) foam: a composite of several substances including ethelene. The ethelene was distilled and 'cracked' from Saudi petroleum shipped in a tanker to a Korean refinery. My shoes' outer soles were made of styrene-butadiene rubber. The rubber was synthesized from Saudi petroleum and local benezene in a factory in Taiwan. This factory got its electricity from one of the island's three nuclear power plants. The rubber was formed into large sheets and flown to Jakarta. In the shoe factory, machines cut up the sheets and moulded the grooved tread that I see at the bottom of my shoe.

The factory in Tangerang manufactured shoes for most top brands. Powerful machines used pressure and sharp blades to precisely cut the leather and other tough material into shoe parts. Though hi-tech equipment helps, putting shoes together remains the domain of hand labour. On the assembly line many young Javanese women cut, sewed, and glued my upper and soles together to make shoes. The air smelled of paint and glue, and the temperature neared 100° F. Though solvent fumes caused health problems for some workers, the shoe factory generated little pollution and required little energy compared with refineries, chemical plants, and tanneries that produced its raw materials.



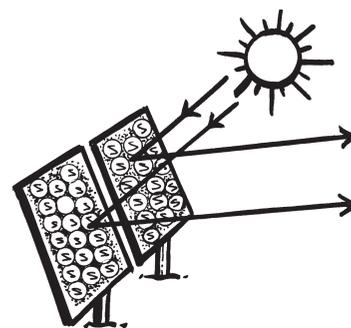
My shoes are hand stuffed with light weight tissue paper (made from Sumatran rain forest trees) and put in a shoe box. The box was corrugated cardboard that was 100 per cent recycled and unbleached. Folded stacks of empty boxes were shipped west across the Pacific from Los Angeles, boxed shoes were shipped east in a supercontainer ship carrying 5,000 20-foot containers. Each journey took three weeks.

As I laced up my shoes, I noticed a small tear over my big toe. At this rate, the pair would not last more than a year. Maybe I could make my shoes last longer, walk more softly on the earth, and save 75 bucks too.

### **Cleaner Production Technology**

The kind of technology and processes that are used in an industry determines how environment friendly it is. An everyday example of cleaner technology would be the use of a solar water heater rather than a wood stove or LPG. A wood stove gives out smoke or; LPG, in its extraction and processing gives rise to pollution. A solar water heater uses renewable energy and gives out no pollution.

If industries spend more towards such cleaner production, they will have to clean up less pollution and they will put less stress on the environment. But research and development of such technologies and processes is still in its infancy. Sometimes, even where they exist, developing countries like India cannot access them.



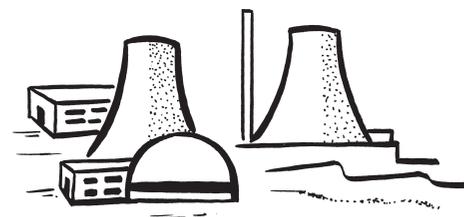
#### **6.4.1**



1. Draw a flow diagram of how the shoe has been manufactured, including the different places from where different components were sourced.
2. What are the different raw materials that feed into the shoe making and how do they effect the environment?
3. Can you trace this type of manufacturing cycle for two/three other products, say a soap, toothbrush or a pen?

### **6.5 GREEN CORPORATES**

In March, 2000, Business Toady, a leading business magazine, and the Tata Energy Research Institute conducted a cross-country study to look at environmental practices in corporate India. It was the first study aimed at finding out how environmentally conscious corporate India was. The study, which looked at 50 companies, revealed that more than three-quarters had an environmental policy. Sixty per cent has an environment department and four out of every ten had formal environment certification (ISO 14001).



The study also found that about a fifth of the companies had an environmental policy operational at both the corporate office and the factory level, while in majority of the others it was either at plant level or at the corporate office level. An environmental audit system was also in place in about 70 per cent of the companies.

Among the sectors that are most environmentally conscious, the chemicals and pharmaceuticals scored higher. The reasons are both stricter waste treatment and disposal guidelines from the government as well as the nature of their effluents to cause higher environmental impact. The mineral and mining sector also fared well with green policies prevalent at both corporate office and plant level. Engineering sector was found to be most weak in having eco-efficient policies and practices in place.

Overall the findings reveal that corporates have found that greening makes business sense. They are now increasingly investing in greener technologies and almost half of the companies surveyed planned to include environmental improvements in their expansion plans. Almost all of them had an environmental training programme in place and around 40 per cent rewarded better environmental performance by their departments.

### 6.5.1



Do you think the corporate world is recognizing the value of being environment-friendly? Would more incentives or more laws would make them still more environmentally conscious?

Can you think of some examples—products or practices—by companies which reflect this consciousness?

Is your school environment friendly? Are any environmental audits conducted in your school to know the expenditure on power, water, etc. and how to cut down on these?



#### **Pollution Control**

The Central Pollution Control Board (CPCB) is an autonomous body of the Ministry of Environment and Forests, Government of India.

The CPCB, along with the State Pollution Control Boards and Pollution Control Committee, is responsible for implementing the laws relating to the prevention and control of pollution.

These bodies develop rules and regulations which describe the standards of emission and effluents of air and water pollutants and noise levels.

## 6.6

1. If you were setting up an industrial unit, what steps would you take to ensure minimum impact on the environment?
2. What does the concept of 'Cleaner Production' imply? Why is it not called 'Clean Production'?
3. What do you think would be the most powerful incentive to make industries take steps to reduce pollution?

## 6.7

### The Golden Corridor

Given below is a scenario. Use this scenario as a tool to communicate/teach your students about major concerns with regard to setting up of industries.

The 'Golden Corridor' of Gujarat is an industrial belt of about 400 km length that runs along the main north-south highway, linking the southern town of Vapi, with the State capital Gandhinagar in the North. This area includes the large industrial estates in Ankleshwar, Nandesari and Vapi. These industrial areas contain thousands of individual industrial units, including dye factories, textile, rubber, pesticide and paint manufacturers, pulp and paper producers, pharmaceutical, engineering and chemical companies. This region is called the Golden Corridor because of the wealth that has been generated by rapid industrial development. However the price of this economic success has been, and continues to be, severe environmental damage. Industries have been dumping hazardous waste in the open. Not only has this polluted the groundwater but it has also damaged fertile lands. For example, in Bajwa, a village in the Vadodara district where industrial waste has been accumulating for the past thirty years, there is barely any agricultural land today that can be called 'good' in terms of soil quality and productivity.

Besides the land, the pollution has also affected the water resources here. Environmental impact assessments by the National Productivity Council, Gandhinagar, in 1997-98 showed high levels of lead contamination in the groundwater of Nandesari industrial estate. Samples taken from the area contained 38.25 milligrams per litre (mg/l) of lead, whereas the permissible limit is 0.05 mg/l for drinking water. The groundwater has been severely contaminated to a depth of about 60 m. Besides the groundwater, surface water resources have also suffered. There are reports that prove that pesticide, agro-chemical and dye factories in the region have been dumping untreated effluents in the river Khari. At Kolak village, about 15 km away from this industrial estate, statistics show that sixty people have died of cancer in the village in the past 10 years, while 20 others are fighting the dreaded



disease. Though no absolute proofs exist to link the pollution and the increasing number of cancer cases, the organochlorines and other persistent organic pollutants (POPs) present in the industrial effluents are known carcinogens. Villagers say that 20 years ago, cancer cases were not so prevalent. When researched, it was found that most residents of the village are fisherfolk who eat fish from the river Khari. Are there any connections?

Also farmers in the region, with no options available, are using the highly contaminated water of Khari River for irrigating their fields. If this continues, the crops of the region would soon absorb these persistent chemicals and would reach the apex of the food chain—humans. How? In a food chain, as one moves to higher trophic levels, the concentration of certain persistent chemicals builds up. This process of building up of concentrations of chemicals through a chain of living creatures is called **biomagnification** (more in Module 1). Continuous longterm exposure to chemical residues in food, air and water is hazardous. Each year, thousands of humans die from poisoning due to toxic chemicals, while many more suffer acute illness.

### **6.7.1 GOLDEN CORRIDOR: THE FEEDBACK**

(credit points: 5)

- a) How did you use this scenario in your class?
- b) What other teaching/learning activities did you undertake/conduct besides using this scenario?
- c) Share some responses/ideas/questions that your students came up with during this exercise?
- d) Comment on the effectiveness of this exercise as a teaching-learning tool.

