



degradation. IPAT equation describes the multiplicative contribution of population (P), affluence (A) and technology (T) to environmental impact (I) as below.

$$\text{Impact (I)} = P \times A \times T$$

where, P = Size of the human population

A = The level of consumption by population (P)

T = Processes used to obtain resources and transform them into useful goods and wastes.

On the basis of this model they concluded the following things:

1. In developing countries basically population, poverty and pollution are three key factors responsible for rapid environmental degradation which is called as P^3 syndrome.
2. In developed countries, use of natural resources with very high rate (high per capita use) is the main reason of environmental degradation.
3. Different applications suggest that different types of impacts relate differently to changes in population, affluence and technology.
4. IPAT applications are used to evaluate single variable measure of environmental impact, such as air pollution. For example, the *Intergovernmental Panel on Climate Change* has applied IPAT to studies of CO_2 levels.

1.5.1 Sustainable Development

Sustainable development is a process of betterment of life in all the sectors like economic, social, educational, health and sanitation, national security, food and housing, etc. In 1987, the *World Commission on Environment and Development* made sustainable development on the theme of its entire report (Brundtland report) “Our Common Future”. As per this report, sustainable development is defined as a form of development or progress that meets the needs of the present without compromising the ability of future generations to meet their own needs.

Sustainable development has three important components that are also highlighted in the Brundtland report. They are discussed below.

1. **Economic development:** This includes utilisation of natural resources, agricultural developments, industrialisation, creating job opportunities and raising the quality of life.

2. **Social development:** This includes providing the basic needs of life, like food, drinking water, shelter, fresh air, cloths, education, health and sanitation.
3. **Environmental protection:** This includes providing safe environment by means of providing clean air, water and soil.

The idea of sustainable development was strongly supported by the Earth Summit 1992, held at Rio de Janeiro, Brazil. In this summit, UN general assembly asked for a report on progress made towards sustainable development. It was the largest environmental conference ever held attracting 30,000 people and more than 100 heads of states. The biggest challenge involved in this summit was finance, consumption and population growth.

Sustainable development must be a part and parcel of our national development plan. It can be achieved by keeping the following points in consideration:



(a)



(b)

Fig. 1.8 Picture showing environmental degradation by (a) Industrial effluent and air pollution, (b) Air pollution by power plant

Source: Google.com

1. Controlling population and reducing substantially the population growth rates.
2. Reducing the over-exploitation of resources and enhancing the conservation of water, soil, energy and forest, etc.
3. Minimisation of waste production by performing recycling and reuse.
4. Enhancing the use of nonconventional energy resources.
5. Providing housing, health care and education to poor people, particularly in villages.

6. Encouraging the empowerment and education of women.
7. Arranging plantation programs in cities and villages and increasing people's participation in conservation of natural resources.
8. By making strategies for eradication of poverty.



(a)



(b)

Fig. 1.9 Picture showing environmental degradation (a) By floods, (b) By Tsunami at Sumatra
Source: Google.com



(a)



(b)

Fig. 1.10 Picture showing environmental degradation (a) By Earth quake, (b) By Volcanic eruption
Source: Google.com