Chapter Four
Environmental Impact Assessment and Sustainable Development

4.1 Introduction

The present era of fast development and growth is aimed at raising the quality of human life by providing greater opportunities for employment, better provisions of basic amenities and comforts, healthy environment ensuring physical and mental well-being of humans. Also growth and development lead to several environmental problems like pollution of the air, water and soil, depletion of natural resources, energy crisis, occupational health problems, and global problems like climate change, ozone layer depletion, and loss of biodiversity. Thus, development is bound to have certain environmental impacts. It was about 40 years back when it was realized that before a development project is started, prediction and assessment of its impacts should be done, so that measures could be taken to minimize those impacts. This concept was formulated as a methodical procedure known as **Environmental Impact Assessment (EIA)**.

Further, for achieving the goals of real improvement in the quality of human life, development should be based on sustainability principles. Thus, sustainable development aims at growth with judicious use of resources and causing minimum damage to the environment.

4.2 Environmental Impact Assessment (EIA)

Environmental Impact Assessment (EIA) is a procedure to plan some developmental activity with well-defined environmental goals so that damage due to the activity both during developmental stage and production stage has minimum impact on the natural system and the population in the area.

The National Environmental Policy Act (NEPA) U.S.A. in 1969 first of all provided the guidelines for environmental impact assessment through Council for Environmental Quality (CEQ).

4.2.1 Goals of EIA

(i) To fulfill the responsibilities towards the coming generations as trustees of environment.

(ii) To assure safe, healthy, productive, aesthetically as well as culturally pleasing surroundings.

(iii) To provide widest range of beneficial uses of environment without degradation or risk to health.

(iv) To preserve historical, cultural and natural heritage.

(v) To achieve a balance between population and resource use for a good standard of living.

(vi) To ensure sustainable development with minimal environmental degradation.

4.2.3 EIA Methodology

The basic steps followed in EIA are screening, scoping, base line data, impact identification, prediction, evaluation, mitigation, EIS preparation, and review and environment audit, involving public participation at various stages, as shown in **Figure 4.1**.

(i) Screening is done to see whether the project needs an EIA for clearance or not. Further, there are some prohibited areas where generally development projects are not allowed.

(ii) Scoping involves determination of the extent of EIA required for the project. Depending upon the project, basically two types of EIA may be carried out. When the EIA report is based on a single season data (other than monsoon period), it is called rapid EIA. When the EIA report is based on detailed seasonal data, it is called comprehensive EIA.

(iii) Baseline data gives a holistic picture of the overall environmental setting of the project location showing any significant environmental items prior to initiation of the action; any potentially critical environmental changes and information about the site to the decision makers and reviewers, who might be unfamiliar with the general location of the project area.

(iv) Impact prediction: Here magnitude of changes going to occur due to the project is predicted by using mathematical models or mass balance models.

(v) Impact evaluation: Impact evaluation is done by considering the costs and benefits of the project. Long-term effects and side-effects of the project are also evaluated. Indirect valuation of environmental parameters is also done, e.g. loss of a rare species, degradation of a lake etc.

(vi) Mitigation: Once the impacts are predicted and evaluated, mitigation measures are to be suggested to avoid, reduce or rectify the adverse changes due to the project. Review and a draft impact statement are prepared at this stage.

(vii) Decision analysis: Public participation is involved by arranging group discussion or by adopting questionnaire method to arrive at a decision about the project and its evaluation.

(viii) Environmental audit: It compares the impacts predicted in EIS before the project was started and actual impacts after implementation of the project.

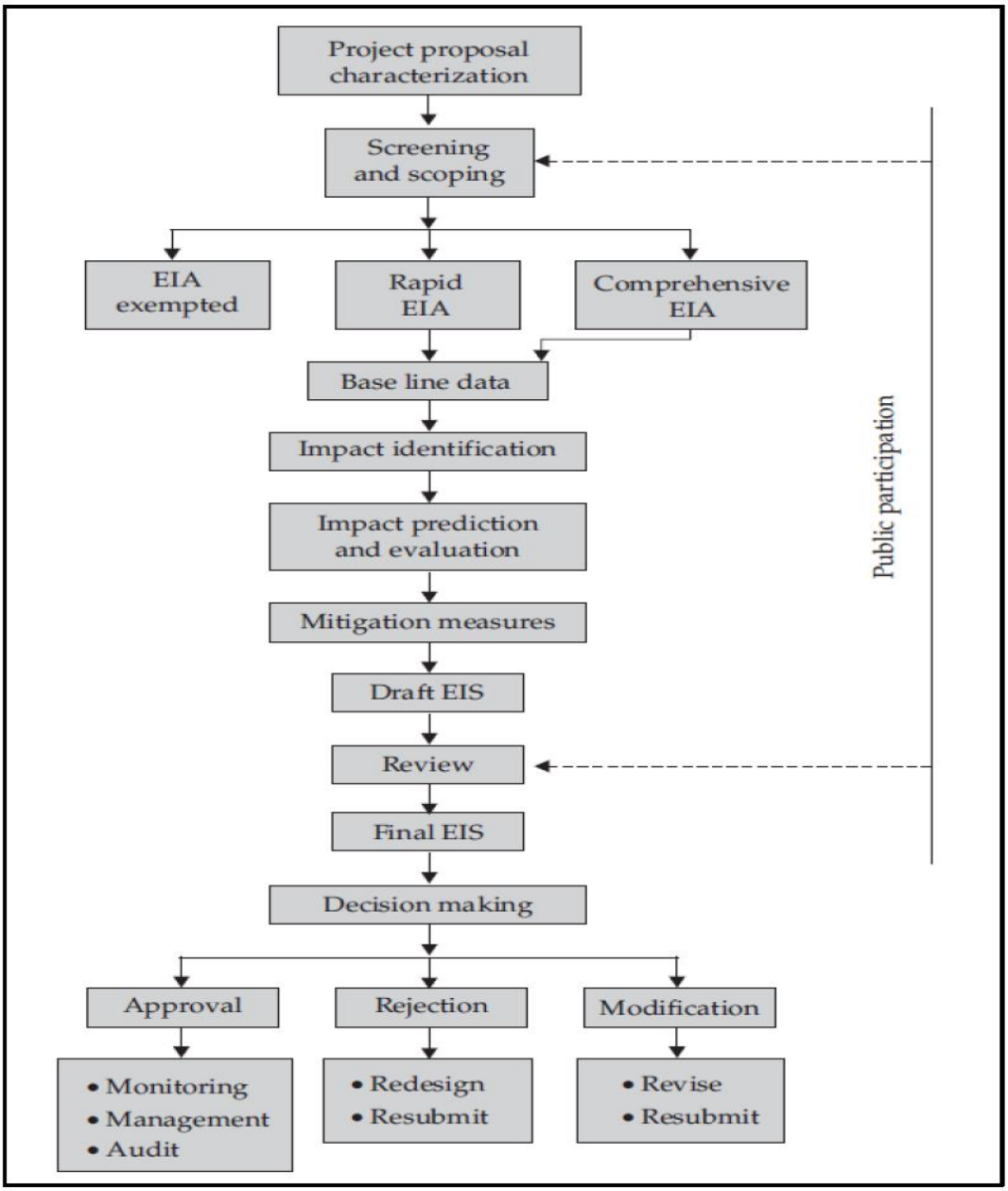

Figure 4.1 EIA Methodology Flow-chart

4.3 Sustainable Development

Sustainable development is defined as *"meeting the needs of the present without compromising the ability of future generations to meet their own needs."* This definition was given in Brundtland Commission Report, ''Our Common Future'', by the Norwegian Prime Minister, G.H. Brundtland, who was also the Director of World Health Organization (WHO). Today sustainable development has become a buzz word and hundreds of programs have been initiated in the name of sustainable development. If you want to test whether or not a proposal will achieve the goals of sustainability just try to find out the following:

- Does it protect our biodiversity?
- Does it prevent soil erosion?
- Does it slow down population growth?
- Does it increase forest cover?
- Does it cut off the emissions of CFC, SO×, NO× and CO2?
- Does it reduce waste generation and does it bring benefits to all?

These are only a few parameters for achieving sustainable growth. Until now development has been human-oriented, that too mainly, for a few rich nations. They have touched the greatest heights of scientific and technological development, but at what cost? The air we breathe, the water we drink and the food we eat have all been badly polluted.

The key aspects for sustainable development are:

a. Inter-generational equity: This emphasizes that we should minimize any adverse impacts on resources and environment for future generations i.e. we should hand over a safe, healthy and resourceful environment to our future generations. This can be possible only if we stop over-exploitation of resources, reduce waste discharge and emissions and maintain ecological balance.

b. Intra-generational equity: This emphasizes that the development processes should seek to minimize the wealth gaps within and between nations. The Human Development Report of United Nations (2001) emphasizes that the benefits of technology should seek to achieve the goals of inter-generational equity. This type of technological development will support the economic growth of the poor countries and help in narrowing the wealth gap and lead to sustainability.

4.3.1 Measures for Sustainable Development

Some of the important measures for sustainable development are as follows:

1. Using appropriate technology: is one which is locally adaptable, eco-friendly, resource efficient and culturally suitable. It mostly involves local resources and local labor. Indigenous technologies are more useful, cost-effective and sustainable. Nature is often taken as a model, using the natural conditions of that region as its components. This concept is known as "design with nature". The technology should use less of resources and should produce minimum waste.

2. Reduce, Reuse, and Recycle approach: The 3-R approach advocating minimization of resource use, using them again and again instead of passing it on to the waste stream and recycling the materials goes a long way in achieving the goals of sustainability. It reduces pressure on our resources as well as reduces waste generation and pollution.

3. Promoting environmental education and awareness: Making environmental education the center of all learning process will greatly help in changing the thinking pattern and attitude of people towards our earth and the environment.

4. Resource utilization as per carrying capacity: Any system can sustain a limited number of organisms on a long-term basis which is known as its carrying capacity.

5. Improving quality of life including social, cultural and economic dimensions: development should not focus just on one section of already affluent people. Rather it should include sharing of benefits between the rich and the poor and the population growth should be stabilized.

Thus sustainable development can occur by integrating social, scientific and ecological dimensions at regional and global level, as illustrated in **Figure 4.2**.

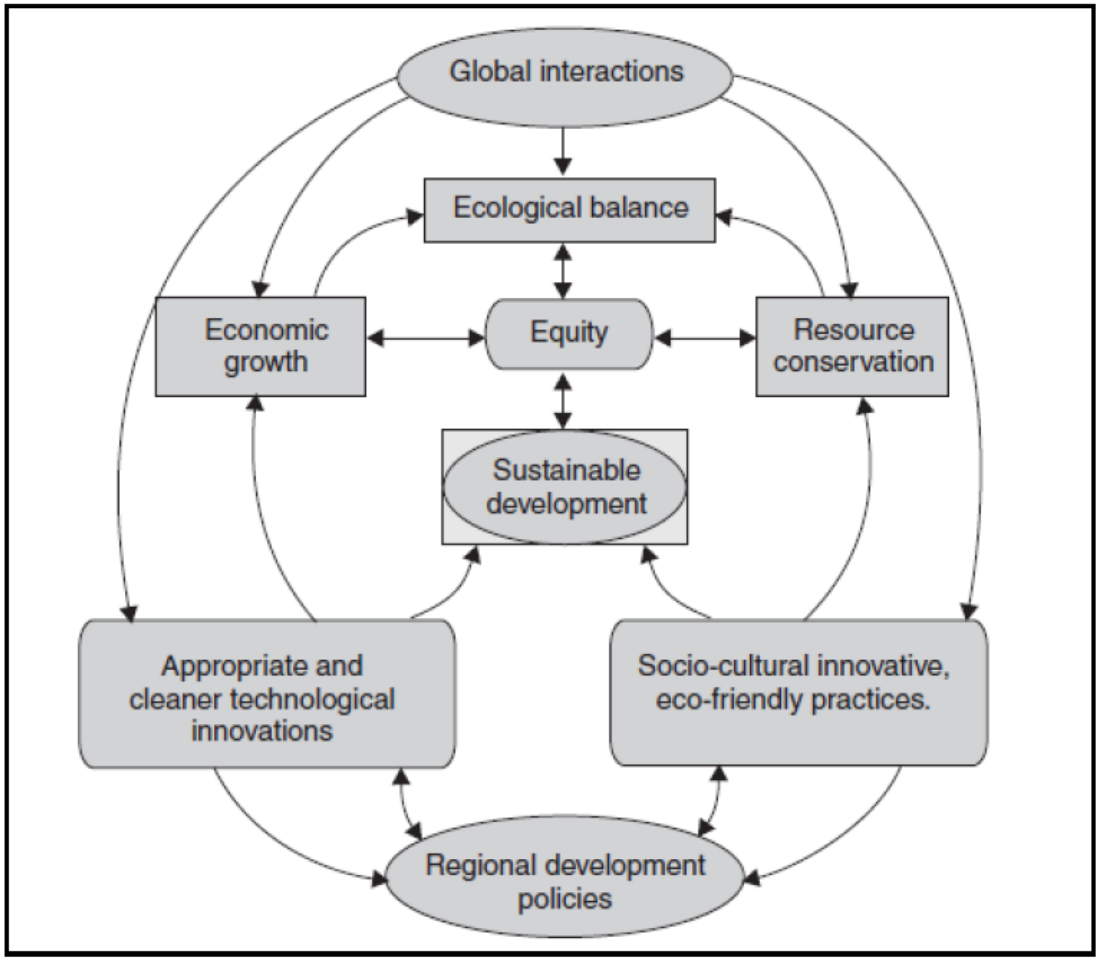

Figure 4.2 Multidimensional models for sustainable development