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Sustainable development A solution to environmental crisis: A review

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Human beings have created a world of social institutions and infra structure using science, technology and political organizations. Both of these are essential for survival of human beings. Throughout the history of civilization, humans have degraded and depleted; as well as restored and replenished the environmental resources. His activities have created both beneficial as well as adverse impacts on the economy as well as environment .Today it is an indisputable fact that environmental degradation is increasingly undermining our lives .Even most economically developed nations of the world have realized the need to prevent vast destruction caused to the environment on account of fast moving wheel of development, be it industrial, agricultural or development by any other name. Now this is the time for us to learn to apply the concept of "SUSTAINABLE DEVELOPEMENT". Sustainable development as a solution to environmental crisis .Its time for us to bring about a compromise between development and environment and not a compromise of one for the other. It is something like a "Friendly shake hand between Development and Environment" as against the past process of "Development at the Cost of Environment".

It is a fact that we will not be able to manage environmental crisis until we change our attitude, our consumption pattern, our manufacturing and marketing practices and get into a technological world that is less intensive in its use of materials and energy. We can save the nature by using our resources more efficiently. It is now accepted world wide that there has to be development that is rather sustainable than the one adversely effecting and destroying the environment. This has given rise to the concept of sustainable development. According to J.Kuldip Singh, sustainable development is a balancing concept between ecology and development. According to Meinhard Schroeder, that the natural resources such as forests ,seabed etc are not the fruits of the labour of present generation and thus, these resources can be exploited only with adequate consideration of the "rights" of the future generations. Accordingly, we can define sustainable development as "As the one that meets the needs of the present without compromising the ability of future generations to meet their own needs". A commitment to meet the needs of present and future generations has various implications. Let us elaborate this above definition to make it clearer "Meeting the needs of the present," means satisfying:

1) **Economic needs** - including access to an adequate livelihood or productive assets; also economic security when unemployed, ill, disabled or otherwise unable to secure a livelihood.
2) **Social, cultural, and health needs**- including a shelter which is healthy, safe, affordable, and secure, within a neighborhood with provision for piped water, drainage, transport, health care, education, child development, and protection from environmental hazards. Services must meet the specific needs of children and of adults responsible for children (mostly women). Achieving this implies a more equitable distribution of income between nations and, in most cases, within nations.
3) **Political needs** - including freedom to participate in national and local politics and in decisions regarding the management and development of one's home and neighborhood, within a broader framework that ensures respect for civil and political rights and the implementation of environmental legislation.

Meeting such needs "without undermining the ability of future generations to meet their own needs" means:

1) **Minimizing use or waste of non-renewable resources** - including minimizing the consumption of fossil fuels and substituting with renewable sources where feasible. Also, minimizing the waste of scarce mineral resources (by reducing use, reusing, recycling, and reclaiming).
2) **Sustainable use of renewable resources** - including using freshwater, fossils, and forests in ways that ensure a natural rate of recharge.
3) **Keeping within the absorptive capacity of local and global sinks for wastes -** including the capacity of rivers to break down biodegradable wastes as well as the capacity of global environmental systems, such as climate, to absorb greenhouse.

How sustainable development is a solution to environmental crisis ?

The concept sustainable development has gained a lot of importance in this present scenario of limitation of natural resources and at the same time degradation of these natural resources by human activities. Sustainable development does not slow down economic growth or technical development; rather it aims to achieve that sustainable rate of growth which is necessary to meet mans material needs while conserving scarce natural resources and protecting natural environment.

Sustainable development can be brought vis-à-vis its two different approaches viz,

(a) Development based on standards and
(b) Development based on best practicable means.-

a. Development based on standards:

This first approach requires statutory provisions for standards for each pollutant for air, water, noise, and soil pollution. A regular monitoring of each pollutant and its comparison with the prescribed limit will indicate the prescribed steps necessary for pollution control. However should their be any deviation from the prescribed limits, penal action could be taken against the polluter. This approach is reflected in various Ordinances and Legislations of our country. Some of them are:

1. The Air Act,1981
2. The Water Act,1974
3. The Environment Protection Act,1980
4. The Forest Conservation Act, 1980
5. The Wild Life Protection Act,1972
6. The Indian Forest Act,1927
7. The Central Motor Vehicle Act, 1988
8. The Factory Act,1948 .etc

In Addition to some of the above Ordinances, the Judiciary also plays a vital role in highlighting the principal of sustainable development through its various judgments given from time to time. For instance in The Taj Trapezium {M.C.Mehta Vs Union of India and Others (1997)} case, The Hon Supreme Court recognized the necessity of industries for economic development of the Nation but also stressed the need to take necessary steps to prevent danger to nature and national heritage through increasing industrial pollution . In another instance of, The Rural Litigation and Entitlement Kendra, Dehradun, The Hon Supreme Court again highlighted need to keep balance between environment and economic development. There are many other such examples in which the judiciary from time to time has stressed the need for environment protection through sustainable development.

b) Development based on best practicable means:

This approach is based on best practicable means. In this, one is free to adopt any suitable method, which is technically feasible as well as economical too. Some important sub – approaches under this are-

1) Sustainable Agriculture
2) Sustainable Transportation and Traffic Management
3) Sustainable Forest Management
4) Sustainable Land Management
5) Sustainable Water Management
6) Sustainable Human Settlement Development etc

1) Sustainable Agriculture

Sustainable agriculture strives for the integrated use of a wide range of pest, nutrient, soil, and water management technologies. It aims for an increased diversity of enterprises within farms combined with increased linkages and flows between them. By-products or wastes from one component or enterprise become inputs to another. As natural processes increasingly replace external inputs, so the impact on the environment is reduced. Since the mid-20th century, agricultural development policies have been remarkably successful at emphasizing external inputs as the

means to increase food production. This has produced remarkable growth in global consumption of pesticides, inorganic fertilizer, animal feedstuffs, and tractors and other machinery. These external inputs have, however, replaced natural control processes and resources, rendering them more vulnerable. Pesticides have replaced biological, cultural, and mechanical methods for controlling pests, weeds, and diseases; farmers have substituted inorganic fertilizers for livestock manures, composts, and nitrogen-fixing crops; information for management decisions comes from input suppliers and researchers rather than from local sources; and fossil fuels have replaced locally generated energy sources. The specialization of agricultural production and associated decline of the mixed farm has also contributed to this situation. What were once valued internal resources have often become waste products. The basic challenge for sustainable agriculture is to make better use of these internal resources. This can be done by minimizing the external inputs used, by regenerating internal resources more effectively, or by a combination of both. Sustainable agriculture, therefore, is a system of food or fiber production that systematically pursues the following goals:

- A more thorough incorporation of natural processes such as nutrient cycling, nitrogen fixation, and pest-predator relationships into agricultural production processes
- A reduction in the use of those off-farm, external, and non-renewable inputs with the greatest potential to damage the environment or harm the health of farmers and consumers, and a more targeted use of the remaining inputs used with a view to minimizing variable cost
- A more equitable access to productive resources and opportunities, and progress towards more socially just forms of agriculture;
- A greater productive use of the biological and genetic potential of plant and animal species.
- A greater productive use of local knowledge and practices, including innovative approaches not yet fully understood by scientists or widely adopted by farmers;
- An increase in self-reliance amongst farmers and rural people;
- An improvement in the match between cropping patterns, productive potential, environmental constraints of climate and landscape to ensure long-term sustainability of current production levels
- Profitable and efficient production with an emphasis on integrated farm management and the conservation of soil, water, energy, and biological resource.

When these components come together, farming becomes integrated, with resources used more efficiently and effectively.

2) Sustainable Transportation and Traffic Management:

The transport sector has an essential and positive role in economic and social development of any nation but the rapid expansion of transport sector that has led to increased level of pollution and has forced us to review existing transport system and for more effective design and management of traffic and transport system.

The following are some of the activities that can be undertaken under this head-

- Development and promotion of an appropriate cost effective, less polluting and safer transport system, particularly integrated rural and urban mass transit, as well as environmentally sound road networks, taking into account the needs for sustainable social, economic, and development priorities, particularly in developing countries.
- Facilitate at the international, regional, sub regional and national levels access to and the transfer of safe, efficient, including resource- efficient and less polluting transport technologies, particularly to the developing countries, including the implementation of appropriate training facilities.
- In accordance with the national socio-, economic development and environment priorities evaluate and as appropriate, promote cost effective policies or programmes, including administrative, social, and economic measures, in order to encourage use of transport modes that minimize adverse impacts on the atmosphere.
- Development of mechanism to integrate transport planning strategies and urban and

regional settlement planning strategies, with a view to reducing the environmental impacts of transport.

- In order to control pollution by transport vehicles steps such as Fuel Change, Engine modification etc can be taken.
- At time when we talk about steps to be undertaken to reduce transport pollution some steps must be taken for better traffic management such as reduction in number of vehicles, more public transport, smaller and lighter cars with small engines, park and ride, bicycle lanes, pedestrianization schemes.

3) Sustainable Forest Management

Sustainable forest management entails balancing today's needs with those of future generations. It emphasizes on sustained yield—a regular and continuing flow of production that the particular forest can sustain without impairment of its productivity. It aims to secure the long-term protection of the environmental "services" of a forest, notably its biological diversity, soil conservation, watershed regulation, and climatic regulation. It encompasses various activities of planning, operations, and monitoring: site quality assessment; forest stock and growth measurement; forest plan preparation; road and infrastructure provision; soil and water management to prepare and improve the site; silviculture (the tending of woodland) to alter the forest stock characteristics (tending, thinning out, felling, regenerating, or planting trees, and fertilization, to result in stands of desired species, age, and size composition); harvesting operations; yield control measures to keep outputs at sustained levels; and protection from pests, diseases, fire, and extreme climatic events.

In Europe and North America, most forests are managed. However, in developing countries, relatively few forests are formally managed. Much tropical timber production still derives from natural forest. Selective logging, with regeneration and "enrichment" planting, has been attempted, beginning around 1860 using principles developed first in central European forests. However, in most places this has been sporadic, as conditions have usually favored deforestation. The losses due to deforestation—in Pacific North America as well as the tropics—have generated public pressure to manage forests. With this pressure and with many timber production forests now also in demand for other goods and services, the goals of forest management in most countries are broadening. The emphasis is not only on timber yield but also on broader sustainable forest management. This covers the spectrum of forest objectives, from conservation to production, and usually involves multiple objectives. These may include several of harvests of timber, fruits, fungi, medicinal plants, and animals; soil and water conservation; biodiversity conservation; recreation; and landscape amenity. In addition, sustainable forest management entails balancing today's needs with those of future generations. This implies a greater role of foresters in broader land-use decision-making, as well as more participation of non-forestry interest groups in setting the objectives of forest management. In many countries, the roles of different forest users are under reassessment. Government forestry departments are looking for ways of sharing the rights and responsibilities for forest management. Where government resources are limited, and where local people have a particular dependence on forests, forms of joint forest management are being developed. In India, for example, there are many ways in which local communities, the private sector, and government are cooperating in sharing the burden, as well as the benefits, of forest management.

In forests more than any other ecosystem, demand is increasingly made that their must be preservation from any destructive commercial use, particularly the cutting of trees for timber, which in a virgin forest is known to have harmful consequences far beyond the loss of the actual trees (for example the loss of animal habitats, and soil erosion). Where tracts of virgin forest are given over to timber production, principles of management have evolved in order to minimize the destructiveness of the process and to make it as sustainable as possible. The management of forest trees for timber production involves three fundamental principles. The first is protection of the growing trees from fire, insects, and disease. However, fire, once regarded as a destroyer of forests, is now recognized as a management tool when carefully employed. Some important timber trees actually require fire for successful regeneration. Insects, such as the gypsy moth, spruce budworm, and pine sawfly, and disease, still take a heavy toll. However, biological control measures and some aerial spraying, proper cutting cycles, and slash disposal are increasingly effective. The second principle concerns proper harvesting methods, ranging from removal of all trees (clear-cutting) to removal of selected mature trees (selection cutting), and provision for reproduction,

either naturally from seed trees or artificially by planting. The rate and frequency of any cutting should aim for sustained production over an indefinite period. The third principle is complete use of all trees harvested. Technological advances, such as particleboard and gluing, have created uses for branches, defective logs, trees too small to be milled into boards, and so-called inferior trees. As demand for wilderness areas and recreational use of forests increases, management of commercial forests will become more intense.

4) Sustainable Land Management

Today land degradation manifests itself in the form of soil erosion (water erosion and wind erosion) of the soil. It is estimated that one third of worlds cropland is losing top soil that support flora and fauna at a very rapid rate. Also 50% of worlds range is overgrazed and is changing into deserts. The result is loss of productivity, both the grains and the livestock. At the same time, large-scale use of chemical fertilizers and pesticides further degrade the soil. So now, it is necessary to properly manage this resource of land and prevent its further degradation. This can be done in the following ways-

- Change in agricultural policies and caring for soil by preventing its pollution. Raising crops that do not require much pesticides, strip cropping, and raising draught resistant crops are certain sustainable agricultural practices that in turn promote sustainable land management.
- A well-developed integrated land use policy should be developed at the earliest, as also rural fuel wood and grazing and fodder policies to guide management of land and forest scientifically and sustainably.
- Land management in conjunction with water management needs to be the core of any agenda as both these resources are inter-dependent and cannot be dealt with independent of the other.
- Increasing the utilization of irrigation potential, promoting water conservation, and efficient water management along with expansion of irrigation facilities need urgent attention.
- Proper assessment of and nature of land and soil degradation using techniques such as remote sensing etc
- A threshold value for adding fertilizers or use of any other agrochemical needs to be defined.
- Pollution of soil must be prevented from toxic chemicals and other wastes by applying proper waste disposal techniques.

5) Sustainable Water management

Management of shortage of water and management of water pollution are complex tasks. These issues have drawn attention of both developed and developing nations as well as various national as well as international organizations. The groundwater quality has been deteriorating in many parts of the world. This vital resource is not only being depleted but also being polluted chiefly from human activities that are pouring massive quantities of pollutants into our aquifers (under ground sources of water).

Many rivers in India have sacred names. Yet hey have been subjected to misuse and converted in highly polluted water bodies. Rapid urbanization and industrialization are major sources of pollution of these water bodies. Its is time for us to develop a strategy for sustainable water management with some of following suggestions

- The price for water use in different sectors is fixed by the state governments and varies from state to state. The subsidy regime has on one hand encouraged inefficient use of the resource and on the other, led to poor financial health of this sector, resulting in poor service and user dissatisfaction. On the policy front, it is recognized that long overdue price reforms be undertaken. Water price reforms will encourage conservation on one hand and on the other hand will provide financial support to the government. It needs to be added that any attempts to rationalize water tariffs must go hand in hand with improvements in supply efficiency and service quality.
- In addition, it is necessary to introduce market-based instruments to arrest water misuse and quality degradation.
- Involvement of community in the management and maintenance of water projects.
- It is necessary to augment the available resources to the maximum possible extent. The need is to develop strategies such as surface-irrigation sources, rainwater harvesting and prevention of run off.

- Natural fertilizers and pesticides must replace the important sources of water pollution such as chemical fertilizers and pesticides. Applying and mixing the concept of sustainable agriculture management will also prove helpful in water management.
- Demand management has to form an integral part of water management. It is necessary that water management practice in the day–to–day use of water be encouraged through appropriate policies; promotion of low cost and water efficient technological options; R&D efforts and awareness building.
- Re-use option for domestic wastewater needs to be explored.

6) Sustainable Human Settlement Management

Many social and environmental problems have arisen from the rapid pace of urbanization. The vast scale increases in the use of technology and to a greater extent separation of cities from nature are in a way responsible for these problems. The unplanned growth and often dirty and sordid conditions of industrial cities have inspired city planners to build town ships combining scientific farming, communal living and progressive social principles. Business and industries can be screened from houses by vegetation. There is a recent move to shift businesses and people from the larger cities to small remote towns and rural areas. Some cities are changing from concentric set of suburban housing development to a polycentric complex of several urban townships interlinked by highways. By moving out of the cities, businesses will find land prices cheaper, lower taxes, parking spaces and less transport hassles. Suburban locations are closer to residential areas, airports, hotels, and other amenities. New buildings can be designed for the modern electronic offices, which is much easier than re-modeling space in old buildings.

In order to curb unplanned growth, the city survey office and the town planning department has demarcated the land into zones and specified the end use of the new buildings. Accordingly, no factories can be set up in the residential areas, and no buildings can be constructed in green zones reserved for greenery. Another way to control proliferation of buildings is the FSI (Floor Surface Index) restrictions. Under this system, a plot of land is permitted to have a building of a certain area only. In the rural area all, the land is deemed to be for agricultural purpose, in case of use of land other than for agricultural purpose a prior permission from appropriate authority has to be taken. Thus, by applying above-mentioned approaches of sustainable development both development and environment will to a far greater extent stay at comfort with each other. Moreover, neither of the two will be compromised for each other.

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