

Dilemma of development and environment: A perspective

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If industrialization and economic development are not based on the premise of sustainable development that is in harmony with a nation's carrying capacity (supportive and assimilative), India cannot realize the goal of alleviating poverty and improving the living standards of the majority of its population.

The notion of sustainable development has given the world's growing population a chance at prosperity without planetary degradation. Sustainable development demands restructuring of neoclassical economic structure that is based on open-ended consumption of material resources and growth. Doctrines of carrying capacity-based development call for ecological economy, wherein the use of renewable resources would only be at the rate not greater than the regeneration of resources and the use of exhaustible resources would not exceed the rate at which they are substituted by renewable resources. Ecological economy would help to preserve biodiversity and produce waste only at the rate at which it could be assimilated by the biosphere. The very existing patterns of production and consumption are ecologically dubious and are also inherently inequitable, which led to uneven distribution of goods and services across the globe. It is in the above context that the notion of sustainable development attempts to devise a win-win way or methodology to create a more livable future, which is presumed to be pragmatic and eco-compatible.

Axioms of sustainable development

The environment, with its biotic and abiotic components, while providing the basic resources that support production and consumption activities, assimilates the residues generated during the course of these activities. The limits to development are therefore defined by the supportive and assimilative capacities of the environment within the planning region. The crux of the carrying capacity-based sustainable development lies in the quantification of supportive and assimilative capacities of the environment and optimal allocation of resources to stakeholders for various developmental activities.

Production and consumption are recognized as two guiding directives to be applied in the search of models, which display characteristics of sustainability. Sustainable development attempts to identify and explain physical limits to economic growth and extraction of natural resources. Sustainable development is an embodiment of the symbiotic relationship between consumer human race and producer natural systems and compatibility between ecology and economics. It is a process of attaining a dynamic equilibrium in which exploitation of the resources, direction of investments, and institutional changes are made consistent with the future as well as present needs.

Equity and social justice, economic efficiency, ecological harmony and endogenous choices are identified as essential ingredients of sustainable development. The underlying correlation between population, poverty and pollution must be analysed against the backdrop of ecosystem capacity to provide supportive capacity for the development and assimilative capacity for the maintenance of the acceptable quality of the environment. Carrying capacity-based sustainable development is expected to explore a way to bring technology back to the observance of all indicators of sustainability. Safe minimum standards for the environmental assets are implemented as constraints into the optimization process of economics. The core requirement of sustainable development, i.e. current economic activity should not place a disproportionate burden on future generations, is thus accounted here.

Development and quality of life

The very meaning of quality of life has not been clearly defined, but the paradox is that, all the developmental activities are being justified against the backdrop of this dubious benchmark. The benchmarks, again as in most cases, are borrowed from and influenced by the Western mindset. It is high time we establish an unambiguous and realistic benchmark of quality of life, exclusively within the framework of the needs and priorities of our own society, consistent with our resource base and the ecosystem's resi-

lience capacity of the region. Our economic goal or any kind of developmental activity must be viewed with respect to this benchmark.

The most basic elements of quality of life essentially include safe drinking water, food security, safe shelter and sanitation. The very fact that about 80 per cent of our population has not been provided with proper sanitation and more than 50 per cent of the population does not have access to potable drinking water, clearly reveals the flaws or misplaced priorities in our economic and developmental policies. These policies must be harmoniously integrated with ecology which is inherently related to quality of life. We must realize that it is just not possible to mimic the Western way of quality of life. It is very shocking that 20 per cent of the world's population from developed countries consumes approximately 80 per cent of the total world resources. Mahatma Gandhi once said, that if the population of the entire world has to mimic this kind of quality of life, we need at least five globes to meet the requirement of resources.

Introspection of our priorities

It is quite appalling that, nearly more than 60,000 new chemicals are being pumped into the environment every year. Most of these are synthetic organic chemicals. Many of these chemicals are neither degradable nor safely disposable; thus an imbalance creeps into natural material cycles (hydro-bio-geo-chemical). This imbalance would ultimately induce instability in the symbiotic relationship existing between consumer human race and the ecosystem. The question here is, do we really need these myriad numbers of chemicals for the sustenance of our life? Were we not living without these chemicals just a couple of decades ago? Our scientific and technological abilities in producing such a vast array of chemicals/products should not be simply misconstrued as development without realizing their potential risk on human health and irreversible long-term ecological impacts. Most of these new chemicals find their application in the manufacture of pesticides, herbicides, dyes, paints, cosmetics,

drugs, perfumes, etc. Many of these products which were never heard of before have now invaded the consumer sector and have become part and parcel of our lives. We need to do some introspection of our present priorities *vis-à-vis* retrospection of our past priorities in order to arrive at sustainable priorities, which are a prerequisite for sustainable development. Following are the important issues that need to be addressed in this context.

- How many of these myriad number of synthetic chemicals and products which are posing a potential risk to human health and environment are inevitable for the life of the common man?
- If the products are identified as indispensable for life but not eco-friendly, can we substitute such products with eco-friendly products by restructuring and reorienting our present scientific research and technological efforts?

Green industries

Incorporation of ecological concerns into industrialization is an innovative, effective, and efficient strategy for enhancing the competitive edge of our industrial sector in the fast changing global market and economic scenario, with greatest concern for environment than ever before. Any industry or developmental sector that is insensitive to environmental concerns is bound to be unsuccessful in the new emerging era wherein the second phase of green revolution, i.e. 'The Industrial Green Revolution' is under way. Internalizing ecological concerns into industrialization need not retard the economic growth but, in fact, will trigger the evolution of the new breed of industries and products, which are expected to be inherently competitive and eco-compatible. Environmental concerns thus pave the way for a sustainable development in which eco-industry, eco-products, eco-market and eco-consumerism are the transformed and essential elements.

Future research needs

Our future research activities need to focus on the following:

- Modelling and simulation to conduct life cycle assessment of existing and emerging products, with regard to their potential health risk and ecological impacts.

- Major thrust on materials science and biotechnology to develop a spectrum of eco-products (bioplastics, bio-manure, eco-detergents, Ayurvedic medicines, etc.) to replace the existing non-degradable and toxic ones.
- There should be focused and committed research on non-conventional energy resources, which include solar and hydrogen systems, biomass-energy, tidal and wind energy systems. Environment-friendly automobiles and transportation systems based on non-fossil fuel energy should also be developed.

Environmental responsibilities

Desired environmental goals can only be achieved if we synchronize appropriate policies with scientific research and technological capabilities. For instance, research labs can produce eco-friendly products, but it is government's responsibility to protect its market by appropriate measures like incentives and tax exemption, with relevant disincentive measures on non-ecofriendly products. It is also necessary to predict and evaluate potential short-term and long-term health risks and ecological impacts of a new product before it is launched against the existing product or any substitute product with the same functional objective. This will help in making environmental ranking of the products and help the consumers to make informed decisions about their products.

Development and environment need not conflict

Towards the goal of sustainable development not only must we refine our notion of what constitutes a sustainable society, but also the means necessary to bring a sustainable society into fruition. Conservation and development need not be in perpetual conflict, but can, and perhaps must co-exist. The concept of sustainable development aims to achieve this. Economic growth is critical to development, especially in developing countries like India. The only caveat is that if economic growth is needed to realize development, it should be of sustainable growth mode and thus should not result in the depletion of capital or environmental assets beyond the rate of regeneration of these assets. Since the resource base, societal needs, pattern of waste generation and the region's assim-

ilative capacity are all specific to a region, mimic of developmental paradigm may be self-defeating.

It is imperative to consider what kind of development is appropriate for a given country or region. Still striving for basic needs, developing countries cannot find their way out of poverty by adopting the rusted technology the industrialized nations are leaving behind. Developing countries are in need of 'home-grown' solutions which are in harmony with their opportunities and environments. Irrespective of the mode of approach, the achievement of an ecologically sustainable form of development can be interpreted as a process that seeks to manifest high standards of living for human beings by enhancing their capabilities to live well. Apart from this, it should be recognized that this cannot be achieved at the expense of environmental and ecological integrity. Strategies for achieving an ecologically sustainable mode of development would undoubtedly vary according to country and region, as each would face somewhat different geo-environmental and socio-economic conditions and perhaps even conceptually different developmental goals.

Our ability to achieve the goal of sustainable development lies with technological competence and social commitment of research institutes, environmental regulating agencies, as well as the government's will in devising scientifically sound, pro-active or preventive strategies and policies for sustainable development and environmental protection. If we do not realize this before it is too late, the history of industrialized nations will repeat in our country also, not in terms of prosperity, but in terms of environmental disasters like polluted rivers, contaminated groundwater and addition of more and more cities to the category of most polluted cities in the world. Reactive approach to many of these problems is neither technologically feasible nor economically affordable for a developing country like India. The underlying characteristics of all such pro-active strategies, however, is that development is ethically good; it is a value-laden process seeking to make life better than what it is at present.

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