

Managing Environment & Natural Resources: A Challenge for the Future

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Abstract: Proper management of the environment and natural resources is a formidable task and a challenge that the World faces in the future. The issue has become a debatable subject and a sort of power struggle among vested interests. Priority usage and conservation of a particular resource differs with different stakeholders. Pursuance of selfish economic interests is bound to lead to diminished economic welfare of the society. Going beyond laws, rules and regulation we need to tailor our requirements for a lasting and sustainable economic development.

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Introduction

The enormous variety of natural resources on this planet provides everything for the survival of all forms of life including human being. Nature has been kind to human being right from the beginning. In the initial stages of the history of mankind, humans identified the gifts of nature and made use of them for their existence. While, the pre-historic human led a life of hunter and gatherer in the forests and produced everything for survival, modern society makes an extensive use of these natural gifts by using technological advances. Ever greater harvesting of land, sunshine, wind, water, mineral, forest and wild-life for the modern day comforts are putting an enormous pressure on all available resources. The question is whether or not the planet can sustain it for ever. Alarm bells have sounded since the signs of climate change have started appearing. Along with scientists, politicians and others the

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economists have also started raising their voices to evolve systems to sustain the pressure on resources and meet the economic development challenges of the future.

Economics is all about limited resources and their rational use. Left to market and price mechanism, it ends up in their irrational or extreme use. At some stage, sooner or later, economic growth and development is likely to be jeopardised. It is, therefore, essential that the socially responsible people in business and government take care well in time and manage properly the use of available natural resources. As the statistical data gathered in the last decade of the 20th century suggests the current century is heading for an overall scarcity and degradation of resources and thus an awareness must be created and a management system (ENRM) evolved now.

Economic Growth and Environment

Environment is essential for economic activity and growth and vice versa. Environmentalists argue that unconstrained economic growth will lead to the exhaustion of non-renewable resources and to levels of environmental degradation that will seriously affect production and the quality and existence of life (Meadows et al., 1971). Economists who believe in the effectiveness of market have responded to these arguments (Barbier, 1989). They believe that if market operates effectively, increased scarcity will raise their prices that will give incentive to changes in economic behaviour of the subjects. As a result of higher prices the direct consumption of these resources may fall; the use of higher priced non-renewable resources will decline; there will be an incentive to search for new supplies; and encourage the development of new technologies.

High economic growth strategists argue that growth contribution to environmental degradation has been overestimated. They believe that growth in developing world will increase the supply of new resources that can be used to reduce the degradation. Idea of such a simultaneous twin development has been supported by the World Bank. However, it has been felt state intervention will be imminent. Grossman and Krueger (1995) suggest that in the early phase of development the level of environmental degradation will increase and but shall improve on later. Whether or not their thesis prevails is to be seen.

Economic Thought and the Environment

Classical economists such as Thomas Robert Malthus, David Ricardo and John Stuart Mill were generally pessimistic about the possibility of continued economic growth. They assumed that laws of diminishing return apply to factors of production

i.e. the resources. With growth in population and thereby the labour force, technology being constant, the marginal product of labour will be reduced. Mill, however, believed that technical progress could offset the diminishing returns. Later, Alfred Marshall and Arthur C Pigou invented and developed the idea of externalities, but general environmental externalities were considered to be unimportant (Little and Mirrlees, 1969).

The debate on environment and economy started in 1962 (Carson). Many learned minds joined (Barnett and Morse, 1963; Boulding, 1966; Ehrlich, 1970; Forrester 1971, Meadows et al, 1972; Schumacher 1973). These contributions stimulated economists to examine the relationship between the environment and economy (Dasgupta and Heal, 1979; Kneese, Ayres and D'Arge, 1970). The debate has finally changed public view as well as views in governments and international agencies.

Natural Resources

Any material that can be transformed into a useful and valuable commodity can be called a resource. Thus, economics treats land, water, air, minerals, forests, wildlife, micro-organisms as well as human beings as natural resources. Any material may qualify to be a resource provided an appropriate technology is available to transform it into more valuable goods.

A variety of valuable materials are obtained from nature. This natural wealth of substances obtained from different components of nature include: (i) minerals (including precious metals), (ii) fossil fuels (coal, petroleum, and natural gas), (iii) non-conventional sources of energy (sun, wind, water, tidal waves, geothermal energy, biomass) (iv) products from plants, domestic and wild animals and (v) products from micro-organisms.

The direct or indirect sources of the above mentioned materials are thus atmosphere, soil, water and biodiversity that can be classified in different ways i.e. based on their (a) utility, (b) origin (organic or inorganic), quantity and extent of continued availability (i.e. exhaustible – that are renewable or non-renewable - and inexhaustible resources).

Over exploitation of natural resources by human kind has caused degradation of our environment. Major environmental problems that have emerged especially in the last quarter century are: air and water pollution, loss of bio diversity, global warming, climate change and ozone layer depletion, etc. One of the basic reasons of these environmental problems is the modern life style and developmental processes created by industrialization. Urbanization, industrial growth, transportation systems, agriculture, housing etc have all resulted in degradation of all natural resources. Lately, it has been recognised by all the nations of the world – developed and

developing – that there is a close relationship between development and environment. Unsustainable pattern of consumption and production of any natural resource can no longer be afforded or supported. Henceforth are the calls for sustainable development.

Sustainable Development

Much of the literature on the relationship between environment and economic growth is the result of concern on the present state of affairs. It is argued that current trends of economic growth can not be sustained by environment for ever. Such view is based on past and present economic growth policies (Lele, 1991). This concern is of major importance in the concept of sustainable development. The Brundtland Report (1987) defines the concept in the following words: ‘Sustainable development seems to meet the needs and aspirations of the present without compromising the ability of future generation to meet their needs’. The concept has gained wide acceptance and become a standard model of thinking about the environment, development and the economy (UN, 1993).

Evidently, the above mentioned environmental problems are the outcome of over exploitation of natural resources. But, there is no need to be disappointed and feel powerless to meet the challenge. We need to find alternatives to an alternative good – a goal which ultimately is the true goal of development i.e. ‘an environmentally sound sustainable development’. Naturally, it would imply discarding our habits of over-consumption and wasteful practices. Further, it would also imply that the future development process will have to rely on ‘on a change in all aspects of life in a way that causes little damage to environment’ and that it ‘follows a form of growth and development in society that meets the current human needs preserving/conserving the natural resources for meeting the needs of future generation as well’. Lately, such awakening has led to a world wide call for three R’s (Reduce, Recycle, and Reuse).

Conservation may be defined as the management (controlled utilization) of natural resources to meet the benefits to the present and future generations. There are two known methods of conservation, namely in-situ (in the natural habitat/area) and ex-situ (outside natural areas). The system of in-situ include: biosphere reserves, national parks, wildlife sanctuaries, world heritage sites, national monuments and cultural landscapes. The ex-situ conservation includes: botanical and zoological gardens; germplasm, pollen, semen and ovum banks; tissue culture and genetic engineering.

Forests and wildlife are not only essential for ecological balance of any area, but also a source of production of various goods and environment (e.g. check air pollution and soil erosion, save hill-slopes from landslides, attract rains. Forest

ecosystem is dominated by trees. They present a rich biodiversity, a wide range of plants, animals, and micro-organisms. These are renewable natural resource and contribute a substantial share in economic development of a country. Forests also contribute to environment by influencing the life supporting system. The stakeholders in forests are: people living in forests, governments and industries. All need to work towards a common goal of preservation of forests and wild life. For quite some time now the international agencies, various governments, non-governmental agencies, and some celebrities have taken keen interest in this mission.

Water is the source of life. In most countries agriculture is solely based on the supply of water for land irrigation. Its consumption in domestic and industrial use is in enormous quantities. Unlike land availability of water varies from places and time. The primary sources of water are: surface sources (lakes, rivers, streams); groundwater (wells, springs); and wetlands. Water scarcity is generally seen in those areas where there are no large rivers, diversion canals or storage and sufficient groundwater exploitation facilities. In the tropics the absence/insufficiency of rains may cause draught affecting food production. The burning problems of the day in context to water use are the global insufficiency and pollution. Accordingly, water supply management has become the prime job most governmental and municipal administrations.

Fossil fuels being an important source of energy and thus economic growth of nations has much discussed subject in economics. The world has been increasingly consuming this vital resource to boost its economic growth. Since this is non-renewable and exhaustible natural resource, its conservation becomes the most important challenge of the modern world. Immediate boosting the alternative sources of energy holds the key to the speed of future economic growth. Future innovations and improved technologies would play an important role in this context. In the meantime efficient and restrictive use seems to be the only solution.

Why an ENRM?

It was the 1929-33 Great Depression that motivated the famous Cambridge economist J. M. Keynes to produce his revolutionary treatise, 'The General Theory of Employment, Interest and Money' (1936) in which he propagated the maintenance of full-employment level and to 'never, again' see the collapse of the world economic system and experience the miseries of depression. In his view the depression of prices and speculative surge brought down the financial markets. Later, in his recommendations at the Bretton Woods meeting (1944) he suggested, among others, the maintenance of stable world prices of strategic products (raw material and

resource inputs). His recommendations bore fruits and for over a quarter of a century the global economy witnessed an unprecedented economic growth and increased employment levels.

The year 2008 started with economic turbulences. The first half of the year witnessed an enormous rise in the prices of inputs particularly food and energy. Oil prices jumped to almost 250 per cent and food prices by 85 per cent (incidentally, on an average, compared to the same period in 2007, in said year the input prices are just double). Year 2009 saw the collapse of prices, decrease in demand and thus prices, breakdown of financial system followed-up by a prolonged recession.

Economist strongly reason and respond by negation. However, every body will point finger at factors such as increased demand for resources caused by increased world population and fast economic growth in countries like China and India. On supply side the fast depletion of non-replenishible resources and degradation of renewable resources. Further, one could add to the list factors such as climate change, financial speculations, market inefficiencies, and institutional failures.

To us the most striking factor seems to be the lack of proper appreciation of the fact that for long the world has not cared enough for maintaining the supply of resources and least about the rational use of factors of production.

Evidently, Economics has for quite long relied on the growth of GDP as a sole source of economic development. In theory at least, the idea of 'sustainable economic development' is in currency over two decades now, but both the private sector and the governments have shown little practical interest in it.

It should however be stressed that in the 21st century, in a global unstable world market, we will have to come to terms with a balance of global demand and supply of all factors of production.

If we look at the concept of growth and development from microeconomic point of view, unambiguously we have to adopt a factorial approach i.e. any final product is the reflection of five Marshallian factors of production viz. land, labour, capital, technology and management. Accordingly, the future growth process will require 'rational use' of all the available factors of production.

We believe that the future world will be divided into countries that will 'have' and 'do not have' the resources. Since, resources will become scarce and scarcer, an 'efficient use' and 'sound management' will be the key to a sustained economic growth and increased economic welfare of the people.

Designing an ENRM Strategy for the Future

The frequently asked question these days is: Can the development trends of the past be sustained in the 21st Century? Fears persist that present patterns of economic

growth may seriously endanger the supply of global resources and degrade the environment making it difficult to sustain. However, the linking of value judgements and operational objectives to the concept of 'sustainable development' could make future growth possible. Future growth objectives could be defined as: increasing economic growth, meeting basic needs, involving more people in development process, controlling pollution, controlling population growth, conserving and improving the environment, accounting for the environment in economic decision making, changing technology, managing risk and changing global economic relationships, and so on.

Question that we may ask is should economic development be left unattended? Answer is: Definitely Not. The development experience of post-war years has shown that countries that have made concerted and managed effort to develop their economy (Japan, S. Korea, Singapore, Malaysia, and lately the Gulf States) have succeeded in such goals. Those countries that have struck a proper balance and put the resources to efficient use have scored enviable results. Therefore, new development strategies of sustainable development need to be designed. For this purpose we must make cross-country studies and manage the development of the future through regulated market of resources.

A review of various paradigms and critique of 'sustainable growth and development' is required to balance the development. A comparative review is needed of how the new institutional economics and development administration (centralized bureaucracies, market, and participatory institutions) deal with the operation of providing development services.

For this purpose an Environmental Assessment and Evaluation of the situation is required. Therefore, we need to review (a) environmental regulations and implementation policies (analysis of the policy process and instruments of environmental management together with examination of environmental management practices in relation to selected policy issues); (b) environmental impact and risk assessment (critical appreciation of the nature of environmental data – units of measurement, spatial and temporal variability, monitoring problems and strategies and error considerations – and impacts; hazard and risk management; (c) strategic environmental evaluation (understanding the strategic evaluation and appraisal –accounting and social auditing – techniques; and elements of environmental evaluation including neoclassical framework, market based instruments such as pollution taxes and cost benefit analysis.

The most important aspect that we should examine is the Environmental Management. Technical, economic, political, administrative and social forces influencing the quality of the environment and the use of resources need to be examined. Governments and industrial programmes to combat pollution of the air,

soil, and water must be designed. Legislation involving environmental and related energy matters must be re-evaluated.

As we know, in the past land and natural resource endowments were and today once again have become the most precious resource in economic development. Supply being fixed its rational use is vital for the future economic growth and development of society. In economic theory, the production function approach to the analysis of the sources of growth, land has been often used as a separate fixed factor of production. Given the importance of primary sector in the economic structure of the economies the physical attributes of land, extent of natural resources endowment, ownership and management system are likely to exert a major influence on the speed of development. The primary sector has four functions to perform i.e. (a) product contribution (supply of food, marketable surpluses), (b) factor contribution (labour and capital contribution), (c) market contribution (equilibrium terms of trade), and (d) foreign exchange contribution. In this context geographic factors such as climate has to be given due allowance.

Among the land resources we must concentrate particular attention to the following aspects:

(i) Food Supply Management

In view of the fast growing population of the world, increase in the per capita income of the people and alternative use of agricultural products there has been a sharp increase in the demand for food products. This has driven the prices up sharply. On the other hand the increase in the agricultural output is meagre. Coming years are likely to witness a substantial imbalance between the supply and demand. All countries will have to manage their food resources properly. Food surpluses will be a source of economic growth and the deficiency are likely to cause hunger, social unrests and negative growth.

(ii) Management of Energy Resources

An analysis of key issues involved in the exploitation of energy resources and their use is of special significance. The assessment of decision making and policy formulation at the levels of companies, governments and international organisations will be required.

A continuing study of an expanding supply at affordable prices is vital as an input to economic development, to the security of nations and well being of people. Access to affordable energy is thus a strategic issue. Therefore rational use of national energy resources is of utmost importance.

Additionally, though geological and other natural phenomena constitute the supply-side i.e. opportunities or limitations, the environmental considerations are playing an increasingly important part in energy production and use, developments

and decisions. In no way should we underestimate the increased demand for energy caused by growth and development in the developing world and thus having an immense impact on the energy prices.

A review of policies in international context is the core of an awareness of energy-use. To explore energy sources and boost energy production we need to review world's non-renewable fossil and fissile fuel resources. Interplay of geology, engineering and economics is vital in this context. Exploration, excavation, production, and processing of fuels require proper attention. For renewable energy resources such solar energy, biomass and chemical processes technology need to be developed. Today, at primitive stage, solar photovoltaic, wind energy, ocean thermal energy conservation, tidal and geothermal energy technologies are available. These need to be perfected. Trends in energy consumption, demand for energy, price structure, and distribution methods need further sophistication. Conservation methods in home, in transportation, industrial manufacturing and in commercial sectors need a strict follow-up. Laws of thermodynamics from a conservation point of view need to be strictly applied. Construction methods need to be developed for low energy consumption in small and large edifices. Conservation and management of supply of and demand for energy resources including petroleum, natural gas, coal nuclear power, and conventional forms require our urgent attention. Point of attention should also include energy legislation, instruments of energy policy, price mechanism, government's role, and institutional barriers to new technologies in extraction, processing and utilization.

(iii) Water Management

Water is going to be the most precious strategic factor in economic development of the future. Its scarcity (due to its increased use and natural factors) is very likely. Water is increasingly required in agriculture, industry, sanitation, and for drinking. It is going to have an unprecedented impact on the growth of food supply and civilian needs. Only countries with abundant water resources supply can count on brighter growth prospects. However, contaminated waters will pose a serious threat to humankind. Countries with water shortage will have to heavily invest in increasing the water supply. Accordingly proper water use management will become the need of the future,

(iv) The Exhaustible Natural Resources

The significance of limited supply of exhaustible natural resources – minerals, forests, fossil fuels, wild life etc., as limiting factor of economic growth has widely been expressed as early as 1970s. So far, the world leaders and the captains of the economy have only paid lip service to the fact. Suddenly, although slowly but gradually, we are experiencing the scarcity crunch driving up the prices of these

materials. This has proved to be a major cause of the slowing down of the engine of economic growth. In the future, each country will be forced to take care of its natural resources and put them to the most efficient use test. Companies and government alike will have to come together to pull an efficient system of management of natural resources.

(v) Waste Management

Post-war economic development experience has shown that fast economic growth was based on excessive use of resources, production push and high consumption levels. This has naturally led to an increase in garbage and waste. Recycling of waste resources and garbage is an economic and environmental problem. Proper waste management is the need of time. However, it has its cost as well as income aspect that need to be studied intensively. Waste management companies have an increased role to play in the future economic growth.

Conclusion

The above narrated description of the state of environment and natural resources in the world necessarily implies that their management is of great significance for the future economic growth of societies. This puts the burden on us as citizens, economists, managers and politicians to devise and implement appropriate policies both in private and public sector, countries will have to sooner or later face this tricky triangle of 'sustainable growth', 'availability of resources' and 'rational use or sound resource management'. The world urgently needs a grand and wholesome ENMR strategy for the future. It definitely poses a challenge for world community.

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