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Sustainable Development: Prism of Developing Countries

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Abstract

The paper makes a strong case for the pursuit of sustainable development in a proper historical and comparative perspective on the basis of incontrovertible cross-country experiences. Accelerating environmental changes, rapidly depleting potential economic value of finite resources and their attendant implications have been increasingly realised. Issues of environmental preservation, uncertainty and irreversibility necessitate an accent on renewable energy (RE) for life, biodiversity, climate variability, environmental sustainability, inter-generational and distributive equity. It isolates and identifies causes of extinction of various forms of biodiversity, explores and examines the role of indigenous people in sustainable development and brings into focus some of the salient features of the Biodiversity Treaty. It looks at the perspective of the developing countries with particular reference to India and stresses the need for the formulation of a coherent strategy for environment-friendly development because of the great dynamics of historic consequences. Towards this end, it brings into focus the concepts of common effluent treatment plants, cleaner production technologies, and environmental concerns in services, acquisition of ISO 14000, etc. The final section of the paper stresses the necessity of long-term planning and appraisal mechanisms and places matters in perspective.

Keywords: sustainable development, renewable energy, biodiversity, climate variability, environmental sustainability, inter-generational equity.

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Introduction

Considered in a proper historical and comparative perspective, access to modern energy has enhanced the standard of life for persons across the development spectrum. But over 1 billion people still lack access to modern energy services. Against this backdrop, achieving universal access and meeting growing energy requires a paradigm shift in the delivery of energy services, greater use of renewable energy and enhanced energy efficiency measures. This requires a sense of contextual immediacy because around 1.4 billion people have no access to reliable electricity (GTR, 2013) (estimated at 1.1 billion people still lack electricity in 2018, WEF), drastically reducing their chances of getting education and sustainable livelihoods. Simultaneously, more than 2.7 billion people are dependent on traditional bio-energy.

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The process of transforming unsustainable patterns of consumption and production and developing sustainable livelihood systemsneeds to be facilitated by a slew of measures. Such measures include resolving conflicts between the trade regimes and environmental agreements, integrating advanced modern technology with traditional practices and mainstreaming education to promote awareness, attitudes, concerns and skills. What is basically required is a paradigm shift in attitude towards sustainable development and a recognition of the inseparable nature of people and their habitat.

Concept of Sustainable Development

The Brundtland Commission set up by the United Nations in 1987 defined the term sustainable development as "*development that meets the needs of the present generation without compromising the ability of future generations to meet their own needs*". The enhancement of value for the stakeholder would then have to be done by addressing needs and adding environmental, societal and economic values through products and services. Hence, the concept of sustainable development does not merely imply "*a concern for the progeny*" but requires intermeshing of economic, social and environmental policies 'to ensure a better quality of life for everyone, now and for generations to come'. The strategy of sustainable development encompasses four basic themes of social progress that recognizes the need of everyone, effective protection of the environment, prudent use of natural resources and maintenance of high and stable levels of economic growth and employment. The goal of broad-based sustainable development (BBSD), which is equitable, participatory, and environmentally sustainable, must replace the narrower goal of economic growth. Good governance and sound economy-wide policies provide the basis for BBSD. These policies must, however, be complemented by several sector-specific policies to facilitate move towards BBSD.

The significance of preservation of biologically diverse organisms ('biodiversity') and its implications for life, sustainability and equity has been increasingly realized across the world. Biodiversity means variation and abundance of species. Total estimate of the species on the range and composition of organism making up the biota ranges from 3 million to 30 million. But only less than 2 million species of animals, plants and organisms have been identified. Yet, millions more exist. The terrifying dimensions of the alarming deterioration in the earth's vital life supporting eco-systems are starkly reflected in the fact that human activities, such as, agriculture, forest clearance and land under urban and industrial use account for 40 per cent of the annual net photo-synthesis production of the world. The deplorable trail of destruction runs through areas like coral reef, ancient lakes, eco-system of the Mediterranean climate region, tidal zones and tropical rain forests together with

devastation of terrestrial plant species - all of which are home to rare and endangered species of flora and fauna (Knoll 1984). Viewed in this perspective, the return of the reality is manifested in the growing sense of the dread. The destruction of wilderness and its concomitant extinction of species have had such a profound influence on natural evolutionary processes as to be characterised not only as leading to the "*death of the species*", but also as marking an "*end of birth*" (Soule and Wilcox, 1980). The main costs of biodiversity loss might not be the loss of genetic material but the loss of eco-system resilience and the insurance it provides against the devastating environmental effects of economic and population growth (Perrings, *et al* 1995). Evidently, such systematic annihilation of annual net food resources is inconsistent with the central theme of biological diversity and stability, which protects watersheds, local rainfall, food supply and soil (Vitousek, *et al*, 1986). Unless we cure ourselves of this need to consume, we kill the Earth - and ourselves. These and other uneasy thoughts require the removal of nettles that spike development and necessitate a look at the whole picture. All religions stress that the future of existing animals, plants and organisms in their present forms is inextricably linked to one another and they can survive only by being *"inharmony with nature*".

Dynamics of sustainable development

Sustainable development has implications for life, biodiversity, climate variability, environmental sustainability, inter-generational and distributive equity. The sustainability of fossil fuels is worked out by Reserves-to-production ratio (R/P), i.e., the extrapolation on the basis of the reserves at their present rate of consumption. Estimated global R/P ratios for the main conventional fuels are – Oil-46 years, Natural Gas-58 years and Coal-118 years. This brings to the fore the concepts of interrelatedness, of a shared planet, of global citizenship, and of 'spaceship earth'.

Sustainable development in a globalizing world stressesthe mutuality of activities. We cannot, however, be oblivious to the issue of "*common but differentiated responsibility*", whereinall nations must try and save planet but rich countries are expected to shoulder greater financial burden than poor nations.

The impact of equitable sustainable energy policies and programmes at both national and international levels requires a holistic approach towards sustainable development reflecting the inextricable connection between economic, social and environmental objectives. This necessitates mutually coherent policies or approaches in finance, trade, investment, technology and sustainable development, particularly because of the inter-linkages of the global village-"*vasudhaiva kutumbkam*", as we say in

Sanskrit. More specifically, the unsustainable consumption and production patterns jeopardizing the natural life-support system require improved design and establishment of effective institutional and associated legal and regulatory frameworks; improved policy measures; modernized forestry approaches; improved data collection and associated biomass energy planning; the provision of adequate financial and technical resources and effective mechanisms for transfer of technology. Accordingly, environmental concerns need to be dovetailed into development planning as indicated below in an attempt to formulate a coherent strategy for environment-friendly development:

Level	Integration of Environmental Policies and Procedures	Environmental Assessment Planning or Management Techniques Used
National	Environmental policy included in national action plan	• Environmental profiles • International Assistance Agency Country Programming.
Regional	Economic-cum-environmental development	• Integrated regional development planning. • Land use planning • Environmental master plans.
Sectoral	Sectoral review linked with other economic sectors	• Sector environmental guidelines. • Sector review strategy.
Project	Environmental review of project activities EIA procedures.	• EIA • Environmental guidelines

In view of the inherent limitations of the conventional approach, the focus of environmental problems now covers problems, such as, water shortage, crop failures, tropical diseases, flooding and extreme weather events condition. Going forward, all these problems could be exacerbated because of increased concentration of green house gases (GHGs) emitted by a vast number of highly heterogeneous sources.

Environmental self-annihilation has been instrumental in damaging land gradation, desert ecosystems, forests and wildlife, river and mountain systems, groundwater, wetlands and coastal eco-system. The survival of species and eco-system requires making the pursuit of sustainable development a credo by designing both appropriate energy programmes and appropriate energy delivery systems. Protecting and managing sustainable development is, therefore, a tall order, and requires maintenance of various elements of eco-system to enhance their economic value**.** There has to be enabling policy and operational frameworks comprising cleaner use of fossil fuels, improved use of traditional biomass, sustainable transport, biomass and systems approach, international, national and regional cooperation, gender issues and commitment to concrete measures with a sequential and well-defined timeline to give the world community a common set of environmental goals and aspirations.

Promoting environmental and economic sustainability requires reversing the trend of reporting standards that confine themselves to financial information or risks without questioning economic or societal risks. In sum, the background environmental processes need not be taken as exogenously given.

While some welcome measures by various agencies have been initiated, such measures need to be strongly reinforced by a different mindset, fostering of transformational changes, cross-sectoral decisions, macro-economic policy, the sensitisation of the common man to environmental concerns and realisation of the potential economic value of the eco-system for the markets and their attendant implications for sustainable development across countries. This would help to institutionalize sustainable development and develop pathways for our future development.

The goal of equitable, participatory, and environmentally sustainable broad-based sustainable development (BBSD) must replace the narrower goal of economic growth. Good governance for sustainable development at the local, national and global levels and sound economy-wide and sector-specific policies provide the basis for BBSD. Given the enormity of the issue, "*incremental changes*'', as Peter Bakker, President and CEO, World Business Council For Sustainable Development (WBCSD), stresses "*cannot be a strategy for sustainability"*.

In recent years, there have been widespread expectations because of the rapid growth of information technology, genetic engineering and revolutions in health and medicine. There has, however, been an increased awareness of the irretrievable destruction of our life support systems through toxic wastes, global warming, land development, climatic change and the widespread loss of bio-diversity. Accordingly, we immediately need to explore development options, which address the issues of

environmental stability, generational equity, distributive justice, etc. in a synchronised manner.

Important Developments

The Johannesburg 2002 Summit evoked wide interest with the participation of 104 Heads of State and Government in the Summit. The agreement of the Governments on several commitments in five priority areas supported by specific government announcements on programmes and the identification of more than 220 partnerships, representing $235 million in resources, to complement the government commitments marks headway. The major outcome, the Plan of Implementation, contained targets and timetables to spur action on a wide range of issues, including halving the proportion of people who lack access to clean water or proper sanitation by 2015, restoring depleted fisheries by 2015, reducing biodiversity loss by 2010, and, by 2020, using and producing chemicals in without harming human health and the environment. The Summit also generated concrete partnership initiatives by and between governments, citizen groups and businesses. But in view of unhappy past experience and myriad problems associated with financing, the implementation was grossly unsatisfactory.

Sustainable development does not need to be variously defined for the developed and the developing world, but plainly the environment for development has to be transformed. While global mechanisms to check the status and level of compliance have to be operationalised in every sector of industry, the priority areas relate to water and sanitation, energy, health, agriculture and bio-diversity and eco-system management (popularly called WEHAB). This would help to ensure that linkages between environment and health, environment and food, environment and poverty, etc. are examined in an attempt to find new and innovative ways of meeting people's needs, expectations and aspirations.

Bio-diversity: The Indian Setting

India is a mosaic of agro-ecological zones: each with its distinct species of crops, plants, animals and micro-organisms. India's rich biological diversity, its immense range of eco-systems (forests, wetlands, grass lands, deserts, marine areas, coral reefs, etc.), species (some 1.3 lakh recorded, many more yet to be disclosed), and genetic forms (50,000 varieties of rice alone) - is by virtue of its tropical location, climate and physical features. India's geographical composition is unique as it combines living forms from three major bio-geographical realms, viz., the Indo-Malayan, the Agro-Tropical and the Eurasian. India is designated as one of the 12 mega-diversity states in the world. Of the 12 bio-diversity places in the world facing massive threat to flora and fauna, India has two places, i.e., the North Eastern Regional and Western Ghats.

Bio-diversity Devastation

The unprecedented scale of destruction and devastation has brought into focus several inter-related issues. These include (a) the physical links between economic activities and change in the composition of the species in an ecosystem and the significance of the change in terms of its impact on the ecological services required for human consumption and production, (b) the reasons for the divergence between private and social valuation of ecological services and (c) the scope for minimising the cost in terms of biodiversity loss of damage inflicted upon habitat and options open to reduce damages to other habitats in the future. Human usage of all ecosystems relates to ecological functions, subsistence values and commercial usage (McNeely, *et al,* 1990).

Role of Indigenous People in Sustainable Development

Structural transformation, the process by which a traditional, agrarian economy evolves into a modern, industrial, diversified one is a salient feature of most countries. Cross-country experiences unmistakably bring out the significance of the participatory approach, local community involvement and conservation education in the preservation of biodiversity. Economic change invariably produces rapid socio-economic upheavals in transition economies with resultant stresses and strains in the milieu. This necessitates concurrent, objective and urgent tackling of three primary issues – compensating the affected individuals, reversing the damage to ecology and strictly monitoring the functioning of the polluting units so that they do not pollute any further. Participation of indigenous persons in development is a multivariate function of several determinants operating at the grass root level. Arrow and Fisher (1974) have illustrated how "*extinction of a form of life, the destruction of a unique geomorphological phenomenon, the toxicity and the persistence, indeed the increasing concentration, of the hard or non-degradable pesticides*" can cause irreversible changes in the environment produced by economic activity. Viable alternatives need to be devised for activities conflicting with community's objectives, institute transparent, regular and systematic monitoring process involving all partners, extension and training programmes and coordinating with various government agencies and other institutions, groups and individuals involved in this gigantic task. Success stories in India, as indeed elsewhere, demonstrate that local experiments, community enterprises and popular participation have led to some of the most remarkable achievements in sustainable development.

The Indian Bio-Diversity Bill incorporates provision regarding prior consent of the National Bio-Diversity Authority for access to biological resources from India. While these provisions would ensure prevention of bio-piracy in India and sharing of benefits arising out of traditional knowledge, this will not prevent persons seeking patents on traditional knowledge in other countries and also using traditional knowledge without prior informed consent and benefit sharing. Therefore, benefits

must be shared by the user country to create an enabling environment and confidence through legislative measures for compliance of prior informed consent stipulations and for ensuring equitable sharing of benefits as visualised in the Convention on Biological Diversity (CBD). CBD provides an accent on the conservation of biological diversity (or biodiversity); the sustainable use of its components; and the fair and equitable sharing of benefits arising from genetic resources.

The National Forest Policy 1988 stipulated that area under forest cover should expand to one-third of the total land area in the country. But, as India's State of the Forest Report 2019 shows, the forest cover in the country is just 21.67 per cent. Contextually, WWW-India's community initiatives, e.g., Ranathambore eco-development project; activities under project SERVE in Darjeeling, rehabilitation of sacred groves in Manipur, orchid cultivation in Apatani Valley and rehabilitation of Rhodorandon forests in Tawang, Arunachal Pradesh are both timely and welcome. These projects use joint forest management (JFM) as a tool for sustainable forest management with the cooperation of the local people. Against this backdrop, the attempt of the people to move ahead with the times without obliterating their distinctive identities acquires greater force in case of tribal and other vulnerable groups at the periphery. These leading issues coalesce in the central theme of reconciliation of conflicting objectives of development and eco-balance without exacerbating the pressure on the affected communities. Some of the most promising strategies to conserve wilderness around the world relate to debt-for-nature swaps, carbon credit offsets, conservation concessions, ecotourism, marine reserves, wildlife corridors, philanthropy and indigenous control. Apart from legal bans on hunting and trade in India, official attempts have focused on creation of vast protected area network of biosphere, national parks and sanctuaries.

Perspectiveof the Developing Countries

According to the Asian Environmental Outlook 2001, "*environmental degradation in (Asia and the Pacific) is pervasive, accelerating and unabated. At risk are people's health and livelihoods, the survival of species and eco-system services that are the basis for long-term economic development*" (ADB 2001). While developing countries saddled with three times more population than the developed countries, have been far less responsible for "polluting" the global atmosphere with GHGs, the contribution of developing countries to the worsening of environmental problems is increasing rapidly. A 'dualistic society', wherein environmental problems emanate basically from the greed of the rich and the poverty of the poor characterize most developing countries. Three rapidly accelerating trends are agricultural intensification, fast paced industrialisation and rising energy use, particularly, greater use of fossil fuels. Consequently, a wide range of environmental interventions, from local to international, are needed to safeguard both environmental quality and human health. The strategy of effective environmental management, *interalia,* requires expanding

water and sanitation coverage, tackling indoor air pollution, controlling disease vectors in the local environment, eco-friendly industrialisation by pollution abatement measures, reducing exposure to the worst offenders and cleaner production in the future, etc. Holistic development of developing countries requires the integration of the agricultural, economic, social, and environmental sectors of the economy with a judicious mix of practical, applied, and theoretical perspectives.

Indian initiatives

India provided for the protection and improvement of environment in its Constitution as reflected in the 42nd Amendment to the Constitution in 1976. While there were provisions already in existences in various enactment, such as, The Indian Penal Code, The Criminal Procedure Code, The Indian Forest Act, etc. to tackle environmental pollution, these were found either inadequate or ineffective or both in checking the pervasiveness and intensity of the degradation of the environment. Consequently, uniform laws for broad environmental problems endangering the health and safety of our people as well as of our flora and fauna were framed. Some of the milestones in this regard are The Water (Prevention and Control of Pollution) Act, 1974, The Air (Prevention and Control of Pollution) Act, 1981, etc. The widespread devastation caused by the Bhopal gas tragedy led to the promulgation of The Environment (Protection) Act, 1986to provide a single focus for environmental issues in the country and to overcome difficulties in the existing Act. Several amendments have also been made in various statutes to meet the emerging environmental requirements. Implementing a system of comprehensive enforcement of laws at the local level following the environmental regulation initiative is urgently required. While both the substantive and procedural laws relating to environment are inadequate and certainly need to be tightened, what is basically needed is social will, which precedes the law.

India's Capacity 21 Project examined sustainability issues and environmental governance at national level. Four focal areas of environment viz. air and water quality, common property lands resources, and biodiversity were considered at length. Methods of Environmental Economics, legislation, stakeholder participation in management, and empowerment of women, were some of the multi-disciplinary approaches used in assessing and managing the environmental resources and services. Capacity Building in these approaches is progressively perceived as an essential prerequisite for formulating sustainable development policies. There is a compelling need for multi-disciplinary approaches in assessing the true worth of natural resources, management of the natural resources through innovative ideas in planning, monitoring, and policy to analyse current approaches, best practices, and new methodologies. The issue of resource allocation at local, regional, state and national levels and reforms in policies and legislation for sustainable development is also important.

The Ministry of Environment and Forests (MoEF) is the nodal agency for the management and control of hazardous substances that include harmful chemicals, wastes and microorganisms. The MoEF have progressively attempted to foster and disseminate clean technology and environmental management through propagation of ISO 14000 and EMS, greening the supply change, environmental due diligence, transformation of management systems to become an improved sustainable urban environment through better management techniques, governance, partnership with industry and civil society and establishing a policy framework to sustain a clean movement all over the country. The MoEF implemented "India: Environmental Management Capacity Building Technical Assistance Project" (EMCaB) with World Bank assistance. EMCaB aims to enhance environmental management capacity in selected areas of environmental management, e.g., Environmental Economics in India across the full range of issues, such as, priority setting, cost-benefit analysis of alternative policies for pollution control, resources management and biodiversity conservation.

Strategy for environment-friendly development

Environmental problems emanate from land degradation and depletion of natural resources; human settlements unfit for living due to inadequate shelter, sanitation and water supplies; soil, water and air pollution; and global issues like global warming, ozone depletion and loss of bio-diversity. Accordingly, environmental concerns need to be dovetailed into development planning in an attempt to formulate a coherent strategy for environment-friendly development. The past failure of development planning processes to adequately consider the detrimental impact of economic development led to the emergence of environmental impact assessment (EIA) processes. The cost-benefit analysis of projects must factor in appropriate discount rates, substitutability and the assurance of inter and intra-generational equity. This needs to be processed through institutional regulation, community participation and education. EIA processes, therefore, need to be made an integral part of development planning to check ravages of unwise development.

As the traditional approach was demonstrated to be “dangerously inadequate”, the focus of environmental problems has now expanded to encompass problems, such as, global warming, the destruction of the ozone layer, acid rain, the management of rangelands, eutrophication of lakes, pollution of estuaries trans-boundary movement of hazardous waste and environmental problems in developing countries (Nordhaus, 1990; Costanza, 1991; Walker, 1993). Cohesive efforts for dealing with environmentally sustainable economic development could be based on four pre-requisites of renewal based on the natural laws that govern human growth and progress (a) the rate of regeneration must be greater than or equal to the rate of rate of harvest; (b) waste emissions should not exceed the renewable assimilative capacity of the micro-environment; (c) the rate of exploitation of non-renewable resources must

always be less than or equal to the rate of creation of renewable substitutes; (d) and in case an existing renewable resource is to substitute for a depleting non-renewable resource, the rate of harvest of this resource must be strictly less than its rate of regeneration to the extent necessary to prevent this substitution. India resolved on June 5, 2001 to adopt several measures to check the rising level of environmental pollution in the country. The translation of these policy pronouncements effectively into practice requires two broad sets of policies examining the broader, holistic picture and disaggregated, granular data at the local level. More specifically, this requires strengthening of the positive links between development and the environment; and focus on specific environmental problems.

Environmental Pollution

The process of industrialisation squeezed infrastructural and natural resources. Pollution affects river water and land, besides polluting air and posing health risks. Consequently, environmental self-annihilation has been instrumental in destroying rain forests and green cover on an increasing scale because of outdated and inefficient technologies that generate large amounts of wastes, large and unplanned industrial conglomeration, inadequate resources for enforcement and implementation of pollution control programmes, lack of public/market pressure for improving environmental performance, performance of labour-intensive or capital-intensive industries. Hence, pollution needs to be holistically tackled on a war footing by building a framework for different scenarios, formulating proactive approaches to change related to business performance and formulating practical steps. Here co-ordination of environmental policy incentives and programmes between Central, State and local governments, between different administrative institutions and ministries and between institutions themselves is sorely needed. This requires transcending sectoral approaches and adopting an integrated to resuscitate rapidly depleting resource endowment. Some of the basic elements of such a strategy could emphasise regulation for use of less polluting materials, introducing clean technologies and recycling of waste streams- either on site or as a useful by-product; training, technology transfer and development; support for fulfilling environmental conditions and technical incentives for research and development facilities and promoting non-government organizations (NGOs).

While environmental problems stem from intensified use of natural resources, the process of development can also lead to development and use of environmental protection technologies. Institutional factors like mode of production, patterns of ownership and systems of employment have significant environmental implications-implications not often adequately analysed or even understood. Hence, all these aspects need to be factored in for a comprehensive assessment and perspective. Further, the present-day world is characterised by (a) remarkable economic development and (b) greater energy use and production, which have contributed to

worldwide environmental degradation. In recent years issues, such as, (environmental) Life Cycle Assessment (LCA) of products, Ecodesign, etc. have become important instruments for companies to improve the environmental performance of their products and production processes (by examining the greatest environmental impact and scope for improvement). This could lead to both internal (improved efficiency) and external (perceived image) advantages.

The concept of common effluent treatment plants (CETPs) for clusters of industries has gained prominence. While CETP has the advantage of reducing wastewater of individual industries up to the desired concentration by techno-economic solutions, CETPs could themselves increase pollution loads through contaminated wastewater and large quantities of toxic sludge generated in the process. Wastewater management projects are not widely practiced and are limited to places with at least a modicum of environmental regimes. Accordingly, economic analysis of such projects is conventionally confined to a least cost-analysis without gauging the environmental impact in monetary terms (Dole 2002). Important issues in measures for optimum efficiency relate to ownership aspects - government, consortium of industries or an independent body, conveyance system through gravity flow, by tankers, etc., cost-effective treatment supported with a system of regular collection/ payment of treatment charges by each member unit while maintaining its effluent quality within acceptable norms, criteria for cost-effective based on the volume of effluent, consideration of dilute streams and conveying highly toxic waste to CETP, appropriate design of CETP based on low capital investment and lower operation and maintenance cost. Cheaper and easy to use biological methods of treatment can also play an important role in effluent treatment.

Enhanced eco-competitiveness agenda for industry requires: **(**i) Move towards zero emission and zero effluent goals; focus on holistic recovery and recycling strategies, attack inherited pollution, and create wealth from wastes, (ii) Adopt an integrated approach towards environment, quality, health and safety; look beyond ISO 14000, address safety and emergency response issues and adopt eco-labelling to indicate that the certified product is environmentally more eco-friendly as compared to other non-certified products in the identical category, (iii)Translate cutting edge technology into environmental benefits; focus on biotechnology upgradations, environmental and processed management solutions and accelerate research, (iv)Utilise new markets for environment trading and CDM projects; implement efficient, reasonable and clean energy technology projects and introduce carbon accounting and (v)Adopt environmental performance as corporate social responsibility; attain global eco-competitiveness; focus on green business opportunities.

These issues need to be pursued by strengthened linkages between formal and informal / non-formal institutions by focussing on the set of possibilities that have now emerged rather than the constraints that have always been there. What is

basically needed is strategic direction, extensive consultation, business creativity and innovative market solutions together with a long-term partnership between business and government. This conceptual shift has several facets, including a thrust on capacity building activities to help businesses enhance their competencies and practices for greater common good.

Imperatives of Cleaner Production Technologies

Attempts need to be made to strengthen the relationship between business and environment and to provide sign posting to businesses. Rising industrialisation without proper treatment of effluents exacerbates pollution levels. Cleaner production (CP), which is the continuous application of an integrated preventive environmental strategy to processes and products to reduce risks to human beings and the environment, can promote the control and management of industrial waste.Cleaner production leads to financial benefits through energy savings, waste reduction, waste conservation and higher–quality-output. Consequently, most industries could reduce the consumption of resources by 10-15 per cent with more efficient production processes and therefore better bottom lines. The principal cleaner production technologies relate to 1. Source reduction 2. Recycling and reuse and 3. Product reformulation or modification. Source Reduction impliesi) good housekeeping and ii) process change - Input material change - Better process control - Equipment modification- Technology change. Recycling and reuse involves on-site recovery/reuse; and creation of useful by-products. Product Reformulation or Modification comprises input material change; equipment modifications; and process modification. Firms, however, are reluctant to install cleaner technologies because of the difficulty in accessing finance, the high cost of investment *vis-à-vis* perceived benefit in some cases and insufficient mechanisms in terms of regulations and monitoring and enforcement measures to push firms to internalise the environmental cost. There is thus a considerable potential to move ‘upstream’ to cleaner process technologies and materials.

Technology practices adopted in the industrial sector vary widely with the manufacture of an array of products. But the fault lines of the conventional process and pattern of development are real and worrisome. Hence, the impact of industrial waste on the environment necessitates ever-higher standards for waste minimization ranging from good operating practices to modification of the production process through assistance for pre-competitive industrial research in the environmental field and to involve business in an exercise to agree on benchmarks and targets for each of major energy-using industries. This requires adoption of technologies and best practice techniques for environmental benefits among industrial units, preferably technologies for process changes in industrial units.

Environmental concerns in services

Transforming needs of the manufacturing sector together with growing expectations of customers influence service industry considerably. The service industry needs to adopt an eco-friendly approach to its business through a holistic approach of cost reduction, increased productivity, conservation of resources and environment. A different strategy from manufacturing is needed to maintain eco-balance in the services sector because of the sectoral peculiarities, viz., different nature of the operating process, difficulties in measurement, quick manifestation of quality deficiency, the impossibility of predetermination in quality, etc.

Acquisition of ISO14000

Initially, the emphasis on controlling industrial pollution was at discharge points ('end of the pipe'). This process aimed at cleaning up emissions prior to discharge. Important technologies in this regard included settlement/ centrifugation/ floatation (to separate high/low density materials from water/ air), membrane filtration (physical separation for a wide variety of materials), ion exchange (e.g., for recovery of metals and electrically charged coatings), evaporation/ condensation/ distillation (e.g., solvent recovery from waste coatings), absorption/ desorption (e.g., solvent capture and recover from gas streams). Accordingly, pollution control became auxiliary to the production activities without forming an integral part of the blueprint of development. However, increasingly stringent legislation, development of economic policies and measures to foster environmental protection and the growing concern of individuals, groups and societies about sustainable development necessitated a paradigm shift from pollution control to Environmental Management System (EMS), such as, ISO 14001 and Eco Management and Audit Scheme (EMAS). These measures have provided an impetus to checking of industrial pollution on an increasingly larger scale. It is now necessary to adopt ISO 14001 plus approach and create/designate a national accreditation body in the country and engage competent groups of environmental auditors/certifying agencies.

Financing Issues

Interactive and mutually reinforcing strategies, viz., strengthened institutional capacity, public-private partnerships and synchronized relationship between government agencies, UN bodies, business and industry, non-governmental organizations and academia reduce ubiquitous risks. Given the humungous investment requirements in RE, we need to identify financing issues, viz., their higher capital-intensive nature with lower O&M cost, exposure limit of banks to sectors, inadequate sector-specific risks awareness among financial institutions and solar

project viability apprehensions. An attempt also needs to be made to briefly examine sources of financing, viz., debt finance, equity finance, multilateral funding, clean energy funds and role of Development Finance Institutions (DFIs).

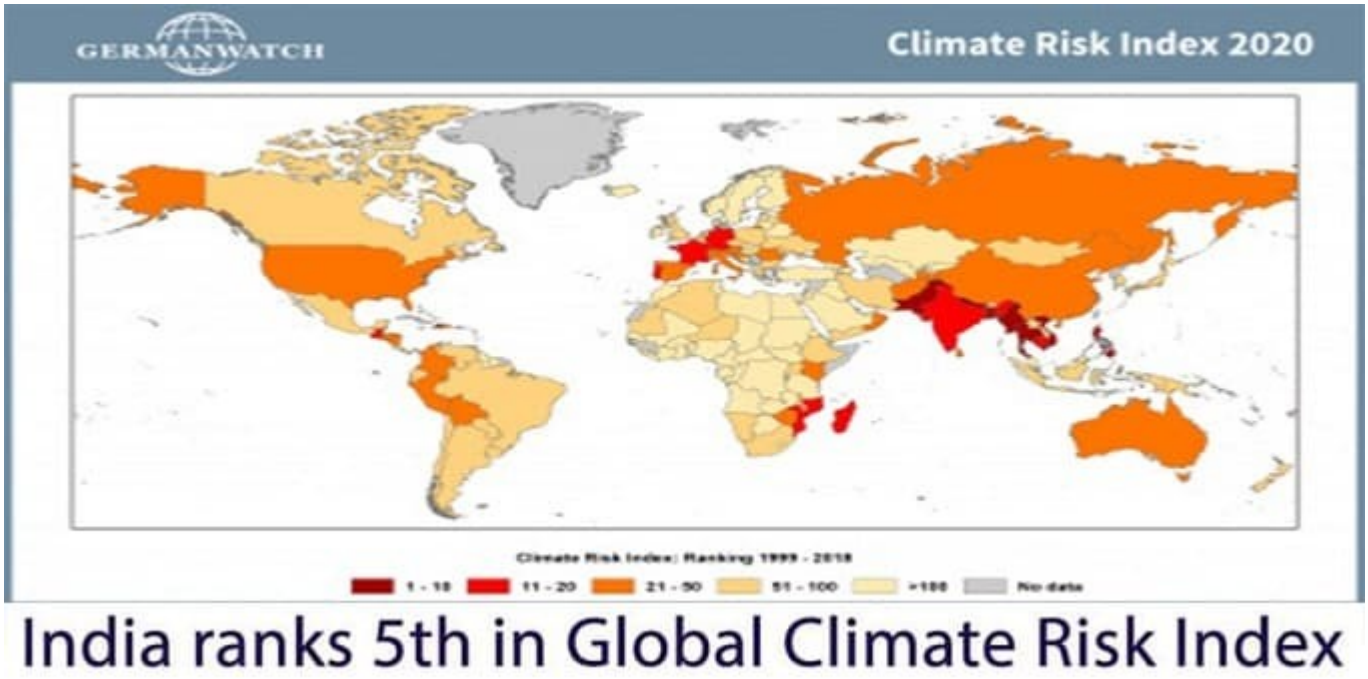
The survival of species and eco-system requires making sustainable development a credo by designing both appropriate energy programmes and appropriate energy delivery systems. The market for energy efficient products and services in India stems both from regulatory impetus and commercial incentives for industrial process efficiency. Some of the basic drivers of RE are energy security, energy deficit, abundant renewable supply and potential, climate change, government support, energy access and increased competitiveness of the sector.

Basic issues hampering the growth of the sector relate *inter-alia* to high cost and short-term debt; low availability of debt for RE sector because of non-conducive bank policies, restricted foreign borrowings and inadequate equity for new projects. Accordingly, action-oriented, time-bound outcomes approach requires transfer of energy technologies, enabling policy environments, greater private sector involvement and proper appraisal mechanisms. All stake-holders, viz., government, financial community, RE developers and distribution companies need to work in a coordinated and concerted manner with a sense of urgency to meet the challenges of the present and the expectations of the future. This requires strengthening of schemes to improve access to domestic and foreign debt; amend existing lending policies; enhanced capacity building; greater understanding of viability of financing energy efficient projects, type and size of projects; and replicating best practices across geographies. There is also a compelling need to assess and mitigate technical risk, commissioning risk and performance risk and Energy Service Company (ESCO) Appraisal by credit line to an ESCO and energy efficiency project specific financing.

Climate Change

India is greatly susceptible to climate change because of extensive poverty, population density, high reliance on natural resources, and a stressed environment. By mid-century, the mean annual temperature in India is projected to increase 1.1º to 2.3 º C under the moderate climate change scenario of the Intergovernmental Panel on Climate Change (A1B), with expected deterioration of agro-climatic conditions. In terms of a severely stressed scenario range, the loss to Indian GDP would be greater than the world average, and could be close to 5 per cent. Simultaneously, there is likely to be greater variability in rainfall, leading to higher risk of increased frequency and severity of droughts, floods and cyclones. India is ranked as the fifth largest emitter of greenhouse gas emissions in the world. India is, however, a low carbon economy because of relatively low intensity of emissions per unit of GDP, low per

capita emissions (10 percent of the developed country average) and stabilized forest cover. However, India's emissions could rise faster because of the process of accelerated growth and structural transformation. Five elements of a robust climate change strategy are macroeconomic context, analytical framework, sectoral transitional mapping, technology & financial mapping & institutional arrangements. There has to be a coherence between them required for short-term dips & long-term recovery with an accent on climate change. Global Risks Report 2021 stresses managing risks, building resilience & leveraging new opportunities with an integrated approach. There is a manifest need to reset current systems & build better economies & societies with people & societies at center-stage.



Roadmap Ahead

An optimum combination of programmes for each area by considering cost, environment and convenience needs to be worked out urgently. The commonality of interest requires equitable allocation of resources, attention to quality of economic growth, new technologies for efficient resource use and need-oriented economic and ecological development. In the Indian context, empowering local government and people, increasing afforestation and preventing swamping of traditional social and cultural systems would also help promote a more eco-friendly pattern of development. What is called for is the broad basing of the development process - different programmes ought to be looked at not in isolation but as part of an organic

whole. Some of the basic elements of the resuscitation strategy relate to vigorous efforts to promote and facilitate industry action for environmental improvement and management, dissemination of business-related information on climate change, energy efficiency and climate friendly technology and providing technology intermediation and business to business match making services to support the environmental initiative of industry, Government and international agencies. Sustainable development implies integration of environmental, economic and social needs in bringing about an enhanced standard of living in the short-term and a net gain or equilibrium among human, natural and economic resources to support future generations.

In the context of developing countries like India preoccupied with the task of attaining higher growth rates, it is important to consider the concerns of ecologically productive and sensitive areas of the country. Sustainability requires alleviation of poverty, a decline in fertility, the substitution of human capital for natural resources, effective demand for environmental quality and a responsive supply. The process of development itself also generates considerable environmental degradation. Ineffective action on environmental issues emanates from the prevailing mind set, which emphasizes development at the cost of environment. This could be attributed to the myopic short-term perspective that a transition from an agricultural or rural economy to an industrialized and urban economy invariably causes a rise in pollution. However, the pollution levels might fall later. Recognition of inherent complimentarity in the long run needs to replace the perception that the roles of environment and development are essentially conflicting and adversarial and the self-sustaining regime of preconceived and unexamined expectations needs to be expelled immediately. There ought to be *a priori* recognition that in the ultimate analysis, eco-friendly development is often the best, sometimes the only method, of enhancing economic development. There is no unavoidable trade-off between environment and development objectives and a synergistic relationship exists between growth and employment, employment and environment and environment and growth.

Environmentally unsustainable practices turn out to be more expensive in the long run-in terms of human and health costs and loss of capability. We need to carry out a paradigm shift for effective long-term policies with pragmatic approach and strategic focus. Spearheading the delivery of this vision requires comprehensive strategy, collective effort and shared commitment in promotion of eco-friendly development for sound and sensible growth over the long haul. The role of voluntary environmental initiatives (VEIs) and agreements (VEAs) as an alternative tool of bringing in environmental discipline that satisfies the concerns of all stake holders - the government, industry, neighboring community, customers and society at large – is

important in overcoming this scourge of environmental catastrophe. In sum, the background environmental processes need not be taken as exogenously given. This calls for immediate putting in place an action plan for environmental pollution emanating from air, water, noise and solid waste disposal by consolidating the on-going programme of the Central Pollution Control Board for district-wise Zoning Atlas for siting of industries, capacity building for control of pollution and outreach involving a wide cross-section of individuals and institutions.

The quest for eco-balance basically requires sensitization of the common man to environmental concerns to make them socially, economically and politically acceptable in a turbulent era – a quest in which banks and financial institutions can play an increasingly important role. The promotion of the unswerving objective of wholesome development is by no means going to be easy. But with cutting edge policy advice, advocacy and knowledge networking services, together we can and must make a difference - a difference to the understanding and management of the dynamics of the developmental process by reviewing our priorities afresh. Maintenance of eco-balance is a matter of choice, not chance. We must, therefore, address a variety of factors relating to the emanation, spread and control of biodiversity destruction by adopting a broad-spectrum strategy for tackling the basic forces and factors endangering our future as never before in recorded history. This strategy can succeed only if the campaign for sustainable development is turned into a mass movement with people back at the center of the human economy, subsuming economics to the interests of the public good. Otherwise, the outcome would be "*the worst of all possible worlds*" for the citizens of the world, whose tragedy is "*awesome*" because of "*the integral and interdependent nature of the Earth, our home*".

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