“Scope and Importance, Concept of Sustainability And Sustainable Development”

by

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Abstract

During the last 50 years, there has been tremendous expansion and proliferation of all sorts of economic activities covering consumption, production, marketisation, international trade etc. As a result, there has been unprecedented pressure on the extraction of natural resources that led to a substantial rise in demand for diverse natural and environmental resources for resource intensive production. It has given rise to the great question of sustainability of human race itself over a longer time horizon. The adverse impacts of these factors are evinced in the damages to the environment and ecology that have been caused over these years in the pursuit of fruits of unmindful and over ambitious industrial and agricultural activities. But these environmental and ecological concerns were soon integrated together with the concept of economic development- giving rise to the notion of sustainable development to meet the needs of present generation without compromising with the needs of future generations. India along with other countries has signed the declaration on the 2030 Agenda for Sustainable Development, comprising of seventeen Sustainable Development Goals (SDGs) at the Sustainable Development Summit of the United Nations in September 2015.

Introduction: The term 'Ecology' and 'Environment' are often used in interchangeable form there is some basic distinction between these two notions. By the term ecology we refer to the complex organic relation between all living and nonliving objects. Contrary to this, environment is an anthropometric concept which sets human beings at the center of this complex relationship and tries to relate the natural phenomena like air pollution, water level depletion, deterioration in waste sink services, deforestation etc. with the riskiness of the existence of mankind. Depletion of the environmental services due to unmindful human economic activities has its untoward impact on the ecological order on the earth. At the present level of human activity there have emerged a number of phenomena which have featured in tilting the ecological balance thereby putting a question mark on the sustainability of human well-being.

Global Environment Outlook3(UNEP1999,2002) and Human Development Report (UNDP 1999, 2001a) have identified a number of destabilizing factors that creates enormous stress on environment:

Climate Change: Annual emission of CO_2 during the late nineties reached about 4 times the 1950 level and concentration of CO_2 in the atmosphere touched the peak in 160000 years (UNEP1999). This is likely to have a Substantial adverse impact on human health as well as physical constraints in the way towards achieving viable management of natural resources like forestry fishery etc.

Global Warming: Global energy consumption has risen by about 70% during the course of last 30 years and has been estimated to rise by 2% per annum over the coming 15 years. Greenhouse gases like, SO_2, CO_2, NO_2, CFC etc. prove fatal for human health and other species, raise average temperature on the earth, increase the probability of rapid melting of ice at the poles, thus threatening the existence of island dwellers.

Pollution: Pollutants in the form of suspended small particulate in the air, obnoxious gases, heavy metals, various toxic chemicals, pesticides, herbicides etc. generated from different sources like industrial, agricultural and allied activities, cars etc. have begun to threaten the life support system on the earth.

Ozone layer depletion: Ozone acts as a shield for deterring the entry of ultraviolet ray in the earth's atmosphere. Concentration of poisonous CFC in the air is breaking the molecules of ozone and this is resulting in increase in cancerous diseases on earth.

Acid Rain: Rain water when mixed with these oxides form weak acids and this acid rain reduce the ph. level of both soil and water. This creates stress on the biotic component of both terrestrial and aquatic animal and plant life. Acid rain has serious adverse impact in destroying the photosynthesis tissues of plants and stunt their autotrophic activities.

Biodiversity loss: A substantial part of production in the global economy is based on biologically derived products and processes, many large-scale production processes in agriculture and forestry has led to replacement of biodiversity with monocultural production.

Deforestation and Desertification: Massive rise in population resulting in huge demand for food and other agricultural articles as well as furniture has led to cleaning up of vast tracts of forest lands for extensive agricultural practices. This has given rise to problems like soil erosion, loss of environmental services of forests like its use as habitat of different species of birds & animals, its capacity to protect from flood, storms etc. In arid regions deforestation results in high risk of desertification.

Water level depletion: With rise in population global demand for water has increased tremendously and it is often said that next war in the world will be for scarce water resources. About one third of world's population live in countries already starving from availability of pure and usable water.

The international recognition of a deteriorating environment and need for a sustainable development pattern was relatively in dormant state until the 1972 U.N conference on the human environment at Stockholm. According to the Brundtland commission's report (in 1987)' Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs.'

Indicators of sustainable development: Indicators for monitoring progress towards sustainable development are needed in order to assist decision-makers and policy-makers at all levels and to increase focus on sustainable development. On the basis of the voluntary national testing and expert group consultation, a revised set of 58 indicators and methodology sheets are now available for all countries to use.

Social Indicators: Equity, poverty, Gender Equality, Health, Education and literacy, Housing, security, population.

Environmental Indicators: Atmosphere, Air-Quality, Land, Agriculture, Forests, Desertification, Urbanization, Oceans, Seas and Coasts, Fresh Water, Biodiversity.

Economic Indicators: Economic Structure, Financial Status , Consumption and Production Patterns, Waste Generation and Management.

With the developing countries during OECD- DAC dialogues there have emerged a number of key principles which should govern any reasonable strategy for sustainable development:

(i) An effective strategy requires peoples' centered approach

(ii) All the stakeholders should have consensus on the major issues and a long term vision with a clear time frame for attaining the set objectives. This is conditioned by the commitment of all political parties not to reverse implementation of a strategy despite it being initiated by some rival predecessors.

(iii) Social, economic and environmental objectives should be integrated and mutual inconsistency must have to be avoided such that entitlements of future generations do not come into conflict with that of the present.

(iv) The strategic priorities should be well matched with budget allocation.

(v) Monitoring and assessment on the basis of performance of indicators is necessary to keep track of the progress and signal adjustment whenever necessary.

(vi) High level Govt. commitment on a long-term basis for making provision of financial resources and implementation of strategies is necessary.

(vii) Multi -stakeholder interface covering the interaction, debate and communication, for settling needs and priorities are required and there should be broad based participation of not only Govt. but decentralized authorities, private agencies , civil society as well as impoverished groups.

<u>Evolutionary view of Sustainable Development Goals</u> :

Driven by capitalist spirit the idea of accumulation of capital and production of tangible goods reigned supreme during the era of industrial revolution. It was supposed that the more the production, the more is the wealth accumulation and corresponding progress of an economy. Say's law (supply creates its own demand) was in vogue and hence demand was supposed to automatically assert itself. After the end of the war the emergence of an unparalleled economic prosperity since 1950 restored the optimism about increased output and high consumption

prospects and this prevailed till the middle of 1960s. Barbara Ward is one of the first champions of sustainable development and greatly contributed to the formative years of the Sustainable Development agenda. Conventional GDP needs to be replaced by very broad measures like DALY (Disability Adjusted Life Years) or index of sustainable economic welfare (ISEW) or Genuine Progress Indicator (GPI). Traditional macro-economic system of national income accounting should also be modified by incorporating the depreciation of environmental resources and bringing in the notion of green accounting in wide practice.

Gaia hypothesis

According to it, the various micro ecosystems on earth represented by the coexistence of diverse biotic and a-biotic resources in oceans, rivers ponds, forests mountains etc. have a self-regulating and self-perpetuating mechanism. According to this hypothesis, this earth is visualised as a super ecosystem in which the existence of life is maintained because of the role and behaviour of different living organism. The biosphere is viewed as a highly integrated and self organised cybernetic or controlled system. There is a constant balancing interaction and feedback loop operative among different species of living objects such that condition supportive of life is dynamically maintained. Sustainability of an order of nature system is considered important because of the uncertainties involved in the stability of the life support system which may confront us if there be any radical unpredictable changes in world's ecosystem as a fall out of the aforesaid environmental factors.

This is evinced in the I=PAT expression that was put by Prof Ehrlich. The variable "I" in the equation represents environmental impact. The expression equates human impact on the environment to the product of three factors: Population, Affluence, and Technology. It is similar in form to the Kaya identity which applies specifically to emissions of the greenhouse gas carbon dioxide. The 1972 Limits to Growth (LTG) report (commissioned by Club of Rome) based on the computer simulation of exponential economic and population growth with a finite supply of resources, expressed great doubt about the survival of life based on unbridled use of natural

resources.

They considered five basic factors that determine and, in their interactions, ultimately limit growth on this planet: population increase, agricultural production, nonrenewable resource depletion, industrial output, and pollution generation.

The 1972 study suggests that maintenance of the tempo of sustained growth in industrial output to cater to the culture of consumerism requires ever increasing use of resources.

The global collapse is attributed to increasing pollution and adverse climate change events. Carbon dioxide emissions may gradually result in environmental cataclysm through warming the atmosphere. It is perceived now that the process has already set in as evinced in the form of flash floods, cloud burst, forest fire, unpredictable storms, extreme weather conditions, outbreak of invasive species, long spell of heat-waves and so on. It is surmised that the Global Financial Crisis of 2007-08 and continuing economic malaise may be an aftermath of the blow emerging from resource constraints. Mahatma Gandhi once said 'nature has given enough for our need, but not enough for our greed'. This epitomizes what human beings are running after, oblivious of the resource constraints at its disposal and the adverse impact of its rampant use. A comprehensive report on resource use and global warming published last year revealed that climate change is continuing briskly, leaving the future of earth at stake.

Chronological view of international recognition of environmental concerns

1972: 1st UN Conference on Human Environment at Stockholm.

1980: Establishment of IUCN (International Union for Conservation of Nature)

1982: 2nd UN Conference on human environment at Nairobi

1985: Vienna convention for protection of the Ozone layer

1987: Montreal protocol on regulation of CFC

1987: Brundtland commission report

1987: Establishment of IPCC (Intergovernmental Panel on Climate Change)

1992: 3rd UN Conference at Rio De Janeiro

1997: Kyoto Protocol

2002: World summit on Sustainable Development at Johannesburg

2007: IPCC summit at Bali, Indonesia

2012: Rio+20 conference at Rio De Janeiro

2015: Paris climate agreement

In 1992 Rio earth summit, governments made a commitment to adopt NSDSs. These strategies were supposed to be fully participatory in nature and were evolved 'to ensure socially responsible economic development while protecting the resource base and the environment for

the benefit of future generations'. (Agenda 21, UNCED 1992). It was also resolved that there should be a NSDS for each country implementable by the year 2005, which should aim to effectively reverse the current trends of environmental degradation at both national and global levels by 2015.As a trail of this commitment in the year 1996, the DAC (Development Assistance Committee) of the OECD selected an integrated set of goals to be followed in any national strategy for attaining sustainable development. These were referred to as millennium development goals listed as follows:

- Eradication of extreme poverty and hunger
- Achievement of universal primary education
- Promotion of gender equality and empowerment of women
- Reduction of child mortality
- Improvement of maternal health
- Combating HIV-AIDS, malaria and other diseases
- Ensuring environmental sustainability
- Development of a global partnership for development

The legacy and achievements of the MDGs provide us with valuable lessons and experience to begin work on the new goals. But for millions of people around the world the job remains unfinished. We need to go the last mile on ending hunger, achieving full gender equality, improving health services and getting every child into school beyond primary. The SDGs are also an urgent call to shift the world onto a more sustainable path.

SUSTAINABLE DEVELOPMENT GOALS (SDGS)

The SDGs are a bold commitment to finish what we started, and tackle some of the more pressing challenges facing the world today. All 17 Goals interconnect, meaning success in one affect success for others. Dealing with the threat of climate change impacts how we manage our fragile natural resources, achieving gender equality or better health helps eradicate poverty, and fostering peace and inclusive societies will reduce inequalities and help economies prosper. In short, this is the greatest chance we have to improve life for future generations. The SDGs coincided with another historic agreement reached in 2015 at the COP21 Paris Climate Conference. Together with the Sendai Framework for Disaster Risk Reduction, signed in Japan in March 2015, these agreements provide a set of common standards and achievable targets to reduce carbon

emissions, manage the risks of climate change and natural disasters, and to build back better after a crisis. The SDGs are unique in that they cover issues that affect us all. They reaffirm our international commitment to end poverty, permanently, everywhere. They are ambitious in making sure no one is left behind. More importantly, they involve us all to build a more sustainable, safer, more prosperous planet for all humanity.

The Sustainable Development Goals (SDGs) were born at the United Nations Conference on Sustainable Development in Rio de Janeiro in 2012. The objective was to produce a set of universal goals that meet the urgent environmental, political and economic challenges facing our world. The SDGs replace the Millennium Development Goals (MDGs), which started a global effort in 2000 to tackle the indignity of poverty. The MDGs established measurable, universally-agreed objectives for tackling extreme poverty and hunger, preventing deadly diseases, and expanding primary education to all children, among other development priorities. For 15 years, the MDGs drove progress in several important areas: reducing income poverty, providing much needed access to water and sanitation, driving down child mortality and drastically improving maternal health.

In the year 2015, leaders from 193 countries of the world came together to create a plan called the Sustainable Development Goals (SDGs). This set of 17 goals imagines a future just 15 years off that would be rid of poverty and hunger, and safe from the worst effects of climate change. It's an ambitious plan. The United Nations Development Programme (UNDP) is one of the leading organizations working to fulfil the SDGs by the year 2030.

1. End extreme poverty in all forms by 2030.
2. End hunger, achieve food security and improved nutrition and promote sustainable agriculture.
3. Ensure healthy lives and promote well-being for all at all ages.
4. Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.
5. Achieve gender equality and empower all women and girls.
6. Ensure availability and sustainable management of water and sanitation for all.
7. Ensure access to affordable, reliable, sustainable and modern energy for all.
8. Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all.

9. Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation.
10. Reduce inequality within and among countries.
11. Make cities and human settlements inclusive, safe, resilient and sustainable.
12. Ensure sustainable consumption and production patterns.
13. Take urgent action to combat climate change and its im pacts.
14. Conserve and sustainably use the oceans, seas and marine resources for sustainable development.
15. Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss.
16. Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels.
17. Strengthen the means of implementation and revitalize the global partnership for sustainable development.

The system approach to sustainable development

The aspect of resilience inherent in the mix of economic, ecological and environmental functioning, so essential for sustainable development can be better explained through the system approach to sustainable development. This approach to sustainability involved consideration of the different major components interacting in the world as systems. Each system can be viewed as consisting of some subsystems. These are interlocked in a very complex manner and all these diverse systems (and their components) display changing pattern over different time scales. The complex interaction among these diverse systems that matter for sustainability can be depicted by means of a diagram. State of this complex super system at any point of time can be represented as a point in a high dimensional phase-space whose axes are the control variables and whose co-ordinates are their current values. In a two dimensional plane we may measure time at horizontal axis and normal range of variation of each system or control values along vertical axis. For certain of these control variables there is a small subset of values which human beings can withstand. In other words there is a common subset or region of normal values of all concerned control variables within which human survival is ensured. This is the intersection of survival regions of all systems necessary for continuation of human existence. Conceptually speaking, as the boundary of this region is

approached, human existence is increasingly threatened. In the following fig. we depict survival regions of three systems A, B & C.

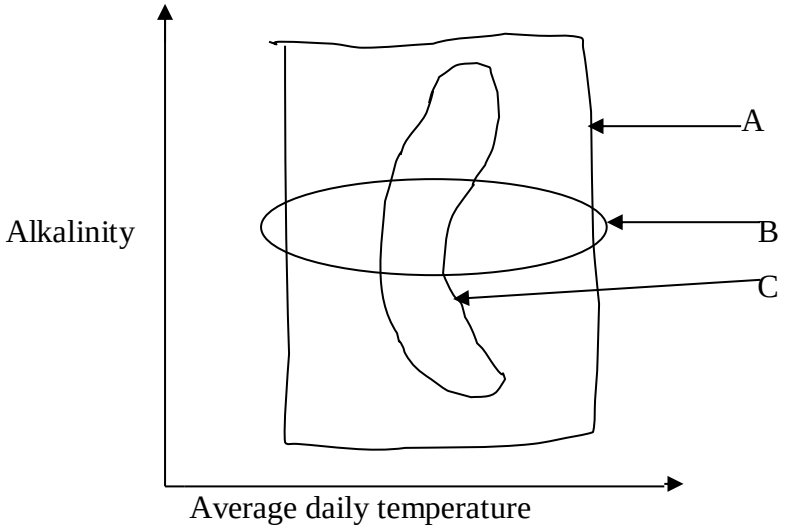


Fig-2 : Survival Regions of Three Systems

System A can endure wide variation in temperature and alkalinity while B& C have relatively weaker capacity in this respect. Obviously human capacity to survive depending on the simultaneous satisfaction of three survival regions implies an intersection area common to all the systems. The narrower the common region the lower the capacity of human survival.

Sustainability Rules

Once the concepts of sustainability are elaborated question arises as to how to operationalize and ensure the sustainability process. In this respect we may consider certain rules.

Hartwick's rule: Prof Hartwick in his seminal article argues that even if one considers the weak view in terms of keeping the consumption level intact over generations, what is needed is to invest all the profits (or rents) earned through use of extracted nonrenewable resource into either man made capital formation or regeneration of renewable capital.

Pearce- Atkinson rule (developed in London school of Economics): This rule is devised in partial modification of the drawbacks of Hartwick rule. According to this rule society should resolve to preserve all critical non substitutable natural resources. Thus for instance certain in situ resources, endangered species, environmental services like aesthetic values, spiritual values, recreational values, carbon cycle, nitrogen cycle, ozone layer etc. which are also dubbed as critical natural capital are prescribed to be kept intact.

Daly's operational principle: According to Daly (a)we should be always careful about restraining the scale of production (throughput) within the limits of carrying capacity (b) Technological development should be efficiency increasing rather than throughput increasing (c) Rate of extraction of natural resources should be less than the rate of regeneration and waste disposal should also be below the waste assimilative capacity of the environment. (d) Exhaustible resources should be extracted at most at the rate of regeneration of renewable resources.

Steps to achieve SDGs

Following steps may be taken to achieve the SDGs by 2030

Importance of Recycling:

If we merrily go on cutting down the forests, pollute the water courses, vitiate the air, extract the exhaustible resources, sooner or later the natural resources will vanish from the planet earth leaving virtually little for the use by our offsprings. Hence, people should learn how to act prudently such that the environmental condition does not slip beyond control and the earth remains habitable for generations to be born. In saving use of resources, the process of reusing based on recycling, can make a great contribution. The significance of recycling based on entropy law of thermodynamics has now reached such a height that it is viewed as a possible way of economizing use of natural resources.

Importance of Protecting Plant Life: Forests constituting different type of plants, provide diverse amenity values. Apart from providing us food, forest provide multifarious benefits. It helps control soil erosion, provides habitat for diverse species, protects against storm, helps sequestrate carbon dioxide from air, controls flood, provides wherewithal of life for the downtrodden section in the form of food, fodder, fencing material, fuel, shelter, medicines etc. Forests maintain the balance of nature, the environment, the climate, the weather, and the composition of the atmosphere. Most of the world problems today were accentuated by deforestation and inability to revert back in the system with quick rotation. Human beings being prudent one, must save plants and forests, since survival of life on earth heavily depend on their growth and flourish.

Stress on Reduced Consumption: Apart from recycling and reusing, people can help save the environment by reducing the use of several types of natural resources. This pertains not only to paper and plastic, but also things like water and energy. Meticulous care about preventing wastage of resources can save a lot for future generation. For

instance students can play a big role in this regard: turning off the lights when the classes are over in schools/ colleges/universities; economizing the use of water in hostels or other public places, saving use of paper in official domain by encouraging writing on both sides, taking recourse to e- notification, using domestic garbages as composts etc. Whenever possible we need to reduce the use of exhaustible resources like oil, coal, natural gases etc.

Saving the Wild life:

The property right of the resources does not belong to human beings only. From long time in historical past a large number of species of animals, big or small and even micro organisms have coexisted with mankind on the mother earth. If such species are obliterated from earth's surface, human beings would gradually start feeling lonely species on this planet. So all-round efforts are needed to ensure the survival of these species, specially those which have reached the brink of extinction. There are many such endangered species like olive ridley turtle, blue whale, white elephant, geometric tortoise, bamboo lemur, roloway monkey, gooty tarantula etc.

Controlled Emission of Pollutants :

Deforestation, industrialization, mining activities as well as urban sprawl have led to enhanced emission of pollutants thus spelling disaster for the environment. Due to increasing emission of CO_2 and other pollutants that are gradually piling up in the atmosphere, the perils global warming will sooner or later annihilate the world civilization unless solid steps are started to be taken to allay these problems. Human interference has brought nature close to destruction. Now it is high time that human beings come to a consensus and take a pledge together to stave off pollution and protect the environment for ensuring the flow of life on this unique beautiful planet.

Environmental Education from Primary Stage :

Training young minds by using models/pictures about how to protect the environment would instill in them a lifelong habit for taking care for environmental issues. School curriculum from the primary stage needs to be arranged in that manner so that students find active interest in its preservation and keep on nurturing this habit as they grow up. Parents also should motivate their children towards this end.

Reducing the Intensity of Environmental Waste :

The waste sink service of the environment in terms of its capacity to absorb garbage/ junk matter has in many cases reached the saturation point. In a number of regions

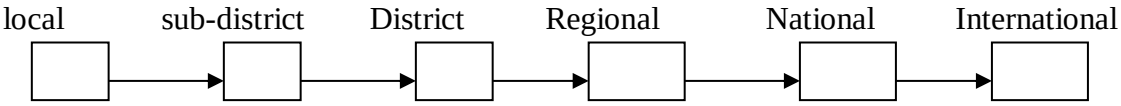
today, municipal landfills and waste incinerators are overburdened and can hardly afford to absorb any further supplies of trash and abandoned materials. Ponds, rivulets, streams and lakes in many rural areas have been vitiated due to rain water driven agriculture runoff mixed with chemical fertilizer and pesticides.

Conclusion:

Four years after signing (2015) the 2030 Agenda for Sustainable Development, the Sustainable Development Goals Report 2019 shows that while advances have been made in some areas, monumental challenges remain. The most urgent area for action is climate change. If we do not cut record-high greenhouse gas emissions now, global warming is projected to reach 1.5°C in the coming decades. As we are already seeing, the compounded effects will be catastrophic and irreversible: increasing ocean acidification, coastal erosion, extreme weather conditions, the frequency and severity of natural disasters, continuing land degradation, loss of vital species and the collapse of ecosystems. Promoting

sustainable agriculture can help reduce both hunger and poverty, since close to 80 per cent of those who are extremely poor live in rural areas. Increasing access to safe drinking water, sanitation and hygiene can save millions of lives per year and improve school attendance.

There is still time for us to achieve the SDGs if we act now and act together, taking advantage of the many synergies that exist across the 2030 Agenda. For attaining the goals of Sustainable development, there is a need for empowerment of the potent groups and this can be reasonably achieved by the participation and co-operation of relevant stakeholders. It require the participation , concern and dedication of all relevant groups. In specific cases the layers of participation may extend from local to international levels having the following intermediate chain .



The corresponding institutions/regulations need to evolve towards this direction. But there needs to be proper monitoring and execution of the regulations. Without this, whatsoever the coverage of environmental regulations be, their impact on controlled resource use would remain a distant reality.

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