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Sustainable Development and Indian Context

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It is really exciting that the 39th Indian Geographers Meet is being held in the historic city of Cuttack on the beautiful campus of Ravenshaw University. Cuttack, also known as Abhinab-Baranasi-Cuttack due to its geographic location, is one of the oldest cities of the country and has been the birth place of several freedom fighters including that of Netaji Subhash Chandra Bose. This meet, therefore, in Cuttack assumes great significance. The theme- Population, Environment and Sustainable Development, is not only relevant and contextual, it is also close to the heart of geographers because the core of geography lies in studying Man-Environment relationship and holistic development has always been its focus. For no reasons we have, hitherto, almost stopped talking about population knowing full well that this is the point of reference from which the other elements are observed and from which they all singly, collectively derive significance and meaning. It is the population which furnishes the focus (Finch et al., 1957). All the environmental stresses and strains and ecological crises are the fallouts of the increasing pressure of population which has necessitated the debate on growth and development. While growth is quantitative and economic, development is qualitative and subjective. The world community however, appears to be in a state of dilemma because the problems are complex and choices are limited. "Humanity today is like a waking dreamer, caught between the fantasies of sleep and the chaos of the real world. The mind seeks but cannot find the precise place and hour. We have created a Star Wars civilization, with Stone Age emotions, medieval institutions, and godlike technology. We thrash about. We are terribly confused by the mere fact of our existence, and a danger to ourselves and to the rest of life" (Wilson, E.O., 2013). This is definitely alarming and calls for healing of the planet Earth. The current thrust on sustainability (goal) and sustainable development (process) provides some ray of hope because sustainable development has emerged as a new paradigm of development.

The paper aims at highlighting the international and national scenarios regarding the issues pertaining to environment and development, and suggests a framework to achieve sustainable development in the Indian context by focusing on the concept of sustainable development in brief.

Emerging Global Scenario

The world population has been increasing at a very rapid rate. It stands at over 7 billion today and would reach 9.8 billion by 2050 AD. Interestingly major growth will be taking place in less developed world (Fig. 1). While more developed world is likely to have 1.3 billion, the projected population of less developed world will be 8.5 billion.

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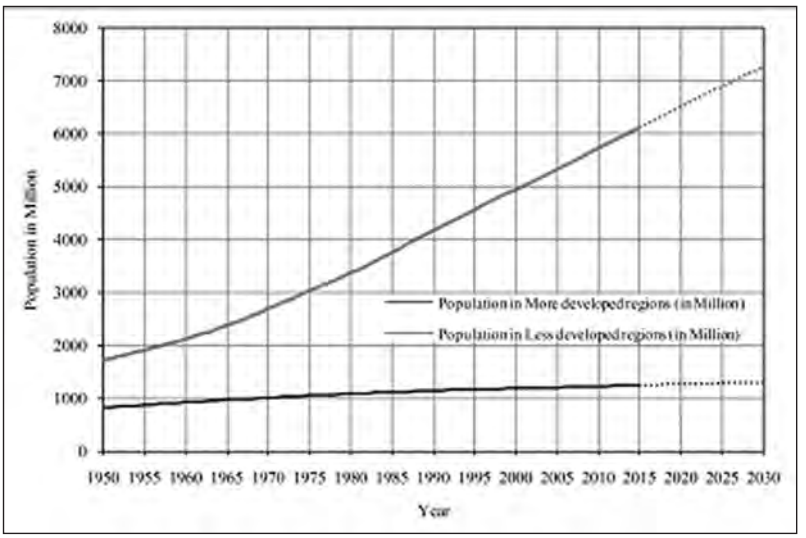

Fig. 1: Population Growth in More and Less Developed Countries

The world's population living in urban areas is projected to increase from 54 percent in 2015 to 60 percent in 2030 and to 66 percent by 2050. This is particularly significant when considering that until the start of the 20th century only one in 10 people lived in urban areas. In absolute terms, more than 1 billion people were added to urban areas between 2000 and 2014. The United Nations estimates that more than 90 percent of future urban population growth will be in low- and middle-income countries (LMICs) (Global report on Urban Health, 2014, UN HABITAT). According to one of the projections, out of 101 cities registering the highest population growth in the world by 2100, 47 coastal cities will be the most resilient to environmental hazards (Hoornweg and Pope, 2017).

Much of the increase in population is in the part of the world which is economically poor and technologically backward. Because of these two reasons, the demand for natural resources in the third world countries has not increased at the rate at which the population increased. But this was more than balanced by the increased demand for natural resources in the industrially advanced countries of the world. The result is that the output of natural wealth has gone up in the developing countries and its use has increased in the developed countries (Misra, 2014).

The world is passing through a stage of impending ecological crises. The crises are the consequences of a number of factors and forces such as: (i) pressure of human population on natural endowments; (ii) mal-development of the international ecology leading to over-industrialization in some regions and no or under-industrialization elsewhere; and (iii) technological and scientific advances giving immense power in the hands of man to destroy things of lasting value. Incalculable harm has already been done to our natural wealth. Agricultural

land of lasting value has been brought under other uses; water is getting polluted, mineral wealth has been lost forever, plant and animal species are dying. We are jeopardizing our health and the survival of generations yet to come. We rarely realize that land is a finite resource and hence must be used judiciously. Our water resources are drying up fast and the technology to desalinate sea water at reasonable cost is not in sight. The rate at which mineral resources are being used by the industrialized countries will leave the rest of the world in the lurch in not too distant a future. There have been several fallouts of phenomenal growth of population, such as decrease in per capita availability of land, drying water sources, pollution of water, land and air, large scale devastation of forest and loss of biodiversity. The indicators of climate change i.e. global warming, sea level rise, and increase in sea surface temperature, shrinking and retreat of glaciers, thinning of Arctic ice, and increased frequency of extreme events are likely to further worsen the situation. Natural disasters such as floods, famines, earthquake, forest fires etc. have become completely unpredictable. So is the case with the weather phenomena. The large scale shifting of mass on tectonic plates has made the fabric of natural system vulnerable and fragile.

State of Development in India

History reveals that India was one of the biggest economies of the world during ancient times and sustainability never posed a challenge then. Our environmental awareness was on top of world and we greatly valued the harmonious relationship between the natural and man-made world. It is not intended to go into the historical details; nevertheless, it is a known fact that this country had faced the onslaught of the invaders only for plundering the resources. Even until the Mughal period India`s contribution was about 24 percent of the total GDP of the world. In fact, we had always brushed our shoulder with China, yet another the then giant economy of the world.

Table 1: GDP in millions of 1990 International Dollars

Years	1000AD	1500 AD	1600 AD	1700 AD
India	33,750	60,500	74,250	90,750
China	26,550	61,800	96,000	82,800
West Europe	10,165	44,345	65,955	83,395
World Total	116,790	247,116	329,417	371,369

Source: Consulate General of India, Jeddah. (These figures are based on the calculation by Professor Angus Maddison, University of Groningen, Netherlands, and Honorary Fellow at Cambridge University).

Unfortunately our economy got shattered during the colonial period and it stands derailed even today. This has also had adverse impact on the environmental ethics and values. The staggering growth of India`s population continues aggravating the situation (Table 2).

Table 2

Year	Total Population (in Million)	Decennial Growth of total population (%)	Urban Population (in Million)	Decennial Growth of urban population (%)
1901	238.4	--	25.9	--
1911	252.1	5.75	25.9	0.35
1921	251.3	-0.31	28.1	8.26
1931	279.0	11	33.5	19.12
1941	318.7	14.22	44.2	31.97
1951	361.1	13.31	62.4	41.43
1961	439.2	21.64	78.9	26.41
1971	548.2	24.8	109.1	38.23
1981	683.3	24.66	159.5	46.14
1991	846.4	23.87	217.6	36.46
2001	1028.7	21.54	286.1	31.48
2011	1210.2	17.64	377.1	31.8

Source: Various censuses, GOI

According to 2011 census there are 640,868 villages and 7935 towns of different sizes. Towns are growing faster than villages in number. During 2001-11, there was an increase of 2279 villages whereas the number of towns grew by 2774. The number of metropolis has gone up from 53 in 2011 to 72 in 2016. India is only 4 short of China. The urban population of 377 million in 2011 is projected to be 590 million by 2013 AD. The fabric of symbiotic relationship between rural and urban areas stands non-existent, because rural areas are so poor that they are not able to forge the link through their products to the urban areas. Thus, there is no sustainability either in the urban area or in the rural area. Undoubtedly, growth of population has been posing a great challenge. Some experts opine that population growth is not a problem, it is basically the management problem but the fact of the matter is that management can be done only when there are enough resources. The basic problem is how to convert such a huge population in to a productive resource and in order to do that the population should have access to health facilities and education.

There is poverty both in rural as well as in urban areas in the country but urban poverty is acute and dehumanizing. It is the urban poor who bears the brunt of environmental degradation. Rapid urbanisation has put severe strains on already scarce resources. Even potable water, which is a basic need of human life, is not available in sufficient quantity in most of the cities. There is no proper system to handle the waste and garbage; sewage is a rare facility, available only in a few cities. Urban environmental pollution is, therefore, order of the day. The infrastructural facilities are in deplorable state. Slums and squatter

settlements are mushrooming with appalling living conditions. While the quality of life in cities is in deplorable state, the villages also bear the brunt of poor quality of life because the common property resources (ponds, tanks, orchards and grazing grounds etc.) which are supposed to be environmentally very sensitive areas have also disappeared, or have been encroached upon by vested interest.

Although, there is no composite index to measure the level of sustainability, yet Human Development Index may be used as a proxy variable to measure the quality of life prevailing in different states of India. Currently this is thought to be the most reliable index to measure the quality of life as also the level of development. Based on this assumption, an inter-correlation matrix was worked out by taking Human Development Index as dependent variable and (i). growth of population, (ii). percent urban population, (iii). percent female literacy, (iv). multi-dimensional poverty index, (v). road network, (vi). GDP, (vii). percent total main workers, and (viii). percent of population above poverty line as independent variables.

Table 3: Inter-Correlation Matrix of Nine Selected Variables at State Level in India

	HDI	% Urban Population	Percentage Decadal Growth (Persons) 2001-2011 (Total)	% Female Literacy	% APL Population	% Total Main Workers	Multi Dimensional Poverty index	GDP in Rs. Crore	Road Length in Km per 100 sq. km. Area
HDI	1								
% Urban Population	.68**	1							
Percentage Decadal Growth (Persons) 2001-2011 (Total)	-.49**	-0.34	1						
% Female Literacy	.64**	.59**	-.55**	1					
% APL Population	0.24	0.24	-0.21	0.08	1				
% Total Main Workers	.38*	.73**	-0.25	.49**	-0.15	1			
Multi Dimensional Poverty index	-.78**	-.68**	.46*	-.75**	-0.17	-.60**	1		
GDP in Rs. Crore	0.24	0.31	-0.08	-0.14	0.06	0.37	-0.01	1	
Road Length in Km per 100 sq. km. Area	.41*	0.23	-.62**	.48*	-0.07	0.19	-0.17	0.14	1

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

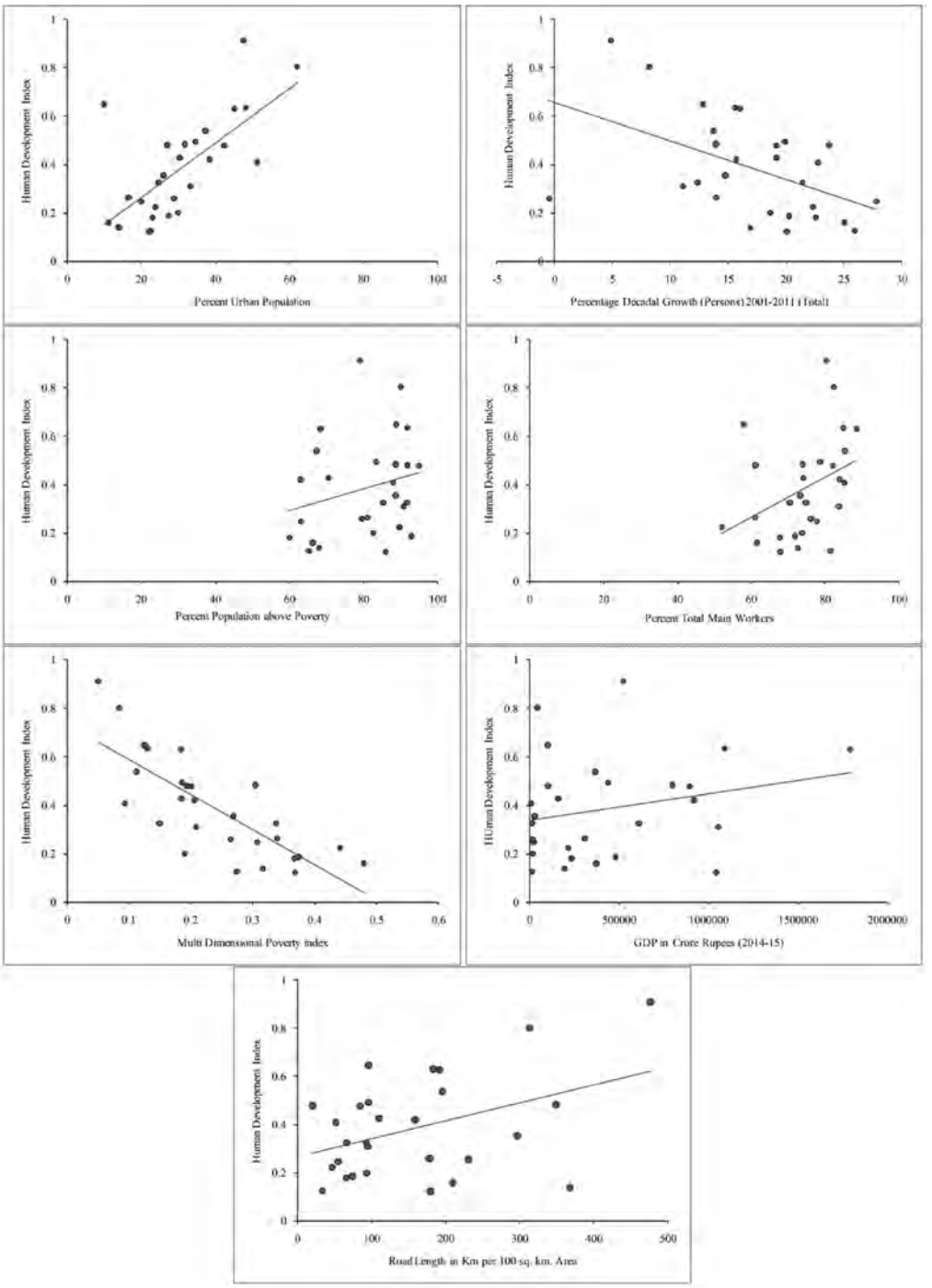
Human Development Index
Percent Urban Population
Human Development Index
Percentage Decadal Growth (Persons) 2001-2011 (Total)
Human Development Index
Percent Population above Poverty
Human Development Index
Percent Total Main Workers
Human Development Index
Multi Dimensional Poverty Index
Human Development Index
GDP in Crore Rupees (2014-15)
Human Development Index
Road Length in Km per 100 sq. km. Area

Fig. 2

From this matrix it is clear that there is a negative relationship between Human Development Index and population growth (r = -0.49). So is the case with multi-dimensional poverty index (r = -0.78). Quite contrary to it, the percent of urban population, percent of female literacy, percent of APL population, percent of total main workers, GDP and Road length indicate a positive relationship with Human Development Index. What comes out very clearly is the fact that growth of population

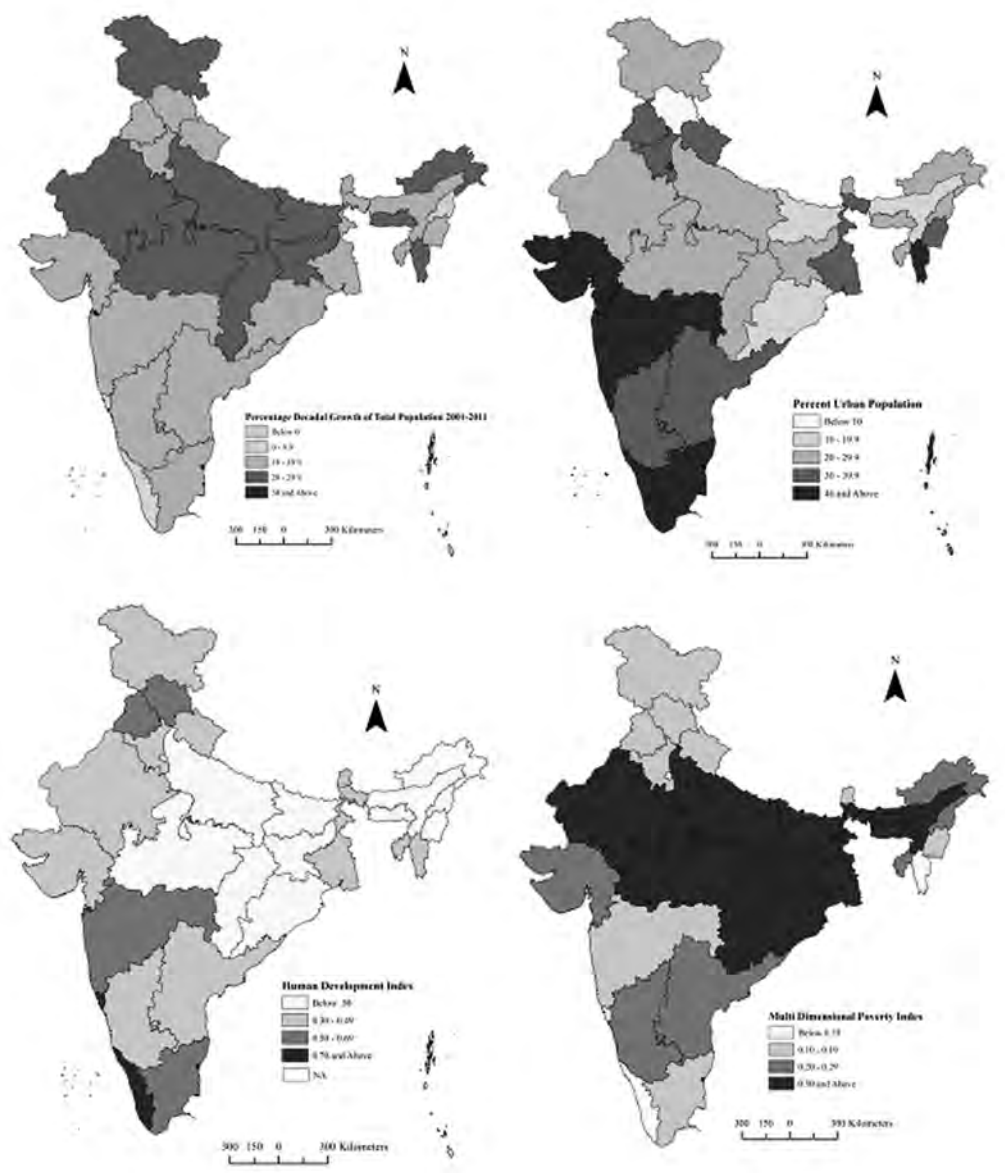

Fig. 3

is the most critical variable followed by multi-dimensional poverty index which determine the HDI. This is reflected from the maps (Fig. 2&3) which display the growth of population, percentage of urban population, HDI and multi-dimensional poverty index at the level of states in India. Even female literacy appears quite significant influencing factor on the HDI. From the matrix it is clear that the Multidimensional Poverty Index is also strongly correlated with growth of population (r = 0.46). All the development variables such as female literacy, infrastructural facilities, and urban population are negatively correlated with population growth. What comes out quite clearly is that if population problem is tackled, all the developmental variables will promote the Human Development Index and thereby the sustainable development.

Sustainable Development: A Conceptual Frame

Sustainable development has been the part of Indian thought process since times immemorial. Our Vedic literature bears ample testimony to this. In modern context, G.P. Marsh (1864) was the first environmentalist to have captured the idea of sustainability. Silent Spring (1962), Limits to Growth (1972), Global Report 2000 (1980), Resourceful Earth (1984) and Our Common Future (1987) are much later assertions of the concept of sustainability. The sustainable development may be defined as, "development that meets the needs of the present without compromising the ability of future generations to meet their own needs." Meeting fundamental human needs while preserving the life support system of planet Earth is the essence of sustainable development.

The three basic elements of sustainable development are: (a). Inter-generation transferability, (b). social justice, and (c). trans-boundary responsibility. These emphasize that the present generation has to keep in view the need of future generation, all communities irrespective of their caste, creed, and sect have to be treated equally and developed countries cannot lose sight of their responsibility in reducing the inequality in underdeveloped and developing countries. It is through environmental integrity, economic viability and social well being that the sustainability can be achieved. Environment does not mean merely natural. Natural or physical environment is a form which is only incidental or declarative knowledge. It has human face also, such as behavioral environment (environment of human interaction and movement), socio-cultural environment (hidden structures of customs, virtues and values which work as constraints on human relations), the political environment (human-defined boundaries, legal structures and organizational structures within which human actions take place), and the cognitive environment (the world which is in our memory or mind) (Golledge, 2002:2). This creative knowledge of environment is imperative to understand the processes which play a critical role in decision making by individual groups, community and society. The intellectual terrain of sustainable development is very complex. There are several variants of sustainable development such as deep ecology, actor-network theory, environmental modernization, systems` thinking and several debates surrounding the anthropocene. Sustainable development is a product of many stories, world views, values, actions and perspectives. "It is a

process that requires us to view our lives as elements of larger entity ... It requires a holistic way to looking at the world and the human life … it requires an understanding that the world is multifaceted, fragmented and complete. This may not be easy to grasp at first, but it is a way of looking at the world and one that increasingly makes sense … may be the best way to view sustainable development is a collage or a kaleidoscope of shapes, colours and patterns that change constantly as we ourselves changed." (Blewitt, 2014)

The four types of debate which are doing round the sustainable development are: (a) conservation versus growth, (b) freedom versus control, (c) centralization versus decentralization, and (d) reformism versus revolution (Wilbanks, 1994). These debates are more tenable in the developed countries but in case of developing countries like India, the first and foremost object is to meet the challenge posed by poverty, hunger and starvation as also the socio-economic disparities prevailing among groups, communities, societies and regions. This is possible only by promoting growth with a certain degree of control, decentralization and revolution. There are several strategies which have been suggested to achieve sustainability. Some of these are: (i). Efficiency Strategy: This is possible through innovations in technical and organizational functions; (ii). Consistency Strategy: This may be achieved through renewable resources; (iii). Permanency Strategy: This aims at enhancing life span of products through technology; (iv). Sufficiency Strategy: This lays emphasis on changing consumption pattern through new life style; and, (v). Education and Social Commitment Strategy: The education and social commitment strategy helps by promoting awareness for social justice among the people.

In addition to the aforesaid five strategies suggested by Haubrich (2007), yet another strategy which commands and shapes all other strategies is the environmental ethics strategy. This strategy relates to ethics contained in our ancient scriptures to protect, conserve and enrich the ecosystems. The very first 'Mantra' of 'Isopnishad,' one of the foremost India`s books of ancient wisdom says, "Everything in this creation is owned and controlled by the Lord. One should, therefore accept those things necessary for himself, which are set aside for his quota, and one should not accept other things, knowing well to whom they belong". This idea needs a kind of ethical revolution, a task which may be taken up by the young geographers to familiarise and popularize the concept and need of sustainable development (Misra, 2014).

The 17 millennium goals of sustainable development which have been envisaged at the international level are: no poverty; zero hunger; good health and well-being; quality education; gender equality; clean water and sanitation; affordable and clean energy; decent work and economic growth; industry, innovation and infrastructure; reduced inequalities; sustainable cities and communities; responsible production and consumption; climate action; life below water; life on land; peace, justice and strong institutions; and partnerships for sustainability. However, Langhelle (1999) observes that these goals overemphasize the importance of economic growth at the expense of the broadly ethical concerns of

human togetherness, social justice, respect for ecological limits, and the eradication of the global poverty and inequality.

A Model for Sustainable Development of India

Sustainability is not an option but it is imperative. For a better world to live in, we need clear air, safe water, nutritional food, healthy environment and greenery around us. Without sustainable and secure livelihoods, environmental deterioration and economic decline will be feeding on each other leading to poverty, pollution, poor health, biodiversity loss, and land degradation. The assertion on precautionary approach or 'polluter should pay' approach is not long term solution. Virtually it is a shared responsibility which should be borne by both developed as well as developing world. This is possible only when we consider earth as our home, and cherish the philosophy of 'Vasudhaiv-Kutumbukam'. Nevertheless, there cannot be any universal model of sustainable development. This is true that globalization has made the world borderless, but this is also the fact that spatiality of human society is a reality, and, therefore, we need different models for different locales at different scales. Besides, sustainable development like time-space prism is so complex that it requires maximum variables with optimum functions to be understood. It is interesting to point out that a few states in India have tried to adhere the goals envisaged by the United Nations, nevertheless, the achievement has been precious little.

A simple qualitative linear model that has been proposed here is based on the assumption that population is the major strength of the planet Earth and given a quality population the life support system of the planet earth will remain in balance. The seven major challenges/issues which have been identified here are: (1) built environment, (2) health, education and skill development, (3) economic viability, (4) conservation and preservation of stock capital, (5) research and development, (6) policy, finance and governance, and (7) the environmental ethics (Fig. 4).

Fig. 4: Model for Sustainable Development

1. The built environment represented by rural and urban settlements is the most important space on the cultural landscape and needs to be given top priority because population which is the prime consumer of resources lives here. It is a well known fact that the parks, playgrounds, open spaces, ponds, lakes, grazing grounds, orchards and other common property resources are vanishing very fast and this has been causing tremendous loss to the environment. The process of

gentrification or social filtering is quite rampant in cities whereas naturalization which aims at enriching the biodiversity, reducing the air pollutants, expanding the breathing spaces with strong public transport system have been relegated to background. The small and intermediate towns which are in a large number, have become the victim of the suction mechanism of cities, and therefore, they are completely deprived of using their own resources. The process of resource drain operates even at the village level. The villages are the worst sufferers. The resource exploitation chain is so strong that it is very difficult to break it. The devouring of common property resources in the village is so fast that they have also been facing variety of environmental problems. The dictum, 'God made country and man made town' has no relevance in the current context of development. There is a need to rehabilitate such spaces by changing them into smart spaces. The concept of smart city or for that matter smart villages should not be confined only to developing the infrastructure, but also providing the clean air, safe water and healthy environment.

2. There is no denying the fact that population growth has been posing major challenges in the developmental process. We talk too much on demographic dividend, however, the benefit of demographic dividend can be harnessed only when it is a quality population. Quality population can be achieved by ensuring good health, quality education and skill development. Undoubtedly, enriching the human capital will provide a capillary action in boosting the developmental processes. However, it is sad that rampant corruption has become the greatest barrier in making our human capital a quality resource. Buch (2013) rightly remarks, "From a society of hope, India has suddenly gained notoriety as one of the most corrupt countries in the world. Whether it be in trade, industry, the election process, government, in all its branches, even education and health … For every Indian, this is a situation which is not only fraught with danger, it is a situation which threatens to damage the very fabric of India beyond repair".

3. The development cannot be sustainable if economy is not viable. Viable economy here refers to diversification and opportunity seeking both in formal as well as informal sectors. Both the sectors have great scope as ours is a developing economy. The chronic problem of 'brain drain' could be arrested only when we expand the vista of two sectors in a systematic and planned manner within the time bound frame. This should be given priority not only because it provides greater opportunity of employment, this will accelerate the development at the sub-regional and regional levels. This will also reduce the dependency.

4. Conservation and preservation of natural resources or stock capital by protecting critical and non-critical zone resources is an important step towards the process of sustainable development. All kinds of resources whether renewable or non-renewable need to be judiciously used. It is not intended here to present an exhaustive list, nevertheless, some

basic resources such as land, water and minerals need to be carefully protected. Undoubtedly, they are all in a precarious state. There are plans and policies to conserve and preserve them, but they are flagrantly flouted.

5. Enhancement of technology and searching alternatives for increasing efficiency is an important step which can be accelerated through research and development. It is significant to mention that research and development is in a very poor state even after seven decades of independence. It is a sad state of affairs that for many things we depend on borrowed technology. The continuous research and development in the field of technology is, thus, imperative for sustainable development.
6. It is pathetic that the policy paralysis often impedes development. The poor governance further exacerbates the situation. It is important that policy formulation should follow the strong governance so that fruits of implementation are distinctly visible. There is a need to augment the finance through proper resource allocation and also by way of maximum opportunity seeking approach. The help may be sought from international agencies for funding the developmental activities.
7. Environmental ethics is the most vital component of the sustainable development. It is imperative that all policies, plans, programmes and developmental activities have built-in mechanism of environmental ethics. The environmental ethics, which aims at frugality of using different kinds of resources, should be promoted as movement so that this becomes part and parcel of our daily lives.

Undoubtedly, sustainable development is a distant dream which is difficult to achieve. But, the dream may come true if we continue dreaming. Geographers are especially blessed because of their physical as well as human perspectives. They are potentially at the cutting edge advantage of interdisciplinary knowledge especially due to their expertise in Geospatial Technology which combines Remote Sensing, GIS and GPS. Geographers, thus, can play a critical role in promoting the cause of sustainable development. Geography is very profound discipline indeed.

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