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Towards a Sustainable Future – Issues and Perspectives

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1. Prologue

I take this opportunity to express my heartfelt gratitude to the IIG for electing me President and to the organisers of this conference for providing a platform to share my views with the august gathering of geographers from different parts of the country. It is, indeed, momentous for me to be here on this occasion to deliver the Presidential address at a venue, which is my alma mater and an institution of excellence, with which every one is tempted to be associated with. The topic chosen for discussion here is a matter of grave concern for one and all and has a wide context. It is multi- rather than co-disciplinary in nature, and thus requires a vast spectrum of feedback and explanation. Of late, many subjects particularly those belonging to social sciences showed a tendency to extract and absorb relevant themes and methodologies from other disciplines to make themselves widely acceptable. Geography did not lag behind, although it is charged with losing its genuine claim for its pioneer contribution in certain areas, e.g. environmental studies. Needless to mention that the contribution of geography is more recognised in diversity of its contents, philosophies and popular techniques (graphicacy, numeracy, literacy) supplemented with requisite specialization which enables it to offer a more comprehensive and rational interpretation of phenomena. The process analysis has now acquired ample significance and equipping it with recent techniques like GIS and remote sensing has sharpened its capability to comprehend. All this puts a geographer in the unique position to apply his integrative and synthesising approach. However, it is better if the said techniques are used as means not as an end in itself as the present day trend appears to be. These may otherwise meet the same fate as quantitative geography.

It is a daunting task to determine the contents of this address, as more and more one thinks of the components, issues and perspectives related to a sustainable future, more ideas occur to the mind and everything appears to be relevant to be discussed. However, certain issues like poverty, inequality, unemployment, environmental problems, and perspectives such as economic, social, ecological etc. could be identified for presentation in an illustrative manner taking examples, by and large, from India.

What constitutes the sustainable future? The answer lies in Kofi Annan, U.N. Secretary General's observation: 'A world of clean water and air, green technologies where homes, transport and energy all are efficient; where everyone shares the benefit of development and industrialisation, and of the earth's natural resources, yet those benefits can be sustained from one generation to next.' In other words, sustainable future is supposed to be more prosperous, more just and more secure envisaging a new era of economic growth based on policies that sustain and expand the environmental resource base.

'Sustainable' became, perhaps, the most common prefix after the world experienced fast depletion and rapid degradation of resources and glaring imbalance in social ecology. A perceptible adverse impact of various types of pollution on environmental and human health, and growing impatience of the vast majority of deprived population not to allow the one-fifth to grab and enjoy the prosperity, brought the issue to the centre stage. The fact remains that all these have cumulative effects over the years, that need our concern today, or it may be too late tomorrow. In the wake of these changes, the concept of development was subjected to review, and there was marked shift in its paradigms, for there is no automatic link between increasing incomes and 'flourishing human lives'. The new paradigm emphasises sustainability and higher levels of welfare, supported by rising levels of productivity, which, in a wider context, embraces every development issue including economic growth in a sustainable fashion.

Sustainable future is an elegant term of late 20th century implying economy of performance, social investment, people's empowerment, provision of basic needs and social safety nets, political and cultural freedoms and all other aspects of people's life. To this can be added a dimension of 'ecological sustainability', implying that the resource needs of the present are supposed to be met without compromising the ability of the resource/environment to meet the needs of the future. Thus adequate economic growth, supplemented by distributive justice, equality of life and sustainable environmental practices, form the ingredients of a sustainable future. With the inclusion of the elements like 'peace' and 'happiness' under development goals, the measures of achievement will be different, and the notions of 'efficiency', 'productivity', 'profit' and material consumption will be viewed differently.

In formulating future development strategies, principal issues, prime goals and important means have to be properly identified. Contextually, the objectives of the development with respect to the people and their cultural matrices have to be taken care of, in other words preferably a development of those resources that are specially needed for the satisfaction of the basic needs of people; these needs being defined realistically and independently to counter the undesirable effects of copying the consumption style of rich nation.

2. The Issues

The issues linked with sustainable future are complex and hydra-headed and so multi-faceted, multi-sectoral and multi-processual in nature. Broadly speaking these may be identified as i) poverty, ii) inequality, iii) unemployment, iv) exponential population

growth (discussed under: human resource) and v) environmental problems.

Poverty

Poverty characterised with a host of attendant evils like hunger, malnutrition, illiteracy, unhygienic conditions, diseases, etc. is one of the most dreaded and disturbing problems facing the mankind. Poverty is not a natural state of being; it is the outcome of the process of impoverishment, although the orthodox, so called Brahmanical philosophy, explains it as a part of divine order being a consequence of the degree of merit of past actions in previous lives, and the developed West categorically blames the poor themselves for their poverty. The immediate need is to find out what constitutes the process of impoverishment and then to find out the methods/strategies by which exploitative processes can be stopped.

Among a large number of causal factors contributing to poverty, mention may be made of the inappropriateness of polices resulting in too high a concentration of development efforts, inadequate and failing redistribution system, limited or no access of poor to resources and social facilities, such as education and health care. Further, the prevailing ignorance and narrow mindedness causing slow or no adoption of modern agricultural techniques, the family size and inversely the member of income earners in the family etc. accounting for low income, low saving, low investment, low capital formation, low level of education and so low standard of management – all squarely lead to low rate of development and thriving vicious circle of poverty.

Despite many efforts towards its alleviation, poverty has not declined; instead it has increased. Remarkably, the bulk of the poor are small and marginal farmers, share-croppers, agricultural labourers and local artisans. Their circumstances are very special, they form an inert, inarticulate and unorganised mass characterised with powerlessness, vulnerability, isolation and physical weakness. More often than not they fall prey to the trap of poverty and have limited opportunity to escape from it. The identification of the genuinely poor and more so of the target group/beneficiaries is still a critical issue.

Inequality

Inequality, although a law of nature, is planet's major developmental problem of our age (World Commission on Environment and Development, 1987) and is often found to co-exist with poverty (Fields, 1980). Virtually we have a sordid scenario of two Indias, one – known as India- consisting of the very rich, the elite, the educated, the urban, the modern, etc. enjoying practically all the benefits of the rich world outside; the other – known as Bharat – accommodating the masses, the illiterate, the backward, the tribals, the resource – less, the dependents, the rurals and the rustics, etc., who are not only poor but also bear the cost of enrichment of those who are already rich (Verghese, 1984). There is no dearth of statistics to prove that there exists an acute inequality in India at different levels, manifesting in landholdings, per capita income, employment, standard of living, extent of saving, education, social transformation and most importantly, access to resources, particularly in rural areas. To illustrate this, the average income of the lowest ten percent and top ten percent of the

households in India is in the ratio of 1:50, and the growth rate of agricultural production (2.2 percent) and industrial production (8 percent) are by far unequal. This indicates that one sector of the society is accumulating economic gains, and most growth is confined to large farms and big industries.

As the circumstances suggest, there is little chance of narrowing the gap between rich and poor at any scale, as the former is more capable of and is also busy in multiplying the assets and income, while the latter being indifferent and incapable moves in reverse direction. However, what is really surprising is that such an appalling dichotomy has evoked merely pity, not even notable protest, and it is likely to remain so as long as the Bharatis (the masses) at the base of the pyramid are inert, inarticulate and unorganised (Verghese, 1984).

Unemployment

Unemployment is one of the major concerns of the planners because of its association with abject poverty. In the opinion of Pearson Commission's Report (1969), the failure to create meaningful employment is the most tragic failure of development. Problems of unemployment and under employment are still more complex in rural India where the majority of landless, small and marginal farmers have by and large part-time, seasonal, irregular, disguised and less productive employment. With a huge number of youths entering the job market, the proportion of potentially productive but unemployed Indians is swelling year by year. The situation is attributable to a mismatch between the growing number of un-employeds and that of various Rojgar Yojnas proposed to provide full employment to unemployeds, a poor formulation and ineffective implementation of projects, and an ad hoc identification of beneficiaries.

Unfortunately, the poor suffer more because the market does not generate for the only commodity they can offer in return i.e. labour at wages which will entitle them to the bundle of goods needed for their survival/sustenance. Also, there is a danger of an adverse impact of vocationalisation, if there is no parallel increase in the demand of various services it is meant for. The country may otherwise be saddled with herds of unemployed artisans in place of unemployed clerks (Singh, 1998). It may be pointed out here that there is no automatic link between the increase in employment and poverty alleviation. To end poverty, employment has to be appropriate, based on skill and training that help sustain the beneficiaries in keeping with Kuantzu's (a Chinese) advice that 'If you give a man a fish, he will have a single meal. If you teach him how to fish he will eat all his life'.

Employment as a strategy to increase GDP and sustain it over long periods is the prime goal of development planners; with increased employment overall growth becomes a by-product. As has been observed, in order to realise goals of full employment, besides the organised industrial sector, additional employment has to be generated in rural areas through intensification of agriculture and village and rural industries, diversification of rural economic (dairy, poultry, fisheries, etc.) and large programmes of construction and capital formation within rural areas. This will also check the incessant flow of surplus labour to problem riddled urban centres. Surprisingly, India does not have the

required statistics of manpower in terms of skill level which could help planning for its utilisation in accordance with its capacity.

Environmental Issues

The environmental issues may succinctly be put as: (i) rapid depletion (causing scarcity) and large scale degradation (causing deterioration in quality) of resources, (ii) loss of biodiversity (including extinction of some rare and precious species) and high intensity of various types of pollution (spelling on plants/animals and human health). While explaining various dimensions of these issues in an integrated perspective, scholars have tried to sum it up as 'Environment versus Development' debate. The problem came to focus following the incidence of various forms of environmental degradation by and large around developed areas characterised with intensive agriculture, wide range of mining and industrial activities, power generating plants, etc. Now the real challenge is to achieve agricultural, industrial, technological and economic development without desecration, despoliation and devastation of the natural environment, as expressed at the Rio-Earth Summit (1992) and Kyoto Protocol (1997).

Some Ironical Situations: Challenges of the Future

i) The developing countries are faced with a difficult choice, either to lay emphasis on growth rate of GNP disregarding the growth of employment or to spend the scanty national resources on expanding employment to the detriment of its economic development.

ii) Developing countries also face a great dilemma regarding investment on infrastructure and human resource development. If they cut back expenditure on the former they run the risk of their economies stagnating. If they give human resource a lower priority, as they are doing, most of the gains are neutralized by disproportionate population growth, low levels of literacy/ education, health, and medical care etc. (UNFPA, 1990).

iii) Ironical are the slogan 'growth for justice' without permitting the trickle down process to operate (Plum, 1977), and call for 'equalitarian society' through check on consumerism, allowing just six percent of world population (USA) to consume as much as one-third or more of the global resources.

iv) Undesirable is the situation that instead of being used as means to improve agriculture, the mainstay of rural economy, education is looked upon as avenue of escape from it (Nair, 1962); youths are making constant efforts to desert rural areas to relocate themselves in urban slums carrying the frustration of villages to the city.

v) Many of developing countries can produce enough food to feed one and a half times their projected population even at their low level of technology (World Commission on Environment & Development, 1987), yet there are reported starvation deaths and suicides, which to Lord Plum is the paradoxical problem of plenty and to Moore and Lappe a myth! as more food is being produced, yet more people are hungry.

So the central question is not only how production can be increased but also what is grown and who eats it (Capra, 1985).

vi) Prevalent feeling among the masses that the large number of thriving children is a great good on many counts, e.g. increase in pooled income, old age security against the government and rich section of society's stress on limiting the family as the sole option to serve the best interest of the nation; adoption of fertility control measures meant more for the masses basically by the socially better off people; the shortage of specific size of manpower in spite of explosion in the number of unemployeds (Premi, 1990) are also ironies.

vii) On a global scale, more than 15 million people are dying of starvation every year, 500 million people are being undernourished, 40 percent people having no access to professional health care, 35 percent lacking even potable drinking water and other such essential services (Capra, 1985), yet there is a substantial and growing spending on defence (may be a forced priority).

viii) The most painful and the biggest global irony is that the poor countries of the South while deprived of an equitable share of world's wealth suffer the environmental hazards generated by the creation of that wealth in the North.

3. Perspectives

Economic Perspective

Under economic perspective, consideration is made of a philosophic approach to the problems/strategies, resource appraisal and management and structure of two basic components of the economy (agriculture and industry).

An overview of economic philosophy reveals that our growth-oriented policy, although suffering from several deficiencies, cannot be outright rejected, for zero-growth economy and distributive justice would amount to even distribution of poverty. In fact, a redistribution policy is unlikely to work in isolation from the pattern of growth, India is able to generate (Chakravarty, 1987). The matter of real concern is that most of our efforts are shortcuts and so directed to attain the growth rate of everything (electricity, water supply, mining, agricultural output etc.) somewhat, anyhow, or at whatever cost, sweeping under the carpet all the damages to the environment that result hereof.

As a routine, a significant part of the funds allocated for development ends up in the pockets of greedy and corrupt public officials and political leaders as implied in the confession of the late Prime Minister Rajiv Gandhi that out of 1 rupee spent for the poor only 15 paise reach them bears testimony to the same. Corruption is in fact a kind of termite eating away the fruits of development. In reality, there exists an alliance of politicians and bureaucracy with vested interests (land lords, traders and business groups, contractors, bank officials, sons of rural rich) which allows the enterprising clever section of the population to use and bypass the entire system. No wonder, the constituents of this system have practically conspired to create a kind of parallel economy.

The Gandhian concept of resource trusteeship, production by masses and not

the mass production and the notion of self-reliance, has much relevance. However, self-reliance needs to be rightly understood; it does not require help to a needy to relieve dire necessities for a while, but requires improvement in the capability to earn more on a steady basis (Chakravarty, 1987). In this context popular participation plays a catalyst role and is a critical factor in the promotion of self-reliant development.

Here contextual is also the Buddhist economic approach (Capra, 1988) which emphasises cooperation rather than exploitation. Based on the notion of 'right livelihood' and the middle way, its aim is to achieve maximum with optimal pattern of consumption. It naturally involves more of wisdom, importance of human scale, quality, good work, an economy of performance based on sound ecological principles, and a 'technology with a human face'.

Resource Appraisal and Management

An appraisal of resources is rather a pre-requisite to their appropriate management and planning. Surprisingly, in spite of vigorous human efforts even through application of sophisticated technologies, there are still many areas like vast polar regions, much of tropical lands, gigantic ocean floors and some planets within reach of man which have not yet been fully surveyed/explored and tapped. And what is known to us, is distributed quite unevenly in terms of quantity and quality and part of that is subject to exploitation only under developed economies. Although use efficiency of certain resources has been enhanced with the help of technology, much of such achievement has been nullified by side effects like devastating exploitation, wastages, misuse and environmental pollution, all threatening the prospects of future generations. This has led few to believe that the modern man of the 20th century has brought to credit more in the form of destruction of resources as compared to its creation and generation. Here Pearson's warning that human technology often exceeds his wisdom seems to be too glaring to be ignored.

What should be the size and level of spatial units (village, block, district, state, river basin etc.) for assessment of resources is an important consideration; better it is resource specific. Similarly, the temporal framework (short-term, long term, projection period) for resource surveys also needs to take into account the greater probability of changes in techno-economic, political, social and ecological circumstances.

Land Resource

The developing countries in general are highly dependent on primary production and so rely heavily on the efficient and sustainable use of their resource base, land and water, which support their activities. Land is limited and hence a precious resource. The first basic question raised is: Are we going to have enough good land to feed the additional population who will be on this planet by 2025 or so? Obviously, the land available for cultivation is being encroached and is gradually shrinking with the development of a variety of economic activities. Whatever is available, its considerable proportion is affected by water erosion (57.16 million ha) and wind erosion (10.4 million ha), salination/water logging (9.5 million ha), desertification/dryness,

shifting cultivation (2.38 million ha), ravines (2.68 million ha), degraded forests (24.90 million ha), and other activities e. g. mining, quarrying, brick-making[1], acid sulphate (10.34 million ha), shallowness, chemical imbalance etc. all totalling over 107 million ha.

In fact, the potential human induced land degradation is reported to be very high. In spite of land scarcity, over 50 percent of land is either idle or under utilised. Such wastelands, unable to retain water not only promote erosion but also account for flooding of rivers and silting of lake/pond beds and harbouring of a host of wide range of pests and diseases.

The immediate basic concern is the management of these wastelands to improve the productivity, revive the supply of fodder and fuel, facilitate the percolation the rainwater and augment agricultural production. Needless to mention that the reclamation and management process will be a good source of employment to needy local population. The next major concern is optimum/balanced (economically as well as ecologically) use of the land. Thus, the best proposition would be apportioning, if possible, about one-third of the total geographical area for vegetation cover so as to enrich biodiversity and check run-off and soil erosion, and selecting the best possible land use of the remaining part keeping in view the crop association which could cater to sufficiency and nutrition needs of the population.

Water Resource

Water is a basic human need and a critical input for realising the full potential of the agricultural sector. But the entire world is experiencing a water crisis of varied dimensions and magnitude so much so that there is a prediction of a next world war for this precious and scarce resources. India, although comfortably placed in terms of surface as well as ground water, is marked by variations (both spatial and temporal) in distributional pattern. It is regrettable that in absence of the adoption of requisite conservation methods approximately over 65 percent of the rain water runs off flooding the rivers, and wherever it is available in plenty, its excessive use accounts for converting fertile lands into sodic and saline wasteland thereby posing a serious threat to food security and bio-diversity.

The estimates of ground water potentials by different sources e.g. Central Water Commission, Central Ground Water Board etc. reveal that even after exploitation of all the irrigation potential half of the sown area will remain rain-fed. Also, there is a sizeable gap between the potential created and the potential utilised, and even the potential being harnessed is not put to optimum or efficient uses. As general observations suggest, about half of the water supplied goes waste as distribution loss in addition to wasteful flow of used water. There is marked disparity in water uses. Large-scale pollution and consequent deterioration in quality of water is another area of serious concern, both, in case of surface and ground water.

The competitive demand for limited water resources has made it rather imperative to conserve and manage this so precious and vital resource so as to meet the present as well as future needs on a sustainable basis. From this standpoint the

priority areas of approach are: i) efficient use of water, ii) problems of water-logging, salinity and drainage, iii) maintenance of water quality, iv) implementation of small-scale water programme. In the context of policy dimensions, care has to be taken of (a) quality, (b) access (c) supply (d) management (e) treatment and (f) disposal, etc. Conjunctive use of surface and ground water and reduced water consumption, if need be, through legislation as demonstrated by Australia, may prove to be an effective measure.

In a broader perspective, Command Area Development and Watershed Management have proven their utility in many, though limited, areas. Obviously, the watersheds being organically linked to the natural drainage system, and hierarchically integrated from lower to higher order drainage networks, constitute an ideal unit for conservation, up-gradation and utilisation of water resources, and assurance of restoration of ecological balance in rain-fed areas.

As has been observed, promotion of traditional and cost effective water harvesting measures like farm ponds at appropriate (strategic) locations along with harvesting structures e.g. check dams are a better solution. The *Johads* of Alwar (Rajasthan) numbering 600 have contributed to the replenishing of the water table, springs and eventually river Asvan, and have thus proven the utility of such an approach.

The thrust of these approaches lies in the participation of the local community and beneficiaries (actual users and stakeholders) in all aspects of water planning and management. The recently announced programme of introducing the *Pani Panchayats* at 5000 villages (in the first phase) is a welcome step in this direction.

A reference to River Linking Programme (RLP) designed with the objective of conserving water for use on a sustainable basis, reducing floods, transferring water from surplus to deficit (drought-prone) areas by rivers' inter-links is essential. This ambitious project involving huge expenditure of Rs. 560.000.00 crores remained the subject of serious debate with a lot of arguments and counter-arguments for quite some time, and was virtually found unacceptable on techno-economic, social, ecological and political grounds. However, in view of the non-availability of rational alternatives of that magnitude to overcome the large-scale water crisis, the proposal is still alive, although for the time being kept in abeyance.

Human Resource

A nation's human population is a vital resource and key element in its development process. Ironically, more often than not it is treated as a liability and causal factor of many of undesirable economic, social and ecological consequences e.g. slow economic growth, inadequate provision of social facilities, unprecedented depletion of natural resources, prevalence of crime and corruption and host of environmental crises. While thinking so we forget that population is: i) basis for increase in production through demand-pull effect, ii) stimulant to innovation and development and blessing under the shadow of nuclear war, iii) essential for specialization and division of labour, iv) a relief to problems of ageing as well as disproportionate reduction in population by many countries of the West

requiring large scale immigrant workers to keep the working age population steady. So the United Nations while describing the inexorable growth of world population as a major challenge to the future mankind, genuinely accepted the population as solution to most important problems of time.

It may be pertinent to mention here that many of the projections, wild charges and sweeping remarks related to population growth and its impacts appear to be based on statistical manipulations, because things are not expected to move so straight in a linear fashion. And explanations for most of the population related problems lie in the unequal distribution of assets, wide variation in consumption patterns and dietary habits, inefficient delivery system etc. Regarding the ecological crises ascribed to population growth, it is relevant to quote our late Prime Minister Indira Gandhi: 'World suffers more from excessive resource use by the West rather than excessive population growth in India', and the 1974 U.N. Conference's observation that the high consumption levels of population in the industrial world have a much greater impact on world's resources and the global environment than their impoverished population.

We all crave for quality population which means turning the population into a resource i.e. as productive agent. This does call for investment in human capital to improve the abilities and skill of people through provision of better health, nutrition, education and training, particularly to the underprivileged section of rural population. It will be quite contextual to pinpoint here that man is a very clever and able human being, and that he is aware of an ecological crisis exacerbated by the growing number of his kind, and that with requisite technological, scientific and human capacity he will be able to control the whole situation to the ultimate benefit of mankind.

Infrastructure

The significance of infrastructure, as a sine-qua-non of sustainable economic development, can hardly be over-emphasised. Although India has made provision for an outlay of 53 to 63 percent of the total budget on infrastructure development, infrastructural framework is still poor and thinly spread especially in vast rural areas. The guiding principle for infrastructural provision has so far been catering basically to regional interests accounting for the lack of a well-knit integrated system. What we really need is not just a road here and a bridge there but a transport network (Owens and Shaw, 1972) incorporating farm to village and village to market roads designed essentially to promote spatial interaction between the growth centres/central places and numerous villages scattered within their respective hinterlands, so as to bring multi-faceted socio-economic benefits to the villagers.

The present system of irrigation appears to have developed haphazardly both in spatial and functional terms. There is a wide gap between the irrigation potential created and that actually in use, accounting for disparity in water availability at local as well as individual farm level. Certain planning measures like a ceiling on the area of land per household to be irrigated; raising irrigation rates beyond a minimum area; provision of small tanks to conserve rain water and education of farmers for optimum utilisation of water etc. may prove to be

effective for providing adequate and assured irrigation.

The power transmission system, especially in rural areas, is rather deceptive, being characterised with erratic supply, frequent failures and pilferage, higher repair and maintenance cost. There is needed provision of dispersed but well-knit and extensive system of mini and micro hydro plants supported with numerous local units run on biogas, solar energy and wind power. Regarding the market facilities, the foremost requirement is close location of market towns and agricultural sub-centres equipped with storage facilities.

The role of credit and financial institutions has become more crucial, as in the absence of these institution, poor farmers come under the power of professional moneylenders and ultimately fall into the vicious circle of poverty. The remedy lies in the provision of a set of integrated credit agencies, supplemented with farmer's credit cooperative and societies aiming at minimizing the risk and pushing up the level of productivity in agriculture. The supply of inputs like HYV seeds, fertilizers and insecticides (including bio-fertilizers and bio-pesticides) has to be assured at reasonable prices and on a scale-neutral basis.

Sustainable Agriculture

Although contributing about 35 percent to GNP and generating over 85 percent of rural income, agriculture has not been able to achieve the desired level and a sustainable basis of its development. It has rather slid into a crisis marked by rising costs of cultivation, increasing dependence on expensive resource, growing regional imbalance and erratic crop yield. To add to it, among the landholders the majority comprises small (1-2 ha) and marginal (less than 1 ha, the average being 0.4 ha) farmers, most of whom are illiterate and non-enterprising, treating agriculture as an age old family tradition with little or no investment in modern inputs, thus, causing poor productivity of land as well as livestock.

Our new agricultural strategies are under criticism. These are said to have been worked out in utter disregard to micro-environment of a particular region characterised with unique climatic peculiarities, natural soil chemistry, water resources, biotic sickness or poverty, diversity of micro-organisms, pest complexes, etc. The bio-tech's contribution in developing crop varieties which reduce insecticides' use and are more drought-tolerant is being questioned in view of its long-term undesirable impact on environmental and human health. The contract farming appearing to be very attractive on face value is also being opposed by people's organisations on more than one count.

As an alternative, some experts advocate increase in yield through multiple cropping agriculture as practiced by traditional farming methods with crop residues fed to ruminants (to produce more milk and meat) and organic farming by and large replacing chemical fertilizers to effectively solve the twin problem of hunger and persisting land degradation (Sundaram, 2004). Agricultural policies in general suffer from elements of uncertainties, sharp fluctuations and inconsistencies which act as disincentive to farmers. The need is to assure the farmer of

remunerative prices of his produce, and to realise this, a minimum support price geared to inputs and hooked with industrial goods, fixed by the State, and buffer stocks become essential ingredients of the policy.

In a wider perspective, there are certain prerequisites of sustainable agriculture, such as (a) crop diversification through crop rotation, mixed cropping, double cropping etc. which may simultaneously check soil erosion, improve soil fertility and promote increase in yield; (b) conservation, enhancement and utilisation of genetic and agro-biodiversity, so as to realise stability of yield taking an holistic view of crop management; (c) integrated nutrient, and integrated pest management; (d) sustainable water management through adoption of sustainable technology for storage; (e) use of appropriate post-harvest technologies to optimise the extraction process; (f) judicious development and utilisation of renewable energy sources; (g) development and application of sustainable land use models; (h) sound extension programmes to train and impress upon farmers the need to adopt innovative techniques.

The sustainability of modern agriculture is linked with the application of technology, which in the opinion of Swaminathan (1995), is supposed to have the following dimensions: (i) appropriateness (suiting to social situation of the land users); (ii) economic feasibility (within financial status of farmers); (iii) economic viability (return to investment of every rupee); (iv) environmental soundness (enriching the environment or at least not harming existing ecological conditions) etc.

Agriculture as a Source of Food Security and Employment

Agriculture can contribute substantially towards a solution of problems like poverty, hunger, unemployment and environmental degradation. For this to happen the focus of the agricultural development strategy has to change from production for survival to production for sustainable profit, from emphasis on meeting minimum needs to realising maximum potential. Thus the new strategy has to be designed for accelerating the growth of commercial agriculture, agro-industries, agro-exports, availing of country's competitive advantage in labour-intensive agricultural crops and allied industries. This will simultaneously facilitate achievement of nutritional self-sufficiency and rise in rural income (Swaminathan, 2004).

The aforesaid strategy is supposed to be low-cost and provider of additional jobs on the farms and in allied activities with increase in productivity, and growth in labour-intensive commercial crops supplemented with reclamation of wasteland for forestry and promotion of animal husbandry and poultry. Non-farm employment can also be created after the establishment of agro-industries (sugar mills, cotton textiles mills, fruit, fish and silk processing units) using surplus agricultural production as raw material in rural areas which may act as counter magnets to rural-urban migration.

The implementation of the strategy will require: investment in training of both, on-farm and industrial workers; an organisation for bringing together small farmers for processing, marketing and distribution; public awareness about the technological

and commercial opportunities; transfer and dissemination of technology and management education to rural enterprises.

Utilisation of common property resources such as community ponds for fisheries through the involvement of the department of rural development can help the resource-poor to share the fruits of development. Establishment of bio-villages can play a vital role in facilitating of an appropriate blend of traditional (eco-technology) and frontier technologies which are pro-poor, pro-nature, pro-women in its basic development orientation and in providing knowledge and skill regarding small scale income generating activities on a site specific basis, tailored to circumstances of the resource poor household.

Sustainable Industrial Development

Sustainable industrial development is a prerequisite for a strong economic foundation of any country. Also, it acts as a catalyst to provide large-scale employment meaning substantial increase in income/ purchasing power and thereby access to social facilities needed for a better quality of life. Needless to mention that had India not pursued the policy of developing a strong industrial base, there would have been more poverty both in absolute and relative terms as the country needs various agricultural inputs which could be provided only through requisite industrial development. In fact, more integration is desired between agriculture and industry (as two legs of the economy) and other organised sectors.

As a policy, in the larger interest of the country heavy industries should continue to strengthen the foundation of the national economic independence but at the same time, the production of consumer goods should be increased through household industries using appropriate technologies, largely manual (specially trained) labour and local raw material.

The new industrial units need to be less capital-oriented, labour-intensive, small but viable and preferably set up in depressed regions so as to promote employment opportunities and effective utilisation of resources in such areas. Broadly speaking, industries have to be as far as possible decentralized, disseminating development benefits to backward/far-flung rural areas but taking precautionary measures against tremendous waste in the process.

Social Perspective

In a social approach to the problems, man is accorded supreme place and all developmental processes are treated as subservient to his chosen style of living. This implies creation and evolution of a new society and social order. For this to materialise, a spectrum of activities and human mobilisation is required which could make people stand on their own feet breaking away from structural disabilities, and reduce their vulnerability and dependence by allowing a greater role for the people and their organisation.

If the Indian society values growth with equity, the country has to go a long way in adopting institutions and inspirations in that direction. This does require a change in the attitude of the society towards the poor, meaning restructuring of the existing apparatus of politico-economic federalism. For this, the society as well as the

administration has to undergo reforms, the former through increase in the level of literacy and awareness of common people and the latter through the reversal of position of the power pyramid (Aziz, 1978). Needless to mention that in a wider perspective, there is always an eye at transformation from a traditional to a modern society although with certain inherent big losses such as fracturing of the old system of joint families which used to be 'a giant shock absorber' of society, a stable point in an increasingly flux-filled environment (Toffler, 1971).

It has to be underlined here that we have so far concentrated too much on 'hard', highly complex and resource-intensive technologies and must now shift our attention to 'soft' technologies of conflict resolution, social agreements, cooperation, recycling, and redistribution and so on. This concept is embedded in our age-old philosophy of 'Vasudhaiv Kutumbkam' i.e. the entire world forms a single family with a sense of mutual understanding, respect and cooperation. The other concepts like 'Daridranarayan' i.e. treating the poor as God, keeping him at the centre of all developmental strategies (Gandhi); 'Bahujan Hitay, Bahujan Sukhay' i.e. for the benefit and comfort of the majority; 'Tain Tyakten Bhunjitha' i.e. distributing what God has given to us among others, etc. all conform to the need for attitudinal change of the haves.

Ecological Perspective

It is, indeed, unfortunate that irreversible processes of environmental degradation have been registered throughout the world and have become a global challenge. An answer to this lies in an ecologically sustainable development giving emphasis on inter-generational equity which requires the present generation to ensure that the health, diversity and productivity of natural resources are maintained or enhanced for the benefit of future generations. Many analysts attribute the existing situation to the modern society devoid of ethical vision, meta-physical resonance and existential meaning. And the consumerism with its unending demand on planet's limited resources is a product of the same. Mr. George Bush's defiance of the Kyoto Protocol and his stand that environment is a luxury priority which economic growth will take care of, is reflective of the same.

Many international agencies including the World Bank have turned their focus on environmental concern covering a gamut of environmental issues related to economy and ecology. However, the need of the hour is 'not to contain development to save ecology to promote development' (Krishan, 2000). This implies reconciliation between two fundamentally opposite views/ approaches of activist-environmentalists and pro-active developmentalists, the former focusing on a pessimistic situation and pleading for absolute conservation, and the latter ignoring the ecological damage and advocating a technological future. Thus in the larger interest, developmental activities should proceed but with an inbuilt provision for the protection of the environment.

Political Perspective

The political perspective relates to political decisions at different levels, administrative set-up and good governance. As such, decisions regarding wars and pollutants' emission at global level have had far

reaching consequences. Regarding the form of government, democracy has been found to be most acceptable. But it is also true that this system suffers from several vote bank building, unviable populist approaches telling heavily on the economy and law order situation. The other problem of this system is the inefficiency caused by inherent contradictions between the elective system and the structure of the Indian society, the former being territorial in nature, formal and based on law, and the latter on the contrary consisting, by and large, of exclusive religious and caste groups (Misra, 1983).

Although propriety of the centralised or decentralised approach to planning is a subject of debate, yet hopes of successes still lie more in decentralising the process. It is supposed to give attention to the problem and concerns, specific to a particular area apart from being more democratic and inclusive, cost-effective and maximizing benefits to the people against the boxed approach with involvement of a small group of leaders, experts and consultants. True, development after all is a political problem and needs the involvement of people at large. The crux of this approach is to devolve the administrative and financial process which more often than not faces resistance from the high officials, politicians and landlords who apprehend the consequences of the reversal process implying exchange of position: topside down (Aziz, 1978). Under the changed set-up the people have to be organised to develop their own administrative and development capacity to do the things for themselves with bureaucrats and technicians to assist and advise the local institution as genuine servants of the people.

The geographer's critical task will be designing an appropriate spatial organisation for development administration. They have a role in identifying the optimal size and configuration of states, districts, blocks and all such spatial units so as to minimise the (operational) cost and maximise the benefit of the development process. The appropriateness of the existing language-based state boundaries which accounted for heterogeneity of development levels and led to violent situation in certain parts (Telangana in A.P. etc.) is not beyond question and calls for better option.

4. Summing up

"Sustainability' has become a catchword being frequently used as a prefix to various socio-economic activities in general and 'development' in particular. The inclusion of more and more tenets in its definition/ concept has made many to feel that the term is merely a cliché and little beyond a buzzword whose appeal is fading, owing to few demonstrations of what it means and how it works, especially on the ground. However, the philosophy is sound and needs concerted efforts towards its translation into action.

The issues related to sustainable future should be viewed in an integrated and long-term perspective, so also the resource management and development strategies. We have to remain conscious of the fact that with a poor perception of the realities, fondness of borrowed models and strategies we are heading towards a rude shock, and if we do not act right now and hasten to reverse the process of dualism, our development scene soon will see a sea-change, yes, for worse (Chakravarty, 1987). Agriculture and

industry have to be developed as two legs of the economy. Agriculture may, thus need restructuring to ensure food security and generate employment for small and marginal farmers and landless labourers, and industrial development needs to meet local demands preferably through local processing and utilisation of locally available material facilitated by rural electrification, supplemented with development of non-conventional sources of energy. Broadly speaking, the diversification and dispersal of economic activities and the provision of infrastructure in adequate measure are desirable for a balanced development of any area.

Policy changes have to be introduced to counter uncertainties, sharp fluctuations and inconsistencies in the economy, particularly in the agricultural sector. As rising growth is no guaranty against worsening poverty and increasing inequality, better distribution policies are to be built into the very pattern and organisation of production (Haq, 1996). Similarly, our population policy must not deal exclusively with population variables as such but also with the underlying socio-economic conditions (including education, health, technological means, services, etc.) to help people achieve a well-being that will induce them to limit their fertility voluntarily.

Attitudinal change and cooperation are prerequisites of a sustainable future. Contextually, it is in the fitness of things to quote views of an I.I.T. Professor (Chennai): 'Bihar won't change' (Nitish Kumar at best may be a good joke between two bad serials). He prescribed scores of 'do's and 'don'ts emphasising change in the attitude and work culture as the only option to achieve the goals of development in Bihar. Also, interesting is Amartya Sen's observation that 'I sometimes wonder whether there is any way of making poverty terribly infectious. If the privileged would catch poverty from the poor they meet in the street, I don't doubt at all that the poverty would be eliminated with remarkable speed'. This implies a forced way of changing the mind-set of rich and haves.

No doubt, the man endowed with faculties of reason, imagination, memory and so on has a responsibility of taking care of the whole earth including human beings, animals, plants, etc. He is supposed to use the tremendous power acquired by him with necessary intelligence and wisdom to save the entire planet from destruction (may be from global war or large environmental degradation). There may be a desired 'new world order' and 'alternative economies' whose paradigm will necessitate: (i) a new way of living that will drastically cut the present levels of energy use and pollution; (ii) new ways of measuring economic performance that reflect human well-being; and (iii) new ways of organising work and elimination of all kinds of international trade and debt that impoverish people.

At the end, coming to the role of geography, it may be observed that geography needs to maintain its diverse and popular character, at the same time, taking care of desired advances in the disciplines. So, geography at school and college levels has to be further strengthened in terms of contents and techniques with an eye at producing students with a requisite background and skill for further studies. Elementary knowledge about the environment including ethics, utility of

G.I.S., remote sensing etc. may be imparted at this level itself. Regarding research, the choice of the topics has to be guided by societal relevance. As such, challenging issues like crime, terrorism, corruption, disaster management, solid waste disposal related problems, etc., which have been out of research focus may be taken up for research and analysis. Obviously, there is demanding scope for geographer's contribution in studying problems of re-delineation of administrative boundaries of the States/Districts/Blocks/Parliamentary and Assembly constituencies, particularly in view of the failure of the language-based territorial organisation to deliver the desired results (The Telangana and Northeast States' problems being examples in point). Hope Geography will succeed in its mission.

Thank you one and all.

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[1] Urbanisation consumes nearly 3000 million tones of soil for brick making.