

Today's Burning Problems

Is such confidence justified? Is economic growth likely to go on forever? Or will it be constrained by certain factors? Is technological advance likely always to offer timely solutions? What does technological advance exactly mean? Let us to find answers to these questions.

Adam Smith had claimed that free competition would operate in such a way as to achieve social welfare through sublimating individual self-interests only if the concerned society could achieve a high level of moral and social responsibility. Economic development and growth have not helped in the last 300 years in creating such an atmosphere in any society. The general consequence today is that in the complicated system of production and distribution evolved through technical progress, it is impossible to bring in free competition. Bringing in free competition means buyers and sellers have perfect knowledge of all present and future transactions, that is they are also aware of present prices and changes expected in them in near future; that how they will affect decisions of buyers and suppliers in future, and that they can also comprehend what miracles technical progress may bring in future and what will their consequences! As no society is capable of such extraordinary knowledge, free competition remains a Utopian dream.

Nature and Economy

Nature is a system that works through certain processes. In the course of evolution nature is manifested through different eco-systems such as atmosphere, the sea, land, vegetation, etc. which are repositories of different forms and shapes of matter galvanized through energy. The source of energy is the Sun. Different components of nature receive and utilize this energy and dissipate it as heat. Evolution has created certain mechanisms through which the circulation of energy and its utilization are achieved. These mechanisms are essential for the survival of all living organisms including human beings. They provide vital services to living beings. Some of these mechanisms are: soil, forest, flowing water, the sea, the atmosphere, etc.

The primitive man was totally dependent on nature's mechanisms as all the wherewithals of his life came from nature. Like any other animal he/she was using the products of solar energy. When he/she started making use of different things in nature to produce other useful things, the usable things in nature became his/her resources. Things that are outside economic transactions enter into economic transactions in a production system and again go out as waste out of economic transactions after they are used. But certain mechanisms in nature remain outside economic transactions and are still used by human beings, e.g. atmosphere, the sea. Organisms in nature are able to convert waste into usable materials. Soil if used for farming may get exhausted but its fertility will return if kept fallow. Air and natural systems have a capacity to regenerate or renew themselves. If things are used according to their regenerative capacities, one can use them over and over again.

After use matter goes into a state of entropy or disorganization. Entropy may also be created in the environment where waste is deposited. Agents like decomposers are available in nature to recycle nutrients present in the water. In this sense nothing is wasted in nature as the released nutrients were reused for generation. Human beings should create only as much waste as can be handled by decomposers.

Who is to bear the cost? Nature or People?

If resources are used according to their regenerative and recycling capacities, the cost of economic transactions will be reduced. A large part of work will be processed by natural agents who charge nothing. Today resources are used on such a scale and in such quantities that nature can neither regenerate nor recycle. Technology may help people to

accomplish these processes but only at a price. As the scale of production increases, this cost also increases. Avoiding this cost means allowing the environment to languish in disorganization, i.e. creating pollution! This cost goes up as consumption increases and as technology is used to perform tasks otherwise performed by nature free of charge. Technology used in this way becomes expensive!

Economic growth, which means increase in production and consumption and consequent increase in waste, will involve higher and higher costs as technology replaces nature in regeneration and recycling processes, to avoid pollution. Should we allow such costly growth to continue or should we restrict it within the regenerative and re-absorptive capacities of nature by maintaining ecosystems and nature's mechanisms in a healthy state?

The Threshold Effects

Human beings use nature in two ways: they extract natural resources from land, sea, forest etc. and they use nature's system free of charge. People require oxygen for breathing, they do not manufacture it but use it as provided by nature in the atmosphere. Soil is required for agriculture. It is not manufactured by decomposing rocks but is used as given. We use plants' natural capacity to produce food through photosynthesis. Decomposing services offered by decomposers are also used freely by us.

But all these mechanisms will degenerate if overused by human beings. All these mechanisms have a threshold of tolerance. Their efficiency decreases if their use is stretched beyond this threshold. They can tolerate strain only up to a point. Unexpected consequences may result if these are stretched beyond their thresholds. When human population was low, these thresholds were rarely exceeded. Their life cycles continued unperturbed. Now thresholds have already been crossed in many instances, disrupting the working of ecosystems and their rhythm and disturbing their cycles. Scientists are not at all sure about the mature of the consequences.

Indiscriminate conversion of all kinds of ecosystems for agriculture, disruption of the natural flows of rivers and disturbing thereby their physical and biological equilibria, increasing carbon dioxide in the atmosphere are the most common instances of overuse of nature's systems by human beings. How these will affect temperature, humidity and rainfall? How will the natural erosional and depositional processes be affected? What will be the effect of such drastic changes on the lives of several nonhuman beings who also utilize these mechanisms? In turn how future human life would be affected? Scientists are unable to predict with any degree of accuracy!

Evolution also brings about changes. But this change is far slower than one effected by human beings. Ecosystems are unable to face this rapidity of change brought by human beings. Most ecosystems lose their productive capacity immediately such as soil under intensive agriculture or production of sea organisms due to destruction of mangroves. Destruction of forests affects the quantity of natural food as area under photosynthesis is reduced. It will also affect hydrology. Destruction of habitats may lead to changes in the variety and composition of insects and this may lead to the emergence and spread of diseases. Large scale death of phytoplankton in the sea encourages algal bloom which remains a potent cause of many infections. Loss of temperate forests reduced the populations of 35 species of insectivorous birds inducing pests to erupt and affect several of remaining trees. Insecticides introduced by human beings have actually created more pests than they have destroyed!

Human beings then try to overcome such consequences by using technology. Technology is being increasing used to enable us to survive in a degraded environment. As technology is used as a substitute for nature's services, the cost of economic transactions goes up.

Does 'Growth' mean Increased Energy Use?

The prosperity enjoyed by America and Europe in the fifties and sixties of 20th century began to appear empty, hollow and weak for many people. It became apparent that nature everywhere was victimized in the cause of economic growth. In 1962 Rachel Carson's 'Silent Spring' was published. It detailed the adverse effects on birds and other fauna and on human health of increasing use of pesticides in farms. It vividly brought out the destruction of nature for the cause of increased production. Many manufactures became the target of public ire. Companies sued the author for defamation but courts, after examining all the evidence, vindicated her stand. The book became extremely popular and effectively sparked off 'Save the environment' movement in USA.

In Europe eminent thinkers and scientists came together to produce a report called 'Limits to Growth'. It also laid bare how Europe was sacrificing nature and natural resources for economic growth. It was literally growth at all costs! If the then scale of resource exploitation continued, they argued, a severe crunch would appear by the year 2000. They also underlined the dangers of increasing pollution.

These studies also highlighted the fact the economic growth was due mainly to the availability of cheap energy. Developed nations were able to get oil from the Middle East at ridiculously low prices. Even during the world wars, petrol was sold at less than a rupee per gallon! With such pricing products based on petroleum multiplied fast until 70% of the market was captured by these. Dr. Narinder Singh in Cambridge, England, published his thesis "Economics and the Crisis of Ecology" in 1976. He showed that most of the products available in the market were decidedly poisonous and were spreading contamination of water and soil. Pollution from industrial and commercial growth was the main cause of higher incidence of cancer, it was argued. The growing pressure from the Environment Lobby in America compelled the US Government to establish the 'Environmental Protection Agency' with wide powers to check all sorts of pollution.

In 1973-74 oil producing countries of the world joined hands and substantially raised the price of oil. There was an immediate crisis in the production system and European economies were severely affected. Recession was in the offing, US industry was also affected and once again public faith in the economy was shaken.

As environment protection movement gained momentum, UNO was forced to take action. The UNO invited all heads of states to a conference in Stockholm, Sweden, to discuss the environmental crisis and suggest solutions. Debate on pollution and economic development dominated the meet. India's prime minister Smt. Indira Gandhi argued that poverty was the biggest polluter and pleaded that developed nations must help the developing world in eradicating poverty!

As the debate on pollution and economic growth became more general the role of energy in economic development and what effects conversion of matter by applying energy, produced in the economy, was examined in detail and from different angles. Let us now look into these issues.

Energy – A Double-edged Sword

For Planet Earth, the source of all energy is the Sun. stocks of matter are available on the planet in various forms and shapes. Both, the flow of energy from the Sun and stocks of matter are finite, as neither of these can be increased. Energy is required to produce goods from stocks of matter, it may also be required to produce goods from stocks of matter, it may also be required when goods are processed or being used and to decompose the waste so created, energy is used also.

Planet earth is a closed ecosystem as all matter is utilized and recycled here through the application of energy and nothing goes out of it. All living organisms are open ecosystem as waste is thrown out of them after energy and matter are consumed and used. The economic system created by human beings is a part of the earth's system as energy and matter are used. Economic production is also a part of the total ecosystem productivity of planet earth. In this sense the waste created through production and consumption should also be recycled and nutrients and other material released from decomposition used for regeneration and restoration of ecosystems!

In the process of evolution, the use of matter and energy has increased and become diversified over the millennia. This use increased substantially after the evolution of photosynthesis. As surplus food was produced a variety of organisms evolved, habitats and niches were formed to accommodate them. As the food surplus was by no means unlimited, the development of life on this planet was qualitative and not quantitative. Life diversified but evolved in such a way that no single life form could dominate the earth indefinitely. Different forms such as invertebrates, fish and amphibians, reptiles and mammals dominated life in different geological eras. Human being is the dominant form of this era. They are trying increasingly to direct the existing flows of matter and energy towards themselves and are also using energy from fossil fuels. The rise in the share of human beings within world's total productivity is therefore, quantitative and not qualitative. Forty percent of all the terrestrial production is being utilized by human beings forcing the rest of the living organisms to survive on the remaining 60%. Consumption is being increased not through utilizing diversity but by reducing it to uniformity. At the same time energy has been used to produce chemical and other products which the existing mechanisms in nature are unable to break down. On the one hand diversity is being reduced and on the other waste is accumulating. As all this goes against the evolutionary trend, the growth is not sustainable and human domination of world will be short-lived. This is the argument put forward by some scientists.

The Eternal Laws of Physics

Certain immutable, eternal laws governing the universe also tell us that such quantitative growth cannot be sustained. Two basic laws of thermodynamics are: 1) energy and matter can neither be created nor can it be destroyed and 2) total conversion of matter by applying energy is not possible. Both energy and matter go into forms of entropy to a certain extent. Part of energy escapes as heat and part of matter comes out as waste in any transformation. At each step in the process of transformation some energy and matter go into a state of entropy. Increase in production involves numerous steps in which heat and waste increase and they even create entropy in surroundings where they are deposited. If heat and waste are created beyond the absorption capacity of the surroundings, pollution will be the result.

From Entropy to Regeneration

In any system of production creation of entropy is a cost, heat as lost energy is a cost and waste as lost matter is a cost. The whole system of nature can be conceived as an effort to reduce entropy inherent in energy and matter. As evolution shaped matter and energy into living forms and organized them into mechanisms, costs in terms of entropy had to be incurred, entropy created in the surroundings which over geological time could be reduced. When something dies or loses its form, not everything is recycled, part of it remaining in the surroundings to be gradually converted to reusable energy and matter, e.g. the formation of fossil fuels in the bowels of the earth. Evolution proceeds in such a way as to use energy and matter in ways where costs are kept to the minimum. Life forms which require both matter and energy in great quantities and over a shorter time are though numerous in population have tiny bodies and a short lifespan; these are mostly insects, bacteria etc. whose rates of metabolism are high. On the other hand life forms using matter and energy in concentrated form, have slower rate of metabolism, longer life and also smaller population. Most

of the higher plants and animals constitute this category. Evolution have perfected life forms in such a way as to make their shapes, populations and life span proportional to their requirements of matter and energy and to the rate of metabolism. In water and land energy and matter are distributed through habitats and niches in such a way as to keep entropy costs to the minimum and still support a huge diversity of life. Trees that require large quantities of water grow only in particular climates. When water is scarce, grasses and not trees is the common life form. For deserts only specially adapted plants and animals can survive.

In nature every life form has to struggle to keep down the entropy. If it does not get enough energy to keep its body away from disintegration, the life form inevitably proceeds towards death or disintegration. Every life form has to compete to get enough energy for survival. Today human beings have outcompeted every other life form by capturing a large part of energy and matter flows. Such diversion and consequent conversion of matter by applying energy have resulted in entropy, enormous quantities of energy escaping as heat and of matter thrown out as waste. These costs have increasingly to be incorporated into the costs of production, which increases prices. If they are not incorporated, increased pollution is the result. Every human society has been caught either in the spiral of increasing costs, i.e. higher and higher costs of living as in developed nations or increasing pollution as in developing nations.

The eternal laws of physics dictate that if all entropy created (of energy and matter and of the surroundings) is accounted for, and everything recycled, input balances output, surpluses are temporary and small and net productivity is zero as in an eco-system of mature forest. Large surpluses are a result of imbalance in the system, where some costs are borne by others and are not accounted for and resulting waste allowed to create pollution. Surplus, i.e. profits, in a system of production can result because some sections of society are made to bear costs of externalities and pollution. Profits mean robbing Peter to Pay Paul. 'In this sense, they are completely unnatural. A production system which hankers after continuous growth of profits will always create imbalances, deprivation for certain sections of society and greater pollution. It will also make cost of production greater than value and the system will require constant subsidies which ultimately mean a higher burden on nature or some sections of society. Moderate profits, which are invested in social capital to promote equity in society and lessen the sense of deprivation of certain sections of society, should be the goal as Ruskin had wisely advised!

Such compulsions imposed by immutable laws governing energy and matter were conveniently forgotten as advances in technology promised high rewards. As greater and still greater production became technologically possible, greater investment was diverted towards locating additional sources of energy and minerals, in refining marketing techniques, in improving transport and communications and in erecting other infrastructure. As costs continued to rise, developed nations began shifting their industries, especially pollutive industries, to developing nations, where labour and other costs were low!

Developing nations as also communist nations had adopted a capitalistic production structure. Keeping production cost low and avoiding pollution were the problems their economies faced also. Developing nations tried to keep costs of energy and raw materials low by allowing industries to exploit their own resources at greatly subsidized prices and depriving people of the use of these resources. The centrally planned economies of communist nations monopolized control over energy and materials and directed their flows to particular uses. Costs could be kept low by controlling prices and restricting consumption. Rising pollution was largely ignored and implementation of pollution control laws became lax.

A Benign, Conscientious Predator!

The apex predator, the human being, is a two-faced creature. The familiar, widely seen face is of predator par excellence, out to kill everyone and everything in pursuit of self-interest; the other face, persistent but rarely seen, is of a benign, all-caring, a steward duty bound to save all God's creations! The history of nature conservation is therefore, as old as human beings themselves.

In India Vedas had eulogized nature as the early Aryans perceived it. As cattle-herders and nomads, they probably showed little interest in preserving natural habitats. When Aryans entered India, settled down to form kingdoms, they must have realized the connection between the health of nature and natural resources and the welfare of the state. The later Vedas and the Upanishadas contain references to forces of nature like the hydrological cycle and the energy derived from the Sun and their importance to life on earth. Emperor Ashoka was however, the first to record laws and dictates about management and care of forests and animals living there. Benign treatment of animals continued in more or less intensity, throughout India, till the country suffered from invasions. Invaders like the Muslims and later the Europeans took delight in mass hunting of animals and birds, especially the larger carnivore, and a number of other animals like elephant and the rhino were victimized by the trade in their body parts. The number of animals and birds completely eliminated from India however remained small till little before the independence, when a system of national parks and sanctuaries was set up to conserve nature.

In Europe Greeks showed extraordinary interest in natural phenomena and virtually established the science of natural history. The Roman Empire however, was more predatory than conservation-minded and such conditions continued till Mediaeval times when certain kings and princes enforced laws to protect game animals and forests. In China Mongol Emperor Kublai Khan prohibited hunting of birds and mammals during the harvesting season.

In modern times the first natural reserve was established in France by a group of painters in 1853 and was sanctioned by a royal decree in 1861. The concept of large reserves was born in the US when the Congress ceded the valley of Yosemite and Mariposa Grove to the State of California to establish a natural reserve and protect Sequoias. The first National Park was established at Yellowstone in USA on 1st March 1872. The idea of creating nature taken up by almost all nations and relevant laws has been enacted to protect flora and fauna.

As experience of handling natural reserves was gained, it was realized that mere elimination of human disturbance might not lead to conservation of flora and fauna. Isolated small reserves were found to be always at the mercy of surrounding land use from where pernicious factors might affect them. It was also found that large-size reserves were more viable than many small ones scattered all over. A system of corridors also was thought necessary to provide interlinking of reserves, so that animal movements were facilitated.

Necessities of economic development however, many times conflicted with the maintenance and viability of these reserves, especially in developing countries. Their boundaries had to be redrawn; chunks of habitats had to sacrifice for particular development projects end-angering certain species of flora and fauna. It was also claimed that reserves were created on lands that for generations supported tribals and other local communities and that their eviction from those would disrupt their livelihoods and their culture. This dilemma was posed as people versus wildlife conflict and as yet no satisfactory solution that would protect the interests of both has so far been worked out, especially in a country like India. Pressures of population and economic development render therefore, the future of these protected areas at best tenuous, at worst bleak and dismal.

The IT Revolution

The relentless march of technology and economic development continued through 1980s and 1990s. The computer so far was an instrument mainly to record and store vast amounts of information and to carry out intricate calculations not possible for individuals. With advances in space technology and launching of data-gathering satellites in the space, the era of computer connectivity began. Internet made possible instant communications over unimaginable distances facilitating give and takes of vast quantities of information including photographic images. Markets for certain commodities suddenly became worldwide, capital movements became dangerously easy and flights of capital destabilized certain economies. With fossil fuel use still subsidized by most governments, intercontinental transport was not expensive and big corporations began looking for distant sources of raw materials and developing far flung markets. For these big market players globalization became an essentially as tariff and other barriers could have impeded free movement of resources and goods, increased costs and reduced profits. So was propelled the credo of globalization and governments and people enticed to the alluring prospect of limitless availability of goods and commodities with the development of a global market.

Time had arrived for nature to become just one sector of human economy like agriculture and industry as was believed by growth economists of post 2nd World War days!

The nature conservation movement which began with the publication of Rachel Carson's 'The Silent Spring' and prospered in the post oil-crisis era (1973-74) suffered during the administrations of Thatcher and Reagan in the UK and the US respectively. In the name of providing an impetus to their sagging economies and more jobs to people, they weakened administrative agencies like EPA, slashed funds for education and health and provided tax cuts and subsidies to the corporate sector. The UN however came forward with fresh initiatives adopting World Charter for Nature in 1982 and then appointed a high-level commission under the chairperson Mrs. Brundtland, Prime Minister of Norway, to go into the question of development versus environment debate. The Commission, in their report, emphasized the need for sustainable development meaning thereby development which while conceding the needs and aspirations of the present generations, does not compromise the needs and aspirations of future generations. The Commission exhorted developed nations to cut down consumption and give more aid to developing nations enabling their citizens to cover their basic needs and requirements of education and health. It implied that unless a basic level of development was reached, nature conservation would be futile. But it also stated that environment should be considered in determining all policies and that it should not be sacrificed in the name of development. It enjoined each nation to evolve its own environmental code consistent with its geographical position and culture.

For environmental conservation these cardinal principles were enunciated:

1. The Polluter Pays Principle: A polluter cannot externalize the costs of pollution. He must cover the cost of abatement of pollution so that others do not suffer from it. The onus of providing that his actions are adequate is his.
2. The Precautionary Principle: National policy makers should keep vigil and assess if their policies are affecting the environment and to what extent. They must take every precaution to avoid damaging environment by suitably modifying policies and rejecting damaging options.
3. Sufferers of environmental pollution should be adequately compensated and damaged ecosystems should be restored.

The UN General Assembly's initiative in constituting the Brundtland Commission was followed up by other organizations. The United Nations Environmental Programme in 1989 issued a World Charter on Environment which demanded conservation and judicious use of natural resources and ecosystem utilization in ways that would not damage their stability and resilience. Even earlier, i.e. in 1980, the International Union for Conservation of Nature had published the World Conservation Strategy, appealing every nation to draft its own national conservation strategy. The UN strategy had also cautiously advocated reduction in resource use and consumption for the developed nations.

These appeals hardly produced any tangible results for largely because the US continued to ignore and Canada, Japan, Australia more or less followed US. The European Union enforced strict pollution control and overall energy use was reduced. The developing nations under the UN banner continued to press for international cooperation in nature conservation and aid to eradicate poverty. The result was another worldwide conference convened by the UN in 1992 at Rio de Janeiro. The heads of states who gathered there adopted Agenda 21, an environmental policy blue print for the 21st century. The conference however, carefully noted the non-compliance of member states carrying out provisions of various agreements and resolutions passed since 1972. In this respect the negative role played by the US was highlighted. Adequate international cooperation was not forthcoming to check the rise in global temperature, the hole in the ozone layer and increasing marine pollution, it was noted. Closing years of the 20th century brought out the fact that humanity's efforts to save the planet were far from adequate.

The Concept of Sustainable Development:

Economists of various hues either supported or criticized the concept of Sustainable Development. Hartwick and Solow differentiated between sustainable economic development and sustainable environmental development. Consumer sovereignty and an efficient price mechanism were thought to be necessary for the former. To achieve economic sustainability, the prices of non-renewable resources had to increase every year in proportion to the prevailing rate of interest, for their efficient allocation and the rent accruing from their use must be invested in production and regeneration of renewable resources. This theory assumed perfect substitutability between natural and man-made capital. The prices of resources must cover the cost of restoring the destruction and degradation of ecosystems.

The above conditions were thought to be insufficient for achieving sustainable environmental development. Several other pre-conditions had to be fulfilled. They are:

1. Ecosystem needs are more important than consumer sovereignty.
2. No perfect substitutability exists between natural and man-made capital.
3. The use of natural resources should be within the bound of their natural regeneration.
4. The production of waste should not exceed the assimilative capacity of natural systems.
5. Biodiversity has to be maintained and enhanced for the future generation's wise use.
6. The notion that development and environmental protection cannot go together, should be abandoned and all policies must include considerations of environmental protection.
7. Natural systems should be allowed to work according to their capacities and man-made capital should not be substituted for them.

8. Substitutes should be developed for non-renewable resources and use of renewable should only be increased.

What makes Sustainability Unsustainable?

The ushering of the new century failed to inaugurate a new era in either economic or environmental governance. Sustainability or sustainable development in both, economic or environmental forms, continued elude humanity as their imperatives were far too constricting for growth economists and champions of market system. If natural systems and biodiversity are to be conserved and looked after, these would have to be properly priced in the market. But economic growth so far had prospered by keeping down the prices of natural resources (through state subsidies and political or monopoly control) and not valuing at all nature's services. Also economic growth had to be rely more and more on stimulating the demands of the consumers. It was therefore, unthinkable for proponents of growth to accept that needs of natural systems were superior to consumer sovereignty!

Today's preponderance of the market system is being maintained by 1) investing in goods and services which save or substitute for human labour, 2) investing in trying to discover new sources of non-renewable resources and 3) by commercializing education and directing it to satisfy needs of the market rather than those of social welfare. Instead to direct investment in natural capital, in making nature's systems and services more durable and efficient and in recycling, repairing, restoring, waste and wasted nature, would be unthinkable for supporters of the market systems. For the system survives on waste creation and throw-away culture! The necessity of developing an alternative educational system which will give due recognition to achieve social welfare and make restoration and conservation of nature viable and remunerative, was not even visualised. Lastly, if today's have-nots become politically strong, economy would be directed towards achieving more equitable distribution rather than achieving higher and higher production. This would have meant an end to the present market system which increases production by maintaining relative scarcities and ignoring just distribution of wealth! Sustainable development therefore, remains an anathema for growth economists and proponents of the market system.

They therefore, convinced themselves that environment and natural systems would be protected if the following could be achieved:

1. Internalizing the externalities and adjusting the production costs accordingly;
2. Developing controls and standards to check and minimize pollution of air and water;
3. Making cost- benefit analysis and/ or environmental impact assessment compulsory for projects that involve investment beyond a minimum;
4. Creating protected areas such as national parks and sanctuaries for nature conservation;
5. Creating administrative agencies to implement and enforce above provisions and

6. Instituting tradable permits which will goad firms to minimize pollution and encourage use of energy saving technologies.

Such provisions, controls, standards and administrative requirements have become 'legal tender' in almost all the developed and developing nations today (2006). Once again, humanity therefore, succeeded in circumventing and dodging the real issues of sustainable development and equitable distribution of wealth.

It was apparent at one time (before the Thatcher- Reagan era) that even the honest enforcement of the above provisions had not only reduced pollution but inequality of wealth also. The champions of market system could not tolerate these trends as it meant declining importance of the market. They therefore, prevailed upon their governments to adopt policies that would bolster production in the name of job creation. This production subsidy became possible through reduction in expenditures on education, health and other social measures! Nature conservation and pollution control also suffered through reduced budgetary allocations and lax enforcement of rules and regulations. Relative scarcity was maintained through war expenditure, development of weapons systems and investment in related fields. This trend continues today!

In developing nations the supremacy of the market system was maintained by persuading the haves and the powerful to view environment and development as alternatives, by watering down provisions in environmental laws and regulations, by encouraging lax enforcement and by encouraging an educational system geared exclusively to technology and the market. In this respect it is common knowledge that the role of bribery and graft is by no means insignificant!

The result is devastation of nature and natural systems and scarcity of natural resources tending to be absolute rather than relative!!

What then lies in future? Are there any alternative systems of production and distributions, of energy and material use, or in general, of reversing the present trends! Or is nature already doomed?

An Alternative Economy

In the last over 300 years, the economy that has been produced and practiced by the civilized humanity, is one which emphasizes production and not distribution of wealth. An alternative economy should emphasize production as well as equitable distribution of wealth in a society. What could be the imperatives of such an economy?

A decentralized system of production focusing on utilization of local resources to satisfy local needs may be the prime necessity. Such decentralized transactions are the surest way to check accumulation of excessive wealth by individuals. Democratic governance and free competition in the market cannot bring this about. But this imperative may not be sufficient to promote nature conservation. Nature conservation can be promoted through:

1. A production system which produces goods necessary from the economic as well as environmental point of view;

2. A production system which uses simple techniques which minimize use of energy and materials;
3. A production system which values natural resources more than human labour;
4. A production system which organizes agriculture and industry in such a way as to mimic natural processes;
5. A production system which does not aim at simplifying natural processes and redirecting flows of energy and materials to human beings but which aims at utilizing available biodiversity and food chains and food webs to obtain food and other necessities for human beings;
6. And a production system not based on continuously increasing human wants but which aims at development of human values while satisfying human desires.

In the sense sustainable development is not a mechanism to be set up to organize a production and distribution, but a system of economic and social values. Sustainable development can only be attained in a society of individuals with adequate level of education and holding high moral values and having a very high sense of social responsibility as visualized by Adam Smith.

Once Again Circumvent Ethics and Morals

One wonders whether this is possible in today's human society where science is amoral, where technology is held in the high esteem and where individual and social behavior tends to be analyzed using mathematical modeling. Once again we find human societies circumventing moral and ethical principles while trying to economise use of energy and materials. A number of such experiments are being promoted in developed and some developing nations.

3 M Corporation in the US reduced its energy bills by over \$ 50 million by inviting suggestions from its employees. In Denmark a power company provides other industries energy in the form of escaped steam which economizes oil use. Petrol-saving hybrid cars are becoming popular in USA. New enterprises based on recycling, repair, re-fabrication now number 73000 in the US and employ about half a million people. In business schools 'Reverse Logistics' has been introduced as a subject which aims to recover useful goods from the waste. Waste is being incinerated not by using coal or oil but sound waves! In building construction use of local materials is increasing, new techniques of insulation from heat or cold are being used saving electricity, coal and oil, vermiculture, organic agriculture are replacing use of fertilizers and insecticides based on petroleum, agriculture waste is being utilized to produce low cost coal through fermentation etc.

In America people are now speaking of natural capitalism and an economy based on restorative efforts in various directions. Over 2000 local communities have been organized in Europe and America where self-help and human labour are employed to satisfy human wants using local resources. Some of them have established their own currencies which basically exchange labour units. In Brazil a co-operative movement having a membership of 1,50,000 families is now spread in 23 states. The movement co-operatively manages agricultural production, social services, credit supply, agribusiness etc. They have their own system of

education used in 1000 municipal and government schools, employing 2500 teachers and providing education to 75,000 children. The movement has its own supply sources in which organic farming and soft engineering techniques are used. They have also their own water supply system based on small and large dams, artesian wells, dug wells and canals. They also have animal husbandry, dairying and poultry wings. As such this co-operative movement has been successful in establishing an alternative economy in Brazil.

In 2002 China passed a law to bring into reality an economy based on circular movement of energy and materials. On this basis 20 industries have been identified and recognized to use environmentally sound technologies. Ten thousand workers have been specially trained for this.

The global spread of such efforts is still limited. They are bound to have a beneficial effect on nature conservation if they expand their reach.

How to Sabotage an Alternative Economy

While the above developments were taking place, the supports of growth and market system were not idle. An all out effort was made to unify and standardize the production system through large corporations bet upon capturing global sources of raw materials and minerals and expand the reach of the market. Negotiations were held through the mechanism of the General Agreement on trade & Tariff (GATT) in which the official US delegation was assisted by representatives of large corporations such as Nestle, Pepsico, Philip-Morris, Monsanto, DuPont etc. The rules and regulations formulated by the GATT made it difficult to provide adequate protection to such threatened marine species as Tuna & Dolphin. Following these rules rendered implementation of pollution control regulations difficult. The GATT gives more importance to reducing costs of production than exercising pollution control.

Taiwan & South Korea had enacted laws to control & reduce use of tobacco. The GATT forced these governments repeal laws. This benefited US tobacco manufacturers but were harmful to social relations in these countries as addiction to tobacco increased! If a country limits exports of natural resources to conserve then it becomes liable to pay fine for infringement of GATT rules!

Since 2004 GATT rules and regulations have the result of making the implementation of pollution control difficult and making enforcement agencies non-functional. Conservation of rare plants and animals and preservation of stocks of natural resources are also being rendered difficult. The consequences are rise in pollution levels and economic inequity in many countries!

The Multilateral Agreement on Investment being promoted by developed nations will bestow exclusive rights to large corporations in developing countries. It will then become very easy for them to expand their operations. This agreement will limit the authority of respective governments to control their economies and direct their operation in socially beneficial ways. This will further open up many fields for multinational corporations!

These concerted efforts by developed nations is to expand sphere of influence of a technology and production based economy are bound to have profound impacts on nature and nature conservation,

especially in the developing world. The proponents of market will always ensure that the nature of initiatives to bring about an alternative economy and to conserve biodiversity remain superficial and would never lead to basic changes in the economy. The struggle to bring about democratization in decision making in the production process and promote an equitable distribution of wealth in society is going to be hard and long-drawn out!

At the end one may indicate here a set of criteria which should help people or groups to organize initiatives that will lead to changes in the structure of the economy and help thereby conservation of nature. These criteria are:

1. Initiatives that put pressure on the government to abolish subsidies to minerals and fossil fuel extraction and pollution industries based on that.
2. Adoption of a landscape approach in planning. This will involve organizing human settlements, public amenities, production centres in consonance with the existing structure of eco-systems and working of natural processes.
3. Efforts that promote a production system based on local biodiversity and availability of natural resources instead of on export needs. This should lead to self-reliance and care of natural resources.
4. Efforts that make economic activities respect ecological boundaries.
5. Efforts that reduce all kinds of transport in carrying out economic activities, thus reducing energy
6. Efforts that enhance the environmental capabilities of urban areas. These include use of wind and solar energy, energy from waste, recycling and reuse, rainwater harvesting, terrace vegetable gardens etc.
7. Efforts to make producers responsible for the total life-cycle of their products. They should preferably be able to utilize waste to regenerate useful products.
8. Efforts that aim to replace carbon-based economy by a carbohydrate-based economy.
9. Efforts to promote a social system that will continuously assess the ecosystem needs and base the production system and changes therein to conform to these needs.
10. Lastly efforts to promote a social system that will replace the present system of wages and salaries by a family social income which values today's unpaid work performed by women and men at home and/or for the society. The society thus honors women's unpaid work that helps maintain family relations and voluntary work of social workers.

All these efforts will indirectly help nature conservation and nature conservationists will do well to wholeheartedly support individuals and associations engaged in such work

Whither India? Nature Conservation in 21st Century

The dawn of Independence also witnessed the beginning of planned economic development for the country. Side by side the inauguration of Wildlife Advisory Board at the Centre heralded planned efforts for conservation of nature. The development of a system of protected areas and later the launching of Project Tiger were landmarks in the progress of nature conservation in India. However, all these efforts notwithstanding, it turned out at the end of 20th century that nature in India was still beset with a number of problems. In the 1990s two studies revealed the alarming state to which nature and natural resources in the country were reduced. The first was the Citizen's Fifth Report brought out by the Centre for Science and Environment, New Delhi, and the second was 'Looking Back to Think Ahead', a report prepared by Tata Energy Research Institute. Overall they painted a picture of quantitative gains in certain areas but tremendous loss of quality of atmosphere, water, land, forest and marine resources. A very high rate of growth of population was believed to be at the root of all the problems that India faced. But while it was 2.22% in 1971-81, it had come down to 1.80% after 1991. The prediction is, it will go down further.

Available water is extremely unevenly distributed in the country. Colossal expenditure on dams and canals has not changed this situation. 70 to 80 % of agriculture is still dependent for irrigation on ground water and not canals. Excessive exploitation of groundwater has created problems in Haryana, Rajasthan, Gujrath and Tamilnadu. As all fresh water flows are arrested, the rivers now carry loads of sewage and industrial effluents only contaminating drinking water supplies and making fresh, potable water extremely scarce. Contaminated drinking water and stagnant water bodies due to spread of irrigation water have led to proliferation of infections and waterborne diseases. Land everywhere suffers from water and wind erosion and salinity and water logging. Industrial effluents have poisoned soil and wells in many places. Use of carcinogenic insecticides has rendered vegetables, fruit, tubers etc. dangerous for human consumption. It is claimed that area under forest has expanded but commercial and other plantations have expanded at the expense of natural, indigenous forests. Good canopy forests (at least 40% canopy) are only 11% of the total forest area. There is acute scarcity of timber, fodder and other forest produce as supplies from forests cannot keep pace with increasing demands.

About 4% of the total area of the country is protected to a variety of degrees from human use. But for almost 80% of the protected areas the legal process of formation of sanctuaries and national parks is far from complete and in everyone of these, wildlife has to compete for their share of resources with human communities. In spite of the recent efforts to formulate a new wildlife protection bill and a new tribal rights bill, no viable solution is in sight to reconcile the interests of local communities and wildlife.

The post 2000 scenario has more problems to present than success stories. There are new initiatives like Gujarat proposing six wetland reserves, a centre planning a string of biosphere reserves, and UP proposing an elephant reserve. The Wildlife Institute of India (WII) is now propagating a landscape approach to nature conservation instead of advocating creation of more protected areas which remain isolated in many cases. Manipur government has undertaken to draft a comprehensive legislation covering Logtak lake. It will include

control of obnoxious species, rehabilitation of tribals and promotion of tourism. Sand mining which threatened Gharial habitat and marine turtles has been stopped in some areas on judicial orders.

On the other hand human and wildlife conflict has attained serious proportions in Sariska, Namdapha and in Karnataka and Tamilnadu. Tigers have been wiped out from Sariska and Namdapha reserves due to poaching which prompted Government of India to appoint a Tiger Task Force to go deeper into the problem and suggest a way out. The Task Force made a number of recommendations to revamp administration and confer rights and responsibilities on local communities. Implementation of these recommendations would probably await the passing of tribal right bill and wildlife protection legislation. In Maharashtra man-wildlife conflict mainly concerned leopards who found a viable breeding habitat in standing sugarcane. From these fields they strayed into nearby villages endangering the life of children and women. The Wildlife Department trapped a number of them and transported them to distant sanctuaries. But this is hardly a solution to the problem. Fragmentation of their habitat due to encroachment by agriculture and human settlement, blockage of their normal movement by roads, highways and reservoirs, have created this problem. These same factors affect movement of elephants whose migratory routes have been disturbed. Elephants therefore, stay into areas where they were rarely seen. They may destroy crops and threaten villagers. This man-elephants conflict has resulted in substantial numbers of elephants having been killed in Jharkhand, Orissa and around Nagarhole.

Dams, reservoirs, power projects many times fragment habitats, destroy forests and create impediments in wildlife movement. Intrusions of these and roads and highways in sanctuaries have threatened wildlife and endangered species such as Jordon's Courser and Great Indian Bustard. Mining for bauxite has threatened Radhanagari Sanctuary and stone quarrying is worrying Kaziranga National Park. Growth of tourism and presence of tourists have created administration problems in Ranthambor and Corbett National Park. Daily life of wildlife is then constantly disturbed. Presence of pilgrims has resulted in destruction of forest and habitats in Sabarimala and Bhimashankar sanctuaries. Andaman and Nicobar and Lakshadweep islands were also under great pressure of tourism till the tsunami disaster struck. 42 species and medicinal plants from Himalayas are threatened due to excessive exploitation for commercial purposes.

Marine and desert ecosystems have not so far been adequately covered by protected areas. Central Government's open door policy for fishing in our waters has been severely criticized by local fishermen. This policy has already resulted in a substantial decline in the annual catch, besides endangering power stations, oil installations and pipe lines have been located in our coastal areas without giving any consideration to the needs of marine biodiversity. The resulting industrial pollution has endangered breeding and nursery areas of marine life, especially mangroves and shallow seas. They have also impacted mango and cashew plantations along the coasts. Desert biodiversity has been threatened by increasing numbers of cattle and agricultural development. The pressure of grazing animals has destroyed local flora and has encouraged the spread of weeds. Wild animals like the Chinkara have now to feed on weeds instead of their natural forage. Spread of agriculture has created problems of salinity and water logging.

The present government has been accused of diluting the procedures of environmental impact assessment, environmental clearance of projects and quick hearing. This is obviously to encourage industrialization and quick implementation of other development projects. The National Environment Policy being drafted by the present government has so far failed to go through the consultative process and requirements of public debate. It is said that even elected representatives and Panchayats were not consulted. The policy is accused of assuming that environmental problems could be solved through market and economic instruments. Any protests and representation made to the office of the Prime Minister has fallen on deaf ears. It appears therefore, that the present government wants to pay only a lip-service to the cause of environmental protection and nature conservation. In such a situation no serious attempt to solve problems is expected from the authorities.

The present government and its policies neatly fall into the app-pervading paradigm of growth economics and supremacy of the market. Production of wealth is considering more important than its distribution. The result is widening of the rift between rich and poor, dominance of relative scarcities in the market and the increasing, absolute scarcity of natural resources and nature's services. For the common man times will be getting more and more difficult!

What is the solution? It may be a total landscape approach streamlining land uses according to geomorphic feature and natural drainage pattern. If ecosystem needs and functioning of nature's services are given priority over consumer choices, the production system will be modified as to eliminate production of a number of intermediate goods and services. This will release resources and money for investment in natural and social capital. Market will not be necessary to maintain relative scarcity as selection of consumer choices will be dictated by needs of social welfare through a consensus of enlightened consumers and their associates. The real goal of economics, that of creating ideal conditions in a society, will be achieved. The rift between rich and poor will be narrowed. All this can happen if educational system will inculcate values and mores that recognize the importance of natural resources and conservation of nature!

Economics & The Crisis of Ecology

For economics overall ecological decay appears to be no more than avoidable or at least controllable negative externality.

It is not economics alone, but much if not most of social science being done on the right & left which has gathered crisis of ecology totally renders obsolete. Imperative of ecology impels one to avoid all touch with the conservative modes of thought.

What is threatened above all is our ability to continue to produce the means of our livelihood. Economics can do little better perhaps than to make ecology its central concern. But it can do nothing of the kind. For, concerned primarily with what determines the profitability of 'output' it cannot possibly play the spotlight on its "toxicity" as well. It may indeed go into very elaborate details pertaining to the behaviour of the average & marginal costs of producing commodity X, in the short run, or the long, and yet not care even to enquire what the X itself is.

Many of the X's that were developed, deplete without relent such resources as are in any case exhaustible, and destroy the self-renewing capacity of the rest.

The Keynesian formula of public spending to reduce unemployment, could only cause far more serious problems in the long run by

depleting resources on its own. The assimilation of Keynes's ideas into the established orthodoxy has been rather quick & complete for the simple reason that ^{not} only did he not question the essential validity of the prevailing order, but sought actually to indemnify it from such a basic infirmity as involuntary unemployment.

What seems now to be exceedingly important - apart from the level of employment is the nature of what those employed are made to produce. The crisis of ecology, then, is due primarily to a fundamental malstructuring of what the general would prefer to call man's system of production which cannot even exist without demand stipulation. The question for monopoly capitalism is not whether to stimulate demand: "it must or perish."

The problem as it appears now to be menacing the world economy, is one of dwindling supplies of resources.

Economics, so far, disdains to make any judgements on the resulting composition of output & hence on all the waste and cultural degradation which so obviously characterize our society. Besides, the argument runs, ecological viability in the future can be ensured by instituting ^a steady state economy (ZEG, zero economic growth & zero pop. growth) on a worldwide basis.

The steady-state economy & the imperative of capital accumulation mutually exclude each other. Steady state only diverts one's attention from the truly basic question of acute & intensifying inequalities that characterize contemporary world economy. The kind of economic opportunities it creates, can hardly percolate to the underlying & proliferating millions. When we are threatened by an inexorable & unsustainable destruction of resources, orthodoxy makes their allocation its main concern. The ostensible purpose is to assign the price of place to economic efficiency.

Alternative Paradigm.

Corporate power means an ability to make it impossible for millions within the metropolis itself to continue to be economically useful, and to reduce masses of consumers into a state of hypofunctional stonance. It means an ability to inflict irreparable damage on the human environment and to paralyse, blind & kill people with impunity through, for example, mercury poisoning.

It is their command of financial resources that is large enough to enable it to manipulate its rivals, customers and even states, & those hoisting it abroad. Economic theory examines that the expansion of public sector would itself be enough to neutralize corporate power.

But the top 300 co's in US that perform 77% of all federal R&D also perform 71% of all private R&D. Since these same co's do all or most of their business with govt. the so-called private R&D is paid for by the govt. in the form of overhead or other contracts. Corporations use public agencies to enhance their power. It is natural that the superstate power of the US be deployed in promoting & protecting the global interests of its capital. Foreign owned subsidiaries effectively de-capitalize the country that plays host to them. From 1960 to 1968 approx. \$1 billion of fresh capital was being transferred ⁱⁿ numerically to US-controlled subsidiaries in the less developed areas but \$2.5 billion more withdrawn in the form of annual income.

Capitalist development spawns a technology that destroys the environment and job opportunities at the same time. It is self-defeating. With little left to expand on, a system based on power which can exist only in expansion must collapse.

The conception of human wants as being essentially unlimited, itself is a mere reflection of the specifically capitalist category of accumulation, is taken to be the self-evident point of departure for an analysis of universal economic behavior.

To become relevant economics must raise questions of power & hence of politics. A plea for a relevant economics, is done all, a plea for a radical politics.

There needs to be a radical reorientation of attitudes towards work - no one shall be exempt - from manual work. To the bourgeois, progress means no one will have to work. Education has to fight greed & envy.

The present technosphere is destroying eco-sphere - capitalism requires such destruction as the very condition of its existence. Technological innovation should be entirely safe ecologically, and from the point of view of human participation. Developed countries must rectify excesses of materialism & less developed ones should not try to catch up with the former. It is not human wants themselves which are invariable but the wants of mutually spying victims of affluence. Here the pursuit of profit & personal gain assumes primacy over everything else & creates an illusion of progress through pointless & pernicious ^{technological} sophistication. Wage labour would be replaced by work which men must do to sustain & cultivate their humanity.

Development - meaning breakthrough industrialization is unnecessary in the world of today. A pattern of development with universal human involvement is necessary. Essential question is the relation between man & man & not between man & nature.

Ecological education leads men to unmask a vast variety of pretensions: of social systems which promise growth and endemic depletion; of plans

of development which promise jobs & perpetuate idleness; of revolutions which promise utopias and rpe dystopias. Energy prodigal technology games industrial capitalism while energy parsimonious technology can be tied to various social systems.

Displacement of property from power is not enough to bring technology under control. Productive forces are controlled by laws of Thermodynamics. A perpetual motion machine cannot be created. Endless growth is impossible.

Price system is ^{the} part of the existing order. Capitalism cannot devise ^{price} policies which will discourage aggregate demand. Also huge defence expenditure 300,000 million dollars is outside price system. 85% of passengers flying Indian airlines do not pay out of their own pockets. So price increases will not affect them. There are people who are far rich to be affected by rise in prices.

The radioactive waste of nuclear plants lies outside the abatement sector. Abatement process also causes pollution. De-emphasizing noxious pursuits cannot be done so the throughput increases inexorably & so does the gross National Pollution.

Having perceived socialism exclusively in terms of the public ownership of means of production & its contribution not equally exclusive terms of hyper-industry, its managers could pay little attention to man or such, much less to his habitat.

Profitability or Ecological Bankruptcy

I call them forced redistribution of wealth, those incidents of home-breaking & robbing which occur daily at an increasing pace in urban & rural areas. Our economy seems to be unable to effect redistribution of wealth on its own. Our economic managers seem to be helpless too. The prime minister has several times decried the rising income inequality of income in spite of an impressive growth in GDP. Monetary measures instituted by Reserve Bank of India seem to be ^{of little use} ~~helpless~~ against the rising tide of income inequality. Country's leading economists, including the Prime Minister, have offered no path-breaking solutions to this problem. Is the present economic theory unable to grasp & tackle the problem of redistribution of income?

This question has often been asked as even developed countries are not successful in reducing income disparities. Economists generally agree that market forces, left to themselves, are unable to allocate resources in an egalitarian way. State intervention seems to be necessary to reduce income disparities. Yet economic theory has failed to accommodate such egalitarian measures & quite nonchalantly continues

to make 'profitability of output' its central concern.

But modern technology geared to profitability of output was not only making income disparities acute but was also destroying resources & disturbing ecology was driven home as Rachel Carson's "Silent Spring" achieved wide circulation. This was followed by the report of Club of Rome which forecast depletion of important natural resources by the turn of the century & consequent cessation of economic growth. This was in the sixties of the last century.

But the most probing and forceful attack on Industrial Capitalism was mounted by an Indian Economist, Dr Navinder Singh, when his book "Economics & Crisis of Ecology" was published in 1976. He, for the first time, dared to analyse the "content" of the output, which economic theory views as the result of ^{efficient} allocation of resources. Says Dr Navinder Singh, "I am concerned primarily with what determines the profitability of output - it (economic theory) cannot possibly play the spotlight on its "toxicity," and again, "what seems not to be exceedingly important - than the level of employment is the nature of what those employed are made to produce."

Such explicit assertion of the social content of production was unheard of in economic theory. In these days when India is supposed to be making gigantic strides ^{towards} economic progress, everyone should ask the question, like Dr Singh, are we fulfilling the needs and aspirations of the society as a whole?

Not only the social content but Dr N. Singh also emphasized the ecological imperative, ecological linkages that a system of production must take into account.

Says Dr Singh, "The crisis of ecology, in turn, is due primarily to a fundamental malstructuring of what the genteel world prefer to call man's system of production which cannot even exist without demand stimulation. ~~The~~ . . . The question for monopoly capitalism is not whether to stimulate demand: "it must or perish". And again "It is not human wants themselves which are insatiable but the wants of mutually ailing victims of affluence. Here the pursuit of profit & personal gain assumes primacy over everything else and creates an illusion of progress through pointless and pernicious technological sophistication". Further, Dr Singh attacks the very roots of the

existing economic order when he says, "At present technosphere is destroying biosphere Capitalism requires such destruction as the very condition of its existence".

Many people will feel that these words written in 1976 ring true even today. What hits the common man most is the continuous rise in prices of essential commodities. They have expressed their anger & dismay in various ways. Women in particular have taken the lead in organizing demonstrations against the price rise & have even threatened government officials. People have written letters to editors of newspapers, editors have in turn have expressed concern through backdoor editorials and local leaders have used various forums to attack the govt government for allowing prices to rise indiscriminately.

But the mouth of Dr Navinder Singh is truly carried by free economists like Dr Karam Narayan Kabra & his Alternative Survey Group who have produced a report titled 'Disqualifying Growth'. They have frontally attacked the Structural Adjustment Programme operations in India for the last over 15 years. Its motto is economic reform through LPG - liberalisation, Privatization & Globalisation.

In earlier years the "reform" produced poor results which were attributed to "weak states & their poor governance". Reform was then modified to pay more attention to rural & farm sectors, to inject morality in globalization & giving reforms a more human face. The electorate however, ^{rooted} ~~kept~~ successive reforming regimes. This was hardly surprising if we look at the consequences as listed by Dr Kabra. These are:

High costs of production as industries depended more ~~on~~ ^{not} more on imports; production of high value goods instead of necessities; ~~growing~~ growing debt, large trade deficits, low agricultural growth, growing unemployment, tax evasion, large fiscal ~~loss~~ ~~deficit~~ deficit, black economy, regional imbalances, unsold food stocks, farmer suicides, foreign exchange reserves ^{invested in} ~~in~~ US bonds with low interest rates. A rise in number of poor. Dr Kabra says, "reforms have ~~increased~~ increased the misery & woes of people at large."

Like Navinder Singh before him, Dr Kabra also attacks ~~the~~ prevalent economic theory, saying, "Neo-liberalism has never preferred social equity, democratization of economic sphere & partnership of the people." Its prime

aim # is to achieve growth of national product with the help of indigenons & foreign capital.

State has abandoned its role of moderator of market forces. Instead it has joined hands with Indian & foreign capital to increase the flow of marketable goods.

Even before reforms a large part of India's population was excluded from the market. In such a situation increasing the flow of marketable goods further intensifies inequalities in society.

There are now more than 24 stock exchanges operating in the country. The stock market turnover is almost 4 times the actual physical investment. With enormous tax concessions bestowed on the rich, while all forms of labour income being taxed, Dr Kabra calls the present economy a "Crisis economy."

The indictment of ~~the~~ industrial capitalism & of the present economic order initiated by ~~Dr~~ late Dr Narinder Singh seems to have reached its ~~final crescendo~~ finale.

Ecosocial Society has invited Dr Kabra to deliver a talk on 12th February. The talk will be delivered between 10 a.m. & 12 in Kale Hall of Lokhale Institute of Politics & Economics, Pune 4. The theme is: Rethinking Development.

Eco-based Economic & Technological Strategies
Attack on the root causes of Corruption & all malfunctions
~~The Crusade against Corruption~~

Shri Anna Hazare's fast & the accompanying agitation have brought the issue of Corruption to the forefront. The overwhelming popular support displayed in the agitation showed that corruption affects almost everybody in the society. But Anna was also criticized by media & others for his single point agenda of establishing a Lokpal outside the existing administrative & judicial system. Anna was ^{also} criticized for threatening the government through unconstitutional means.

It is a moot point whether corruption which has a far wider context & which is deeply entrenched can be eradicated by simply establishing an authority like a Lokpal. It is necessary that the problem of corruption needs to be discussed & examined from all angles & from a much wider point of view. The objective should be to formulate ~~a~~ ^{not only} a code of conduct but also to adopt a socio-economic strategy to bring about necessary changes in economic & political policies of the government. To decide these it is necessary to secure the widest participation of society from youngsters of both sexes to adults, senior citizens & people engaged in different professions including trade & industry.

The Ecological Society is planning to organize a conference to discuss the issue of corruption from every angle & to find ways & means to eradicate it. It will take place in Pune on 17th & 18th February. The chairman for the conference will be the wellknown writer & thinker Prof. Sadanand More & the chief guest will be Vice Admiral Manohar Awasti (Retd.).

The Ecological Society believes ^{that} corruption is nurtured by the present economy & economic policies of the government. These should be radically transformed to eradicate corruption. Then what economic model is suitable for India? The Ecological Society has formulated such a model which will be presented in the conference & will be thoroughly discussed & examined. The conference may adopt this model, or may suggest modifications in it or may formulate an alternative model.

The Ecological Society also believes that the present importance & emphasis given to technology & engineering to find solutions to all life's problems is unnatural & unwise. It

destroys natural systems & services & natural resources which provide basic life support to millions in our country. Inflation & a constant rise in prices of basic necessities are the direct results of this emphasis. It is expected that the ^{conference} ~~society~~ will pinpoint the scientific approach & technology suitable to Indian conditions.

The Ecological Society strongly believes that nature & nature's services provide the backbone for ~~and~~ the life of millions in India. Therefore, priority should be given to protection & quality enhancement of nature, nature's services & natural resources. The change of emphasis from quantity to quality entails reorganization of all the sectors from education to different professions & industry & trade. It is ~~is~~ expected that the conference will discuss ~~on~~ this problem in depth & suggest necessary changes.

Our country is endowed with an extensive sea shore which is a treasure house of food & other resources. Some of our border areas, especially in the north & northeast are also rich in natural & natural resources & services. The role of armed forces in the security & welfare of these areas is vital for the country. The conference should be able to give this issue the importance that it deserves.

The Ecological Society appeals to everyone to come forward & actively participate in this conference.

Sincerely,
Rakesh Kote
Chairman,
Ecological Society

The organizers of conference have not approached the bank, or any other agency for financial support. The financial burden is shouldered mainly by the Ecological Society & each participant in the conference is invited to share it in a small way.

Industrial Capitalism - intrinsically loss-making
Conventional Economics - Defence, assumptions unreal.
Individual - irrational choices

Market - compo of output, bio-physical & social, eco-services

Scale - aggregate W&B, ENBPSSM, Purchasing power,
unemployment - Redistrib. of income - Inequality

Adopt a market, Technology a perfect subst.

Env. in India reflects this skewed policy.

Foot print of a modern India.

Economics & Env. Flow of money, Overwhelming demands

US economists - restraints imposed by nature

Entropy creation - cost of entropy

Present attitude - nature a sector of economy

Marginal ^{benefit} cost of creating man-made Capl. = margl. cost of
sacrificing natural capital.

Free goods - sacrifice of eco-sys. services. Local resources

Eco-realities - topics - N & S India. Geo. history

Micro-climates - bio-diversity a variety of livelihoods

In tune with nature, varied & limited exploitation. Sets low
understand basis, Vision for future.

Technology powered, Carbon-based to be replaced by
nature-based, Carbohydrate economy.

increasing wants, it is exploited by the poor for their survival. All this is due to a wrong economic system that we have adopted. And this is the result, I am afraid, of our technological advance.

Several questions arise? Is our choice of technology wrong? Why did we adopt an economic system which only caters for the rich & which I call basically an insolvent economy? Why policies that apparently aim at poverty reduction are perverted through corruption & dishonesty? Why is there complete neglect of nature & quality of life? Why there are no or very little efforts to restore nature? Why proven examples of village development are not commonly adopted? Why is there no effort to improve distribution?

Well, several socio-economic factors are responsible for these & all of us disavow them off & on. Several solutions have been suggested from Marxism, Gandhian philosophy to Art of living & Yoga etc. All these solutions involve some kind of restraint on consumption. There is no escaping the fact that unless we, i.e. city dwellers, change our pattern of consumption, our life-style, we cannot nurture nature. World Conservation Strategy enunciated by World Conservation Union says this. Green parties of Europe prescribe 80 to 90% reduction in consump. of developed countries. The same applies to rich in India. Wealth creation in India has increased but its distribution to every section of society is lacking. That reduces purchasing power in the hands of the majority & concentrates it in the hands of the few. That means greater production of goods required by the rich, greater destruction of nature & so on. We are really on the path of insolvency.

The solution in a democracy lies with us. All of us have to become very conscientious consumers. Our choice of government be governed by wisdom not fashion. That means we have a judicious mindset. It can only be produced by right-type of education. Educational reform, based on correct understanding of our environment & natural resources is now overdue. We must constantly think of how we can nurture nature both qualitatively & quantitatively. That alone will reduce costs all round and will bring us out of debt trap & steer us away from the road to insolvency. Please do not forget that nature & not technology is the foundation of our life. Amen.

4) Once man has assumed what is both a promise & a burden, once he has tasted the temptation of absolute power, he will be never the same again. The modern world, stamped as it is with the image of the machine, must learn to look technology in the face & read its essence, soberly & without illusion.

And this poverty can't be overcome by any technological efforts; it is interestingly inherent in technology itself. There is no clearer, no more infallible sign of poverty than the progressive rationalization of organization, the comprehensive administration and management of war by a bureaucracy of experts especially trained for the task.

Since ^{the} smallest mechanical process consumes more energy than it produces, how could the sum of all these processes create abundance? The designer of a machine never gets beyond the logic of efficiency of Carnot's cycle. Technical progress covers the earth, not alone with its machines & workshops, but also with junk & scrap.

All technical knowledge is marked by an impersonalism that necessarily results from the purely material facts that it deals with. It leads to an economy of deficit which grows the more strikingly obvious, the more triumphantly the perfection of technology progresses.

It invades into education even the victory of factual knowledge over integrated knowledge. It is economic life that becomes ever more subservient to technology.

involve sustainable use of resources. However again
govt. interventions, though well-meant - ultimately re-
sulted in over-exploitation. The govt. provided subsidy to
easy loans to fishermen to buy mechanised trawlers
Govt. even provided cold storages at almost no cost.
The result was a boom in fishing leading to severe
depletion of fish stocks in the otherwise very productive
shallow marine areas adjoining the coast.

Of late laterite plateaus are much in the
news. To the common man they provide immense
visual delight when at the end of monsoon, they are
embellished by a variety of herbaceous flowers with
attractive colours. Kasas, a plateau on the crestline
of Western Ghats, overlooking Konkan has been
attracting hordes of visitors from Mumbai & Pune.
Taitapur & Madban plateaus in the Konkan are
slowly gaining popularity as sites as much endowed
with wild flowers as Kasas.

Researchers have studied these herbaceous
flora & have demonstrated that some of them are
rare & endangered & need protection. Some are highly
endemic & have heritage value. In fact when a World
Conservation^{International} team of experts visited India
they were invited to examine Kasas & researched put up
a strong case before them to include Kasas in the
World heritage list. The experts agreed after their
site visit & after going through the evidence gathered by
the researchers. Taitapur & Madban are in line for
their inclusion. Their biodiversity value transcends
all other values. These windmills generating power have already

to the local people they are equally valuable ^{destroyed} parts of
as the source of perennial water supply. During these
the rain cracks & fissures in the laterite catch rain ^{these} plateaus
water which seeps through to bottom layers and remain
a source of water for springs & underground surface
which moisten farm soil and replenish wells.

Recent research has demonstrated that these herbs tolerate extreme climatic conditions & lack of soil & survive even through driest summers. They are therefore, called desiccation tolerant. Scientists are hoping to find among them some of agricultural & horticultural value. These can then be introduced in regions where extreme dry seasons & vagaries of monsoon make farming very difficult.

People do not want to lose all these valuable resources for atomic power plants whose benefits may prove to be severely negative.

One may then ask why the govt. is so insistent about atomic energy development in the face of opposition by local people & even by experts in the field? Pioneers in this field included such renowned physicists as Dr S.N. Bose, Dr C.V. Raman, Jyotishchandra Bose & Dr Saha. They were for dissemination of atomic physics through universities and research institutes. But the 1948 Atomic Energy Act made the development of atomic energy the exclusive responsibility of the govt. Atomic Energy Commission was organized by the govt. under the chairmanship of Dr Homi Bhabha.

The main argument against atomic power is its high cost. The capital cost of a thermal power plant is slightly over 30 million rupees that for the atomic power plant is around 110 million. The per unit cost therefore of these two types is Rs. 2.37 and Rs. 5 respectively. All atomic power plants in India are beset with the problem of uranium supply. As the supply is inadequate, the plants work upto only 50% of their installed capacity. Import of uranium & of fossil fuel to convert it into fissionable material is the only option for the govt. It seems the govt. is bent upon adopting this high cost road to power development. In 2002-2003 atomic power was given a budget allocation of Rs. over 3 billion rupees while ^{development} of non-traditional sources of power such solar, wind etc. received only about Rs. 4 billion.

In spite of this step-motherly treatment, in 2005 the non-traditional sources achieved an installed capacity of 4800 megawatts against 3310 megawatts of atomic power.

It seems experts including officials of the Atomic Energy Commission heavily discount hazards posed by atomic radiation. Already over 300 such incidents have been documented, most of them involving workers in atomic energy plants and residents of villages & towns in their vicinity. Physical deformities & high incidence of cancer are common among these ^{m.} residents. According to Dr Helen Caldicott, an atomic expert of international fame, India's atomic energy programme is the least efficient in the world and highly pollutive exposing hundreds of workers to dangers of radiation.

But sanity, wisdom & even sound economics fall before the interplay of international politics. It looks countries like France & USA are putting pressure ^{on} the GOI for they want to sell to India technology which they can no longer use in their countries. The Fast Breeder technology which France wants to sell market in India has already been operational in Finland. But it has failed to meet safety & efficiency standards & has created several problems in that country. Yet France wants India to conclude an agreement to buy that technology.

Now a counter pressure from international conservation & peace keeping organizations is necessary. A fight for one part of by certain countries & multinationals. Is it extravagant to hope that these will come forward in support of Indian people?

What is wrong with economics?

If economics is primarily concerned with allocation of scarce resources among competing wants, it ought to show deep understanding of resources and their utilization. It does nothing of the sort. Mainstream economics tries to interpret and analyze the working of Industrial Capitalism and that too without any attempt to probe the foundations on which Industrial Capitalism stands.

Ideally environmental economics should fill in this gap but it too seems to be content in finding out and advocating certain palliatives which tend to bring in distributive justice in societal wealth distribution. The concept of sustainable development is introduced to counter depletion and deterioration of resources and promote their wise use. Resources are divided into manmade capital and natural capital. Economic sustainability is ensured if and when manmade capital is substituted for natural capital. But environmental sustainability cannot be achieved because the two are not perfect substitutes. Certain other requirements are to be fulfilled if environmental sustainability is to be achieved.

Scaling down economic activity may involve use of efficient technology to minimize energy and materials use, use of alternative sources of energy and even materials and ascribing proper prices to environmental (free) goods and nature's services. It is a moot question however, if distributive justice and social welfare can be achieved through adoption of these approaches.

A fourth approach which prescribes local resources used to satisfy local wants is likely to bring in far more social equity than the three approaches mentioned above. The problems of limiting consumer sovereignty and reducing the scale of production are sought to be addressed here not by establishing a central planning authority but by decentralizing authority and investment. If priority is given to use of local resources, their care, maintenance and enhancement should also have top priority. Under Panchayat Raj adequate powers are available to grass roots organizations to achieve this. Some enlightened Panchayats are already taking advantage of powers conferred on them.

If wise utilization of local resources results in an agricultural surplus over and above the basic necessities of the local population, it can be marketed and profits can accrue to the Panchayat. Local resources thereby will be given a value which is honored by the market. This value can be enhanced, local purchasing power increased, if local cultivars can be demonstrated to possess a unique taste, high nutritional qualities and durability. Marketing of such specialized products will bring in higher profits and larger purchasing power to grassroots organizations and rural public, thereby enhancing their interest and capacity to care for the quantity and quality of local resources.

Demand and supply will then have an organic relationship with such basic resources as soil and water and they will not be driven solely by advances in technology as happens today.

Something needs to be stated here about the ownership of resources. It is not necessary to do away with individual ownership. At the village level individual ownership can be retained but its use should be according to the needs of the village plan. Water may be individually allocated according to the crop pattern decided by the village. (Phad system from north Maharashtra which implies exactly these things needs to be publicized).

Mainstream economics has been accused of not caring for the quality of consumer choices and the resultant composition of output. Irrational consumer preferences propelled solely by technological advance have resulted in a product mix containing mainly intermediate goods demanded by the rich and privileged. When much of the resources are allocated to such production, the owners of resource are only interested in collecting rent and not exactly in care and maintenance of resources. They will be more interested in high short term gains and not lower but assured gains over a longer time.

When demand and supply are organically based the character of demand and the composition of supply are likely to be different. Priority will be given to the satisfaction of the basic needs of the masses than to production of high value, intermediate goods meant for the rich.

Eventually industrial capitalism and fossil fuel driven economy are likely to be replaced by natural capitalism and a carbohydrates based economy.

All this of course is easier said than done. A complete change of paradigms is in order. The legal emphasis needs to change from laws protecting exploitation of resources to laws protecting their conservation.

Technological content needs to change in a similar fashion. We need greater doses and variety in what today is called appropriate technology---small scale and energy and materials efficient. Likewise radical changes are needed in our educational system. It may be easier to motivate groups of children in rural areas to take care of their own local resources such as the hill behind the village, the stream flowing through it, the quality of soils in their fields and wild flora and fauna found in and around the village. City children are already goaded to demonstrate against air pollution and traffic indiscipline. They can be further exposed to the reality of city's impact on the surrounding countryside and how resources and landscapes destroyed during city's expansion can be restored and regenerated.

Such a paradigm change may also involve tremendous savings: in terms of reduced or abolished subsidies, in terms of savings in energy and materials use, in terms of transport and traffic, in terms of reduced waste and garbage and obviating the need for centralized, gigantic projects.

As resources are diverted away from production of unnecessary or intermediate goods, the entire culture based on demand stimulation and promotion of a voluptuous life style will be gradually replaced by one which emphasizes quality of life including adequate health care, health and nutritional food for all, outdoor games and healthy recreation, care of the aged and the disabled, and promotion of arts and crafts.

As villages become self reliant in resource use, as quality of life in villages is enhanced, the supply of resources to cities (enjoying top priority today) will be reduced putting a stop to today's unending urban growth. It may even result in reverse migration, from urban to rural areas.

Lastly a word about the necessity of globalization & integrating Indian economy with the emerging world order. Ideally this paradigm also needs to change.

India's location in the world is unique, a fact appreciated by travelers who crisscrossed India from east and west since ancient times. The result is high biodiversity and resource availability. With their proper care and utilization, Indians can be self sufficient despite the population pressure. Globalization is sought by countries which are or have become poor in resources and biodiversity. They need resources to satisfy the needs to their pampered life style. They cannot survive without export and import: export of technology and weapons and import of natural resources. India however, can be quite selective in adopting globalization. We need technology and knowledge to bolster our security needs. We do not need technology and knowledge which guzzle resources and cater to individual ego (like expensive cars). On the other hand we can export knowledge based on the study of biodiversity such as their care and maintenance and innovative uses for medicine, as raw material etc.

In essence care and wise utilization of natural resources open up tremendous opportunities of employment, increase in purchasing power of the masses and enhancement of the quality of life in rural areas.

Prakash Gole