INTEGRATED COASTAL ZONE MANAGEMENT

Regional cooperation in the development of environmentally safe technologies

by

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Abstract

The article examines the problems and prospects of regional cooperation in marine science and technology. It explores the kinds of science and environmentally safe technologies necessary for sustainable development of coastal areas as well as the kinds of institutional arrangements and processing systems that could be availed of. It details the work done by IOI and UNIDO in the last six years and the lessons learnt. It also contrasts the Japanese model of innovative technology management with the US and European. The article suggests an appropriate mix of the above based on histroy, culture, resource endowments, enterpreneurship and external situation of the region.

Introduction: marine science, technology and sustainable development

An important dimension of coastal zone management is the attainment of the capacity to develop and manage environmentally sound technologies. Environmentally sound technologies protect the environment, are less polluting, use resources in a more sustainable manner, recycle more of their wastes and products, and handle residual wastes in a more acceptable manner than the technologies for which they are substitutes.

Environment friendly technologies in the context of pollution are "process and product technologies" that generate low or no waste, thus preventing pollution. They also cover "end of the pipe" technologies for treatment of pollution after it has been generated.

Environmentally sound technologies are not just individual technologies, but total systems which include know-how, procedures, goods and services, and equipment as well as organizational and managerial procedures. This implies that when considering transfer of technologies, the human resources development and local capacity-building aspects of technology choices, including gender-relevant issues also need to be addressed. Environment friendly technologies have to be compatible with nationally determined socio-economic, cultural, and environmental priorities.

Scientific observation and research is critical to ocean management. Scientists are improving understanding in areas such as climate change, growth in rates of resource consumption, demographic trends, and environmental degradation. Changes in those and other areas need to be taken into account in working out long-term strategies for development. A first step towards improving the scientific basis for these strategies is a better understanding of land, oceans, atmosphere and their interlocking water, nutrient and biogeochemical cycles and energy flows which

all form part of the total system. This is essential if a more accurate estimate is to be provided of the carying capacity of the coastal ecosystem and of its resilience under the many stresses placed upon it by human activities.

The concept of sustainable development is an evolving one but in every definition at least the triune concepts of equity, ecology and efficiency underly it.

Equity requires coastal ecosystem management to include the objective of employment especially of the vulnerable sections of the coastal populations - artisanal fishermen, indigenous communities and women in its development strategy. It leads to consideration of the so-called North-South divide in the temporal sense and the needs of future generations in the time-continuum. Ecological considerations raise the question of capacity. Few developing nations have the capability of coping with the problems raised by the marine environment. How then can their scientific and technological capacities be augmented?

Dealing with science, technology and sustainability, Boon and Doorman (1) attempt to answer the following questions:

- what is the role of science in a society aiming at sustainability?
- whether science as practiced today is appropriate for a sustainable society?
- is there a emerging methodology and paradigm relevant for sustainability?
- how to create favourable conditions so as to lead to a sustainable society?

They go on to point out that two radically opposed points of view can be observed in contemporary discussions about the problem; namely, the point of view of those who maintain the necessity of "alternative science" and of those who completely reject this idea.

According to the first point of view a radically different approach to sustainability problems is required compared to the methods of traditional science. This is on the basis of the presupposition that scientific judgements are guided by the wrong values as well as a purely instrumentalistic approach towards nature. "New science" should, therefore, be based on either adopting a new value system or a new paradigm (Holism, New Age movement).

The opposite view maintains that science and technology in their present functioning are pre-eminently suitable for generating appropriate solutions to sustainability problems. Once scientists and engineers have sufficient financial and material means at their disposal they can come up with fitting answers to problems. This view is based on the belief that since till now problems which confronted humanity were solved by scientific and technological means there is no need for adoption of a new value system.

The authors take a somewhat middle position between the above two antagonistic views. They consider that sustainability as a value should guide actual research practice since that enables knowledge to be obtained in spite of limited financial resources. Jansen carries this argument further, in so far as inter-generational equity is concerned by stressing on "backcasting" (as opposed to forecasting) in deciding on which technology(ies) to develop. According to him (2):

> within the framework of technological development, "forecasting" concerns the extrapolation of developments towards the future and the exploration of achievements which can be realized through technology in the long term. Conversely, the reasoning behind "backcasting" is: on the basis of an interconnecting picture of demands which technology has to meet in the future - "sustainability criteria" - to direct and determine the process that technology development must take and possibly also the pace at which this development process must be put into effect.

Backcasting is, thus, an alternative tool for determining the technology pathway to the future thus serving to direct the search process towards new, and sustainable technology. The question that arises is what "science" should developing countries adopt?

Efficiency in resource use is the third important facet of sustainability. Environmental capacity - the resources and the capacity of the environment to absorb and recover - is limited. Three factors determine the **future demand (D)** on the environment by human activities viz.

$$D = M . W . B$$

where: W is average wealth per capita
         B is population level
         M is the "metabolism" or the socio-cultural claim
         on the environment per unit of wealth.

This approach, formulated by Speth (3), gives a first order indication of the technological challenge and "metabolic" efficiency required in providing society with the technical means (embedded in culture and social structure) to meet its needs within the boundaries of environmental capacity.

Coastal resources and science

Poor management of coastal resources poses severe risks to human populations and to the natural environment, further intensified by population growth and climate change. Some of the major issues and problems of coastal areas are highlighted below:
- population pressure on the coastal area is increasing;
- tropical coastal zones sustain some of the earth's most productive ecosystems, including coral reefs, estuaries, mangroves, seagrass beds, lagoons, etc;

. the rational use and development of coastal areas requires the ability to determine the present state of these ecosystems and to forecast future conditions and effects of human action;

. marine pollution and the effects of land-based activities on coastal waters quality are major problems.

There is need for scientific inputs for addressing the above issues. Some of them would have to be tackled at a national level, others at the regional level and of course there are some planetary problems which require international involvement.

Marine technology and sustainable society

Agenda 21, Chapter 34 of the Rio Summit has introduced the concept of environmentally sound technologies. According to this concept, environmentally sound technologies:

- "protect the environment, are less polluting, use all resources in a more sustainable manner, recycle more of their wastes and products, and handle residual wastes in a more acceptable manner than the technologies for which they were substitutes;"
- "in the context of pollution are "process and product technologies" that generate low or no waste, for the prevention of pollution. They also cover "end of the pipe" technologies for treatment of pollution after it has been generated;"
- "are not just individual technologies, but total systems which include knowhow, procedures, goods and services, and equipment as well as organisational and managerial procedures."

The above implies consideration of human resource development, capacity building and the rendering of technologies compatible with nationally determined socio-economic, cultural and environmental priorities. In other words technology has social dimensions and has to be embedded in different socio-cultural systems and structures (4).

Jansen (5) points out that in the environmental debate attention is continuously focused on three elements:

- culture, which legitimates the nature and volume of social needs to be fulfilled as expressed in consumption patterns;
- structure, that is, the economic and institutional organisation of society;
- technology, which provides the technical means whereby needs are (to be) fulfilled.

These three elements characterize development of society in strong mutual interaction and interdependency and so changes in technology to improve environmental efficiency have always to

take into consideration their interdependencies with "culture" and "structure".

The "acceptability" of environmentally efficient technical means is thus directly connected to economic conditions and to demands of society. In this context, it should be noted that these conditions and demands are not static but may change radically as a result of environmental developments and/or policies. Against this background, it becomes clear that sustainable technology development cannot be realized without involving:

-    the culturally and structurally limiting conditions under which the technology must function thus determining its possibility, desirability and acceptability;
-    the cultural and structural requirements necessary for the effective functioning of the technology.

There are three types of technology that can meet the requirements of sustainable use, namely:

-    careful use, the operational challenge;
-    improvement, the implementational challenge;
-    renewal, the conceptual challenge through redefining technology development trajectories.

Jansen thus develops a three-track strategy:

-    operational, i.e., by stopping leaks and streamlining the current production systems, thereby leading to increases in environmental efficiencies by factors of 1.33 to 1.5 within a few years;
-    implementational, i.e., the improvement and application of both "end of process/product" and "process/product integrated" systems, leading to increases in environmental efficiency by a factor of 1.5 to 4 in 20 years;
-    renewal, i.e., development of new technological combinations and concepts by which increase of environmental efficiency should be by factors of 10 to 50 in a long-term (40-50 years) perspective (6).

On a global scale Freeman and Hagedoorm (7) observe a convergence of technology in the North and the newly industrialised countries, whereas both diverge from the developing countries. This is contrary to what is stated in Agenda 21. Also given the dependence of technological development on financial resources, fundamental structural questions have to be addressed.
Nowadays high priority is given to transfer of environmental technology to the "South". In the UNIDO conference on Ecologically Sustainable Industrial Development (ESID), the option was to replace pollution control technology in the long run by prevention technology in ESID. The implicit assumption behind this approach is that (technological) development in the "South" should or will be a replica of the development in the "North". The question arises, however, whether the approach to

development of sustainable technology should not be regionalized and diversified. In the "North" the development of technology is locked in the developed technological and institutional infrastructures which make fundamental shifts in technology trajectories extremely difficult. Should not the absence of such sustainability hostile infrastructures in the "South" be considered a boon in this regard?

Regional differentiation of technology development: a chance for sustainability!

A number of arguments plead for regional diversification. First the scales of specific environmental problems and of technologies have to be taken into account. There is no simple relationship between the scale of environmental threats and the scale of technological solutions e.g. the global ozone layer problem originating from the use of CFC's in widespread small-scale technologies.

Second there are differential requirements of technology. Whereas the "North" urgently needs a manifold improvement of the environmental efficiency of technology, the "South" is in urgent need of technology for sustainable development.

Thirdly, the (physical) infrastructural situation is very different. In the industrialised countries centralized production, high energy intensity, and a massive and rigid infrastructure for transportation will for a long time restrictively determine the possibilities for technological renewal. In the low industrialised countries the lack of infrastructure opens the possibilities of less transportation-intensive production systems with more decentralised production, low-energy intensities and of a sophisticated scale of technology. This gives to developing countries that are beginning the industrialization process a unique opportunity to adopt cleaner and more efficient production systems.

Fourthly, there is a tremendous difference in availability and orientation of human resources such as labour, scientific infrastructure and organizational capacities, with the USA and Central Africa at the extreme ends of the scale.

The UNIDO conference, referred to earlier, concluded that the mutual interests between developed and developing countries provides a compelling argument for "North"-"South" cooperation and for supporting "South"-South" cooperation. This cooperation is very useful in the implementation and development of existing environmental technology and interesting opportunities to base sustainable technologies on the characteristic situation and chances of the "South" might become endangered if the technical cooperation with the "North" led to imitation and resulted in identical infrastructural drawbacks for future development.

In summary, the status of development of sustainable technology in the international field can best be described as at the

definition stage. At this stage, a basis for development of sustainable technology can be laid by:

- working out a philosophy of sustainable technology, based on regional differentiation;
- the creation, building and expanding of regional networks to exchange views and experience;
- setting up pilot projects to try out and compare different approaches on a regional basis.

Institutional restructuring

Bowonder and Miyake (8) have analysed the innovative technology management system of Japan. They state that the high innovativeness of Japanese firms is due to emphasis on the following parameters:

- applied research and development;
- incremental innovations;
- commercial rather than military applications;
- process and production technology;
- component manufacture;
- development of predictable technologies;
- quality control;
- miniaturization;
- standardization and mass volume production.

In contrast, the US innovation system emphasizes basic research, breakthroughs, military aplication, new product design, system integration, software, less predictable technologies, new architectural design and customization. This model is general in nature, and indicates the difference in orientation of innovation in the Japanese firms vis-a-vis the US firms, and the process of building up of competitive advantage in areas, such as random access memories and in liquid crystal displays over a short period of time.

They go on to point out, however, that the Japanese system is interlinked to Japanese folk arts and core values, thus emphasising the cultural dimension of Japanese management styles. But after considering all factors they propose a model, hopefully having larger vailidity than for the Japanese only, in which scanning of world technological trends is the starting point followed by an assessment of the relevant technologies.
The next step is the acquiring of new technologies through technology transfer teams. Technology transfer teams are horizontal groups which facilitate functional integration. This is followed by assimilation of the new technologies, technology fusion and concurrent engineering. Organisational intelligence, horizontal information structures which provide for functional integration, strategic alliances, technology fusion, concurrent engineering and new business subsidiaries are some of the important elements of the Japanese innovation process.

On another plane, the International Ocean Institute (IOI) in 1988 made a study on the modalities of establishing a regional centre for marine science and technology in the Mediterranean (Meditech) (9). The study was based on the need:

- to implement arts 276 and 277 of UNCLOS;
- to build on the UNEP Regional Seas Programme;
- to adopt the EUREKA/EUROMAR system of EEC for Meditech;
- to enable developing countries to acquire high technology;
- to have technology co-development instead of transfer;
- to have "South"-"South" and "North"-"South" cooperation.

The above parameters were considered essential if the technology gap was to be bridged, sustainable development attained for the region as a whole, and unnecessary multiplication of institutions and duplication of effort avoided.

The study went on to develop a decentralised networking model. Meditech was concieved as an organization that acted as a small hub of a network of existing institutions and with operations as decentralised as possible. The objective of Meditech was not only to have joint development of technology through cooperation between the northern and southern States but also to generate investments. The processing system was based on the European EUREKA model.

The concept of Meditech was promoted by IOI and UNIDO. The observations and conclusions drawn by UNIDO from the last six years of promotional work are as follows:

- regional cooperation in the marine sector has the potential to enhance the technological and industrial capabilities of developing countries;
- the process of establishing regional centres could easily be impeded by political disagreements regarding their location;
- the high potential of regional collaboration is at odds with the unwillingness of donors to fund such centres (10).

From experience of the last six years, the establishment of regional business developmehnt centres has been suggested with the following objectives:

- promotion of foreign investments and business alliances;
- strengthening local capabilities to acquire, absorb and adapt technologies;
- improving of technology management capability at the business enterprise level (11).

IOI also drew upon its previous experience and for the Indian Ocean Regional Centre suggested that for establishing such a

centre it was necessary to identify centres of excellence at national and regional levels for the purpose of:

- setting priorities in the development of environmentally and socially sustainable technologies;
- identifying technologies particularly suitable for small islands;
- developing technology for exploration and exploitation, industrialising such technologies and developing human resources through training, conferences and seminars;
- analyzing alternative models for the structure of the "system" which could consist of a number of regional centres;
- identifying potential partners in the private sector of industrialised countries with Indian Ocean interests;
- drawing up an initial budget for a core programme for the coordinating centre.

Thereafter relevant technologies necessary for the exploration and exploitation of resources could be identified and a Centre of Qualification established. This Centre should provide easy access to and information on equipment and technology required for exploring and exploiting marine resources and to distribute labels qualifying equipment and methods for defined areas. The functions of the Regional Centre would be to:

- network the universities, scientific and technological research institutes and the concerned industries in the region;
- maintain contact with the concerned international institutions, e.g; UNIDO, UNCSTD, Third World Academy of Sciences, International Centre for Genetic Engineering and Biotechnology;
- collect, collate and disseminate information on environmentally safe marine technology including advances and developments therein;
- conduct seminars, symposia and training programme;
- provide member states with advice and guidance;
- promote joint technology development based on the EUREKA/EUROMAR systems;
- act as a Certifying Centre for environmentally safe marine technologies (12).

It was the view of IOI that once such an agreement has taken place, international funding agencies could be approached for funding such a Centre or Centres. Since the project would be directly flowing out of the UNCED process, there should be no difficulty in attracting the required funding.

Conclusions

There are many ways in which technical cooperation in a regional context could take place. The paper suggests some institutional

models that could be used as well as processing systems based on the European EUREKA model as well as the highly successful Japanese model. Perhaps an appropriate mix of all the above could be thought of depending on history and culture, resource endowments, enterpreneurship and external situation of the region.

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Integrated Management of the Coastal Zone
by
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The coastal zone – where land meets sea and where fresh and salt waters mix – contains many of the Earth's most complex, diverse and productive ecological systems. It functions as a protective buffer and filter between the land and the sea, and is increasingly valued for recreational and aesthetic purposes.

The ecosystems in the coastal zone are important for biological and economic productivity, storm protection and erosion control. Reefs, mangroves, wetlands and tidelands are vital breeding, nursery and feeding areas for the majority of known marine species. Worldwide, over two thirds of all marine fisheries species depend on coastal systems.

About 60% of the world's population – nearly 3 billion people – now lives within 60 kilometres of the coast. This number is increasing rapidly due to a combination of population growth, migration and urbanization. Two thirds of cities with populations over 2.5 million are situated near estuaries.

The unrestrained pursuit of multiple activities in coastal areas inevitably leads to competition for finite resources, environmental degradation and often environmental and social conflict. Furthermore, development practices which ignore the dynamics of coastal systems can be catastrophic, as evidenced by the increasing loss of lives, property and investment due to coastal flooding and erosion.

If coastal areas are to maintain their productivity and natural functions, there must be major improvements in the way coastal development is managed. Effective coastal management has to be based on a solid scientific foundation taking into account the limitations of natural systems, while balancing and integrating the demands of the various parts of humanity which depend on these systems for their livelihood.

Integrated coastal management

Due to the complexity of human activities, natural systems and the ownership patterns in the coastal zone, an integrated management scheme is needed to allocate coastal resources efficiently and minimize environmental degradation. Choices have to be made between competing uses, and limits to resource exploitation must be set, if escalating conflicts and resource degradation are to be avoided.

Planning for sustainable resource management is based on weighing priorities, translating these priorities into policies, and finally defining goals. A management plan defines the steps required to achieve these goals, identifies the entities responsible for each step and establishes a time frame for action and review.

There is no one "right" way to manage coastal areas. However, there are certain common threads to all integrated coastal management mechanisms.

Any management system has to follow the steps of establishing a policy, planning procedures and programmes. If the system is to be an integrated one, then there have to be integrative mechanisms. Note has also to be taken of the two distinctive parts of the coastal zone: the land portion and the sea. These require to be integrated but of necessity need differing approaches.

Couper points out that unlike land use management, ocean management is complicated by the fluidity of the medium, its three-dimensional parameters, mobility of many resources and activities, the complexity of interactive ecosystems, and the lack of relevance of administrative boundaries to the natural environment. He goes on to say that ocean management is to be considered as a methodology through which several activities (navigation, fishing, mining etc.) and environmental quality in a sea area are considered as a whole, and their uses optimised in order to maximise net benefits to a nation, but without prejudicing local socio-economic interests or jeoparding benefits to future generations (Couper, 1992).

Peet while noting that Couper's description was not a definition of integrated ocean management, questions whether integrated ocean management was possible in practice since ocean systems were much too complex to be managed by a single system of management. Using the concepts of comprehensiveness of scope, coherence of its elements, consistency over time and cost-effectiveness of its results as the key characteristics of ocean management, he goes on to say that countries could only move towards a system where the principles underlying the concept of integrated ocean management could to some extent be utilised in the framing of policies (Peet, 1992).

Miles has given a more operational and process-based definition of management. According to him, "policy" refers to a purposive course of action in response to a set of perceived problems; "implementation" is the transforming of policy decisions into action; and "management is the control exercised over people, programmes and resources. An integrated policy is thus a sine qua non for integrated management (Miles, 1989).

An excellent discussion on integrated marine policy was presented by Arild Underdahl. Accordingly to him, a policy to be perfectly integrated has to meet the triple requirements of comprehensiveness, aggregation and consistency. However, the more comprehensive a policy, the more difficult it is to aggregate it for purposes of evaluation or formulation; while consistency is something rarely achieved in the uncertain and ever-changing marine environment. Underdahl stresses that the ideal model of an integrated policy will rarely, if ever be a sensible goal. When the costs of integration are taken into account, some imperfection in policy is not only necessary but also desirable (Underdahl, 1980).

Cicin-Sain, while strongly agreeing with the emphasis on integration makes the following caveats on policy integration:

- not every interaction, between different sectors is problematic and therefore in need of management;

- integrated management does not generally replace sectoral management, but instead supplements it;

- policy integration is often best performed at a higher bureaucratic level than sectoral management; and

- the costs of policy integration should be kept in mind since sometimes the costs may outweigh the benefits (Cicin-Sain, 1993).

The econo-technical context of management

Coastal management has to be conceived in the context of the existing econo-technical structure flowing from the latest phase of the so called industrial revolution. The process called the industrial revolution began in England around the middle of the eighteenth century through the spread of forms of industrial activity based on certain simple factors:

- increasing use being made of the steam engine which could supply power to several looms simultaneously;

- the evolution of the factory system;

- small amounts of capital being required to set up such activities;

- the new factory-based production resulting in considerable increases in productivity;

- the technology used being fairly simple and within the technical capacity of the "good engineers" of the period.

Since then, and especially since 1945, there has been great complexification of the industrial structure. The introduction of computers, robots, artificial intelligence, new materials, space applications, and flexible manufacturing systems has led to greater stress being laid on research and development, human resources development and integration of systems leading to:

- very high capital inputs;

- rapid obsolescence of technology;

- decentralised work-stations;

- information, and its management as an essential input

into the production process.

This has made technologies, and systems of managing it, so complex that multi-disciplinary professionals are necessary for managing the production systems of the new industrial revolution. This introduces multi-dimensionality to the task of managing the coastal zone since most of the ocean and coastal technologies belong to the new industrial revolution.

The new industrial revolution has also led to the complexification of the production system: vertically by increasing the number of stages before raw materials can be transformed into finished products, and horizontally by the development of a large number of non-industrial activities (finance, transport, research, recycling of waste, storage distribution) which are necessary to support the production process.

Horizontal activities as "adjuncts" to industries (sometimes referred to as "service" or "information" activities) have grown to the extent that in the advanced industrial economies they sometimes represent as much as 70 to 80 per cent of the cost of the final product.

The management aspect of this horizontal complexification is that due to the multiplicity of stages in the processes of production and distribution, it is necessary to co-ordinate these seperate activities. The problems posed by the co-ordination and organization needed between all the parts of the whole system lead to systems thinking and the need for the systems approach. This has made the management of the present-day techno-economy a matter of increasing complexity.

Sustainable development

Management of the coastal zone, especially in the ocean sphere has also to concern itself with the two concepts emerging from United Nations Convention on Environment and Development 1992 (UNCED), namely sustainable development and the precautionary principle - the latter itself being an offshoot of the great degree of uncertainty encompassing most post-modern activities.

"Sustainable development" and "the precautionary principle" are still in the process of evolution and no "standard" definition capable of leading to managerial initiatives has emerged so far. But though there are many concepts of sustainable development but almost all definitions contain as a minumum the following:

-   ecosystem integrity;

-   efficiency;

-   equity both in the inter-generational and temporal senses.

Efficiency and equity in the temporal sense have for long been at the heart of politico-economic thinking and there is a lot of extant material which can be utilised by managers. Ecosystem integrity and inter-generational equity, however, raise many issues which are not only novel in their impacts but have very great implications for existing thought and thus for managers as they assess the politico-economic implications of activities in the coastal zone.

Ecosystem integrity

The concept of an ecosystem as a physical system is the level of organisation of nature at which individual organisms are the key elements of interaction. The organisms are embedded in a physical space whose relevant properties depend also on the presence of dead organic matter in the process of being recycled, of nutrients in inorganic form, and on the operation of external energy. The ecological system being conceived as physical in nature is subject to space and thermodynamic constraints.

Any system, in the sense of general systems theory, can be mentally dissected into the different parts that interact among themselves. The system is dynamic, it changes, but the definition of the system requires that some invariant properties be recognized.

Systems are also to be conceived as retaining some degree of internal flexibility or adaptiveness that may accommodate a measure of indeterminism. For if a system is totally connected and rigid it can then be treated as a single object. The distinction is important and is related to fundamental physical theory.

At the level of the ecosystem, it is illuminating to compare the actual coastal ecosystem, composed of discrete organisms, with a hypothetical system in the form of a continuously connected system from the watershed up to the deep ocean. While the former is a discontinuous system, the hypothetical one is a continuous one. The simplest way of comparing discontinuity with continuity is the dripping faucet with a thin and steady flow.

There is also the question of inderterminacy in the actual ecosystem. Processes associated with demography, for example, add to indetermination in the coastal ecosystem. Other instabilities apply, inter alia, to the dynamically changing ocean system, where all physical parameters are not only discontinuous but in a state of constant change, and the rapidly advancing technological and information systems.

When we talk of the integrity of ecosystems, the reference is obviously to the interaction between the physical ecosystem and anthropogenic activities. In a larger concept of ecosystem including both man and nature, this would mean internal relations between two parts of the (larger) ecosystem. If the ecosystem is taken to be physical, then it would reflect its external

relations with man-made activities.

Analysing the way such ecosystems work, the concepts of the decay of energy and the accretion of information emerge as important factors. Change in ecosystems is twofold: (a) rapid changes (disasters, catastrophes) that destroy structures and that are unpredictable from inside the system, and (b) gradual and slow changes that vanish gradually in a generalised situation of flow of energy and that admit a considerable degree of local diversification. The change is towards segregation, and the persistent situations consist of misplaced things. In the oceanic world, for example, plankton live where there is light. Physically the situation in the oceans is that where there is light there are no nutrients; nutrients accumulate in the depths, where there is no light. Integrity of an ecosystem could thus be conceived as bringing about connectivity between events seperated in time and space. This is a subject of considerable importance to ecosystem management if synergy of anthropogenic activities and the physical coastal zone ecosystem is to be brought about.

The concept of ecosystem integrity raises some uncomfortable questions and the need to transcend the present Western tendency to look at the world in materialistic and value-free Marxian or Capitalist terms. Consideration of ecosystem integrity would lead to the need for the following being integrated into the economic analysis to be presented to managers:

- vulnerability of the system to unanticipated developments;

- the management of uncertainty;

- the impact of value systems respectful of the environment on the analysis.

Vulnerability

The concept of vulnerability relates to the capacity of different complex systems to function smoothly. It is obvious that sufficient resources must be channelled towards the management of vulnerability and that in a complex system the problem will probably be more acute than in a simple system. Orio Giarini points out that the evolution of the activities of insurance companies over the past two decades will be sufficient to observe the truth of this. He points out that during the 1970s the turnover of insurance companies in the world showed a real growth rate of almost 6 per cent annually while the general economic growth rate fell below 2 per cent. Traditional economic theory would have had the insurance activities slowing down even more than the general level of growth (Giarini, 1989).

Empirical analysis in traditional economics has thus failed to grasp the fact that with the technological developments made in the last decades systems have become more and more complex and

vulnerable. The increasing complexity of systems, the very nature of technological development, necessitates the need of obviating negative consequences. This is a matter which managers have to take note of when assessing the desirability of coastal zone activities.

Uncertainty

Uncertainty deals with developments appearing in the efflux of time. As soon as time is seen for what it is, that is, a continuous flux which cannot be stopped artificialy, as in a photograph, concepts of uncertainty and disequilibrium replace those of certainty and equilibrium, which have dominated classical thinking. To some extent uncertainty can be modified by the weight of strong probabilities and deterministic tendencies. But there can be no return to theories propounding absolute determination in time.

Human enterprise is undertaken in circumstances of extreme uncertainty. It is only with the passage of time that some of these attempts emerge as successful. This, in turn, gives rise to the need for a better understanding, in terms of technological economic and social events, of the influence of the problems of inertia and those of probability, uncertainty, and even the absence of predetermination. This is one of the main problems that management would face in tackling the dynamic and uncertain land-sea interface. Though application of the precautionary principle could help to some extent but its impreciseness makes it a very blunt instrumentality. A heuristic approach would seem to be the answer.

Value Systems

In establishing trade-offs between different activities neither scientific analysis nor logical precision would lead to unique solutions. As Kothari (1990) observes, the need is for an ethical imperative:

> "In the absence of an ethical imperative, environmentalism has been reduced to a technological fix, and as with all technological fixes, solutions are seen to lie once more in the hands of manager technocrats. Economic growth, propelled by intensive technology and fuelled by an excessive exploitation of nature, was once viewed as a major factor in environmental degradation; it has suddenly been given the central role in solving the environmental crisis. The market economy is given an even more significant role in organising nature and society. The environmentalist label and the sustainability slogan have become deceptive jargons that are used as convenient covers for conducting business as usual."

In all cultures there are values respectful of the environment. Zarathustra in 3500 B.C., for example, laid down the following

precepts:

"Do not pollute earth, air, and water.

Do not cut trees nor destroy green vegetation but transform waste lands and deserts into gardens.

Refrain from killing birds and animals. Treat them with love and affection and make use of them to improve the lot of mankind.

Nature hates monopolies and knows no exception. It has always some levelling agency that puts the overbearing, the strong, the rich, the fortunate, substantially on the same ground with all others."

In the ultimate analysis coastal managers have to be imbued with attitudes, preferably drawn from their cultures and thought patterns which can balance anthropogenic activities with the environment. Thus it would be the subjective judgement of managers, and not analytical vigour, that could lead to sustainable management of the coastal zone.

Sectoral management

Activities in the coastal zone are usually carried out in the following areas:

. fisheries and aquaculture;

. minerals and metals;

. shipping, ports and harbours;

. coastal development, coastal engineering;

. tourism;

. scientific research;

. technology development;

. defense (warships, monitoring & surveillance);

. development of human resources.

In the new management paradigm, each sector must enhance efficiency in the economic system, safeguard the integrity of the ecosystem, and promote equity, both intragenerational and intergenerational.

The various oceanic/coastal sectors depend on high technology, including information technology and data handling. They are also interdisciplinary and are required to:

- deal with uncertainty;

- cope with rapid change;

- deal with national/international legislation;

- straddle different legal regimes.

But though there are some areas of common concern to the various sectors, there are many others which are divergent in nature. Their scientific bases and disciplines, for example, vary - biology for fisheries, geology for minerals, naval architecture and engineering for shipping, ports and harbours, geography and urbanisation for coastal development, and so on. Each discipline has over the years not only got highly specialised but has also developed its own "culture", idiom and language. Integration of sectoral activities depends not only on institutional measures - inter-agency committees and conferences, super agencies, cabinet sub-committees - but on finding a common idiom and language which can unify the various disciplines involved.

Before discussing possible integrative mechanisms, it may be useful to examine some sectoral management systems.

Fisheries management

The theory of management and conservation of living resources has undergone important changes during the 'seventies and 'eighties, moving from a single-species to a multi-species approach; from the simple models of maximum or optimum sustainable yield to the highly complex models of Prigogine and others, attempting to include biological, chemical, physical, meteorological as well as social, economic, psychological factors into the model structure. Certainty has given way to uncertainty.

Fisheries management has been traditionally concerned with problems generated within the fishery sector. At the forefront of these has been the over-exploitation of target species, over-capitalisation and the related economic waste, and the incidence of conflict, in particular the conflict which frequently occurs between small-scale fisherman and industrial fishing vessels using more powerful means of production. These and other internally generated problems continue to remain at the forefront of fisheries administrations' concerns around the world.

During the last decade particularly, a new set of problems have become apparent in fisheries which mostly have their origin outside the sector. These are environmental changes which have their toxic effects or damaging effects on fish habitats. These changes adversely affect, respectively, the quality of fish as a consumer good, and the productivity and abundance of resources.

They have been present for some time but other than in a few

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instances their effects have been localised and, perhaps in most
instances, not recognised.

As populations in coastal areas increase the economic activity
within them increases and diversifies, those factors which afect
the fishery sector and originate outside it are likely to become
much worse unless governments and resource users take appropriate
action. Already, in some areas, the environmental changes taking
place are likely to impair species productivity and diversity.
In doing so, they may affect fishing incomes and fish food
supplies to an equal or greater extent than excessive
exploitation rates. These two types of problems will be found
together in many situations, each reinforcing the other's
damaging effects on fish and people alike.

Anthony Charles constructs an interesting model for fisheries
management based on four interacting components: ecological
sustainability, socioeconomic sustainability, community
sustainability, and institutional sutainability. Within this
framework, he elaborates some policy directions which include:

- development of approaches for "living with uncertainty;"

- greater recognition of inherent complexities in the fishery
  sector;

- decentralisation of regulation and enhancement of local
  control and participation in decision-making;

- establishment of appropriate property rights or quasi-
  property rights preferably allocated at the group/community
  level; and

- comprehensive fishery planning combined with suitable
  economic diversification.

He admits, however, that in spite of the abundance of theory and
history, fisheries management is almost universally in trouble
(Charles, 1994).

During the next ten years, fishery management will have to face
other dramatic changes and uncertainties. In the last analysis,
it will have to manage the transition from an economy based on
hunting and gathering to an economy based on cultivating marine
plants and husbanding marine animals, in the sense that there
will be human intervention, once or repeatedly, in the life cycle
of every commercially harvested species. The importance of basic
research and research and development, including genetic
engineering and bio-industrial processes, recycling and
industrial uses of waste products, and development of human
resources is bound to increase.

Nonliving resources

The production of both fuel and nonfuel minerals as well as ocean

energy (waves, tides, ocean thermal energy conversion) depends on high technology management, available almost exclusively in the industrialised countries. Developing countries have the choice of relying on foreign companies, with faster but lower and less reliable financial returns, or developing their own capacity, which may take longer but in the end brings higher financial returns and environmental and social security. Access to information; capacity building in technology assessment and technology selection; reverse engineering; environmental impact assessment; data management; risk assessment and risk management; multiple use planning (e.g., electricity production combined with fresh water production and aquaculture both of algae and fish, in OTEC; or electricity production combined with breakwater construction and harbour dredging, in wave energy); conflict of uses avoidance (e.g., hydrocarbon production versus fisheries or tourism); continuous human resource development; self-reliance with regard to spare parts and repairs; capacity building to enable the development of the next generation of an acquired technology; waste recycling: all these are elements of the management of offshore minerals and hydrocarbons.

Deep-sea mining will be a high-tech industry par excellence. It involves practically every branch of high technology, from micro-electronics to lasers, new materials, satellite technology, energy, even bio-industrial processes (anti-fouling and, possibly, processing), a fact not taken into due note of by the Law of the Sea Convention which deals with the management system in a political rather than an industrial way.

The management of shipping, ports and harbours is high-tech, particularly in the field of communication, information and data handling technologies. Sophisticated computer modelling of ship arrivals, berthing facilities, loading and unloading time, etc. are utilized in port and harbour planning and management.

Technological development has greatly increased the cost of constructing and managing port facilities, transformed the functions of ports and harbours, their environmental and social impact and poses new challenges for management.

Ports and harbours, as well as tourism (now the largest industry in the world), are all part of coastal management which is extremely complex, bridging the management of land- and sea-uses, national and international, of broadly interdisciplinary, often multicultural human resources, and high-tech information technologies.

Management of marine technology

UNCED has introduced the concept of environmentally sound technologies. According to this concept, environmentally sound technologies:

-       protect the environment, are less polluting, use all
        resources in a more sustainable manner, recycle more

of their wastes and products, and handle residual wastes in a more acceptable manner than the technologies for which they were substitutes;

- in the context of pollution are process and product technologies that generate low or no waste, for the prevention of pollution. They also cover end of the pipe technologies for treatment of pollution after it has been generated;

- are not just individual technologies, but total systems which include knowhow, procedures, goods and services, and equipment as well as organisational and managerial procedures.

The above implies the consideration of human resource development, capacity building and the rendering of technologies compatible with nationally determined socio-economic, cultural and environmental priorities as a management imperative.

However, environmentally sound technologies are also to be embedded in different socio-cultural systems and structures. As Jansen points out, in the environmental debate attention is continuously focused on three elements:

- culture, which legitimates the nature and volume of social needs to be fulfilled as expressed in consumption patterns;

- structure, that is, the economic and institutional organisation of society;

- technology, which provides the technical means whereby needs are (to be) fulfilled (Jansen, 1994).

These three elements according to him, characterize development of society in strong mutual interaction and interdependency and so changes in technology to improve environmental efficiency have always to take into consideration their interdependencies with "culture" and "structure".

The "acceptability" of environmentally efficient technical means is directly connected to economic conditions and to demands of society. In this context, it should be noted that these conditions and demands are not static but may change radically as a result of environmental developments and/or policies.

Against this background, it becomes clear that sustainable technology development cannot be realized without involving:

- the culturally and structurally limiting conditions under which the technology must function, determining the possibility, the desirability and acceptability of an innovation;

- the cultural and structural requirements necessary for

the effective functioning of the technology.

Conversely, however, technology alone will not be able to provide a solution to the problem of sustainability.

Communication strategy is necessary to diffuse such technologies. The mode of communication reflects the balance between culture, structure and technology. The communication strategy is based on:

- a robust hypothesis for the discrepancy between social needs and the available eco-capacity which forms the basis for operationalizing the technological goals, and contributes to the conclusion that development of sustainable technology is urgently needed;

- the scheduling of technology pathways in time, forming the basis for credible routes for coherent technology development;

- a continuous interactive evaluation of the innovative process and of innovations leading to broadly accepted technologies, and to the trust of the general public in the capabilities of technology.

Jansen develops a three-track strategy:

- **operational** by stopping leaks and streamlining the current production systems, thereby leading to increases in environmental efficiencies by factors of 1.33 to 1.5 within a few years;

- **implementational**, i.e., the improvement and application of both "end of process/product" and "process/product integrated" systems, leading to increases in environmental efficiency by a factor of 1.5 to 4 in 20 years;

- **renewal**, i.e., development of new technological combinations and concepts by which increase of environmental efficiency should be by factors of 10 to 50 in a long-term (40–50 years) perspective.

The above three tracks are interconnected within a general framework, external conditions, but the internal drives and even qualities of the scientists and technologists have to be suited to the nature of each of the tracks. The general framework reflects the starting point, the goal and directions for technological search. The specific track-oriented items reflect the time scale, the level of certainties, and the specific object of development within the interdependence and interaction of culture-structure-technology.

It needs to be noted that the above interlinkage differs from the conventional science, technology and capital interlinkage as the driving force that increases efficiency. The latter has

generally been at the expense of the environment while the culture et. al. interlinkage specifically makes of environment a value premise.

Integrating sectors

In integrating sectoral managements, there are constraints in the form of:

- strong autonomous institutions based on the principle of specialisation, itself an evolute of Newtonian concepts;

- the absence of an appropriate typology and adequate guidelines for adoption in different climatic, political, cultural and socioeconomic environments.

We have already noted that there are severe constraints to the formulation of an integrated policy for the oceans. Ocean management, as pointed out by Vallego, is still largely a theoretical concept discussed in forums like Pacem in Maribus proceedings by a few scholars who have anticipated the magnitude of the task involved in the formulation of such a programme. Very few governments, however, have in practice developed sea-use plans (Vallego, 1988).

However, so far as coastal management (i.e. the landward side of the coastal zone) is concerned, some models have been developed. Chua Thia-Eng suggests that integrated management of the coastal zone involves establishing a dynamic balance between firm, long-term, policy, and responsive, coordinated management. The purpose of policy is to establish a common purpose through objectives needing to be achieved in order to realise that common purpose (Thai-Eng, 1993). The institutional and programmatic arrangements for achieving the common purpose should provide resources and flexibility to government agencies and the community to coordinate activities, assess progress in relation to the objectives, and respond to change and opportunity.

He suggests that the following elements are required:

. a dynamic goal or vision for a period significantly longer than conventional economic planning horizons, say 25 or 50 years;

. the formulation of national objectives to which policies and management are directed;

. guiding principles for exercising discretionary powers;

. a strategy, commitment and resources for detailed day-to-day management;

. clear, legally based identification of authority,

precedence and accountability; and

.   performance indicators and monitoring to enable objective
     assessment of the extent to which goals and objectives have
     been achieved.

Matrices of use interaction can also be constructed showing
negative as well as positive mutual impacts between uses. Zoning
may   reduce   negative   interactions.   To   implement   the
recommendations of UNCED three categories of zones for the
purpose of promoting sustainable land/sea use may be considered:

–   **conservation areas:** these biodiversity–rich areas
         should be preserved in their pristine condition;

–   **eco-redevelopment areas:** the degraded mangrove
         ecosystems, coral reefs and other damaged ecosystems
         should be placed under a restoration regime;

–   **sustainable utilisation areas:** these areas can be
         earmarked for coastal aquaculture, industries, and for
         other developmental activities.

Such a procedure will help to develop an Integrated Conservation
Development Programme for coastal areas.

Integrated resource management

Another important dimension of coastal zone management is
resource management. According to Olsen the successful practice
of integrated resource management, is a complex and subtle
endeavour sufficiently different from sectoral management (Olsen,
1993).   In this connection consideration of programmes of
integrated rural development that were launched with considerable
fanfare and optimism a decade ago shows that in practice the
successful implementation of an appealing concept proved to be
difficult.   Besides unlike the situation in integrated rural
development, there is only scantily documented body of experience
in coastal management. The best of this experience needs to be
critically examined and applied to the 'integrated' coastal
management programmes.

After a study of the experience derived from existing programmes,
Olsen suggests the following guidelines:

–   adoption of an incremental approach to design, funding
         and implementation;

–   having an experimental design;

–   adoption of a two-track strategy at the national and
         community levels;

–   building of constituencies for improved resource
         management at all levels;

        —   having a policy-relevant research agenda;

        —   building of capacity for effective management at all levels.

Conclusion

The benefits provided by coastal systems in the form of fisheries, transportation, natural flood and erosion protection, and other free goods and services have sustained human societies for millennia. As a result of over-population, poverty and unsustainable use of coastal resources, however, the "capital" of many of the world's coastal and marine areas has been seriously degraded, and is further threatened by sea-level rise and other possible impacts of global warming.

Despite widespread coastal degradation, opportunities still exist for sustainable development and for remedial action in heavily impacted areas. A prerequisite, however, is a genuine commitment to coastal management, not just by governments, but also by the multitude of users and beneficiaries of coastal resources. Reconciling coastal conflicts will require measures which are more integrated, adaptive, system-oriented and far-sighted than the sectoral approaches adopted so far.

Integrated resource management is, thus, very necessary for the coastal zone. The concept of the "coastal zone" has tended to be somewhat flexible and to expand, both landwards, to include the hinterland up to the watershed, and seaward, to include the entire ocean. The density of coastal populations — still on the increase -- the complexity of their often conflicting activities and their impact on coastal seas, the vulnerability of the system to unanticipated developments, uncertainty and the need to integrate value systems respectful of the environment into cost-effectiveness calculations poses management problems of some magnitude.

To ease pressures on the coastal zone, a combination of broadscale and targeted management approaches is required. At the national and regional levels, the development of broadscale resource and use policies is important - including coast and ocean-specific environmental legislation and economic incentives and disincentives. Policies on human population may also need to be modified.

Individual coastal areas also require more targeted management approaches, tailored to local, natural, socio-economic and political conditions. Targeted management approaches include operational plans to stimulate sustainable forms of multiple-use management, improved infrastructure, the establishment of protected areas, and rehabilitation of heavily degraded ecosystems.

However it is necessary to keep in mind that in any sustainable development strategy the interests of people are to be considered

as of the utmost importance. Coastal communities feel the direct impact of activities and developments, most of which are beyond their control. Overfishing by industrialized fleets in the deep sea within or beyond the limits of national jurisdiction is causing severe problems for artisanal inshore fishermen in many parts of the world. Transboundary pollution, both from international waters on the seaward side and from international water courses on the landward side, frustrate efforts to control pollution at the level of local coastal management practices.

Effective coastal management, therefore, must include supra-national regional cooperation as well as local/provincial/national cooperation. Just as the waterfront is the link between the marine and the continental ecosystems, the coastal community is the link between the national and provincial systems of governance. The participation of coastal communities, fishermen's cooperatives, and indigenous people in regional and international planning and decision-making, stressed throughout the literature starting with the Brundtland Report, is an aspect of great importance. Any design for a coastal management system, and these designs will vary, depending on local circumstances, must take the complexities and interactions involved in coastal management into account while keeping the interests of the vulnerable sections of humanity involved in the forefront.

The management system also has to be not only process- and structure-based but be such as to impart to all concerned in coastal activities the values necessary for sustainable development and maintenance of the integrity of the coastal ecosystem. This would require the training and production of multi-disciplinary professionals capable of understanding and managing the issues raised by high technology, the information revolution, vulnerability and uncertainty. In the ultimate analysis, management is as good as those managing the system. The analytical abilities and atitudes of managers thus need to be fine tuned to the needs of sustainable management of the coastal ecosystem.

<u>Sustainable Management of Ecosystems</u>
<u>by</u>
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Introduction

Environmental issues are today engaging the attention of statesmen round the globe. In a sense concern about environmental problems is not new. London in the Middle Ages, for example, had a problem with smog as a result of burning logs, and so there were restrictions on the burning of logs. There were also periodic plagues and these forced public health officials to encourage care about such matters as the cleanliness of water. In the 19th century, park areas were created for the preservation of nature and for places of human recreation.

But the current preoccupation with environmental issues is quantitatively and qualitatively different. While destruction and changes of the environment are not new, the size of the problem is. National attempts to address environmental problems have gone on over the centuries; what is new are the international attempts to protect the environment.

In the late 1960s, the environmental impact of the post-war economic boom was being felt in various ways. There was growing concern about the spread of pesticides (such as DDT), oil spills from oil tankers, severe river pollution, and the pollution of inland waterways. Questions were being asked by organizations such as the Club of Rome as to whether the high level of consumption of raw materials could be sustained. The result was the convening by the United Nations of an international conference on the human environment.

The 1972 Conference on the Environment (held in Stockholm) was the first of the UN's 'megaconferences' in which governments from around the world were brought together to discuss the UN's work in economic and social co-operation. The mega-conference represented a new form of diplomacy. It was not a conference to discuss common problems and suggest ideas on how they could be solved; it was not creating a treaty as such and so was not as ambitious as the usual diplomatic conferences. But it was also, in a sense more ambitious in that, freed from the requirements to remain focussed on a particular issue, it could roam freely over a range of issues and encourage governments to think about these problems. To use the jargon of that era, it was a 'consciousness-raising' conference designed to encourage governments to think more creatively about international co-operation. The main focus of the 1972 conference was on cleaning up the environment and prevention of pollution.

Fifteen years later the UN General Assembly set up the World Commission on Environment and Development (WCED) or the so-called Brundtland Commission. By now the emphasis had shifted to combining environmental integrity with the processes of development. The report of WCED made popular the concept of sustainable development which was stated to be "development that meets the needs of the present without compromising the ability

of future generations to meet their own needs" (WCED, 1987). This concept of sustainable development has achieved a large degree of international consensus and was unanimously endorsed by the world leaders gathered in Rio in 1992.

The Brundtland definition of sustainability has, however, been criticised by Starik and Rands (1995) as not being adequate in decision-making situations. According to them, the concept is (a) anthropocentric; (b) indefinite on what the "needs" are and whose "needs" have priority; (c) silent on changes in technology, resource distribution and quality; and (d) unclear regarding the benefits, costs, and strategies of intergenerational sacrifice and transfer. In a more comprehensive definition of sustainability concepts like irreplaceability, biodiversity, carrying capacity, socioeconomic and ecological system resilience, and futurity need to be included.

However though it may be extremely difficult to apply the concept of sustainable development unambiguously in specific decision-making situations yet it is a very powerful, though simple, idea. As with many powerful and simple ideas, it has become a "buzz-word" and is used by many different groups to express a wide diversity of value judgements disguised in seemingly value-neutral language.

Another difficulty is that, in the broadest sense, sustainable development applies to many different policy areas usually thought of separately and appealing to different constitutencies. It involves technical, economic, social, environmental and cultural factors that interact with each other in complex and often unpredictable ways. Thus, it is a highly multi-disciplinary concept that is very hard for any one expert analyst or policy maker to encompass.

Also though inter-generational equity is central to the implementation of the concept of sustainability, it does not follow that achieving it is a zero-sum game between ourselves and our descendants. The reason is that sustainability combines resources and environmental assimilative capacity that are finite with knowledge, and human capacities that are enhanced rather than depleted by being used for human benefit. Knowledge wisely added to resources can thus be the source of new wealth and human capacity, both individual and collective, thereby opening up new options and possibilites for making economic and social growth compatible with sustainability.

Management of a complex objective like sustainable development requires the use of powerful tools. Systems analysis is the methodology that will be used in this paper for analysing methods necessary for sustainably managing the complex and unpredictable physico-ecological system.

Systems Analysis

Systems analysis is being increasingly used to bridge the gap

between different disciplines (economy and ecology, science and the humanities) by providing a common methodology through which the inputs of ecologists, engineers, scientists, economists and social scientists can be integrated.

Systems analysis was introduced in the early 1950s to facilitate cooperation between different disciplines. Boulding (1956) defined systems analysis as

> a level of theoretical model building which lies somewhere between the highly generalized constructions of pure mathematics and the specific theories of the specialized disciplines.

At the highest level of abstraction, the theory of model building prevails and more or less generally applicable definitions and procedures are used for system building. For practical applications, this theoretical framework has usually to be filled in by using a further simplification of the real world into components and interactions relevant to the problem being studied.

General system theory, on which systems analysis is based, arose specifically as a response to the need to counterbalance fragmentation and duplication induced by ultraspecialized modes of inquiry. It has benefited from the parallel emergence and rise to eminence of cybernetics and information theory, and their widespread applications to originally quite unsuspected fields. Presently the rise of this theory is aided by societal pressures calling for the development of theories capable of interdisciplinary application.

The specific contribution of general system theory derives from its de-emphasis of traditional concepts of matter, substance, idea or spirit, and its explicit orientation toward grasping phenomena in terms of organization.

'Organization' can be loosely defined as structure (in space) and function (in time). Structure and function are not rigorously separable, however. That which is structure is the record of past functions and the source of present and future ones. Function in turn is the behaviour of structure and the pathway leading to the formation of new structures. The relativity of the concepts derives from the dominance of the concept of organization. Not what a thing is, what it is made of, or for what purpose it exists, defines it, but how it is organized. Its organization specifies the internal relations of the events which constitute it, and the external relations of the constituted entity and other entities in its environment. This is in line with Prigogine's discovery that in reactions taking place far removed from equilibrium, energy is dissipated and order produced out of chaos by evolution to higher forms of organisation (Prigogine and Stengers, 1984).

Organisations are also composed of entities in interaction with each other. According to Laszlo (1983) the simplest

conceptualization of an entity as defined by its organizational invariance is system. A system in this definition is a collection of parts conserving some identifiable set of (internal) relations, with the summed relations (i.e. the system itself) conserving some identifiable set of (external) relations to other entities (systems). The system also has to have pattern-maintenance and pattern-evolving characteristics if it is to be regarded as a natural system.

In this paper we shall first consider the internal and external relations of two suprabiological organizations, namely, the ecosystem and the human socio-cultural system in a decision-making perspective and thereafter consider the managerial issues that arise therefrom.

Ecosystem: economic perspective

Ecosystems have been concieved of in various ways depending on the disciplinary bias of the concerned scholar. Thus the ecosystem as concieved by a biologist would vary considerably from that "seen" by a geographer or a geologist. In this paper we will look at the ecosystem as conceived by economists and ecologists since these are the two main disciplines involved in sustainable development.

The dominance of the development perspective at the present stage of world history can scarcely be exaggerated, despite apparent reactions against Western culture in the major traditional non-Western societies, and the predominantly Western concern with environmental issues. Cultural compromises can be varied and difficult to categorise - perhaps the universal adoption of modern technology is symptomatic of one such compromise. The covergence of the views of different cultures regarding development perhaps has to do with the fundamentals of human nature, including the acquisition of material possessions, the advance of science and technology, and the profound global forces evidenced in political and social developments.

Seen from the perspective of development, the ecosystem provides three economic functions, namely, as a resource supplier, as a waste assimilator, and as a direct source of utility. Pearce and Turner (1990) have expressed this in a circular economy model (shown in figure 1 overleaf). The model provides a bridge between the environment and the economic processes through a linkage modelled on input-output analysis. The advantage of the model is that external shocks can be traced through the system.

As can be seen from figure 1, the environment is concieved of as a resource, a waste assimilator and as providing utility (aesthetic enjoyment of mountains and beaches for example). The production (P) and consumption (C) processes of the modern economy:

-     reduce the stock of exhaustible resources (ER);
-     decrease or add to the stock of renewable resources

The circular economy model

Notation:

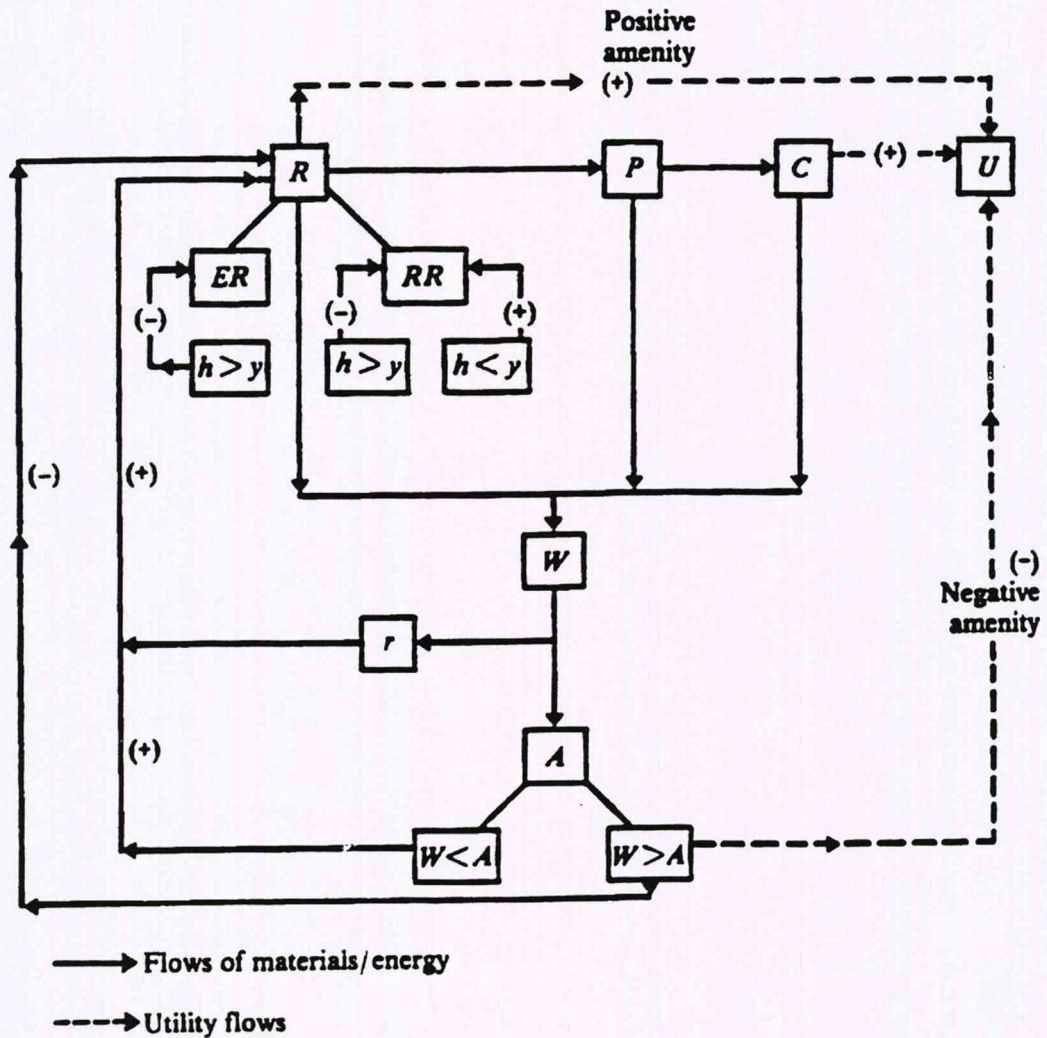|			
A:	Assimilative capacity	R:	Resources
ER:	Exhaustible resources	P:	Production
RR:	Renewable resources	C:	Consumption
W:	Waste	r:	Recyling
y:	Yield (growth)	h:	Rate of harvest
U:	Utility		

Figure 1

(RR) depending on whether harvesting is higher or lower than yield (growth);
- generate waste (W) which has to be catered for by recycling (r) and/or assimilation (A) by the environment. If the assimilative capacity is lower than the waste generated less recycling, there is a negative impact on both the resources and the utility derived from the environment.

The circular economy model shows that in maximising economic development the environment may be degraded to such an extent that it can:

- inhibit use of the environment for production purposes
- decrease the direct utility derived from the natural resource.

The role of economics in the circular model is to maximise intergenerational utility by:

W: minimising waste:maximising yields
A: maximising absorption:minimising harvest
r: maximising recycling.

The importance of using the circular flow model lies in its capacity to help order a particular problem so that what has to be addressed in the ecological/environmental system may be known. It allows not only identification of the components within the enviromment that are prone to degradation, but to identify also the flows between components within the environment. This enables knowledge of the causes of such degradation.

To illustrate how the circular economy model can be applied to an actual ecosystem, figure 2 overleaf shows its application to the Himalayas.

The Himalayan mountain chain provides human beings with:

- exhaustible resources in the form of minerals and land;
- renewable resources in the form of fish, clean water, and forests;
- utility in the form of aesthetic enjoyment and recreation.

Present production and consumption activities (transportation, agriculture, fishing, mining, logging, engineering and recreation) are:

- depleting the mineral stock;
- capable of degrading the land;
- capable of depleting fish, water and forests;
- capable of reducing its inherent utility value.

The model points out the need for regenerating forests, avoiding the dumping of non-biodegradable consumables, preventing soil

The circular economy model as applied to the Himalayas

Clean Water
Minerals
Fish, Forest
Mountanous
Land   **R**

Transportation
Agriculture
Fishing
Engineering
Mining,
Logging **P**

Food   **C**
Water
Recreation
timber
infrastructure

Minerals
ER

Fish
Water
Forest
RR

Dumping of **W**
consumables
Soil erosion
Sedimentation
Eutrophication
Natural erosion

Inherent value of the
Himalaya mountains
Aesthetic Enjoyment
Recreational Utility   **U**

h>y

h<y   h>y

Reforestation
little recycling **r**

Little dispersement   **A**
Limited Microbiological
breakdown (e.g. consumbles

W < A

W > A : The population
has approached region's
life supporting capacity.
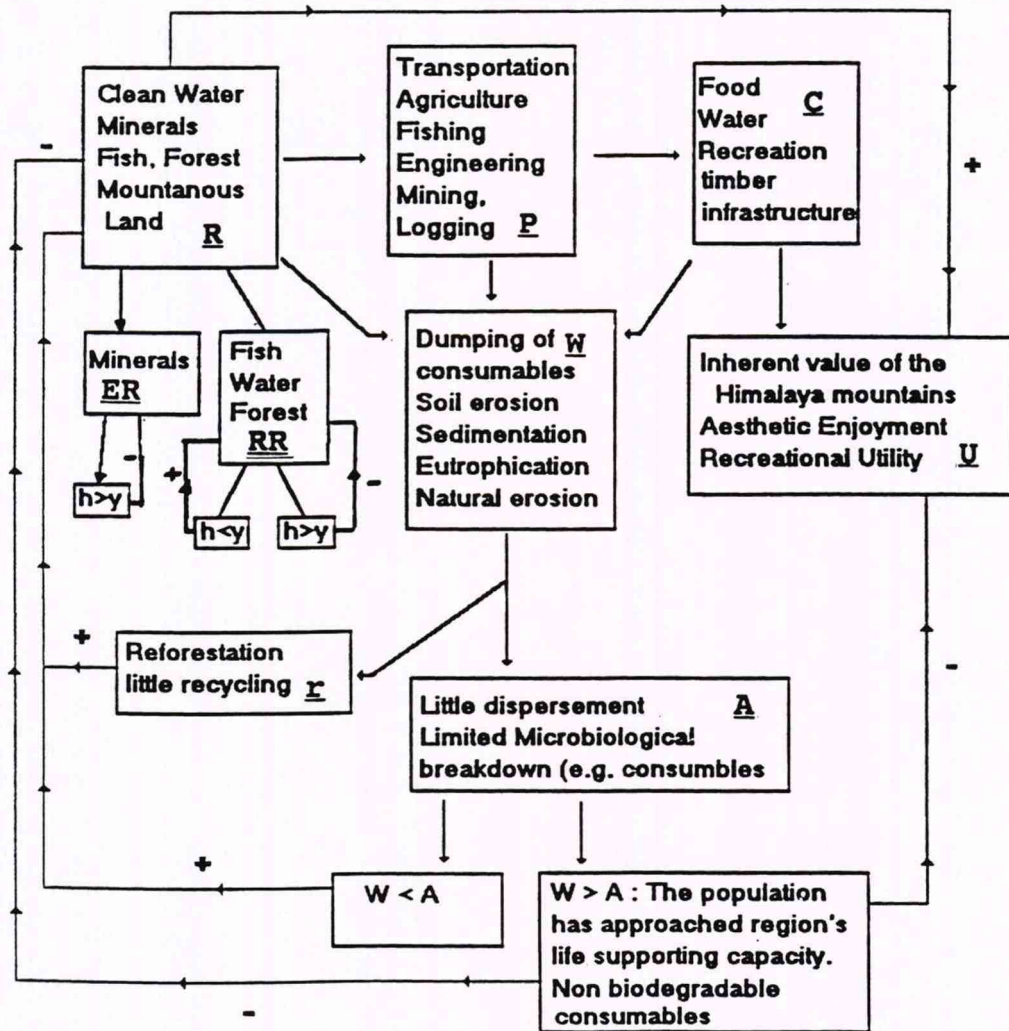Non biodegradable
consumables

Figure 2

erosion and increasing the assimilative capacity of the ecosystem as important management objectives in the context of sustainability.

The circular economy model has a number of limitations in the context of sustainable development. It does not take environmental uncertainty and discontinuity into account, a matter we shall look at more closely when we look at the physico-ecological ecosystem. It also does not take into account assymetries in the time dimension. For example a forest destroyed in a few hours may take decades to regenerate - thus affecting future generations.

Besides sustainable development has come to mean much more than maintaining intact the physical and human capital that produces an income stream. The extinction of a species (plant or animal) for example could take as long as 5 million years to be made good (Myers, 1995)! In this context it is not adequate to consider the environment as only the provider of resources. Its value as a life-sustaining system has also to be taken into account.

There is also the question of synergisms (positive as well as negative) between the various components of the ecosystem. The circular model does not take account of these interactions, mostly nonlinear, and capable, in combination, of producing catastrophic impacts on the ecosystem and therefore on the sociocultural system.

But despite its limitations, the circular economy model provides a simple tool for decision-makers to link up ecology with economics.

Ecosystem: ecological perspective

In contrast to the circular economy model, which is a closed system, ecologists conceive of ecosystems as dynamic open systems. They identify ecosystems as the integration of the communities of living organisms and their total nonliving environment in a geographical region of the earth at a particular point in time. The basic units are the individual living organisms. They form the nodal points of a network whose strands are formed by their interactions. The network is enmeshed in, and integrated with, the environmental matrix. The whole entity is then identified as the ecosystem.

Ecosystems can be identified at different levels, ranging from a small system, such as the ecosystem of a pond, to the ecosystem of the biosphere, including its human population. At each level pattern-maintaining and pattern-evolving characteristics have been identified. At a given season of the year the average number of individuals per unit area is similar to that of previous years in most species, despite some variations in weather conditions, in factors causing mortality, and others that tend to increase or decrease the numbers. Explosions in populations (locust out-breaks, marine algal blooms) are

exceptional phenomena associated with major perturbations of the ecosystem, and normally they are regulated through a number of distinct processes. In this regard it is legitimate to conceptualize ecosystems as dynamic open systems, receiving energy from the sun, recycling it in various ways among their many trophic levels, fixing some of it in biomass, and radiating off some proportion into space in the form of heat.

Bennett and Chorley (1978) point out that in most cases when considering environmental systems the analyst has incomplete and partial knowledge of the system which he seeks to understand and control. The nature of his knowledge is often incremental in that greater insight is gained as analysis or control continues. But elements in the analysis of environmental systems will normally be necessarily indeterminate (or even counter-intuitive) both because of the complexity of such systems and because of the intimacy of man-environment interrelations that constrain understanding. In particular, knowledge of environmental systems is limited by:

- methods of measurement and observation;
- the presence of stochastic variation largely resulting from methods of measurement and system analysis adopted;
- the manner in which systems knowledge is obtained and accumulated;
- the practical stages of systems analysis.

Besides natural processes are extremely complex and do not always lend themselves to providing even an approximate working knowledge of observed input/output relationships as a basis for the creation of system linkages. Since nearly all environmental parameters shift constantly at variable rates, magnitudes and frequencies, those changes need to be tracked in real time. This is made difficult, if not impossible, due to the large number of environmental unknowns including discontinuities and synergisms (Myers, 1995a). This hinders the establishing of systemic relationships between the ecosystem parameters.

Another impediment to the successful modelling of physico-ecological systems derives from their inherently uncertain nature. Uncertainty arises in terms of the magnitudes and the space/time (i.e. areal location) attributes of inputs, outputs and states of the system. All physico-ecological systems have areal extent and thus uncertainty resides in the spatial location of inputs and outputs. In the oceans, for example, plankton are found on the surface where there is light while nutrients are in the deeper, colder waters. This raises the problem of connectivity between inputs and outputs.

Besides the energy and mass transfers in most natural systems are complex and nonlinear. Nonlinearity implies that some or all of the mathematical parameters employed in the description of the system operation are not identical over all magnitudes and regimes of system operation - in other words, that they are free, within certain limits, to change their values in harmony with

changes in the system variables. As a consequence, nonlinear systems cannot be accurately described mathematically by linear algebraic or linear differential-equations. Thus, in most situations nonlinear systems will not satisfy the principle of superimposition (i.e. the addition or subtraction of subsystem outputs to produce a total system response), nor exhibit simple proportionality between the amplitudes of input and output. Also whereas linear systems possess single, unique steady states, nonlinear systems exhibit multiple steady states which makes their behaviour indeterminate and, to a degree, unpredictable.

Ecosystems are also dynamic systems which are continuously changing and evolving. This is due to internal interactions which lead to the emergence of higher forms of organisation as also the man-environment interface. In this connection the impact of human settlements which leads to demands for building materials and aggregates and impacts on water supply, air quality, noise levels and sanitation is especially significant. The ecosystem is thus not only complex and uncertain but also dynamic and one in which new forms of organisation are continuously evolving.

Socio-cultural system: decision-making perspective

Decision-making would be concerned with interfacing the 'natural' ecosystem with the 'human' socio-cultural system so as to achieve sustainability. Due to the dynamic nature of the natural system, decision-making itself has thus to be continuously changing its foci in line with changing environmental conditions.

It is generally believed that there exists potentially an area of great difficulty concerned with interfacing 'natural' systems, on the one hand, with 'human' systems on the other. The former are believed to be structured in a manner that causes them to be dominated by stable negative-feedback loops and by homeostatic considerations to do with energy flows, food chains and the like. They are also believed to be essentially more primitive and less flexible in their operations than socio-economic systems, much more vulnerable to change, and much more imbued with thresholds which, once passed, may not be retraced. On the other hand, socio-economic systems are held to be extremely flexible, largely due to their richness and complexity. They are believed to be potentially sensitive to unstable positive-feedback loops or, at least, to negative feedback loops which encourage explosive growth. The implication is that there is the possibility of protection against destruction due to the flexibility of their structure and by the feedback mechanisms operated by human control.

The basic entities of sociocultural systems are individual human beings. The hierarchical structure of society is formed by their interactions in primary groups, such as the nuclear family, and the incorporation of these groups in organizations progressively more complex and embracing political, legal, economic, and social spheres. Systems analysis has been applied to various social

subsystems. Such analysis is based on the supposition that human socio-cultural systems can be thought of as dynamic open systems, receiving information from their environment, processing the information through a complex structural network, and thereafter responding to the environment. In the feedback process pattern-maintaining and pattern-evolving trends become manifest. These serve to sustain given socio-cultural systems within their environment and permit them to map change within their internal structure.

The analysis of sociocultural systems is rendered difficult by the extremely complex behaviour of humans both individually and as groups. The result is that human beings tend to differ in their perceptions of the ecosystem.

In delineating the decision-making system one would thus necessarily have to take into account the varying perceptions of decision-maker(s). The word perception is used in this paper in the widest sense as encompassing the mental processes of interpretation or the mental processing of information received into a coherent picture that is internally consistent.

According to Litterer (1973), and as shown in figure 3, this would involve the following:

Selectivity: the identification of relevant information
Closure: the structuring of information into a meaningful whole
Interpretation: the judging of information in the light of past experience.
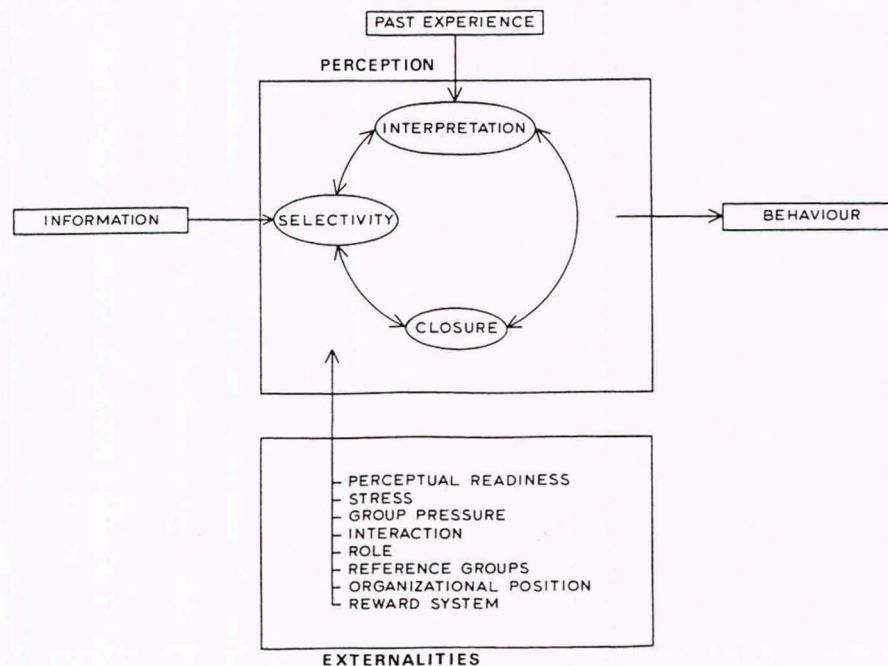

Fig. **3**   The operation of the perception system in translating information inputs into behaviour outputs, under the influence of past experience and externalities. (After Litterer 1973.)

It is clear from figure 3 that individual decision-makers would percieve the environmental conditions in different ways depending on their psychological make-up based on past experience and on external factors like group pressures and interaction, the social reward system etc. in deciding about what actions to take regarding ecosystem management.

In the context of the above it becomes necessary to analyse social group behaviour. Decisions impacting the ecosystem are not taken only by elite decision-makers in governments, corporations and international organisations but by millions of farmers, fisherfolk, urban dwellers, etc. What factors would influence their decisions and how the different levels are to be integrated in a comprehensive decision-making system thus assumes importance.

When one turns to group behaviour, the work of the behavioural school of social anthropology becomes relevant. This school rests on the premise that 'society is an articulated system which exists in its own right independently of the individuals who make it up' (Leach, 1973:38). This has led scholars to the concept of structuralism whereby language and culture are both viewed as mechanisms of communication between conscious humans. Social actions and cultural objects conceived in this manner represent structurally organised systems in time and place which convey meaning and which can only be understood as a whole, like for example, music.

There are three distinct ways in which culture can affect social behaviour and decision-making. Firstly, culture can be manipulated to harmonise with individual self-interest. Secondly, cultural patterns, which are peculiar to particular social systems, impact on perception and thereby on behaviour. And, thirdly, behaviour is most affected by the ultimate structural underpinning of culture by 'deep level' human universals like religion and spirituality (Bennett: 230-31). All these impact on the 'mind-sets' of individuals and the 'world views' of societies and cultures. Perceptions of the ecosystem would thus tend to be culturally determined with a bias towards individual and social self interest.

In evaluating and analysing the ecosystem the decision-making system would also have to take note of the uncertainty that pervades such systems. Such uncertainty arises not only from insufficient knowledge about the internal interactions and working of ecosystems but also from lack of forecasting ability regarding their path through time.

Decision-making in the context of sustainable management of the ecosystem would thus have to deal with the following:

- uncertainty regarding the behaviour of the ecosystem in time and in its interface with the human socio-economic system;
- the presence of decision-makers at different levels who have varying perceptions of the environment due to

              psycho-cultural differences;
-             the need to harmonise the differing cultural biases
              and world views when operating at the supra-national
              regional and international spheres.

The decision-making system has been conceived by Starik and Rands
(1995) as a multilevel, multisystem relationships web.   The
multilevel system is considered as an open system in which inputs
are converted into outputs by the system while managerial
strategies are mediated on by values and a feedback mechanism.
The schemata of the system is shown in figure 4 overleaf.

The relationships web illustrates the fact that an integrated
decision-making system has to incorporate the actions of decision
makers at five levels.   The system that the web represents
imports inputs from its external environment and converts them
into outputs (policies, legislation, actions of individuals
etc.).   The feedback mechanism assists the decision-makers to
fine tune outputs in the context of sustainability. The system
also implicitly accepts that an ecologically sustainable world
requires sustainable individuals, organisations, societies,
cultures, and political and economic systems. At the ecological
level, natural resources have to be utilised at sustainable
rates, waste has to be minimised and assimilable outputs
generated; at the political-economic level, pro-sustainability
policies and legislation have to be framed while the economy and
life styles have to be respectful of the environment; at the
social-cultural level sustainability values have to be advanced
and made socially and culturally relevant.

Besides since ordinary people are the real day-to-day
environmental decision-makers, political and economic systems
have to be based of the effective participation of all members
of society in the decision-making processes. Societal values are
what integrate the system while formulation of overall systemic
strategies leads to coordination of policies and actions.

What the relationships web does not make explicit are the
differing time horizons of the five levels.   Individuals,
especially the poor ones, worry about where the next meal is
coming from and thus have time horizons of only a few hours;
organisations think of the bottom-line if in the private sector
and of political imperatives if in the public, thus giving them
time horizons in terms of months; politicians are largely
concerned with reactive approaches to crisis situations and in
any case their time horizon does not extend beyond the next
election; the time horizon on the social-cultural level varies
from society to society but rarely approaches that required at
the ecological level which could range anywhere from between
three to five decades or even longer.

The decision-making system in addition to scanning the ecosystem
thus has also to take into account the multilevel multisystem
relationships web. According to Radford (1981:1) "the essence
of decision-making is in the formulation of alternative courses
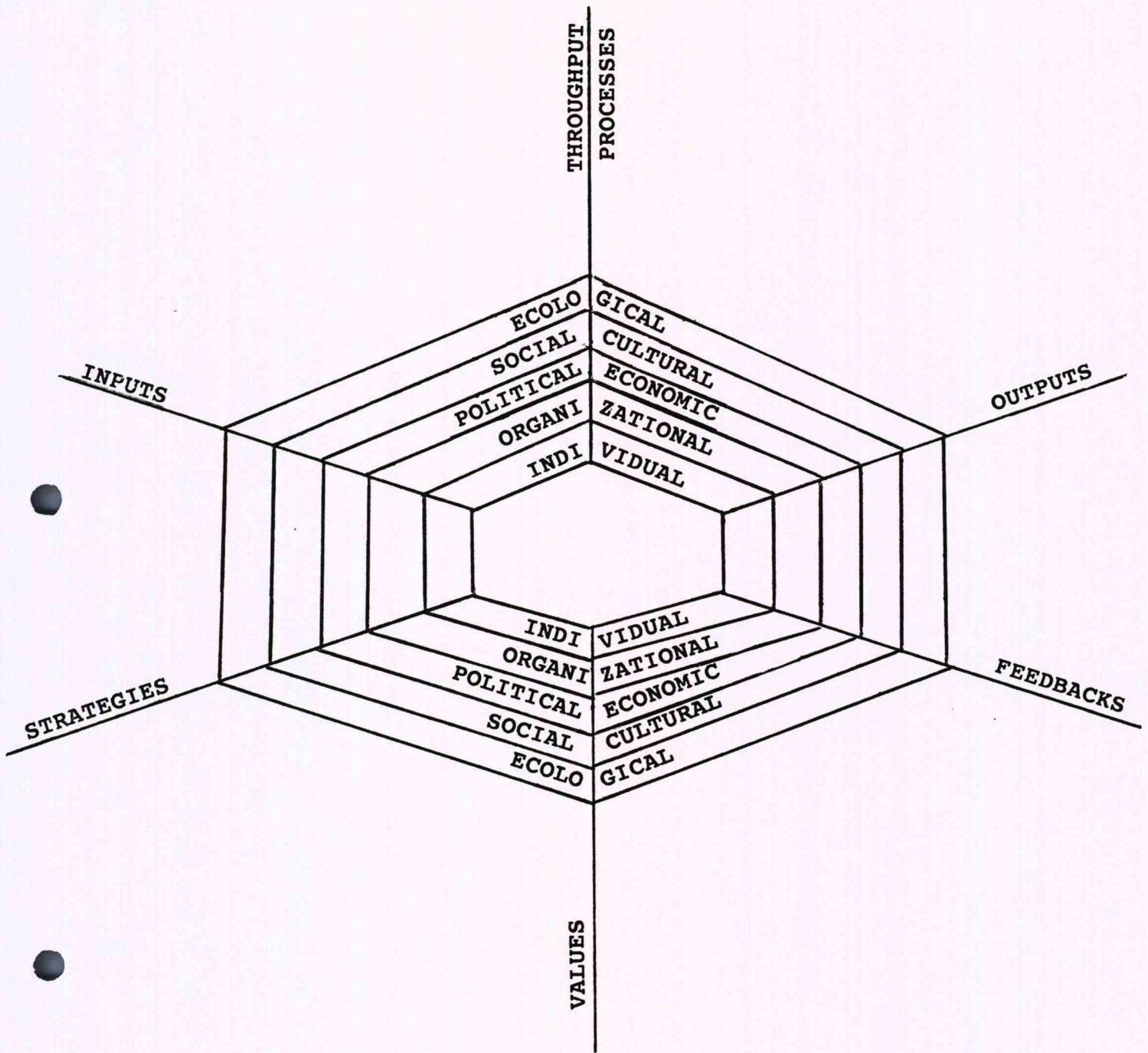of action to meet the situation under consideration and in the

THROUGHPUT PROCESSES

INPUTS

OUTPUTS

ECOLO GICAL
SOCIAL CULTURAL
POLITICAL ECONOMIC
ORGANI ZATIONAL
INDI VIDUAL

INDI VIDUAL
ORGANI ZATIONAL
POLITICAL ECONOMIC
SOCIAL CULTURAL
ECOLO GICAL

STRATEGIES

FEEDBACKS

VALUES

Fig.4   The Multilevel/Multisystem Relationship web (from Starik and Rands).

choice between these alternatives after an evaluation of their effectiveness in achieving the decision makers' objectives".

However, as Radford goes on to point out, in problems where there is uncertainty, multiple objectives and the presence of many decision-makers (as in the present case) the choice as between alternatives is not a simple one. It depends, for example, on the extent of coherence or consensus that can be achieved between the objectives of the various decision makers.

In the case of ecosystems, the decision-making system has also to take into account the future. One way to do this is through forecasting future scenarios. Since at different levels decision-makers have varying time horizons, the forecasting of future states applicable to all levels is difficult to achieve. In such cases backcasting has been suggested as a possible way out. In this methodology desirable future states are specified, alternative path ways elucidated, and thereafter the most eficient pathway selected. In this method the question of different time horizons of decision-makers would not arise though the achieving of a consensus among the various decision-makers would still be necessary.

In the achieving of a consensual view of the desirable future state it is sometimes suggested that traditional cultural and religious/spiritual views could provide the necessary context. Most religions have very positive views on the environment. UNEP (1994) has shown how major religions like Buddhism, Christianity, Islam and Judaism have views which are very much in tune with the concept of sustainable development.

A look at some other systems reveals a similar convergence. Zarathustra (3000 BC) for example has the following in his book Zend Avesta:

-   Do not pollute earth, air, and water;

-   Do not cut trees nor destroy green vegetation but transform waste lands and deserts into gardens;

-   Refrain from killing birds and animals. Treat them with love and affection and make use of them to improve the lot of mankind.

In the Indian scripture the Atharva Veda (contempraneous with Zend Avesta) the following is stated:

"What of Thee I dig out,
 Let that quickly grow over,
 Let me not hit thy vitals,
 Or thy heart."

If the Atharva Veda saying were to guide our relationship with the earth the loss of ecological integrity will be equivalent to hitting the vitals.

Religions and spiritual ideals form 'deep level' human universals which shape societal world views. Value-free "hard" science needs to be mediated upon by ethical values especially those at the very core of the human experience if sustainability is to be achieved.

There is however a point to be made here. The use of diverse cultural world views while helping to achieve consensus at the national/societal levels could make the achieving of a similar consensus at supranational (ie. regional and international) levels that much more difficult. However if we go to 'deep level' spiritual values rather than the relatively superficial societal/cultural ones, the problem is not likely to be that acute as the UNEP study shows.

Managerial implications

As already noted, the global system viewed on a planetary scale is shaped by the interactions between two large, complex systems:

- Social processes (characterized by human activities and organizations, institutions and behaviour);

- Environmental processes (characterized by ecosystems and geochemical, geophysical and biogenic processes).

In establishing such interactions, however, there are problems.

First is the linkage issue. Relating environmental variables and processes to social activities, national characteristics and international relations is no easy task. The social sciences, developed over the better part of two centuries, have been explicitly predicated on understanding social relationships and the philosophical, political, economic, anthropological and sociological manifestation of these relationships. Their links to nature have rarely been explored.

This practice of focusing exclusively on social interactions--abstracting humanity from nature and reinforcing this separation by focusing largely on social relations-impedes understanding of the effects of social action on the natural environment as well as the influence of ecological disturbances on social interactions.

Second is the behaviour problem. There is growing recognition that cross-border environmental effects could threaten both the man-made and natural environments. As the necessity for policy response worldwide is becoming increasingly salient, the conventional modes of policy deliberation are being put to the test. The inherited behaviour pattern of regarding individual states as sovereign actors in areas under their jurisdiction is inhibiting regional and international decision making processes.

Third is the institutional challenge in establishing the appropriate framework for cooperation at the global level. At

issue is whether global environmental issues can be reduced to issues of scale i.e., management requires application of only existing modes of international coordination to environmental processes of planetary proportions; or whether there is something generically different about matters pertaining to the global environment thereby necessitating adjustments in prevailing international approaches and institutional responses.

Besides the difficulty in interlinking the two, i.e., the social and environmental systems, there is the need for decision-makers to maintain a balance between the anthropocentric and ecocentric approaches to ecological management. What this means in practice is that both the ecological and socio-economic systems have to be continuously monitored to ensure that there is no catastrophic collapse in either. Also the concepts of irreplaceability, carrying capacity and resilience of the ecosystem requires the laying down of strict boundary limits within which the system has to be controlled.

The laying down of such boundaries would depend on the extent to which environmental scientists can establish the parameters relating to resilience, carrying capacity etc. At present the knowledge of such boundary limits is very limited.

Then there is the need to manage uncertainty. The uncertainties inherent in ecosystem change, in both cause and effect, are near overwhelming. The characteristic features of environmental alterations are shaped by five factors that together constitute crucial policy parameters, in the sense that the unknowns may well dominate the outcomes.

First, while the basic biogeochemical characterists are generally understood, there are major uncertainties about the feedback effects on both the physical and social processes.

Secondly, environmental as well as social processes operate at multiple, unequal and sometimes overlapping time horizons. Variability in time increments complicates assessments of the underlying processes. Fundamentally, the long lead times in both social and environmental processes--and the separation of "cause" and "consequences"--themselves amount to major sources of uncertainty.

Thirdly, there are a host of related uncertainties associated with inter-temporal effects, particularly the crucial intergenerational effects of environmental change, whereby future generations incur the environmental costs of the actions of past and present generations; this reflects the complexities associated with long lead times.

Fourthly, the irreversibilities. It may well be that some patterns of environmental alterations cannot be"undone," nor can the underlying sources be eliminated either wholly or in part--at least not within the frame of historical rather than geological time.

Finally, there is a major unevenness in the sources of environmental perturbations as well as in the consequences of emissions and in their effects worldwide. This raises crucial issues of international equity since actions in one country have impacts in others.

Decision-making theories have outlined many methods of handling uncertainty. But the orders of magnitude involved in ecosystem uncertainty are qualitatively and quantitatively different. A United Nations publication (UNEP 1994: 77) states as follows:

> The precise nature of environmental hazards and technological impacts especially are often uncertain, in part because of the recognition of many environmental problems and the development of various technologies. Environmental hazards and technological impacts are also uncertain because of the difficulty and expense of data collection. For phenomena for which the data, models or probabilities are questionable, experts reveal that uncertainties of six orders of magnitude are "not unusual" in environmental risk assessment, even in developed nations. Uncertainties of six orders of magnitude mean that typically we do not know, for example, whether an Indian's chance of dying in a Bhopal accident is 1 in 1 million per year or 1 in 1 per year.

The bridging of the data gap could to some extent reduce the uncertainties involved. But they would still be too large to be handled by conventional methods or the so called precautionary principle. Also until this data gap is bridged -- if ever -- every decision maker faces important ethical questions. How do we make environment-related decisions when we are ignorant of basic data and probabilities? How should we behave in a situation of uncertainty? Should we assume that a particular environmental condition is safe or acceptable until proven otherwise: Where should we place the burden of proof? Is it on polluters or on potential victims of polluters, on developers of the rainforest or on environmentalists who protest such development? Where we decide to place the burden or proof will determine who bears enormous risks and who receives great benefits. What is fair, equitable, and ethical in a situation of scientific uncertainty?

Another matter with which management would have to grapple is the issue of indeterminism and unpredictability flowing from the fact that ecosystems exhibit multiple steady states. While in the Newtonian scientific concept, equilibrium was the norm, Prigogine has made it clear that both equilibrium (in the short term) and the emergence of new order through dissipative structures is possible. This raises many difficulties in the interfacing of the natural environment with the man-made environment. One of the currently most intractable ones is that, scientists having imbued the ecosystem model with the Newtonian emphasis on balance, equilibrium, cycling and stability, analysts are increasingly faced with the methodological necessity of also accommodating active control involving the impelling of systems

on time trajectories through sequences of state, each different, probably non-recoverable and presumably ever more adapted to the evolving needs of man in society. The matter is made more complex by the dynamic nature of these longer-term social needs in relation to population totals and the evolving social goals. In short, analysts are being faced with the basic problem of modelling systems which are stable in the short term under negative feedback mechanisms, yet are capable of long-term changes under the positive feedback evolutionary mechanisms involved in economic and social tendencies. This is an issue that concerns both managerial interventions and monitoring systems.

Conclusion

As the analysis shows, the establishing of appropriate management systems capable of sustainably developing ecosystems is going to be no easy task. Till now most attention regarding ecosystem management has been directed at "hard" science and the delineating of thresholds and limits within which inputs and outputs of ecosystems need to be controlled. Not enough attention has been paid to the "soft" sciences dealing with the socio-cultural and decision-making systems.

Yet in the ultimate analysis lack of attention to these may prove to be the achilles heel in designing appropriate sustainable management systems. Disregard of cultural differences, and varying social perceptions around the globe, has already led to the so called North-South divide in analysing the issues arising out of sustainable development with the North stressing environmental integrity and the South development. There is also no adequate understanding of the need for diversity in the establishment of decision-making and management systems. The emphasis on centralised top down decision making has also led to emphasis on policy making, regulations etc. at the sovereign state level while in fact the solution of environmental problems requires local actions activated by common concerns and perceptions. This paper has considered some issues that arise in this regard but more research is obviously necessary.

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on time trajectories through sequences of state, each different, probably non-recoverable and presumably ever more adapted to the evolving needs of man in society. The matter is made more complex by the dynamic nature of these longer-term social needs in relation to population totals and the evolving social goals. In short, analysts are being faced with the basic problem of modelling systems which are stable in the short term under negative feedback mechanisms, yet are capable of long-term changes under the positive feedback evolutionary mechanisms involved in economic and social tendencies. This is an issue that concerns both managerial interventions and monitoring systems.

Managing the coastal system

The coastal zone--where land meets sea and where fresh and salt waters mix--contains many of the Earth's most complex, diverse and productive ecological systems. It functions as a protective buffer and filter between the land and the sea, and is increasingly valued for recreational and aesthetic purposes.

Coastal regions contain a high proportion of the world's most productive and biologically diverse ecosystems. They produce the bulk of the world's fish catch, support a major portion of the world's agriculture, industry, and tourism, and absorb most of the wastes. The pace of change--environmental, social, and institutional--is accelerating and therefore becoming more complex and challenging.

The Rio Conference, 1992 laid great stress on their management. The coastal system being an area whose problems could be addressed by systems analysis a large number of such analyses have been made. A representative example is an analysis made by Weide (1993). A look at this would be helpful.

Weide has schematised the coast as consisting of the following:

- the natural subsystem, which can be further broken down into its biotic and abiotic components;

- the socio-economic subsystem including the users of the coastal resources and the required physical and social infrastructure.

Weide's system can represent a specific coastal area may be extended to include the entire global system. In all cases, appropriate input scenarios are required to account for the interaction of the socio-economic system with the physical and social environment.

The real world is in the first instance schematically considered by him as being controlled by two dynamic sources of activity: the natural boundary conditions and socio-economic development plans. As the next schematising step, he distinguishes three major 'systems' in the world. The natural system encompasses all

relevant non-human domains (atmosphere, lithosphere, hydrosphere, of which the coastline is by definition the extremely dynamic meeting point) including their own dynamics and mutual interactions through the abiotic, biotic and chemical processes. He then includes human activity. The total complex of human activities is split up into two entities. The functions (or, more clearly, user functions) represent the entire set of human interests in terms of the 'use' (in the broadest sense) which is or may be made of the natural resources. Finally, the intended user functions require all kinds of technical and organisational infrastructure.

The three systems (natural system, user functions and infrastructure) interact in a physical way which is in principle susceptible to scientific analysis with all human activities being considered to take place in close interaction with the natural system. The system is described in Fig. 5 below:

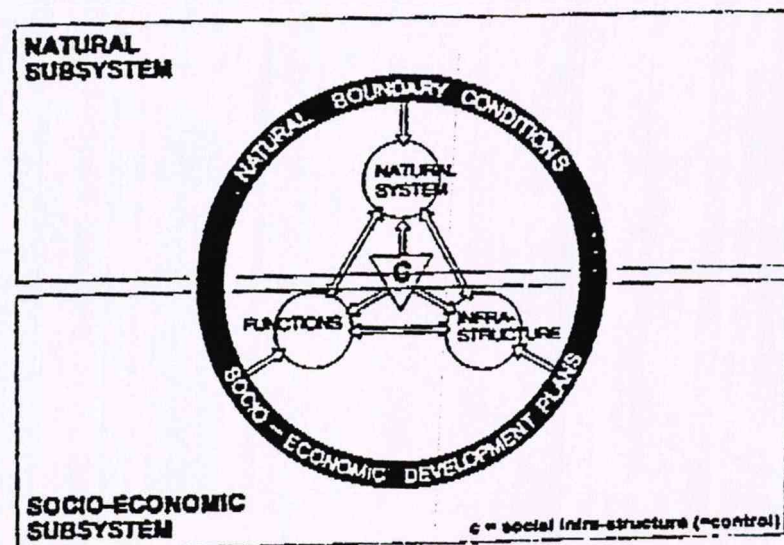*A systems view of integrated coastal management*

Fig. 5   A systems view of the coastal zone.

The global system diagram presented above can help to integrate various disciplines. The small centre triangle in between the three major systems represents the controlling or integrating role of management. Weide goes on to suggest the use of modern Geographic Information Systems (GIS) and data base techniques as an adjunct of the model and to be used to support the processing

activities. The above components can be integrated into an interactive Decision Support System as shown in Fig. 6 below. Such a system can be used for prediction purposes and for developing alternative scenarios.
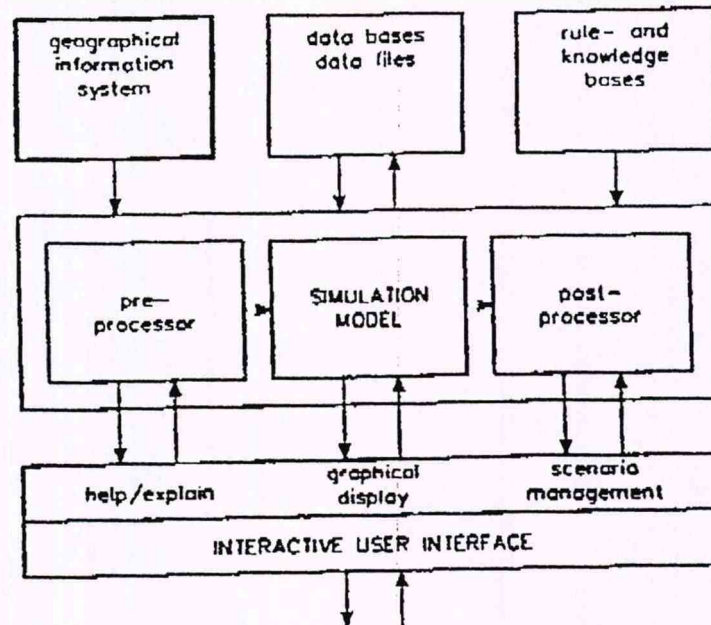

Fig. 6 An integrated frame work for interactive modelling.

Decision makers would also have to take note of the fact that the coastal area is affected by morphological changes governed by climatological and geological processes. On a global scale this has been systematised by a system description using three interrelated subsystems:

- the atmosphere and the governing climatologic processes such as wind, rainfall, etc.;

- the lithosphere and the governing geologic processes, such as regression, transgression of coasts and erosion of watersheds;

- the hydrosphere, acting as a coupling between the two previous subsystems, through the marine, littoral, estuarine and fluvial processes, acting in both the aquatic surface and the groundwater systems.

Both atmospheric inputs and geological processes have an impact on the coastal zone. So coastal zone is defined in a broad sense, and incorporates the land/sea interface and part of the adjacent marine and terrestrial areas.

In this context Weide has refined the system using elements and natural processes relevant to the coastal zone. This is represented in Fig. 7 below.
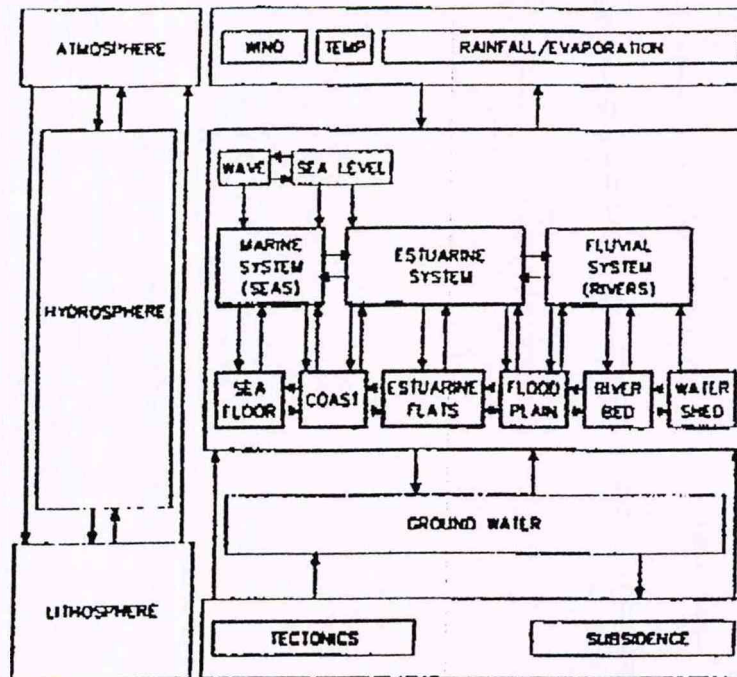

Fig. 7. Generalized system diagram of the coastal zone with aquatic subsystem and main interactions with atmosphere and lithosphere.

The left part represents the global description of the physical environment in terms of atmosphere, hydrosphere and lithosphere and their global interactions. This system description characterizes the coast in terms of the atmospheric and geological inputs and as the interface between atmosphere, hydrosphere and lithosphere.

A breakdown of the system is shown on the right side. The aquatic subsystem is broken down into its constituent elements, the marine, estuarine and fluvial systems and their interfaces with the atmosphere (waves, water levels) and the lithosphere (seafloor, coast, estuary and river beds). In the system the input-output relations have to be quantified to define the various interactions. Knowledge of the underlying physical processes is required for such a description.

Appropriate climatologic and tectonic scenarios can then be defined to be used as an input for the simulation of real world cases.

Weide suggests that the global and refined model, described

Conclusion

As the analysis of Weide's model shows, the establishing of appropriate management systems capable of sustainably developing ecosystems is going to be no easy task. Till now most attention regarding ecosystem management has been directed at "hard" science and the delineating of thresholds and limits within which inputs and outputs of ecosystems need to be controlled. Not enough attention has been paid to the "soft" sciences dealing with the socio-cultural and decision-making systems.

Yet in the ultimate analysis lack of attention to these matters may prove to be the achilles heel in designing appropriate sustainable management systems. Disregard of cultural differences, and varying social perceptions around the globe, has already led to the so called North-South divide in analysing the issues arising out of sustainable development with the North stressing environmental integrity and the South development. There is also no adequate understanding of the need for diversity in the establishment of decision-making and management systems. The emphasis on centralised top down decision making has also led to emphasis on policy making, regulations etc. at the sovereign state level while in fact the solution of environmental problems requires local actions activated by common concerns and perceptions. This paper has considered some issues that arise in this regard but more research is obviously necessary.

above, can be used as a first step in developing an integrated model for the coastal system, to support the system description shown in Fig. 5. Ideally, the model needs to be expanded to include the biological and chemical processes in the coastal waters and the intertidal zone. The next stage would be the development of a descriptive model of the activities in the coastal area, together with the supporting infrastructure. GIS would be the appropriate tool to support such a description. Potential conflicts between user functions and the natural system could then be identified by means of impact matrices and overlays. The severity of these conflicts can thereafter be assessed with the help of the above models.

An analysis of Weide's model reveals that the model deals only with the socio-economic subsystem thereby not considering cultural differences; it also does not consider synergisms (positive and negative); it implicitly considers that input-output relations of the ecosystem are knowable and that the unknowns are not of great significance; that modelling of nonlinear interactions would not be a problem; that the linking of the environmental variables to the social processes, national characteristics and international relations would not be difficult; and that predictability of future states of the ecosystem is possible. More importantly Weide's model implicity deals with one decision maker at the national level. The problems created by the plurality of decision-makers and various decision-making levels are thus not considered significant. Nor does it distinguish between modelling for short term stability and long term definition of the time-path to be followed by the ecosystem.

Also an important challenge is to respond adequately to the mounting pressures upon the coastal habitat by integrating societal responses to forces of change that are operating at three different scales of time. The first scale, the present, contains expressions of coastal change that commonly play out over one to ten years. This scale is dominated by immediate problems and opportunities posed by the development and conservation of coastal ecosystems. The second scale encompasses the population explosion that took off with the Industrial Revolution some 200 years ago and is expected to continue through to the next century. A third and much longer time scale spans cycles of climate and ecology that typically play out over millennia.

These scales and types of change are becoming increasingly intertwined. The power and the desire of society to transform coastal regions, combined with population growth, for example, is affecting global climate. It appears that we are at the edge of significant human-induced climate change that will alter our habitat not thousands of years from now but in the lifetimes of our children. Weide's model ignores the need to integrate responses to these three forms and scales of change.

DALHOUSIE UNIVERSITY ARCHIVES DIGITAL SEPARATION SHEET

Separation Date: June 17, 2015

Fonds Title: Elisabeth Mann Borgese
Fonds #: MS-2-744
Box-Folder Number: Box 323, Folder 15
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Sub-Series: Publications, drafts, and reports
File: Krishan Saigal: papers and reports

Description of items:

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Saigal, Krishan. "Politics, Science, Economics, and Sustainable Development of the Oceans."

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of cooperation as against the traditional geopolitics of Darwinist and destructive competition and to revert to the peace, stability and cooperative trade that existed in the pre-Vasco da Gama period. The year 1998 is the 500th anniversary of Vasco da Gama's entry into the Indian Ocean, ironically with the help of a pilot of Indian Ocean origin.[17] The 500th anniversary would be a good time to reject the imperialist paradigm and shift to a more co-operative and "Indian Ocean" generated system.

In this paradigm, the natural environment should be understood in the context of the cultural and religious environment. The processes which intervene destructively in the natural environment originate in the economic and the social system. If the destruction of nature is to be halted, the norms driving the economic and social forces of society must be changed to norms which derive from the ancient cultural traditions of the Indian Ocean countries. These traditions have emerged from the interplay between the meaning of life as the societies saw it, and the social and economic form of that life. Over a long period of history, systems of value and meaning have become very deeply rooted in the societal subconscious. There are differences between West and East in this regard. Modern science can form a bridge between the "spiritual" East and the "material" West. The integration of science with spirituality, of materialism with morality, are the necessary preconditions if the Indian Ocean is to be sustainably developed and managed.

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[17] Ibn Majid, the "Gujarati", piloted Vasco da Gama from the African coastal town of Malinidi to Calicut in India. He could also have been as Aarab. History of Traditional Navigation, eds. G.V. Rajamanickam and V. Subbarayulu (Thanjavur: Tamil University, 1988) pp. 141-48. "Pilot Ibn Majid".

FIRST INFORMATION REPORT
FROM
THE INDEPENDENT WORLD COMMISSION FOR THE OCEANS
TO
THE FIFTIETH GENERAL ASSEMBLY OF THE UNITED NATIONS

Distinguished Delegates:

As we stand today on the threshold of a new era in global affairs, it is awesome to think of the tremendous achievements of this great organisation in the last half century — a half century that has seen more turbulant changes than perhaps any other period in history.

Distinguished Delegates:

You have been chosen by destiny to represent the collective power of the world community and to shape the future so as to make life in the twenty-first century more democratic, more secure, and more sustainable.

Concepts of development, of sovereignty, of security, the environment, the global commons, have radically changed. We are learning to think in a systemic rather than sectoral way. These changes have institutional implications.

The political map of the world has radically changed.

Proposals will be coming for your consideration from all sides — governmental, intergovernmental, nongovernmental — for changes in the United Nations System, changes necessitated by the institutional gap that is yawning, between the real world of 1995 and the instruments of governance of 1945.

So what need is there for another set of proposals concerning the oceans?

As seen from Outer Space this is still the Blue Planet, Planet Ocean, with three quarters of its surface covered by life-giving waters. The world ocean is in this perspective seen as uniting and not dividing continents and people. This makes the oceans:

- **Our common concern and responsibility:** for life on earth emerged from the oceans and even today largely depends on the health of the oceans;

- **Our common heritage:** for the world ocean is a global commons and the repository of new wealth, in food and fibre, medicines, minerals and energy.

The oceans also force us to behave differently, to think differently from the way we have been behaving and thinking on land for the last several thousand years.

This is perhaps the fundamental reason why the United Nations Convention on the Law of the Sea has been hailed as the greatest achievement of the international community since the

establishment of the United Nations; why it has the potential of initiating a genuinely new order at the global, the regional, the national and the subnational level. The developments flowing from this Convention have converged with those generated by the United Nations Conference on Environment and Development of 1992: like two rivers merging into one mighty stream, they have already started to transform the United Nations system; they are the vanguards of the emerging new international order based on the concepts of equity, interdependence, the Common Heritage of Mankind and sustainability.

Distinguished Delegates to the Fiftieth General Assembly of the United Nations:

The Independent World Commission for the Oceans has been established to study ocean matters in this broader context and to explore their potential contributions to peace, to common and comprehensive security, to sustainable development, to the implementation of the respective Agendas and Action Plans of the United Nations system, and to the restructuring of the United Nations. Under the Chairmanship of President Mario Soares of Portugal and guidance of an Executive Committee of 5 Vice Chairmen from all parts of the world, the Commission has embarked on the following tasks:

- to focus world attention on the importance of sustainable ocean development and the law of the sea;

- to monitor the ratification and implementation of the Law of the Sea Convention, and the progressive development of the Law of the Sea, at national, regional, and global levels;

- to examine whether States, especially developing countries, are able to fulfil their duties, enjoy their rights and generate their benefits under the Convention, to analyze the difficulties they might encounter, and to propose ways and means to overcome them;

- to assess the implementation of Chapter 17 of Agenda 21, at national, regional, and global levels and to observe the function of the Convention in this process (legal framework; peaceful settlement of disputes; enforcement);

- to follow the development of regional programmes of cooperation and development in the marine sector and examine how they adjust to the new requirements of integrated ocean management and sustainable development;

- to examine the role of the Law of the Sea and ocean development in the process of restructuring the United Nations system as a whole for the 21st century and elaborate proposals to strengthen this role.

In the fulfilment of its tasks, the Commission will closely cooperate with the United Nations, with IOC/UNESCO, and other agencies and programmes of the U.N. system competent in ocean affairs, as well as other intergovernmental and nongovernmental organisations, at the national, regional, and global level.

The Commission has initiated global and regional hearings on ocean affairs.

The Commission will submit a detailed Report on its work to the United Nations Commission for Sustainable Development in 1996; the final report will be completed in 1997 and officially launched in 1998, the year designated by the General Assembly as the Year of the Oceans.

Distinguished Delegates to the Fiftieth General Assembly of the United Nations:

The new order emerging for the seas and oceans may, in many ways, be a model for, and must be part of, world order for the 21st century, of a fairer, more equitable, more secure, more sustainable future.

The crisis through which we are passing has shaken humankind to the core and is causing tremendous suffering.

The disintegrative forces are powerful.   But so are the integrative forces. Analysing them, utilizing them, building on what they have already achieved, trying to contribute to a vision of the future, the Commission hopes to contribute, however little it may be, to the ending of the crisis, to a reduction of the suffering, to the growth of a happy and prosperous world based on justice, equity and sustainability.

Networking Systems: the experience of the International Ocean Institute (1993-95)

Introduction

The International Ocean Institute (IOI) is an international NGO devoting itself to helping developing countries sustainably manage their ocean and coastal resources. Through its research, training, publications and conferences it has impacted on decision-making structures, protection of the oceans, environmentally safe technology transfer and capacity building in developing countries.

A background note on the work of IOI during 1967-92, and from which its present activities flow, is at Annex 1.

By 1992, and post-UNCED, the need was felt to extend IOI's outreach both geographically and through languages other than English since the world had become much more complex and new concepts like sustainable development, global governance, coastal zone management, biodiversity, climate change, depletion of the ozone layer etc. were emerging, and they all had very critical linkages with the oceans.

Also although IOI's structure had stood the test of time for 25 years, changes were necessary if it was to meet the requirements of the 1990s and beyond.

So in 1992 IOI moved the Global Environment Facility (UNDP/GEF) for US$ 2.6 million to enable it to consolidate its far-flung operations and to enable it to develop into a networking "system" rather than an "institute". IOI was convinced that this was a necessary response to the needs and challenges of the 1990s: a far-flung system held together by a common philosophy, a common aspiration and a common approach.

To make the system cost-effective IOI decided not to set up greenfield institutions but to enter into memoranda of understanding with existing institutional set-ups so that the host institution and IOI could jointly act as delivery systems for training personnel, conducting region-wise research and holding conferences. It was in this manner that seven regional centres –in Costa Rica, China, Fiji, India, Japan, Senegal and South Africa – have been established in addition to the existing ones in Canada and Malta.

The networking system

When IOI decided to extend its activities from its two centres to seven new centres in Latin America, Africa, Indian Ocean and Oceania, it gave anxious thought to the management system it should adopt. This became even more urgent with the demand by other areas to set up IOI Centres in their regions. On the one hand the globalisation of IOI had its plus side by giving it an extended outreach. The flip side, of course, was the need to manage world-wide operations in a cost-effective manner and without losing creativity or bureaucratising IOI.

Administratively, both financial considerations and post-modern organisation theory pointed to a decentralised system held together by an information flow network and a light coordinating headquarters. The traditional organisational design of a pyramidical structure with the headquarters "managing and controlling" the "lower echelons" would obviously not only lead to large overheads and stifle creativity but would also be out of step with the post-modern age which favours horizontal and flexible structures.

There were, however, some pitfalls to be avoided in such a design. One was to prevent the identity of IOI from being merged into that of the collaborating institutes. Another was to see that all the programmes, research etc., have the distinct multi-disciplinary and practical policy-oriented approach of IOI with quality not being diluted. Also the accounts and finances had to be maintained in a manner that allowed the presentation of consolidated audited accounts of IOI. It was also necessary to keep administrative and overhead expenses low so that IOI did not price itself out of the market.

Keeping all the above factors in mind, it was decided to:

- decentralise the management system to autonomous operational centres which would be joint ventures between IOI and a collaborating institution (university, research centre);

- provide coordination to the system by having representatives of the Centres meet with headquarters once or twice a year to:

  - establish IOI's policy;
  - jointly scrutinise the IOI work plan;
  - jointly decide on courses to be developed and research to be undertaken;

- maintain contact through E-mail as a supplement to the annual/bi-annual meeting of Centres.

Another key element in IOIs strategy post-UNCED was to reinforce existing institutional capabilities through providing active networks for ocean affairs. To this end MOUs were signed with the United Nations University, Tokyo, IOC/UNESCO, Paris, the University of Rhode Island and the International Centre for Public Enterprises, Ljubljana. MOUs were signed with two NGOs, the MS Swaminathan Foundation and the Muruguppa Chettiar Research Centre for collaboration in coastal biodiversity and the development of projects for eradication of poverty in the coastal zone.

The IOI Centres also joined the Train-Seacoast network of the United Nations which, in addition to the IOI Centres in Costa Rica, Senegal, India and Fiji include the Fundacao Universidade de Rio Grande in Brazil, the University of Wales, the Prince of Songkla University, Thailand, ICLARM, Philippines and University

of Delaware, USA.

Contacts were also established with UNECA, UNESCAP, the East
Asian Seas Programme, SPREP, South Pacific Forum, West African
Regional Seas Programme, MAP, UNEP OCA/PAC and others with the
intention of integrating IOIs research and training with their
programmes.

Management system

IOI had to apply its mind to question of devising a management
system which would serve the twin objectives of having a
decentralised networking system while at the same time retaining
the objectives and "philosophy" of IOI. If IOI had been a pure
information network, it could have been totally horizontal. But
since headquarters had the major responsibilities for raising
funds and for reporting regarding their utilisation to the
donors. Besides it was the Governing Board of IOI which, under
the statutes, was responsible for determining policy regarding
the activities, organisation and financial administration.

It was within the above parameters that the Management system of
IOI had to be established. In this context it was decided that
the system had to have the following main characteristics.

The policy of IOI had statutorily to be enunciated by the
Governing Board. But there needed to be active interaction
between the representatives of the Centres and the Board is
harmonious functioning was to result. This could be done by
having representatives of the Centres on the Planning Council,
which is the body advising the Board on all matters. This would
involve the Centres in the decision-making system of IOI.

The strategic plan of IOI should be drawn up at the meeting of
representatives of the Centres and then submitted to the Board.
This plan could, inter alia, examine the interaction of IOI's
plan with other areas of co-operative endeavour which the Centres
might be engaged in e.g. the Train-Seacoast network. The
strategic plan would also help to harmonise the objectives of the
co-operating institutions with those of IOI. Since the co-
operating institutions were involved in other networks besides
the IOI network, IOIs strategic plan would help in harmonising
all of their activities.

The Centres needed to collect information from their regions and
circulate it within the IOI network. Quarterly action reports
of all Centres should also be circulated within the network.
This would not only make everyone aware of what was happening
throughout the network but make for co-ordinated and synergistic
functioning.

The system of accounts and reporting within the network needed
to be standardised so as to make for comparability. This would
also enable headquarters to monitor activities thereby enabling
it to fulfil its obligation to the donors and others.

Impact of the system

The result of the restructuring of IOI has been that the training programmes are now evolving close to where the needs are, region-specific research is being carried out and a dialogue with decision makers in the region is being initiated on a continuous basis.

Also, the existing training programmes of IOI have been updated and new ones developed especially for ecosystem management, environmental economics, small islands, planners, project managers, decision makers, alumni, and trainers. The courses have also been brought in line with the latest developments in instruction technologies and made replicable and transferable through stressing quality of material and linkages with Agenda 21. Besides courses in French and Spanish are being conducted by the Senegal and Costa Rica centres thus making the delivery of courses multi-lingual.

Conclusions

The system has been in operation for a little over three years, a time too short to evaluate it. But some things have already become evident:

(i) in the decentralised system the Centres have tended to be more creative and committed;

(ii) different cultures and styles of functioning are being integrated into IOIs research and training;

(iii) the "experts" base is being widened as more and more people are being utilised both for lecturing in IOI courses and in preparing course material;

(iv) synergy has been created by utilising the strengths of different institutions.

The main lessons learnt by IOI during 1995-96 are:

—   international NGOs need to act through local institutions, and in cooperation with regional systems e.g. the Regional Seas Programme, in a decentralised manner;

—   the sensitisation of decision makers regarding the interlinkages of oceans with climate, the productivity and biodiversity of fragile oceanic ecosystems, the importance of the oceans for sequestering carbon dioxide, and their availability as a resource for food, energy, minerals and fibre leads to rising demands for training programmes regarding capacity building including institutional change, science and technology, environmental economics;

- international and regional training programmes are important for linking global issues with national policies and programmes;

- also such programmes:

    - create a framework for national training programmes;

    - assist in the formulation of national policies, programmes and projects;

    - help regional cooperative endeavours through the development of region-wide networks of professionals and decision makers;

    - increase outreach if conducted in more languages;

- ground-level coordination between regional and national agencies, NGOs and institutions is poor; however coordination can be improved by networking and through training programmes which stress the enormous value added through integrating sectors, disciplines, departments and national programmes;

- a decentralised networking system is the best way of having regional coordination and cooperation as it overcomes inhibiting national considerations;

- in high tech (including environmentally safe technologies) South-South cooperation is needed to supplement North-South cooperation;

- "technology transfer" has to be increasingly replaced by human resources development and institutional restructuring due to the changing nature of "technology" which is knowledge- and information-based besides being soft-ware oriented.

Activities of IOI 1967-92

Background up to 1992

The International Ocean Institute (IOI), in preparation and active since 1967, is one of a handful of international NGOs devoting itself exclusively to the oceans. Its almost three decades of work in the oceanic field could serve as a useful case-study and provide some implementation lessons in the fields of capacity building including human skills development, decision making for sustainable development, acquisition, development and transfer of technology, and the promotion of new institutional structures at national, regional and international levels.

The work of the IOI is organised in four major, mutually interdependent, components: training programmes, research, conferences and seminars and publications.

Training

In the period up to 1992 over 40 training programmes were conducted by IOI and about 700 persons from over 100 developing countries trained. Many of the persons trained by IOI were from universities and other training institutions in the developing world thus having a multiplier effect.

The purpose of the training programme was to deepen the understanding of the ever-increasing importance of the oceans and their resources in world politics and sustainable development.

Research

The IOI conducted a long series of research projects, starting with a project on the pollution of the Mediterranean (1971), on Environment and Development in the Mediterranean (1972), and continuing with a variety of policy subjects ranging from the question of the reservation of the oceans for peaceful purposes to the possibilities of establishing an ocean development tax; from the potential of ocean mining to the institutional implications of sustainable development in the marine sector.

IOI has been also seminal in advancing the establishment of regional centres for R&D in marine industrial technology, a concept that has been endorsed by UNIDO and UNEP. In this connection IOI in association with UNIDO prepared a study on the setting up of Regional Research Institutes for marine industrial technology for the Mediterranean and Caribbean regions in 1988 and 1990.

Conferences and seminars

IOI's Annual Conference is called **Pacem in Maribus**, which means "Peace in the Oceans." It is a paraphrase of Pope John XXIII's famous Encyclical **Pacem in Terris**, "Peace on Earth." Peace in

the oceans, peaceful settlement of disputes, and the advancement of·the peaceful uses of the oceans, indeed constitute the primary mission of the IOI, since without peace there can be neither economic development nor conservation of the environment.

The Pacem in Maribus Conferences have been conducted in all parts of the world -- North, South, East and West. They have explored many global and regional issues as they arose, e.g., EEZ management; Technology Development and Transfer, Monitoring and Surveillance; Ports and Harbours as Nodal Points in a Global System; the Economic Potential of the Oceans; Naval Disarmament. The 19th Conference, which was held in Lisbon in 1991, provided much of the material which went into the UNCED process, in particular into Chapter 17 of Agenda 21, which deals with the seas and oceans.

IOI also conducted a number of seminars during UNCLOS III to sensitise decision makers in the issues involved.

Publications

IOI's major publication is the **Ocean Yearbook**, published by the University of Chicago Press. Eleven volumes of 600 pages each have appeared to date. Proceedings of various conferences have been published by the University of Malta Press, Pergamon Press, and the United Nations University Press. These include **The Common Heritage** by Arvid Pardo, edited by Elisabeth Mann Borgese (1974, about to be re-issued) and **The Law of the Sea and the New International Economic Order (1976)**, by Arvid Pardo and Elisabeth Mann Borgese, on a research grant by the Ministry for Development Cooperation of the Netherlands. A series of 5 monographs was published by IOI and UNEP, starting with a booklet **The Oceans, The Convention and You**, followed by 4 booklets analysing the impact of the Law of the Sea Convention on regional development in the Mediterranean, the Caribbean, the South Pacific, and the Indian Ocean. A quarterly newsletter **Across the Oceans** is also being circulated to IOI alumni and others. The proceedings of **Pacem in Maribus** conferences have also been published.

Linkages with U.N.

IOI had observer status at UNCED 1992, at UNCLOS III, and now has observer status at the International Sea-bed Authority, and has contributed a number of working papers to these bodies. IOI also has consultative status with UNESCO, an MOU with UNESCO's Intergovernmental Oceanographic Commission (IOC), consultative status with the International Maritime Organisation (IMO), and an MOU with the United Nations University.

Impacts of IOIs activities

The impact of IOIs activities can be felt in the areas of capacity building, technology transfer and management, human

skills development, more informed decision making and in promoting North-South and South-South cooperation.

Capacity-building encompasses human, scientific, technological, organisational, institutional and resource capabilities. A fundamental goal of capacity-building is the enhancement of the ability to evaluate and address the crucial choices and modes of implementation among development options. IOI's training programme, addressed as it was to mid-level civil servants and professionals, created by 1992 over 700 persons occupying fairly high positions who were aware of the interlinked nature of oceanic ecosystems and the necessary managerial mechanisms. The global network of individuals spread over 100 developing countries facilitated regional cooperation.

Nearly 200 of IOIs alumni came from island developing states thus greatly adding to their capacity. The marine affairs programme of the University of South Pacific was a direct outcome of IOIs programmes held in the region in 1983 and 1985.

The Pacem in Maribus Conferences, which included experts from North, South, East and West helped in creating resonance between the attitudes of the developed and the developing countries thereby contributing ideas to international negotiations in many crucial areas including technology issues, naval disarmament, the UNCED process and biodiversity.

Besides manpower development, IOIs training programme impacted on integrated management processes, enhanced the capacity of decision makers to use scientific information, led to some universities and training institutions accepting cross-disciplinary studies as a necessary part of their academic curricula, and had a multiplier effect through its training of trainers element. This made for more informed decision making at national, regional and global levels.

The IOI was one of the first to promote the idea of joint technology development as a way of overcoming the North-South divide. This led, in association with UNIDO, to the development of the idea of Regional Centres for Marine Industrial Technology.

Lessons of the 1967-92 period

During these 25 years IOI functioned from 2 centres, one in Halifax, Canada and the other in Malta and the courses were largely conducted in English. During that period the demand for IOI's programmes was rising.

There was, thus, need to extend IOI's outreach both geographically and through languages other than English.

By 1992 the world had become much more complex, new concepts like sustainable development and problems of global governance, coastal zone management, biodiversity, climate change, depletion of the ozone layer etc. were emerging. All of them had very

critical linkages with the oceans.

The experience of IOI showed that creating a critical mass at middle levels of the hierarchy though necessary was not sufficient to impact on policies. Top decision makers unaware of the long-term implications and linkages involved in the recurring crises, had to be made aware of the need for an inter-disciplinary approach, both in Government and in training and education, and to the importance of the oceans, ocean management and the new, emerging oceanic order. They had to be sensitised to all the above if policies and programmes were to be geared to the emerging realities.

There was also need to pursue the ideal of joint technology development as a way of bridging the North-South gap in high technology as well as to lead to increased security since most high technology had military implications.

Although IOI's structure had stood the test of time for 25 years, changes were necessary if it was to meet the requirements of the 1990s and beyond.

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into consideration all the characteristics and processes that
typify and change the coastal zone have any chance of securing
a sustainable future. This is shown in the diagram below.
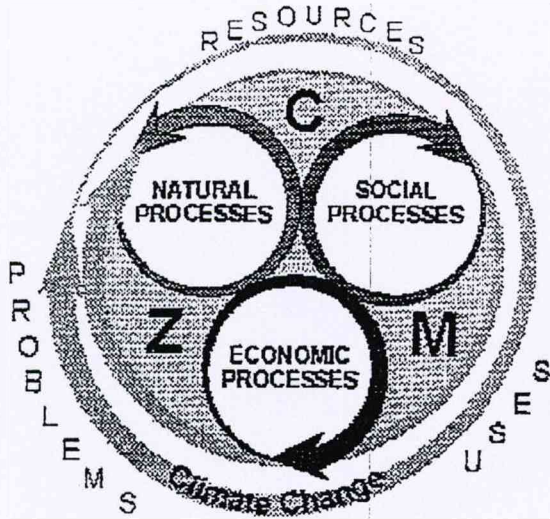
------- Forwarded Message Follows -------
From: ioimla@kemmunet.net.mt
Date: Wed, 11 Sep 1996 08:26:50 -0300
Subject: Document re Gandhi
To: ioihfx@dal.ca

To: Prof. Elisabeth Mann Borgese
      IOI Halifax
      Canada

Date: 11 september, 1996

My dear Elisabeth,

Attached is a document re Gandhian Economics, the Environment and Sustainable
Development as promised. Retrieve through WP5.1.

I hope you enjoy reading it!!

Love

Krishan
IOI-Malta.

Gandhian Economics, the Environment and

Sustainable Development

by

Krishan Saigal, Executive Director

International Ocean Institute, Malta

Gandhian Economics, the Environment and Sustainable Development

Abstract

The paper examines the concept of sustainable development, including economics and the environment, and the relevance of Gandhi's views in this regard. Gandhi lived at a time when the environmental crisis had not become a matter of concern nor had sustainable development become a buzz word. But with his farsightedness Gandhi foresaw that only a nonviolent and nonexploitative pattern of development could lead to sustainability and peace.

Introduction

Environment

The environment, from which human beings draw their sustenance, has been of interest to societies from time immemorial. Primitive man regarded nature with awe. Agriculture societies regarded nature as something to be harmonised with. The rise of the modern industrial system broke the harmonious link between man and nature. The idea of 'mastering' nature took hold of humanity. It is only with the recent widespread perception of imbalances caused by industrialisation, greenhouse gas emissions and the complex set of inter-relationships leading to global warming, climate change and consequent threat to human survival that the whole concept of humanity's relationship with nature is being reexamined.

Until recently, as the World Commission on Environment and Development (WCED) states the earth "was a large world in which human activities and their effects were neatly compartmentalised within nations, within sectors (energy, agriculture, trade), and within broad areas of concern (environmental, economic, social). These compartments have begun to dissolve...(and) various global 'crisis'...have seized public concern, particularly over the last decade[1]". The WCED goes on to say:

* the planet is passing through a period of dramatic growth and fundamental change;
* the present population of 5 billion could stabilise at between 8 and 14 billion sometime next century;
* economic activity has multiplied to create a $13 trillion world economy which could grow five- or ten fold in the coming half century;
* industrial production has grown more than fiftyfold over the past 100 years;
* all these have profound impacts on the biosphere as investments take place in houses, transport, farms and industries and raw material is pulled from the forest, soils, seas and waterways.

The above developments have locked the global economy and global ecology together in new ways. Whereas in the past the concern has been about the impacts of economic growth upon the environment, we are now forced to concern ourselves with the impacts of ecological stress--degradation of soils, water regimes, atmosphere, and forests--upon the economic prospects. Besides the sharp increase in economic interdependence among nations in the recent past is giving way to an accelerating ecological interdependence with ecology and economy becoming ever more interwoven--locally, regionally, nationally and globally--into a seamless net of causes and effects.

This increased interdependence means that environmental issues are likely to dominate the thinking of statesmen, scientists, ecologists and diplomats in the coming decades. The main environmental policy issues expected to grow in scale and importance, both nationally and internationally, in the next 20-40 years are going to be:

- environmental problems that significantly and sometimes irreversibly affect vital functions of human societal systems including their spatial integrity, identity and governance capability;

- the need to deal with environmental threats (i.e. threats to quantity, quality and diversity of environmental wealth) and the mitigation of environmental vulnerability through:

  * conservation of the endangered environment;
  * change-over to an efficient economic mechanism that addresses human needs in the context of sustainable environmental management and international parity;
  * management of environment-related tensions, conflicts and violence;
  * development of environmental-security related institutions, economics, legislation, rights and values.

The issues arising from the above list of environmental problems requires concerted and coordinated action if violence is not to result. The response at present is to codify/elaborate international environmental law on a consensual basis. But no law or consensus can be sustainable unless there is also the transformation of society and the modification of collective behaviour on a global basis. This is especially so because the perceptions of the developing and developed worlds are at odds as to what is the cause/solution of the present environmental crisis. While to the developed nations control of population, scientific analysis and the prevention of the destruction of fragile ecosystems like tropical forests, mangroves and coral reefs is the answer to the ecological crisis, for the developing world it is the problems caused by the affluent life styles of the developed nations, deteriorating terms of trade, the consequent intolerable debt burden and lack of development that need to be addressed.

Basic values

The North-South confrontation, if so it can be called, could only lead to heightened tensions if basic attitudes are not altered so as to lead to nonzero sum solutions. Basic attitudes are patterns of values with which people have emotionally identified themselves, as is shown by the images and metaphors that a culture or society identifies itself with. And basic attitudes imply certain world views which get expressed in the perceived relationship of humans with nature, the concept of a good life etc. A basic attitude, when collectively adopted, prefigures a social paradigm. Based on underlying motives, basic attitudes often remain concealed, and shift very slowly whether at the individual or the collective societal level.

The whole complex of preconscious and conscious societal forces, or ethics and values, is a very intricate phenomena and incapable of being expressed by any simple equation of social dynamics. But global society, including its intricate and multiple structures and value systems, has to move in a particular direction if the issues posed by the environment are to be resolved. This requires a re- explication of attitudes towards nature and the environment.

This is no easy task. There is on the one hand the dominant economic-scientific-technological value system, largely Western in its orientation, but having its resonance in the non-Western world also. In the West a mixture of groups and movements -- environmentalists, ecofeminists, New Age followers and others--are acting as pioneers in an attempt to transform the dominant economic-technological paradigm into an ecologically led one. These movements have their echo in the developing parts of the world where groups and individuals are delving into ancient traditions and practices in order to harmonise developments-- social, economic, technological-- with the requirements of environmental integrity.

Sustainable Development

The concept of sustainable development has gained wide acceptance after it was articulated by the WCED in 1987. In that report WCED defined sustainable development as the ability,

> to ensure that it meets the needs of the present without compromising the ability of future generations to meet their needs[2].

The Chairman of WCED, Gro Brundtland, elaborated on the concept in her Sir Peter Scott lecture in Bristol on 8 October, 1986,

> There are many dimensions to sustainability. First it requires the elimination of poverty and deprivation. Second it requires the conservation and enhancement of the resource base which alone can ensure that the elimination of poverty is permanent. Third, it requires a broadening of the concept of development so that it covers not only economic growth but also social and cultural development. Fourth, and most important, it requires the unification of economics and ecology in decision making at all levels[3].

The concept of sustainable development found global acceptance at the 1992 United Nations Conference on Environment and Development (UNCED). The concept as elaborated by UNCED represents a new paradigm, a new mode of thinking that serves as a guide to action. Achieving sustainable development involves a continuous process of decision-making in which certain questions are asked and appropriate choices and decisions made. Thus there is never an 'end-state' of sustainable development but a process that continuously tries to harmonise the needs of development with those of maintaining the integrity of the environment.

Sustainable development is,

> a process of change in which the exploitation of resources, the direction of investments, the orientation of technological development, and institutional change are made consistent with future as well as present needs[4].

Two ideas are underlined in this definition: (1) the concept of 'needs', especially those of the Third World, and (2) the idea of 'limitations' on the environment's ability to meet present and future needs. Sustainable development requires that 'societies meet human needs both by increasing productive potential and by insuring equitable potential and opportunities for all'[5].

Sustainable development can thus be seen as a continuous process of decision-making guided by a basic philosophy which emphasizes development to improve the quality of life for people (assuring equity in the distribution of benefits flowing from development) and development that is environmentally appropriate, making proper use (and sometimes non-use) of natural resources and protecting essential ecological processes, life support systems, and biological diversity. A necessary element of sustainable development is an integrated decision-making or policy process. Other elements that enhance the likelihood of sustainable development, as suggested by the World Commission on Environment and Development, include a political system that secures effective citizen participation in decision making; an economic system that is able to generate surpluses and technical knowledge on a self-reliant and sustained basis; a social system that provides for solutions for the tensions arising from disharmonious development; a production system that respects the obligation to preserve the ecological base for development; a technological system that fosters sustainable patterns of trade and finance; and an administrative system that is flexible and has the capacity for self-correction[6].

Technology

In the highly technological culture of today, many, both in the North and South, consider a strong role for technology a sine qua non for tackling the environmental crisis. However technology cannot be considered in isolation from society and culture. The links of technology with society and culture are multi-dimensional. Recent developments in socio-cultural sciences and in philosophy indicate that modern technology can be regarded as a social construct. It expresses the aspirations, desires and needs of influential social groups. This vision stresses the importance of the mental and cultural conditions that prepare the way for technological developments.

Given these new insights, it is not surprising that historians now agree about the inadequacy of the traditional explanation regarding the emergence of the Industrial Revolution and modern industrial society. Today, it seems to be generally accepted that the newly acquired technical knowledge and the inventions of particularly the late 18th and the 19th century followed logically from the changes that man and society had been undergoing for a long time. To put it simply, typical modern phenomena such as the new sense of time, the disciplining of western man and the mechanization of his world view were the prelude to all the technical developments rather than the result of them. They were the fertile soil in which technology could flourish.

Economics: Western

The scientific world view has changed from the Newtonian-Cartesian view to a Einsteinian-Heisenbergian one. Today it is being increasingly recognized that ideas based on the world-views of Descartes and Newton are incapable of explaining the present-day reality. The real world is neither linear nor mechanistic; instead it has all sorts of relativities. In physics, the idea that space and time can be separated is no longer acceptable. Relativity introduces many contradictions and ambiguities into concepts and arguments that, considered from the Newtonian logic, appear perfectly consistent. The Einsteinian Revolution, together with the new Quantum Physics, is slowly but surely making a large number of ideas, held sacrosanct for centuries, increasingly obsolete and irrelevant. Such a revolution in our world-view is not confined to physics only. We see it being diffused to other disciplines and thought-processes as well.

But in economics it is the Newtonian-Cartesian reductionist and mechanistic view that has influenced the discipline. Towards the end of the 19th century, Jevons and Marshall abandoned the term 'political economy' in favour of 'economics'. The former's motivation was that economics sounded much more like "mathematics, ethics, aesthetics[7]". The latter's was that political economy seemed to soil the science with the world of politics and the interests of political parties[8]. Economics, on the contrary, seemed to connote "a science pure and applied, rather than a science and an art[9]".

In recent decades, however, a new look is being given to the pure science of economics. For example Bell and Kristol published in 1981 a group of essays under the heading Crisis in Economic Theory which called for a shift to a more holistic economics[10].

According to Hodgson and Screpanti the proclamation of Bell and Kristol of a crisis in economic theory is an understatement for today 'economics is in chaos'. This is due to recent work in game theory which has raised questions about 'hard core' notions like rationality, the presence of imperfect or asymmetric information, the intrusion of chaos theory into economics leading to mathematical models becoming over-sensitive to initial conditions and the discovery that general equilibrium theory does not lead to unique and stable solutions[11].

Dopfer is of the view that economics needs a holistic approach (based on systems analysis, interdisciplinary research, economics as a subsystem related to other subsystems), a long-run view, an empirical approach based on the concept of political economy with distribution and

value being fused into it. In this view of the matter, welfare is not <u>only</u> economic welfare while economic welfare is <u>not only</u> a choice among economic (marketable) commodities[12].

Kapp takes the case of modern agriculture to make the point that the trend towards technology and mechanisation have made agriculture shift from a diversified system of growing food to a monoculture and made heavy and increasing demands on scarce resources especially petroleum and electricity. This has led to a dichotomy between financial returns and returns in forms of energy consumption[13]. This calls into question the use of exchange values as organising principles of economic systems especially when such values are incompatible with the requirements of ecological systems. Kapp goes on to say:

> As our discussion of modern agriculture has shown, the appropriate unit of analysis is neither the individual farm,
> nor the national farm economy, nor a particular ecological
> system. The relevant unit of analysis is much larger and the time span that counts is much longer than those in terms of
> which business enterprise and economic science have traditionally perceived and defined the notions of efficiency, rationality and optimality[14].

The answer according to Kapp is a systems view of the economy which makes it possible to deal with the dynamic interactions between economic systems and the whole network of physical and social systems. This approach by its very nature, would be multi-dimensional, multi-disciplinary and integrative.

Economics: Gandhian

Since the concepts of economics and modern technology largely grew in the context of the value systems of Western society, the question of their utility for non-Western societies arises. One of the earliest non-Western thinkers to think of the problems that modern industrialism posed for a non-Western society, in this case the Indian one, was Gandhi. His concept of the utility of Western thought in the realm of economics and technology for Indian society arose out of his concern for having a society free of violence and based on the twin concepts of Truth and Nonviolence.

The Gandhian critique of mainstream economics has been expressed by Sethi, a prominent Gandhian economist, as follows:

> At the level of practice, economics has become more and more anti-humanistic. In the name of efficiency, productivity, good management, and reasonable return on capital, the corporate sector, with its growing monopolistic and oligopolistic and transnational character, has become the centre not only of economic power but also of the draconian and violent political power. The countervailing power of the state economic sector, instead of countervailing the corporate sector, has become its ally. The alliance, however, is losing its legitimacy because it has failed to tackle the major economic issues of

unemployment, poverty, inflation, inequalities, etc. Besides, the rise of new problems such as pollution, ecological imbalances, exhaustion of natural resources and massive diversion of resources to nuclear armament etc. - problems which were kept separate -- now demand a joint solution[15].

Sethi goes on to say that explosion of knowledge and rapid progress in technological development, instead of solving old problems, is creating new ones. Technology has taken the place of philosophy and threatens to become the supreme value. The result is that technology is looked upon as the answer to the crisis created by technology itself. But notwithstanding the developments in the field of science and technology, human organisation lags behind in capturing and controlling their essence with the result that human beings are becoming victims of science and technology. The greater the thrust of new innovations, the greater is the threat of human enslavement.

Sethi also refers to created and natural wants and the impacts of this on social welfare. With wants divided between those which are natural and those which are created, the question of rational and irrational preferences cannot be sorted out. If the acquired wants are the result of high pressure advertisement which may be genuine or false, it is difficult to say whether social welfare has increased. If one has also to give some weight to the distinction between material and spiritual wants, then the problem becomes even more intractable.

In the world economy, global inequalities, poverty and corruption are increasing. Also

> while the majority of the people of the developing world are sinking into misery, their ruling elites enjoy a life of luxury which is the envy of the rich in the developing world. The Third World rulers have no difficulty in accepting or rejecting any of the prevailing models or theories emanating either from the West or from the East. It is no accident that they also converge on pushing out Gandhi from the debate and the curricula because of his emphasis on making ethical means the central core of economic theory and practice[16].

Diwan and Lutz have this to say when introducing a group of essays on Gandhian Economics

> In view of the disappointing relevance of microeconomics, the theoretical problems of macroeconomics and the ad hoc nature of international economics, we believe that there is a basic need to reformulate the structure of economic thought. Such a reformulation would ideally involve the development of microeconomics based on more realistic assumptions, a mutually consistent macroeconomics and microeconomics, and the extension of a new macroeconomics to international economics taking into consideration the realities of the world order. In view of the diversity and variations in cultures, ecologies and environments, this is perhaps an impossible task. However, because of the failure of economics and deficiencies of existing economic ideas, a search for such a reformulation
> remains most important. This collection of essays is meant to be part of such a search process[17].

It is in a search for new ideas that we now turn to Gandhi.

Gandhi and his principles

Mohandas Karamchand Gandhi was born on October 2, 1869, and this apostle of peace and nonviolence died a violent death, falling to an assassin's bullet on January 30, 1948, while attending a prayer meeting. Gandhi studied to be a barrister in Britain and thereafter was invited to practice law in South Africa. It was there that he conducted his first experiments in nonviolence in opposition to the practice of Apartheid. He refined his ideas on nonviolence later on in India where he led a peaceful movement for independence from British rule.

Today the concepts of nonviolent resistance, civil disobedience, and silent sit-ins are finding general acceptance. The impact of nonviolence is being felt in many ecological movements. A nonviolent movement to save trees, the so-called Chipko movement, was led by a Gandhian, Sunderlal Bahuguna. The movement was pro- women and pro-nature. Its main aim was to save the forests of the Himalayas as their destruction meant women having to walk long distances to collect water and fuel. A major movement against the World bank assisted Narmada dam project is on in the Gujrat state of India. The basic attitude of this movement is Gandhian and the intention is to prevent disruption to the lifestyles of the indigenous tribal population.

Gandhi was one of those rarely gifted individuals in whom the economist, the political scientist, the sociologist and the philosopher were all rolled into one. The product of his genius was a vast system of thought, composed of many sub-systems. This makes it difficult to look at any of the sub-systems, economics, for instance, in isolation.

The entire Gandhian system is based on two fundamental, interrelated principles: Nonviolence and Truth. One cannot understand any of the structural components of this Gandhian system, economics in particular, without understanding the philosophical foundations of the superstructure.

Also the primary concern of Gandhi in all his thinking was man. His adherence to nonviolence meant that man could not be the cause of the destruction of God's creation. So man had to be considered in a holistic manner including his interlinkages to nature. This is the thinking that underlines the two movements described earlier. Throughout his life Gandhi immersed himself in all aspects of general welfare and the happiness of human beings. Life was conceived by Gandhi as a field of experimentation. "He practised what he professed, and advocated only what he had tested in his own life...every aspect of human betterment, every problem touching human welfare, whether in the field of politics, or sociology, economics or religion, in every walk of life, commanded his attention and active interest. He owed allegiance to a philosophy and outlook that expresses itself in a multi-sided approach to the many sided problems of life; this makes him, strictly speaking, not a mere individual but a universal personality[18]."

In the realm of technology Gandhi advocated decentralised village industry, after himself experimenting with it, not only because of his dislike for industrial technology, but because of

his respect for nature. He considered industrial technology as a form of violence as, among other things, it had brought about large scale unemployment and the decline of indigenous skills and crafts in India -- in his view, therefore, a nonsustainable system. He understood, perhaps better than many modern ecologists, the intricate web of relationships between all living things and the physical environment that they share. To him each needed the other and both needed God, which to him was Truth. Also village industry was labour-intensive and led to full employment. We shall deal with this aspect later.

Gandhi's conceptual framework

Gandhi, who was influenced by the cultures of India and England, the religions of Hinduism, Jainism, Buddhism, and Christianity, and the writings of John Ruskin, Leo Tolstoy and Henry David Thoreau, put the peculiar stamp of his genius upon the theory of nonviolence. He confronted the problems of imperialism, industrialism, racism, communalism, classism, and the like, in his own way.

The method of inquiry and mode of action that Gandhi used in his search for Truth is what he called Satyagraha. Satya means Truth and Graha means adherence to Truth. Satyagraha thus means adherence to Truth, or Truth Force.

Gandhi's life was an experiment with Truth (Satya) and the means to achieve the Truth was through Ahimsa (nonviolence). The full force of Ahimsa, explicitly stated, means "action based on the refusal to do harm[19]". For Gandhi, Ahimsa (nonviolence, or love, as he called it) is the means, and Satya (Truth) is the end, and the debate on the means-end continuum was meaningless, for they are irrevocably tied to one another. "The means may be likened to a seed, the end to a tree, and there is just the same inviolable connection between the means and the end as there is between the seed and the tree...We reap exactly what we sow[20]".

For Gandhi the means to achieve Truth was through Ahimsa, that is, nonviolence or love. Not to hurt any living thing is only a part of Ahimsa, that is its least expression. "The principle of Ahimsa is hurt by every evil thought, by undue haste, by lying, by wishing ill to anybody[21]". According to Gandhi's interpretation of Ahimsa, "it is not merely a negative state of harmlessness but it is a positive state of love, of doing good even to the evildoer. However, neither does it mean tolerating injustice. On the contrary, Ahimsa requires not only resistance but also conversion of the wrongdoer[22]".

If there is a dogma in Gandhian philosophy, says Bondurant, "it centres here, that the only test to truth is action based on refusal to do harm[23]". This is one principle of Ahimsa that Gandhi adhered to until the end. To him the supreme and the only means to the discovery of social truths was through Ahimsa. Because we covet things and seek pleasure, we are in a constant state of competition, obsessively seeking self-gratification at the cost of others, plus putting ourselves in a state of violence. Hence the fulfilment of Ahimsa is difficult, if not impossible, without self-sacrifice and selflessness. Attachment to personal things and loved ones defeats the

overall meaning of Ahimsa. For Gandhi, Ahimsa means universal love; and in its dynamic form it means conscious suffering. It does not mean meek surrender to
unjust acts or laws, but confronting the oppressor with a firm conviction and a single-minded honest purpose.

Gandhi kept the Bhagavadgita's (also referred to as the Gita) dictum in mind:

> By reason of delusion man takes wrong to be right. Effort
> is within man's control, not the fruit thereof. All he has
> to do, therefore, is to decide his course of conduct or duty
> on each occasion and preserve it unconcerned about the result. Fulfilment of one's duty
> in the spirit of detachment and selflessness leads to freedom[24].

Gandhi was profoundly influenced by the Bhagvadgita, which shaped his perspective in general and his economic views in particular. In the eyes of Gandhi the Bhagvadgita was a complete and reasoned moral code which satisfied the heart as well as the intellect. He got from the Bhagvadgita the realization that life is given us for service and not for enjoyment. Man has to, by virtue of being a human being, an innate duty to serve Truth by serving his fellowmen and the life process in general. Such action is to be performed as service for the sake of service. It involves self-sacrifice for the welfare of others. By so rising above self-interest human beings fulfil their destiny and become integrated with the true self within us. As we will see shortly, the implications arising from such a view of human nature for economics are both profound and radical.

Influenced, as he was, by different religions, his concern for the welfare of all made him a firm believer in Sarvodaya--man's duty to serve all living beings in the universe. But a selfish, self-centred person would be seeking only self-gratification. Hence, "the path of service can hardly be trodden by one who is not prepared to renounce self-interest....The duty of renunciation differentiates mankind from the beast[25]". Renunciation here does not mean abandoning the world, for that would be cowardice. It means detachment from worldly possessions and desires, so that one can immerse himself or herself in selfless devotion to the welfare of all.

Conventional economics emphasises self interest by building upon the notion of utilitarianism. Gandhi, however, rejected Bentham's concept of the greatest good of the greatest number in favour of the greatest-good-of-all or Sarvodaya. According to him

> I do not believe in the doctrine of the greatest good for the greatest number. It means in its nakedness that in order to achieve the supposed good of fifty-one percent, the interest of forty-nine percent may be, or rather should be sacrificed[26].

> The utilitarian's (sphere of destruction) has no limit. Judged by the standard of nonviolence the late war was wholly wrong. Judged by the utilitarian standard, each party has justified it according to its idea of utility...Precisely on the same ground the anarchist justifies his assassinations. But none of these acts can possibly be justified on the

greatest-good-of-all-principle[27].

The aspect of self-sacrifice, as advocated by Gandhi, may be the least acceptable to the Western mind. "Yet, such sacrifice may well provide the ultimate means of realizing that characteristic so eminent in Western moral philosophy: the dignity of the individual[28]". For Gandhi, flowing from his concept of self-sacrifice, society was not possible without individual freedom and dignity. "No society can possibly be built on a denial of individual freedom[29]".

In making a distinction between man and the system, Gandhi highlighted the primacy of the individual. The system, whether it be social, political, economic, or religious, should be geared toward the betterment of the individual. When a system becomes harmful to the well-being of man, it must be mended or ended, altered or abolished[30].

Gandhian principles recognize that the individual is primary and the rest of the social institutions are secondary and are there to serve him. Man, the operator of the system, needs all the help available. Thus, we can have a legitimate quarrel with the system that is evil, but we should have no quarrel or hatred for the people in whose name and by whom the system is operated. Gandhi championed the cause of the underprivileged, and the cause of those to whom palpable injustice may have been done, to purify and regenerate society. "While working for the mending or ending of certain outmoded institutional patterns, Gandhi placed his main reliance upon sensitized consciences, upon regenerated human beings for abiding change in society[31]". His prayer for another was "...not, God give him the light that Thou has given me, but give him all the light and truth he needs for the highest development[32]".
To Gandhi it was evident that only in this way could radical social change be brought about in a nonviolent manner.

Gandhian social order

Gandhi's thought led him to postulate a grand design of an ideal social order: a nonviolent, nonexploitative, humanistic and egalitarian society. This social order embodied the fundamental philosophy of his life. He approached all facets of society--its economics, its politics and sociology--from the philosophical premises--Truth and Nonviolence--that governed his entire life. For him, therefore, economics could not be 'ethically neutral'. In his own words: "Economics is untrue which disregards moral values. This expansion of the law of nonviolence in the domain of economics means nothing less than the introduction of moral values...[33]". With the appearance of morality in Gandhian economics, we also witness the demise of the 'economic man', the core parameter of mainstream economics.

Gandhi was not an economist in the ordinary sense of the term. In his own way, however, he constructed a model which he claimed to be practical and operational in a given environment. He sketched out, in considerable detail, its basic goal(s), its structure, its components, its modus operandi, its data and its variables. Viewed as an economic system, it has its own management scheme and its own techno-structure. It is not a static but a dynamic model,

embodying a Gandhian theory of growth. He wrote: "The end to be sought is human happiness combined with full mental and moral growth. I use the adjective moral as synonymous with spiritual[34]".

He did not overlook the purely material goals in his economic system. Any viable economic system, he insisted, must have the production capability to meet social demand for the basic necessities of life--food, clothing, shelter, and other essential prerequisites for survival. But he rejected the pursuit of economic abundance for its own sake. He considered such abundance, dictated by the multiplicity of seemingly insatiable human wants, as demoralising. He was unconvinced that economic abundance, measured by the physical volume of goods and services, is either a necessary or a sufficient condition for individual or social welfare. On the contrary, an incessant drive for economic abundance, through accumulation, competition, and technological innovation, he felt, would promote economic aggression, exploitation, and violence in society[35].

The production goal of a Gandhian economic system has been stated by Huq as "the maximization of socially necessary goods and services, and the minimization of luxuries and superfluous goods, constrained not only by the availability of scarce resources but also by an overriding moral purpose[36]". The production and consumption of luxuries to stimulate effective demand was repugnant to Gandhian economic philosophy. He was opposed to such 'conspicuous consumption' on both moral and economic grounds.

Another parameter of Gandhi's model was localised production or swadeshi. Modern economics stresses individualistic mobility and competition on the basis of self-interest. Gandhi's doctrine of non-self-interest, on the other hand, emphasises the social virtues of loyalty and cooperation. No other Gandhian concept illustrates this better than that of swadeshi, the spirit in us which restricts us to the use and service of our immediate surroundings to the exclusion of the more remote.

Swadeshi can be seen as the application of the Bhagvadgita to one's immediate environment. In the sphere of economics, it would give a priority or preference for locally grown and manufactured goods. The doctrine of swadeshi could also be applied to the labour market: Employers are to exhaust first whatever pool of local and unemployed workers there is before hiring more suitable labour from other towns or regions. Similarly, the workers would be more reluctant to leave a local employer in spite of more attractive job offers elsewhere. In short, economic agents living together in a community, region, or country, should first and foremost explore all possibilities to do business with each other before going outside in order to get a better deal. Swadeshi demands the sacrifice of utility for the sake of loyalty. The alleged gains of violating swadeshi (lower commodity price, higher quality, etc.) would tend to be more than counteracted by almost zero transport costs and the (non-market) costs of community decay. At the same time, Gandhi warned that swadeshi should not be made a fetish. Efficiency was also to be maintained. According to him,

(One) should use only things that are produced by (one's) immediate neighbours and serve those industries by making them efficient and complete where they might be wanting[37].

The foundations of Gandhian economics

We have already stated that Gandhi's is a humanistic and holistic concept encompassing politics, sociology, psychology, ethics, economics and ecology and based on his philosophical outlook. The four parameters of his social philosophy are:

* Truth exists in and beyond man in an absolute, eternal, and living essence.

* The purpose of all life and evolution is to realize Truth. For humankind this translates into the need for self-realization, to know one's self.

* While truth is the end, Ahimsa is the means. Truth and Ahimsa are ultimately two sides of the same coin. One implies the other. Self-realization knows no distinction between ends and means. From this follows the all important principle that we cannot realize truth without giving up the means/ends dichotomy.

* Human truth is always relative. Although we have the innate need to perfect ourselves, no man is perfect. Truth as we can apprehend it is always personal, subjective, and, to that extent, relative to our individual context of culture, history and psychology. In this Gandhi followed the Rig Veda (X.164.46) which states, Truth is One but sages describe it differently.

From these four philosophical parameters emphasizing Ahimsa as the key to the realization of Truth, and stressing the relativity of human perception due to subjectivity and cultural differences, we arrive at the following foundational premises pertaining to Gandhi's economic thought:

* Economics, ethics, politics, and religion constitute an indivisible whole. As such, Gandhi had no kind words about conventional economics which led to a acquisitive and therefore a violent society. According to him,

> True economics never militates against the highest ethical standard, just as all true ethics to be worth its name must at the same time be also good economics. An economics that inculcates mammon worship, and enables the strong to amass wealth at the expense of the weak, is a false and dismal science. It spells death[38].

* Economics to Gandhi is essentially the science of human welfare. Its goal ought to be sarvodaya, the welfare of all. Implicit in the doctrine of sarvodaya is the basic presumption of equal dignity of and respect for the life and welfare of every individual. Translated into the sphere of economic policy, it entails top priority for meeting the most basic material needs (water, food, shelter) of everybody before we allocate resources for

goods required for luxury consumption and therefore of a lesser importance.

* The supreme consideration of economics has to be Man. Economic theory that ignores humanity and its needs--material, mental, moral, spiritual--is meaningless.

* Human welfare economics focusing on man implies the crucial importance of a decentralized social economy. The ideal is a community economy allowing for a living interaction, mutual access, and voluntary cooperation of all its members.

* Economics has to respect the law of swadeshi. As we saw earlier, swadeshi was to Gandhi one of the most basic organizational principles consistent with Ahimsa. Obviously, this basic premise is at odds with both calculated behaviour in an integrated competitive market economy as well as with a highly centralized command economy. Instead, it feeds right into his concept of community economics, or decentralized community planning and of cooperation between all communities at all levels--national, international--thereby leading to a nonexploitative and peaceful world.

* At the very core of Gandhian economics is the concept of rationality. Rather than mere cognitive mental calculations of means. Gandhi broadens the concept to involve harmonious action of body, mind, and soul. Rational action is guided by the inner faculty of conscience which he also calls the inner voice.

From the above foundational premises can be derived what may be called the seven principles of Gandhian economic thought. It should be kept in mind, however, that unlike the principles of conventional economics, they do not stand on their own, independent of time and place. Instead, they always have to be seen in relation to each other, to their foundational premises, and to the culture and society where they are being applied. The seven Gandhian principles are:

(i) nonviolent ownership - trusteeship: Trusteeship recognizes the right to private property in the means of production as long as it is responsible to the needs of the community. It is sarvodaya extended to the firm. Absentee ownership of capital and land, investment and production violating swadeshi, excessive salaries, and expense accounts are not consistent with trusteeship. Trusteeship is also consistent with workers' self-management provided they act as trustees.

(ii) nonviolent production - appropriate technology: The term appropriate is used to designate the production function that maximizes human need satisfaction. According to Gandhi no technology should be used which economizes on manual labour, while there are unemployed workers in the community. This clearly flows from his concepts of sarvodaya, swadeshi conscience and trusteeship. Besides appropriate technology should do no harm to the body, mind, or soul. Machinery, according to Gandhi, should not be turned into a craze. Mass production, yes, but in people's own homes.

(iii) nonviolent consumption - non-possession: Non-possession follows strictly from Ahimsa.

The less you possess, the less you want, the better you are. And better for what? Not for enjoyment of life, but for enjoyment of personal service to fellow beings; service in which you dedicate yourself, body, soul and mind. Everybody is entitled to the consumption of the basic necessities but the golden rule for the elite and those in power is to refuse to have what millions cannot have and not multiply their wants.

(iv)   nonviolent work - bread labour: Throughout Gandhi's writings runs the thread of the importance of work in humanity's personal growth. The doctrine of bread labour was inspired by Ruskin, Tolstoy, and the Gita. According to Gandhi:

> I cannot imagine anything nobler or more rational than that, say one hour in the day, we should do all the labour that the poor must do and thus identify ourselves with them and, through them, with all mankind[39].

> Gandhi stressed, however, that bread labour could never be forced on anybody, otherwise it would breed poverty, disease, and discontent.

(v)   nonviolent allocation - cooperation: Gandhi was no believer in competition which more often than not led to violence. He saw in competition the culmination of a material and sensuous paradigm that degraded the population. Competition being predicated on fear and insecurity bred greed and violence. Cooperation, on the other hand, appeals to the human element, our need to serve others.

Yet, Gandhi felt it important to stress that true (nonviolent) cooperation could only take place after provision of the most essential material needs. This is true both of the individual (bread labour) as well as of the village (swadeshi) levels. The problem of scarcity would also be largely dealt with by the institutional features of bread labour and localized economy with both acting to internally reduce wants thereby leading to a harmonious society.

(vi)   nonviolent distribution - equality: Equality meant to Gandhi primarily two things: First, everybody has a basic right to live, i.e., to meet the basic vital needs and live a dignified life integrated in the community with one's fellows. As means to such a goal he strongly denounced charity, the flinging of free meals at people unable to find work, but advocated guaranteed employment for everybody who wants to work. Secondly, equality as absence of exploitation. He endorsed non-exploitative capital labour relations as well as non-exploitation of manual by intellectual labour and above all non-exploitation of the countryside by the city.

(vii)   nonviolence in reforming economic systems: Gandhi was no friend of capitalism. On the contrary, he dedicated much of his life to its destruction. But the destruction of an ideology could not be done with violence. The capitalist had to be redeemed and converted to trusteeship.

It should be clear from the above that the core of Gandhi's economic thought flows from his view of human nature, its needs and goals -- material and spiritual. At first glance it seems that his economic thought is utopian. But a deeper analysis shows that this is not so. Also that some aspects of his thought can be understood even without going into its metaphysical and spiritual ground. This is especially the case with his concepts of swadeshi, non-possession, trusteeship, nonviolence, and sarvodaya. Several of Gandhi's other contributions can also be understood and found meaningful without a direct reference to his spiritual and ethical outlook. This is particularly true of his economic theory of growth and development, as well as his theory of structural unemployment.

The Gandhian concepts have been put into a conceptual-analytic framework more familiar to the economist by Amritananda Das[40]. According to Das, conventional development strategy may be summarized in the following way: Development is to occur by means of capital-intensive technologies replacing the traditional labour-intensive activities and with it the gradual elimination of the limited (and often non-monetary) exchange systems of traditional village economies. In lieu of an economy operating primarily in a rural setting, a modern, urban oriented national or world-wide market economy is expected to emerge gradually. The pull of labour to the city and the concomitant problems of dislocation, displacement and misery, are seen as regrettable, but as an unavoidable temporary cost well worth the long-run gains in efficiency and growth in per capita income and consumption of the masses.

It is here that the Gandhian perspective differs radically and sheds much additional light. Rather than focusing on the growth of the urban sector, Gandhi foresaw the central and ever-worsening problem of the stagnation and decay of the traditional sector resulting directly from such modernization and the single-minded stress on urban, capital-intensive development. By this development, much of the indigenous skills and crafts get destroyed by the new market competition of mass-produced consumer goods, whether foreign or domestic.

Average earnings in the villages declines more than wages grow in the urban cities. Hundreds of thousands can no longer make a living with the traditional sector, and the growing 'structural unemployment' pushes them into the urban slums or 'shanty towns' in a desperate hope of survival. Against this background, the veritable 'kernel' of Gandhian macroeconomics has to be seen as giving priority to investment in the labour-intensive occupations of the traditional sector. Production by the masses replaces mass production.

Similarly, Das points out, excessive population growth is being overestimated as a primary cause of the economic problems of the Third World. Rather, it is a consequence of excessively capital-intensive development bringing with it the mounting structural unemployment and decay of the economy at the village level. Population control programmes cannot be expected to succeed in a population lacking a regular occupational base and caught in a day-to-day, hand-to-mouth mentality. There is simply no room for any type of prudent, self-imposed voluntary restraint in matters of procreation. Moreover, mounting structural unemployment has an unfavourable negative effect on female labour force participation and education, two sociological factors that are found to be closely associated with a decline in the birth rate.

Since the Gandhian development economics see the problem of excessive population growth as chiefly one of a misguided development strategy, the primary focus turns to the issue of a more adequate policy of investment allocation for effectively combating structural unemployment. To create a faster growth in new jobs than the growth in the labour force, available investable surplus needs to be directed into labour-intensive sectors as well as capital-intensive sectors. The latter is necessary in order to assume a sufficiently increased surplus for the years to come. More specifically, the rate of capital accumulation has to be equal at least to the rate of growth of the labour force. But beyond this minimum expansion of the capital goods industries, the bulk of the remaining investable surplus should go towards a revitalization of the village, small-scale, labour-intensive, consumer-oriented sector.

According to Das the Gandhian system raises an important issue: The possible trade-off between output and employment. Gandhi's social and moral philosophy made him lean towards employment rather than output in defining an objective function to be maximised. One of his deepest concerns was the massive poverty, especially rural poverty in India. At the same time, he had better perception of the nature of massive rural unemployment in India than he is given credit for. That type of unemployment is structural, seasonal, and technological, rather than cyclical. Deficiency of aggregate demand has very little to do with that type of unemployment. In large-scale diffusion of supplementary employment through appropriate low-capital-intensive technology and corresponding restructuring of the economy along the lines of decentralization and small-scale industrialization, he saw the only real, feasible, and meaningful approach to the seemingly insoluble problem of Indian poverty.

Apart from economic feasibility, Gandhi's rationale rested on a moral and metaphysical notion of human labour. To him, labour was not just a commodity for sale in the market in exchange for wages to compensate for the disutility of labour. He was reluctant to measure the opportunity cost of work in terms of sacrifice of leisure. In his system, labour had a dignity and a moral substance which was not for sale. This notion he derived largely from the Bhagavadgita. He was especially influenced by the following passage:

> Work is more excellent than leisure;
> The body's life proceeds not, lacking work
> .....If one eats
> The fruits of toil, that thief steals from his world,
> He that abstains
> To help the rolling wheels of this great world,
> Glutting his idle sense,
> Lives a lost life, shameful and vain[41].

This moral and metaphysical notion of work greatly influenced Gandhi's economic thinking, the construction of his economic model, and the specification of its techno-structure. The primary behavioural organizational unit in his model is the individual man or household, and the primary organizational unit is the village. It is essentially a decentralized system where the fundamental economic decisions are to be made by the micro-units of the total system -- the village

communities. Although the individual, village and the community of villages suggest a hierarchy, at the highest level of abstraction, the Gandhian model is, in essence, non-hierarchical. "In this structure," he wrote in a famous passage, "composed of innumerable villages, there will be ever-widening, never ascending circles. Life will not be a pyramid with the apex sustained by the bottom. But it will be an oceanic circle whose centre will be the individual, always ready to perish for the village, the latter ready to perish for the circle of villages, till at last the whole becomes one life composed of individuals, never aggressive in their arrogance, but ever humble, sharing the majesty of the oceanic circle of which they are integral units. Therefore, the outermost circumference will not yield power to crush the inner circle but will give strength to all within and will derive its own strength from it[42]".

Gandhian and neoclassical economic thought[43]

Gandhi did not build any systematic model unlike neoclassical economic theory. This was, in a sense, his strong point. All models become static with time and after having their full run. Gandhi systematically went about initiating, developing, and perfecting open-ended concepts which were amenable and adequate to produce many models, that is, models for a given context, situation, and society. Though he did not have any system, but he did have a method, if method is defined as a necessary link between ontology, epistemology, and theory.

The Gandhian method was both scientific and moral. But it was "scientific" only in the sense in which Thomas Kuhn has used the phrase. The critique of a prevailing paradigm on the basis of its internal contradictions and empirical evidence is not enough for its rejection unless a new and alternative paradigm conceptually and empirically assumes the force of calling for the rejection of the earlier paradigm. But without a moral dimension it is difficult to prove the superiority or greater validity of one paradigm over another.

As Sethi states:

> What was scientific has become vulgar empiricism. The moral hollowness of the old paradigm and the moral strength of the new one, along with its scientific dimension, have to be established with relevant concepts and methods. In his life and political activities, Gandhi simultaneously adopted both the approaches and only when he was convinced of the double validity of a new concept or paradigm would he call for the rejection of the old. In his case we must always make a distinction between the critique and the rejection[44].

The main differences between the neo-classical and the Gandhian system with respect to consumption can be enumerated as overleaf:

NEO-CLASSICAL	GANDHIAN
Resources are limited and wants are insatiable	Resources are abundant enough to satisfy needs of all in a comfortable way
Consumer's goal is to maximize utility	Consumer's goal is to satisfy needs
Consumption is budget-determined	Consumption is need-determined
More is better and desirable for its own sake	More is desirable and better only to a point of freedom from drudgery, discomfort, and arduous labour
Multiplicity of material wants becomes the aim of life	Restraint on material wants is the aim of life

In the sphere of production, the Gandhian system draws a distinction between basic and luxury goods. In the industrialised countries, whether capitalistic or Marxist, the non-basic or luxury goods form the larger part. In Gandhian societies--parts of China, perhaps, are the only example--, the emphasis is on the production of basic goods. Some non-basic goods are produced. However, a very large percentage of total production is made up of basic goods. The motivation for this emphasis comes both from sheer need as well as from moral and ethical considerations about love, humanism, and self-restraint.

In capitalistic societies, there is the prevalence and encouragement of an exploitative production and technological structure. The earlier slave system of the United States has been institutionalized in the form of technology. Technology encourages and imposes production modes which require specialization and large-scale organizations. An extreme degree of specialization makes work alienating and creates opportunities for exploiting the labour.

In the Gandhian system the production modes cannot be exploitative by their very nature. For technological change must satisfy the following three major conditions:

.   technology must increase the productivity of the worker;

.   technology must not replace the worker;

.   the worker must have complete control of the technology.

These are stringent conditions and much of modern research and development does not have these worker-oriented goals. The current Appropriate Technology movements all over the world, however, are attempts in this direction.

It has been argued that production in the Gandhian system is less varied. This is a mistaken argument. It is true that the number of commodities in the Gandhian system is far less. However, there are far more varieties of every commodity produced. The diversity of production in the Gandhian system, thus, is much larger than in a capitalistic system. In the neo-classical system production is divorced from distribution, not so in the Gandhian system.

In the neo-classical system, the concept of social equilibrium leads to a set of static equilibrium conditions in the production, consumption and distribution sectors of the economy. The emphasis is on the efficiency in the allocation of scarce resources, on the maximisation of production and material (economic) gains. In Gandhian economics, the notion of equilibrium is lifted to a much higher plane of thought. His social equilibrium is an optimum combination of material and moral progress through continuous movement towards a nonviolent and non exploitative society founded on equality and freedom from economic deprivation and exploitation[45].

The following details would make clear the distinction between the two systems in the spheres of production and distribution.

Production

	NEO-CLASSICAL	GANDHIAN
Goal of the economic activity	Multiplicity and quantity of the production of material goods	To provide work for body and to satisfy economic needs of the society so that its members can fulfil themselves within a harmonious society
Measure of success	GNP and ever-rising standards of living	Absence of starvation among masses
Incentives	Production for the sake of profits	Produce just enough to satisfy one's needs in order to keep one's mind trained and educated for a harmonious growth
How to produce?	Least-cost combination	Full employment of the available manpower
How much to produce?	Restricted only be the production capacity	Constrained by the individual's needs and a socially desirable level
Capital	Essential	Only if it aids human beings

Technology	Essential	Only if it is simple and usable by the masses
Labour	A commodity of production to be exploited	A source of human power which must be utilized for the benefit of its owner

NEO-CLASSICAL	GANDHIAN
Entrepreneur corporation brings factors and agents together for production by buying/paying wage	Trustees bring together agents and factors of production by example and cooperation
The relationship is of employer-employee	The relationship is one of trustees and cooperative workers
Capital is owned by the capitalists	Capital is owned by the community
Capitalists substitute capital for labour in order to maximise profits to the capitalist	There is no substitution between capital and worker as long as it leads to displacement of workers. The function of capital is to enhance productivity without replacing the worker
Risks of production are taken by the capitalists	Risks are taken by the community as a whole
Investments are made by the capitalists out of income from capital and for future profits	Investment is made by the community as a joint decision to improve the quality of life in the community
Distribution is unequal	Distribution is the essence of the system

Gandhi's relevance today

Gandhi's model, though evolved in the context of India as a part of its religious philosophy and social ethos, the Indian fight against the colonial system and the freedom of the country from foreign domination, has elements of general applicability. Eight elements of his model are particularly relevant in the context of contemporary problems and issues under discussion.

Firstly, the emphasis on dignity of human labour. His symbol for labour amongst other things, was the spinning wheel. Its practice imposed an element of self-discipline and the principle of producing something by one-self for one's need. The use of the spinning wheel, before Gandhi used and popularised it amongst men, was essentially used by woman in India. By using it, he probably wanted to break the sex barrier in work. Further, when one produces something for one's own use, by the sweat of one's labour or otherwise, one values it more and is less likely to waste it.

The principle of producing materials for one's own use, or by the community for the use of the community, also envisages a decentralised system of production, and what is more important is that the produce is for one's own or the community's use. Consequently, those elements which are detrimental to humans or in the use of materials, unlike in the large scale production system for the market economy, are avoided. With the developments in electronics and biotechnology, such an approach of a decentralised production system for use, by the individual or the community, has again become possible. This, however, would require mass education to enable people to understand and utilise the new technologies.

The second major element in his scheme of things is Ahimsa, non-violence. As a principle, it is not passivity or indifference to untruth or tyranny. It is an assertion that injustice, exploitation, tyranny and falsehood can be fought and defeated without violence. The means of protest could be moral or ethical and used for pressurising the perpetrators of injustice or violence, through public demonstration, through non-cooperation and through suffering, instead of taking recourse to violence. If a recourse to violence is avoided, then the possibility of a dialogue to reach an agreement is possible, even though it may take a longer time. It would also help in inculcating respect for others and for their different points of view.

A society based on the principle of non-violence would not need weapons of destruction and all the resources used for developing and producing weapons of war could be utilised for human welfare. In addition, the total perspective of international relations would change and be based on co-operation instead of competition.

The third element in Gandhi's model is austerity and simplicity in life-style. Simplicity, as envisaged by Gandhi, aims at imposing self-discipline on one self by limiting one's needs and wants and the demand one makes on others. It does not mean living marginally or crudely, what it means is having a few things which one needs and which should be of quality, artistic and aesthetic value. This is the life-style which Gandhi endeavoured to promote in sharp contrast to the consumer culture and the life-style of the affluent elite in India, which was an eyesore to a sensitive soul like him especially in a society where majority of the people lived in abject poverty. A simple life-style would also prevent the colossal wastes which are a part of the consumer culture, and would go a long way in meeting the basic needs of people.

The fourth element of the Gandhian model is, essentially, built around self-control being exercised by human beings leading to the doctrine of non-possession. It also implies, in practice, control of materials. A significant element in it is that it has evolved out of past tradition and takes into account contemporary developments. Its rationality provides a common link between human beings and development and use of materials.

The Gandhian emphasis on self-control and non-possession is in direct contrast to Tawney's model of the acquisitive society[46]. The motive force behind the acquisitive society is the propensity to accumulate wealth composed of goods for current consumption and goods for future consumption. On the positive side, this society has set impressive records in the expansion of productive capacity, advances in technology, exploitation of resources, affluence and abundance

of goods and services. On the negative side, the same society has also generated severe strains and stresses on life and powerful tendencies towards and degradation of the total environment -- social, economic, ecological, political, and last but not least, moral.

The dominant principle of the acquisitive society is that "it assures men that there are no ends other than their ends, no law other than their desires, no limit other than that which they think advisable. Thus it makes the individual the centre of this universe, and dissolves moral principles into a choice of expediencies...for it relieves them of the necessity of discriminating between enterprise and avarice, energy and unscrupulous greed, property which is legitimate and property which is theft, the just enjoyment of the fruits of labour and idle parasitism of birth or fortune, because it treats all economic activities as standing upon the same level[47]".

Gandhi shared Tawney's incisive insight into the inherent nature of modern, acquisitive societies bent upon accumulation of goods and multiplication of wants as a never-ending process. He had serious doubts about the ability of modern societies to survive on its present course and was fearful of the high probability of the reconstruction of such societies through eruptions of violence. As an alternative to this path of violence, he offered a set of doctrines for social reconstruction consistent with his fundamental principle of nonviolence. In this set, the doctrine of non-possession holds a pivotal spot. In this regard, this doctrine is both a challenge and a response to the 'acquisitive society'. It is a challenge because it proposes a radical transformation of society through the transformation of the individual. It is a response because it suggests a way to fill one of the most serious gaps in modern society, namely the widening gap between moral progress and technological and other material measures of progress.

The fifth element of the model is swadeshi: The essence of the swadeshi concept lies in the following propositions:

- an individual, as a consumer will reduce his or her wants. In reducing one's wants, consumption will depend upon the commodities that are, or can be, produced locally by the neighbours;

- not only will the consume commodities produced, or producible, in the neighbourhood, but also the consumer will make an effort to obtain these commodities from the neighbourhood itself. In other words, the consumer will prefer the commodities produced by an immediate neighbour to the commodities produced by a distant neighbour except when either the immediate neighbour does not produce those goods or refuses to improve the efficiency of production. Only in these cases will the consumer obtain these goods from a distant neighbour;

- the consumer will cooperate with the producer neighbour in the process of improving the efficiency of production. In this sense consumer and producer do not generate an antagonistic relationship as they are jointly involved in a cooperative effort;

Translated into economic language, and according to Diwan, swadeshi involves a downward shift in the cost curve for a commodity produced in the neighbourhood or locality[48]. According to him there are a number of reasons why the cost function shifts downward:

- firstly, because the consumer -- a neighbour -- helps the producer -- another neighbour -- there are no costs of marketing, such as advertisements, selling, packaging or providing information;

- secondly, since the production takes place in the community at a local level and the consumer neighbours are helping the producer to become efficient, there is a possibility of skill specialization and thereby reduction in production costs;

- thirdly, the production process employs local materials. This minimizes, if not completely eliminates, the transport costs for both input and the output;

- fourthly, since the materials are obtained from the local sellers, these are likely to be at minimum cost;

- lastly, the labour costs are liable to be low.

The sixth element of the model is trusteeship. Gandhi refused to accept any of the prevailing economic systems, which may be summarized as capitalist, communist, and mixed economy, since all of them produced alienation of one kind or another. He suggested in turn what he called the system of trusteeship. Gandhi claimed that trusteeship was likely to be his most lasting contribution, though the votaries of all the existing systems reject it. Partly it is due to the fact that Gandhi did not elaborate the concept suffiently, and partly because adequate attention has not been paid to it.

Trusteeship has two aspects: Its basic principles and structure; and, secondly, the method to achieve a society based upon the principle of trusteeship. It is the second aspect which has created doubts because Gandhi expected capitalists to relinquish voluntarily their property and act as trustees of the society. But more than once Gandhi made it clear that he was offering a solution or a way out for the capitalists in place of a bloody revolution which they must face if they remain tied down to their wealth and profits. He was also quite emphatic in stating that if the capitalists did not voluntarily surrender, the State is within its right to nationalize their assets. But nationalization to him was only a necessary evil, an intermediate state, which must ultimately be transformed into trusteeship. This is one of the vital differences between Gandhi and Marx.

Gandhi did not leave behind a model of trusteeship; he only stated the basic principles of its organization. These principles were:

- no one has any right over property which is a social phenomenon;

.   State ownership of property leads to concentration of economic and political power in the hands of a small bureaucracy which has the monopoly of violence and hence is an antithesis of trusteeship;

.   trusteeship is by definition a communitarian system, a kind of general cooperation of efforts and resources;

.   trusteeship is a system of social self-management and a kind of socialist democracy from below[49].

The seventh element of the model is the imperative of full employment. Gandhi believed in the dignity of labour. He argued that nature has intended us to earn our bread with the sweat of our brow. Anyone who idles away a single minute becomes to that extent a burden upon his neighbours and to that extent commits violence.

To Gandhi, full employment was not merely a means to higher production but an end in itself, that is, to eliminate both the dominance of men over men and violence. Full employment economy--the availability of jobs for all those who are willing and able to work at the going social wage--was to him a prerequisite for the moral and spiritual development of all human beings, especially those who are at the bottom of the social scale.

It must be stressed that the Gandhian concept of full employment is slightly different from the concept of full employment in conventional economics. In conventional economics, full employment is attained when 96 per cent of all those willing and able to work at the current wage rate are able to find jobs. It permits voluntary unemployment, commonly referred to as frictional unemployment. Gandhi wanted everyone to earn his or her bread by the sweat of his or her brow. He could not, therefore, approve of voluntary unemployment. In the Gandhian framework, work does not imply disutility that needs to be compensated by money wages, but is a service to fellow persons. This is its positive aspect, that of enabling individuals to realize their best. Work is yagya or sacrifice and one can realize God through working for one's fellow-beings.

The eighth element is economic equality. Gandhi maintained that a nonviolent social order has to be constructed on the basis of equality. By equality he meant guarantee of a minimum standard of consumption to all. He argued that everyone must have a balanced diet, a decent house to live in, facilities for the education of one's children, and adequate medical care. True individual freedom--the opportunity for the full moral and spiritual development of human beings--is possible only when the individual is free from hunger and unemployment.

Gandhi accepted the fact that there will be inequalities of skill, industry, intelligence, and opportunity. He recognized that people with talent will earn more. But he wanted them to take only what was required for their legitimate needs and to leave the remainder to be used by the society. He therefore preached the doctrine of non-possession, as he believed that the real happiness and contentment comes not from self-indulgence and multiplication of wants but from

self-denial and from deliberate and voluntary reduction of wants.

He wanted the rich and the elite to take an initiative in dis-possession with a view to a universal diffusion of the spirit of contentment. As a practical matter, he was willing to accept, in the transitional phase, income differentials that are considered fair by the society. He proposed to fix a decent minimum living wage and a ceiling for the maximum income that can be allowed to a person in society. The difference between such minimum and maximum income should be reasonable and equitable and variable from time to time, so much so that the tendency will be towards the obliteration of the difference[50].

Policy implications of Gandhian thought

A number of policy prescriptions flow from Gandhian thought. The emphasis of Gandhi is on 'service'--service to one's neighbours, the community, the nation, the world. The current stress on the monetized market economy tends to relegate such activity to the background and to define it as secondary--and this inspite of the fact that even in an economy like that of the United States, nearly 50 percent of services are provided through voluntary, unpaid work! The policy implication is that markets either need to be made more perfect or regulated in favour of voluntary service functions--for example, by recognising the contribution of women, unpaid voluntary workers et al. to the production process and including it in GNP.

The swadeshi principle implies a number of policies. All of these policies will favour the promotion of local producers. They will involve such activities as demarcating the areas of production between local and large producers and discouraging competition between them. They will also involve differential tax and subsidy policies. The existing policy framework has always provided favourable terms to the large producers as opposed to small producers. In many cases, the large producers have been able to withstand the competition from small producers only because of the tax benefits and subsidies accorded to them in the form of subsidised interest rates, power and other materials. Gandhian economics implies a reversal of such policies.

The proposition of equality implies policies that reduce asset/income inequalities. In many countries the governments have followed income maintenance policies. However, these policies simply counteract the increases in inequalities generated by the biases of imperfect markets. In the Gandhian economic scheme, more forceful policies are needed because the object is to lead eventually to equal distribution of assets. One object of such policies is to raise the costs and prices of luxury goods and reduce the costs and prices of necessities. Gandhian thought leads to a ceiling on personal incomes or wealth.

Gandhi also implies a new paradigm of decision-making. In the past there has been a continuous growth in hierarchy and thereby an increase in the power of people at the top of this hierarchy. Hierarchy and bureaucracy have grown not only in the government but in all other walks of life, including such professions as business and education. Gandhian thought suggests a need to reverse this trend.

Gandhi noted that one of the major sources of maintenance of privilege lay in the high elasticity of consumption of luxury goods. Given the aim of Gandhian thought to reduce privilege, an important policy presumption will involve reductions in the ~~luxury~~ elasticity of production. This has to do with the structure of production. If the production structure remains biased towards basic goods, luxury elasticity of production will keep on falling[51].

Critique of the Gandhian model

The Gandhian model is often criticized on the ground that it is anti-industrial and anti-advanced technology and so a feudal tradition-oriented, static, agrarian model. However this criticism is both unfair and superficial. Gandhi never expressed unqualified opposition to industrialization and modern technology. He was opposed to developing the Indian economy industrially along the same lines as the Western one. Such industrialization, he feared, would spell disaster--moral, economic, social, and political.

Gandhi, however, favoured limited, selective, and socially controlled industrialization: Large-scale, heavy, capital-intensive industries, centralized but strictly under public control, and decentralized, small-scale industries to diversify the village economic base. Such a mixed pattern of industrialisation he considered to be responsive to the needs and welfare of a nonviolent society, dedicated to moral and material progress. Writing in the Harijan, he states

> I do visualize electricity, ship-building, iron-works, machine-making and the like existing side-by-side with village handicrafts. But the order of dependence will be reversed. Hitherto industrialization has been so planned as to destroy the villages and village crafts. In the state of the future, it will subserve the villages and their crafts. Nothing will be allowed to be produced by the cities that can be equally well produced by the villages. The proper function of the cities is to serve as clearing houses for village products[52].

Likewise, he was not opposed to technological innovations per se. He recognized that technology has its place and that, wisely used, it can make significant contribution to social welfare. But he was strongly opposed to indiscriminate use of technology which might lead to monopolistic exploitation and displacement of labour.

> Again, all through his strictures on technology, his humanism
> shines through. "The supreme consideration", he wrote, "is man.
> The machine should not tend to make atrophied the limbs of man[53]."

He was equally concerned about the effect of machines on the human mind. He saw in modern machine technology a powerful, dehumanizing force that alienates man from his product, from his community and, most insidious of all, from himself. Yet, the techno-structure of the Gandhian model of the village economy would not rule out limited use of modern technology. He was receptive to the positive role machines can play in reducing the burden of human drudgery and in increasing labour productivity without degrading the human mind. Of necessity,

such machine technology has to be highly selective, controlled, and subservient to higher needs than the simple economic need for efficiency.

Another criticism has been that the self-reliant rural society is without any indication as to how it is to be linked with larger groupings, that of a nation-state and the international system. Further, how to fit in larger transnational systems, such as transportation and communication systems, into the model. Or how to create and support scientific and technological research which has international dimensions and requires international support. The criticism is made that such a system would also lead to localization and narrowing of outlook as it would only tackle local problems.

This criticism too is misconceived and misplaced. Gandhi was not against linking up the village communities with the international community through 'every widening circles' and in a non-hierarchical way. What he was against was internationalisation which led to domination, dependency and the destruction of traditional societies. He wanted people to live in communities that matched their human size and thought patterns; communities small enough to allow genuine self-government and sharing of responsibilities. Each community would be joined with others, to form a larger unit, but not so large as to tempt any one individual to abuse power by having too much of it. The larger a democratic group grew the less say the individual or local group would be able to have in making their decisions. Therefore limits needed to be placed on the size of a regional group. Only this way could those at the very bottom of the socio-political scale have a say in decision-making that affected them.

Huq has examined the question of international trade from a Gandhian perspective[54]. Huq analyses what the doctrine of swadeshi (local self-reliance) mean for international trade. He goes on to point out that swadeshi would be anti-international trade only if the concept is interpreted very narrowly and very rigidly--something that Gandhi never did.

Huq goes on to say that Gandhi anticipated such misinterpretation of his doctrine and he wrote: "Even Swadeshi, like any other good thing, can be ridden to death if it is made a fetish. That is a danger which must be guarded against. To reject foreign manufacture merely because they are foreign and to go on wasting national time and money in the promotion in one's country of manufacture for which it is not suited, would be criminal folly and a negation of the Swadeshi spirit[55]."

Gandhi was realistic enough to realise that under no circumstances would one country be able to produce all the things needed. And he wrote: "So, though our aim is complete self-sufficiency, we shall have to get from outside the villages what we cannot produce in the villages. We shall have to produce more of what we can in order thereby to obtain in exchange what we are unable to produce[56]."

Huq goes on to suggest that there was a positive doctrine of international trade following from the Gandhian paradigm. The Gandhian perspective leads to the following distinctive features of international trade:

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- it accepts the logic of the principle of comparative advantage but rejects it as the sole basis for trade among nations;

- it accepts reciprocal need rather than reciprocal demand as the determinant of terms of trade among nations;

- it postulates an international economic order based on international cooperation and understanding and mutual need, rather than on market forces and competition;

- it is guided by a purpose higher than the purpose of pure economic gain. That is the moral purpose embodied in his notion of 'service' which was to govern the flow of trade among nations;

- it is an economic doctrine into which is infused the philosophical principle of Ahimsa or nonviolence and non-exploitation;

- it offers maximum protection against unequal distribution of gains from trade among nations in sharp contrast with the impact of the existing doctrine of international trade.

The Gandhian perspective thus leads to a global economic and political order based on nonviolence, non-exploitation and a high degree of international cooperation.

Gandhi's views on the scale factor are the most misunderstood or misinterpreted. 'Small is Beautiful' is a phrase coined in the name of Gandhi. There is no such absolute hypothesis in Gandhi. Nevertheless, though the scale factor itself cannot be evaluated, other things being given, small is better than large. But other things do not remain the same. One cannot produce a railway engine in a shed. Absolute concepts leave one with no choice. But when choice exists, other considerations have to be given full weight.

Gandhi was a scientific and post-modern mind. As a searcher and experimenter with truth, he rejected technologies and even scientific research which was repugnant to real human needs just as he rejected those human wants which were detrimental to spiritual and moral development. What he insisted was that technological and scale choices must not be solely determined by economic considerations. Any technology would be acceptable to him if it was found to be consistent with his conceptual system, irrespective of the differences in its productivity components or scale.

Conclusion

In the Gandhian paradigm it is man, and not society or the State, who is the supreme architect of his own destiny. The ways to Truth are many but each person has to proceed towards it in his own way and as dictated by his conscience. For morality is what distinguishes human beings from animals. The path chosen has, thus, to be a moral one.

In relations with others, human beings have always to keep in mind the categorical imperative of nonviolence, that is, while earning their livelihood human beings have to ensure that this was not at the expense of others - whether human beings or nature.

Gandhi also clearly has an ecological orientation. He was led to ecology through his emphasis on nonviolence. Peace in his view was a universal concept. It was not attainable unless harmony -- not only in the social sense between individuals but also in the larger sense as between humans, animals and plants -- was attained. He was sensitive to the bringing about of a balance between individuals and their environment. His encouragement of the Indian masses to spin cotton for their personal use was not only aimed at instilling self-reliance and self-dignity among them, but also to preserve the environment while using the minimum of capital. His concept was to shift the emphasis of economics from capital to labour.

The question of the feasibility of restructuring society, national or global, in line with the Gandhian paradigm is invariably raised. There is no doubt a great deal of idealism in Gandhian thought. As Gandhi himself often stated, his thoughts pertain to the 'world of tomorrow'. He was convinced that the 'world of today' is moving toward the 'world of tomorrow'. To him national and global orders based on nonviolence, non-exploitation and high degrees of cooperation were no doubt distant goals but were entirely realisable. What was required, to use modern jargon, was 'transvaluation of values' in modern society. This was to Gandhi an entirely realisable goal.

Sachs in a recent article has postulated five dimensions of eco-development[57]. These are:

- social sustainability, i.e., greater equity in asset and income distribution;

- economic sustainability, meaning that economic efficiency needs to be evaluated in macrosocial terms;

- ecological sustainability, i.e., expanding and carrying capacity of ecosystems, reducing consumption of fossil fuels and waste, increasing self-restraint, and developing technologies which produce low-waste and are resource efficient;

- spatial sustainability which means attaining a balance between rural and urban areas, reducing congestion and concentration in metropolitan areas, eliminating ecosystem destruction, and promoting modern regenerative agriculture and decentralised industrialisation;

- cultural sustainability i.e. having ecodevelopment in cultural continuity.

From the above it is quite clear that Gandhi was right when he referred to his vision as being for the 'world of tomorrow'. As we can see, Sach's prescriptions for sustainable development in the 21st Century are a mere subset of the Gandhian paradigm. For to Gandhi these would be only a transitional phase--though an important one--to his vision of a world in which peace and

nonviolence prevailed. The question that we need to ask ourselves is, therefore, not the question of feasibility of the Gandhian paradigm in the world as it is but whether there is any alternative to it if the world is to attain Ahimsa, which to Gandhi is the ultimate Truth.

End Notes

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Peace, Environment, and Values:

a Gandhian perspective

by

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<u>Introduction</u>

Today environmental issues are high on the international agenda
and are expected to occupy the attention of statesmen,
scientists, ecologists and diplomats in the coming decades. The
main environmental policy issues expected to grow in scale and
importance, both nationally and internationally, in the next 20-
40 years are likely to be:

- environmental problems that significantly and
  sometimes irreversibly affect vital functions of human
  societal systems including their spatial integrity,
  identity and governance capability;

- the need to deal with environmental threats (i.e.
  threats to quantity, quality and diversity of
  environmental wealth) and the mitigation of
  environmental vulnerability through:

  * conservation of the endangered environment;
  * change-over to an efficient economic mechanism
    that addresses human needs in the context of
    environmental-risk management and international
    parity;

* management of environment-related tensions, conflicts and violence;

* development of environmental-security related institutions, economics, legislation, rights and values.

The above is a formidable list of actions requiring attention of policy makers. But there is also the socio-economic aspect that needs to be taken note of. Any outline of the main policy aims for the 21st century will inevitably be faced with the question of the extent to which society can be transformed and collective behaviour modified. Also while it might be more or less possible to discern individual motives for actions, collective societal behaviour cannot be reduced to an aggregation of the motives of individuals.

Additionally the social order is pervaded with nonrational motives, particularly by basic attitudes that guide individual actions. Basic attitudes are patterns of values with which people have emotionally identified themselves, as is shown by the images and metaphors that a culture or society identifies itself with. And basic attitudes imply certain world views which get expressed in the perceived relationship of humans with nature, the concept of a good life etc. A basic attitude, when collectively adopted, prefigures a social paradigm. Based on underlying motives, basic attitudes often remain concealed, and shift very slowly whether at the individual or the collective level.

The whole complex of preconscious and conscious societal forces, or values, is a very intricate phenomena and incapable of being expressed by any simple equation of social dynamics. But society, including its intricate structure and value systems, has to move in a particular direction if the issues posed by the environment are to be resolved. And this requires the explication of attitudes towards nature and the environment.

This is no easy task. There is on the one hand the dominant value system, largely Western in its orientation, but having its resonance in the non-Western world also. In the West a colourful mixture of groups and movements - environmentalists, ecofeminists, New Age followers and others - are acting as pioneers in an attempt to transform the dominant paradigm into an ecologically led one. These movements have their echo in the developing parts of the world where groups and individuals are delving into ancient traditions and practices in order to harmonise developments - social, economic, technological with the requirements of environmental integrity.

Extant attitudes

In the extant notions ranging from anthropocentrism to ecocentrism the following attitudes may be discerned: rulership, stewardship, partnership and participation.

The "ruler" thinks in terms of dominion; man has free disposal of everything nature provides. To him, nature's only function is to safeguard human survival, reducing it to a supply of raw

materials or just a conglomerate of objects and facts. The attitude of dominion is dynamic, as the ruler, in his infinite appropriation of nature, never ceases to extend his power.

The "steward", however, recognises limits to what man can demand from nature. His attitude is anthropocentric, too, but he holds himself accountable to the Creator or future generations. Nature has given to the steward the right to enjoy the usufruct of it, not to exhaust it. This puts a curb on the urge for expansion typical of the "ruler" and makes the stewardship attitude a conservative one.

The "partner", representing the third basic attitude, combines conservationism with dynamism; what he tries to realize is an interaction between man and nature which is beneficial to both. Technical intervention is allowed, provided that it does not interefere with the self-regenerating capacity of nature. The partner searches for a dynamic balance between societal needs and nature.

Finally, the "participant" wants to prevent the partnership from turning out to the unilateral advantage of man. The participant tries to ensure that human activities are in accord with the possibilities created by nature itself. Interference with nature is understood as a process of adaptation. The attitude of participation is however prone to degenerate into a anti-developmental or at least anti-technical attitude, expressed by the slogan "back to nature".

Technology

In the highly technological culture of today, a strong role for technology is considered a sine qua non for tackling the environmental crisis. Technology however has strong links with society. Recent developments in socio-cultural sciences and in philosophy indicate that modern technology can be regarded as a social construct. It expresses the aspirations, desires and needs of influential social groups. This vision stresses the importance of the mental and cultural conditions that prepare the way for technological developments.

Given these new insights, it is not surprising that historians now agree about the inadequacy of the traditional explanation regarding the emergence of the Industrial Revolution and modern industrial society. Today, it seems to be generally accepted that the newly acquired technical knowledge and the inventions of particularly the late 18th and the 19th century followed logically from the changes that man and society had been undergoing for a long time. To put it simply, typically modern phenomena such as the new sense of time, the disciplining of western man and the mechanization of his world view were the prelude to all the technical developments rather than the result of them. They were the fertile soil in which technology could flourish.

Since in the present view of the matter modern technology largely grew in the context of value systems of Western society, the question of its utility for non-Western society arise. One of

the earliest non-Western thinkers to think of the problems that
modern technology posed for a non-Western society, in this case
the Indian one, was Gandhi. His concept of the utility of
technology for Indian society arose out of his concern for having
a society free of violence and based on the twin concepts of
Truth and Nonviolence.

Gandhi and his principles

Mohandas Karamchand Gandhi was born on October 2, 1869, and this
apostle of peace and nonviolence died a violent death, falling
to an assassin's bullet on January 30, 1948, while attending a
prayer meeting. Gandhi studied to be a barrister in Britain and
thereafter was invited to practice law in South Africa. It was
there that he conducted his first experiments in nonviolence in
opposition to the practice of Apartheid. He refined his ideas
on nonviolence later on in India where he led a peaceful movement
for independence from British rule.

Today the concepts of nonviolent resistance, civil disobedience,
and silent sit-ins are finding general acceptance. The impact
of nonviolence is being felt in many parts of the world and
arises from diverse sources. It is even not uncommon to hear
people being arrested for nonviolently invading rocket base sites
and plants where nuclear warheads are produced and assembled!

By the 1960s, nonviolence, nonviolent resistance, Satyagraha, and
pacifism were frequently used words in literature and were even
to be found in newspapers. In recent years a number of

universities have begun to offer courses in nonviolence and peace. With the threat of nuclear war looming large over the world, the ideas and ideals of nonviolence and methods of non-violent social actions have risen to sufficient prominence to be reckoned with in world thinking and events. Gandhi is, to a large extent, responsible for this.

Gandhi immersed himself in all aspects of general welfare and the happiness of human beings. Life was conceived by Gandhi as a field of experimentation. "He practiced what he professed, and advocated only what he had tested in his own life...every aspect of human betterment, every problem touching human welfare, whether in the field of politics, or sociology, economics or religion, in every walk of life, commanded his attention and active interest. He owed allegiance to a philosophy and outlook that expresses itself in a multi-sided approach to the many sided problems of life; this makes him, strictly speaking, not a mere individual but a universal personality," (Ranganathananda 1971:841). Gandhi addressed topics of life ranging from personal, moral, and spritual problems to health care of the infant and of village cattle. He advocated village industry not only because of his dislike for modern technology, but because of his respect for nature. He considered modern technology as a form of violence as, among other things, it brought about unemployment and the decline of crafts - in his view a deterioration of the human condition. He understood the intricate web of relationships between all living things and the physical environment that they share.

Gandhi and science and technology

Gandhi was Western-trained and learned about Western philosophy and Western science while studying law in Britain. Perhaps most important is the fact that Gandhi became acquainted with Western traditions of cultural criticism, associated with such names as Ruskin, Tolstoy, and Thoreau. The "experiments with truth" that made up Gandhi's life were, in large measure, a conscious effort to combine these critical Western ideas with a very personal interpretation of Hindu belief. Gandhi embodied an alternative science and technology in his own person and tried to develop a more humane and contextual model.

Gandhi was not alone in his attempts to develop alternative approaches to science and technology in colonial India, although it was his vision that has perhaps been most influential. Ashis Nandy has recently contrasted Gandhi's "critical traditionalism" to the more absolute glorification of tradition represented by the art historian and Buddhist scholar Ananda Coomaraswamy (Nandy, 1987). Where Gandhi made use of the Indian traditions in an open-ended, reflective way, Coomaraswamy's "tradition remains homogeneous and undifferentiated from the point of view of man-made suffering...Today, with the renewed interest in cultural visions, one has to be aware that commitment to traditions, too, can objectify by drawing a line between a culture and those who live by that culture, by setting up some as the true interpreters of a culture and the others as falsifiers, and by trying to defend the core of culture from its periphery" (Nandy: 121,122).

Gandhi's critique of Western science was fundamental and comprehensive. He rejected Western science in terms of all its dimensions - philosophical, sociological, technological - recombining the romantic or poetic critique of secularization with critiques of the institutionalized elitism and the "technicist" orientation of Western science. It was the lack of morality, the lack of idealism of Western civilization that Gandhi objected to; and Western science was, for him, a central part of that immoral value system.

Unlike the Marxist or positivist leaders of most other independence movements in non-Western societies, Gandhi sought to develop an alternative way of life in which traditional techniques and non-Western beliefs had a central place. His critique of Western civilization was thus not merely a critique of its immorality, but also of its epistemology. "Traditional technology, too, was for him an ethically and cognitively better system of applied knowledge than modern technology. He rejected machine civilization, not because he was a saint making occasional forays into the secular world, but because he was a political activist and thinker with strong moral concerns" (Nandy: 160).

Gandhian economics

To Gandhi man was the supreme architect of his own destiny. The ways to truth were many and each person had to proceed towards Truth in his own way and as dictated by his conscience. For morality is what distinguished human beings from animals. The

path chosen had, thus, to be a moral one.

In relations with others, human beings had always to keep in mind the categorical imperative of nonviolence, that is, while earning their livelihood human beings had to ensure that this was not at the expense of others - whether human beings or nature.

Gandhi made the acute observation that all previous (urban) civilisations (Babylon, Egypt, Assyria, Indus Valley etc.) were today found in deserts. He said that this was due to the delinking of man from nature (through urbanisation) and the consequent taking away from nature more than could be replaced. He, therefore, suggested that the concept should not be materialistic development based on consuming more and more but human development in which peace and happiness should play the major role. His thought could be placed in a simple formula as below:

$$\text{Happiness (H)} = \text{Consumption (C) divided by Desire (D).}$$

Obviously the highest value of H is unity i.e. when consumption equals desire.

Gandhi pointed out that the materialistic concept of increasing needs so that you could consume more would only lead to happiness ~~succeed~~ if desire remained constant. But experience showed that desire always outstripped consumption so that the maximization of needs only led to a situation in which human beings constantly

chased the chimera of happiness. The answer according to Gandhi was to decrease wants (consumption) to the most essential needs and to simultaneously decrease desire so that the position where happiness tended to unity was arrived at.

His dictum that "the earth has enough for man's need but not for his greed" is a concept of sustainable development based essentially on his non-materialistic outlook on life and stress on peace (ahimsa) and concept of the upliftment of all (sarvodaya).

Gandhi and ecology

Gandhi's teachings and actions clearly reflect an ecological orientation. He was led to ecology through his emphasis on nonviolence. Peace in his view was a universal concept. It was not attainable unless harmony — not only in the social sense between individuals but also in the larger sense as between humans, animals and plants — was attained. He was sensitive to bringing a balance between individuals and their environment within the prevailing social conditions. His encouragement of the Indian masses to spin cotton for their personal use was not only aimed at instilling self-reliance and self-dignity among them, but also to preserve the environment using the minimum of capital.

Gandhi's concept of soul force

Gandhi, who was influenced by the cultures of India and England, the religions of Hinduism, Jainism, Buddhism, and Christianity,

and the writings of Leo Tolstoy and Henry David Thoreau, put the peculiar stamp of his genius upon the theory of nonviolence. He confronted the problems of imperialism, industrialism, racism, communalism, classism, and the like, in his own way. In the process he developed a unique blend of nonviolent resistance, the philosophy of Soul Force, or the moral equivalent of war.

The method of inquiry and mode of action and Gandhi used in his search for Truth is what he called Satyagraha. Satya means Truth and Graha means adherence to Truth. Satyagraha thus means adherence to Truth, or Truth Force. He also called it Soul Force; because for Gandhi, Truth was God.

The basic appreciation of nonviolence or Soul Force was Gandhi's acquaintance with the Sermon on the Mount, which Gandhi said, "went straight to my heart," and he records his delight in the verses that begin "If you are asked to carry a load one mile, by all means carry it under duress, since that is the legal practice, but after you have carried the load under compulsion, offer to carry it the second mile of your volition." This positive act is calculated to stun and convert the task master. Another of his favorite verses is, "But I say unto you, that ye resist not evil; but whosoever smite thee on thy right cheek turn him the other also" (Nelson 1967:9).

The Bhagavad Gita (a Holy Book of the Hindus) deepened for him the impression made by the Sermon on the Mount regarding love and one's duty to fellow human beings. Leo Tolstoy's The Kingdom of

God Within You added sum and substance to his philosophical and moral principles. He thereafter called himself Tolstoy's humble follower (Nelson 1967:11). After reading Thoreau's Civil Disobediance in a prison in South Africa, Gandhi began to call his movement "civil disobedience" instead of "passive resistance," which he called the weapon of the weak since it does not exclude the use of physical force or violence. Satyagraha, according to Gandhi, has to be conceived as a weapon of the strongest and excludes the use of violence in any shape or form (Gandhi 172:3-6). There are three fundamental elements to Satyagraha: Truth, Ahimsa (nonviolence), and self-suffering.

Ahimsa and Satyagraha

Gandhi's life was an experiment with Truth (Satya) and the means to achieve the Truth was through Ahimsa (nonviolence). The full force of Ahimsa, explicitly stated, means "action based on the refusal to do harm" (Bondurant 1965:23). For Gandhi, Ahimsa (nonviolence, or love, as he called it) is the means, and Satya (Truth) is the end, and the debate on the means-end continuum was meaningless, for they are irrevocably tied to one another. "The means may be likened to a seed, the end to a tree, and there is just the same inviolable connection between the means and the end as there is between the seed and the tree...We reap exactly what we sow" (Gandhi 1972:10). The vision of Truth depended upon the realization of nonviolence. Gandhi was of the opinion that life must be lived within the framework of Satya and Ahimsa. Add this to his concern for the social welfare of all people (especially the underprivileged, the wronged, and the oppressed) and we have

the ingredients of a great social and political reformer.

Truth

Gandhi, who never claimed to know the Truth in any absolute sense, asserted that Satyagraha "excludes the use of violence because man is not capable of knowing the absolute Truth and, therefore, not competent to punish" (Gandhi:1972:3). He thus urged others to keep an open mind to those who would differ with them. For him truthfulness is the key to life, for "Truth is perhaps the most important name of God. In fact, it is more correct to say that Truth is God" (Gandhi 1972:38). Under no circumstance whatsoever is one to lie, cheat, or keep anything secret. "Bear ill-will to none, do not say an evil thing of anyone behind his back, above all, 'to thine own self be true,'so that you are false to no one else. Truthful dealings even in the least, little things of life, is the only secret of pure life" (Chander 1945:559-60, as quoted in Bondurant 1965:22). To the question of truth, since it may have different meanings to different people and hence may lead to confusion, Gandhi answered that each individual would determine that according to his or her conscience and since Ahimsa, or nonviolence or love, is a necessary part of the corollary, there would be no confusion (Bondurant 1965:20). "Where there is a truly honest effort, it will be realized that what appear to be different truths are like the countless and apparently different leaves on the same tree" (Gandhi 1972:39). Since each person has to determine the truth according to his or her own conscience, this led to the linking of social with individual behaviour through the following of a

common norm.

Gandhi also equated Truth to knowledge. "And where there is Truth, there also is knowledge which is true. Where there is no Truth, there can be no knowledge" (Gandhi 1972:38). According to Gandhi, there should be truth in thought, speech and action.

"To the man who has realized this truth in its fullness, nothing else remains to be known, but all knowledge is necessarily included in it. What is not included in it is not truth, and so not true knowledge; and there can be no inward peace without true knowledge. If we once learn how to apply this never-failing test of truth, we will at once be able to find out what is worth doing, what is worth seeing, what is worth reading" (Gandhi 1972:39).

Ahimsa

As pointed out earlier, for Gandhi the means to achieve Truth is through Ahimsa, that is, nonviolence or love. Not to hurt any living thing is only a part of Ahimsa, that is its least expression. "The principle of Ahimsa is hurt by every evil thought, by undue haste, by lying, by wishing ill to anybody" (Gandhi 1972:41-42). According to Gandhi's interpretation of Ahimsa, "it is not merely a negative state of harmlessness but it is a positive state of love, of doing good even to the evildoer. However, neither does it mean tolerating injustice. On the contrary, Ahimsa requires not only resistance but also conversion of the wrongdoer" (Gandhi 1972:161).

If there is a dogma in Gandhian philosophy, says Bondurant, "it centres here, that the only test to truth is action based on refusal to do harm" (Bondurant 1965:25). This is one principle of Ahimsa that Gandhi adhered to until the end. The supreme and the only means to the discovery of social truths was through Ahimsa. Because we covet things and seek pleasure, we are in a constant state of competition, obsessively seeking self-gratification at the cost of others, plus putting ourselves in a state of violence.

Hence the fulfillment of Ahimsa is difficult, if not impossible, without self-sacrifice and selflessness. Attachment to personal things and loved ones defeats the overall meaning of Ahimsa. For Gandhi, Ahimsa means universal love; and in its dynamic form it means conscious suffering. It does not mean meek surrender to unjust acts or laws, but confronting the oppressor with a firm conviction and a single-minded honest purpose.

Gandhi kept the Bhagavad Gita's dictum in mind:

> By reason of delusion man takes wrong to be right. Effort is within man's control, not the fruit thereof. All he has to do, therefore, is to decide his course of conduct or duty on each occasion and preserve it unconcerned about the result. Fulfillment of one's duty in the spirit of detachment and selflessness leads to freedom (Desai 1946:145).

Influenced, as he was, by different religions, his concern for

the welfare of all made him a firm believer in Sarvodaya--man's duty to serve the universe. But a selfish, self-centred person would be seeking only self-gratification. Hence, "the path of service can hardly be trodden by one who is not prepared to renounce self-interest....The duty of renunciation differentiates mankind from the beast" (Gandhi 1972:48-49). Renunciation here does not mean abandoning the world, for that would be cowardice. It means detachment from worldly possessions and desires, so that one can immerse himself or herself in selfless devotion to the welfare of all.

Self-sacrifice and self-suffering, familiar concepts in Indian culture, thus are important elements of Satyagraha. It is directed toward moral persuasion. Since it is not a weapon of the weak, it is clearly different from cowardice, which has no place in Satyagraha. It is also not a substitute for an inability to use violent means to achieve victory.

The aspect of self-sacrifice, as advocated by Gandhi, may be the least acceptable to the Western mind. "Yet, such sacrifice may well provide the ultimate means of realizing that characteristic so eminent in Western moral philosophy: the dignity of the individual" (Bondurant 1965:29). For Gandhi, society was not possible without individual freedom and dignity. "No society can possibly be built on a denial of individual freedom" (Chander 1945:21).

In making a distinction between man and the system, Gandhi

highlighted the primacy of the individual. The system, whether it be social, political, economic, or religious, should be geared toward the betterment of the individual. When a system becomes harmful to the well-being of man, it must be mended or ended, altered or abolished (Mazumdar 1952:41).

Gandhian principles recognize that the individual is primary and the rest of the social institutions are secondary and are there to serve him. Man, the operator of the system, needs all the help available. Thus, we can have a legitimate quarrel with the system that is evil, but we should have no quarrel or hatred for the people in whose name and by whom the system is operated. Gandhi championed the cause of the underprivileged, and the cause of those to whom palpable injustice may have been done, to purify and regenerate society. "While working for the mending or ending of certain outmoded institutional patterns, Gandhi placed his main reliance upon sensitized consciences, upon regenerated human beings for abiding change in society" (Mazumdar 1952:113). His prayer for another was "...not, God give him the light that Thou has given me, but give him all the light and truth he needs for the highest development" (Nelson 1967:17).

Thus, for Gandhi all humankind has to be treated equally and justly, with dignity and respect.

Conclusion

Gandhi's view of ecology was derived from his two categorical imperatives: the search for Truth as an end through Ahimsa or

Peace as the means. All matters relating to humanity, namely, human rights and human dignity, economics, science and technology, ecology etc. he derived from this touchstone. Peace was the starting point, the middle and the end of the pursuit for Truth. To Gandhi it was not man who was the problem but his greed.

Addressing himself to the roots of the problem of sustainability, Kothari (1990) writes:

"In the absence of an ethical imperative, environmentalism has been reduced to a technological fix, and as with all technological fixes, solutions are seen to lie once more in the hands of manager technocrats. Economic growth, propelled by intensive technology and fuelled by an excessive exploitation of nature, was once viewed as a major factor in environmental degradation; it has suddenly been given the central role in solving the environmental crisis. The market economy is given an even more significant role in organising nature and society. The environmentalist label and the sustainability slogan have become deceptive jargons that are used as convenient covers for conducting business as usual."

Gandhi would have approved the above. To him sustainability has to be rooted in ethics and "our common future" could not lie in an affluence that is ecologically suicidal, and socially and economically exclusive. It must, on the other hand, lie in the

To: Prof. Rajagopalan
       IOI Madras
       INDIA

Date: 17 september, 1996

Dear Prof. Rajagopalan,

Attached is the note to Faleiro (Summary of hearings already sent to you
earlier), Gandhian Economics and Rig Veda and the Ocean as discussed on the
phone. Please retrieve documents through word perfect (WP 5.1).

Yours sincerely,

Dr. Krishan Saigal
Executive Director
IOI HQ, Malta

c.c.   Prof. Elisabeth Mann Borgese.

The Ocean in the Rig Veda

by

Krishan Saigal, Executive Director

International Ocean Institute, Malta

The Ocean in the Rig Veda

Introduction

The association of human beings with the sea goes back to humanity's mythic past. A generally held view is that ancient continental civilizations like the Indian did not have much contact with the sea. The Aryans were thought to be pastoral nomads who came to India from the Central Asian steppes and so did not have a maritime tradition. Vedic civilization as emerging from scriptures like the Rig Veda (3000-1500 BC) was supposed to be land-based.

The prevalent view about the Rig Veda is that the Vedic people were a racial type (Aryans). They are said to have invaded India in the second millennium BC as primitive nomads from Central Asia. The Rig Veda is said to have been thereafter composed in the Punjab region of northwest India as the first step of this invasion.

Frawley points out that these ideas have been used to interpret the text of the Rig Veda thereby leading to a misinterpretation of its meaning[1]. For they are not found within it. In fact, for the above ideas to be sustained they required altering the meaning of words and changing the orientation of the text.

Recent excavations in India, particularly of Dwaraka, a newly discovered ancient Indian city long ago submerged into the sea, serve to dispel many of the earlier notions. They suggest that the Vedic people were already in India before 1500 BC and built magnificent stone port cities at the furthest point of Gujarat on the West coast of India. This would show that the massive ancient Indus valley civilization that preceded such sites--and which has already been well excavated in India and Pakistan--was also Vedic and that the entry of the Vedic people into India would have to come before the beginning of this civilization, before 3000 BC. In fact Frawley's view is that it was much earlier than this[2].

Frawley goes on to suggest that many references in the Rig Veda lead one to conclude that the Vedic was a maritime culture. These references have many symbolic as well as actual connection to the sea. We now proceed to examine them.

Rig Veda

The Rig Veda is the oldest surviving scripture of the Hindus. It has been variously dated from

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[1] Frawley, David, 1995, Gods, Sages and Kings: Vedic Secrets of Ancient Civilization, New Delhi: Motilal Banarsidas, p.28.

[2] Ibid., p.29.

1

3000-1500 BC by scholars though as we have noticed Frawley places it even earlier--at 6000 BC[3]. Vannucci, a biologist who has spent many decades studying mangroves, tropical forests and the ecology of earth, regards the Veda as a treasure-mine of information which she has tried to decipher with a bio-ecological key[4]. She notes that there are many gods mentioned in the Veda but says that in her opinion "the original God or Gods are born of abstract ideas that evolve into concepts that later become anthropomorphic and are finally encompassed in the religious canon by rites and rituals"[5].

For the purposes of this paper, it would be good to remember that Agni stands for Matter and Energy, Savitar or Sun for Light and Life, while Varuna, the Lord of the Sea, stands for Order which binds and regulates.

Creation in the Rig Veda

The Vedic idea of creation is that there was an original cosmic ocean, which overflowed and thereby produced the manifest world. We see this in the Vedic creation hymns:

> Law and truth from the power of meditation were enkindled. Thence the night was born and thence the flooding ocean. From the flooding ocean the year was born[6].

> The creative Sun upheld the Earth with lines of force. He strengthened Heaven where there was no support. As a powerful horse he drew out the atmosphere. He bound fast all the ocean in the boundless realm[7].

What is perhaps the most famous Vedic creation hymn uses an entirely oceanic symbolism for the world's origin:

> In the beginning there was darkness hidden in darkness, all this universe was an unilluminated sea[8].

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[3]   Ibid., p.39.

[4]   Vannucci, M., 1994, Ecological Readings in the Veda: Matter-Energy-Life, New Delhi, D.K. Printworld, p.22-23.

[5]   Ibid., p.160.

[6]   Rig Veda, X.190.

[7]   Rig Veda, X.149.1.

[8]   Rig Veda, X.129.3.

Another hymn of the world's beginning speaks of the creation of the Sun, the light of the world, from an original cosmic sea:

> When the Gods stood together in the sea. Then as dancers they generated a swirling dust. When, like ascetics, the Gods overflowed the worlds, then from hidden in the ocean, they brought forth Savitar (Life)[9].

A hymn of the fourth book describes creation as from the cosmic sea and the gaining of immortality, the great goal of the Vedic sages, as mergence back into it. The hymn begins:

> From the ocean the blissful wave has arisen, together with its wave it attained immortality.

It ends,

> All the universe rests within your nature, in the ocean, in the heart, in all life. That which is borne in the confluence of the waters, may we attain that blissful wave of yours, oh Gods[10].

In the above verses we have the first germs of the thought that permeates all later Indian thought--Hindu, Buddhist, Jain--that creation arises from the One or That (God). Man can later on be merged with That, either in the state of samadhi or of nirvana. It is interesting that the metaphor used is of the ocean and how "the waters (humanity) get confluence with it (That or the One)".

Other oceanic concepts in the Rig Veda

Vedic culture also believed that it was through the chanting of hymns that humanity attained to happiness and immortality. Referring to Indra, the king of the gods, the Veda refers to him as a vast and expansive ocean to whom hymns and chants flow as rivers to the sea. The Rig Veda says,

> Give increase to Indra who is as expansive as the sea[11].

> As rivers to the ocean, hymns and songs have entered Indra, whose extent is vast[12].

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[9] Rig Veda, X.72.6,7.

[10] Rig Veda, IV.58,1,11.

[11] Rig Veda, I.11.1.

[12] Rig Veda, VI.36.3.

Indra is also said to be "extensive as the sea"[13], to be an "ocean of wealth"[14], and his "thunderbolt lies within the oceans enclosed by the waters"[15]. It is with this thunderbolt that Indra "gave energy to the ocean-going floods"[16] --the reference being to thunder and lightning which created floods flowing into the sea. But this thunder and lightning lay "within the oceans". We thus see here the cyclical link between oceans and the climate.

Both heaven and earth are compared to the oceans, all being the abode of Indra who is requested to come quickly,

"from Heaven and Earth, from the ocean or the heavenly sea"[17].

The hymns flowing to Indra are also compared to the currents of the ocean that rise up (upwell) from the bottom of the sea.

To Indra I direct my songs in an increasing flow, like waters from the bottom of the sea[18].

There are a number of hymns to Agni (Fire and Energy). Again the symbolism is of rivers or mighty streams flowing to the ocean. Agni is frequently related to the oceans.

All delights converge in Agni, as seven mighty streams into the ocean[19].

Oh Agni, for your firm law our words like cattle are spoken, as rivers to the sea[20].

The Rig Veda also refers to fire or energy dwelling in the ocean.
Agni (Fire, Energy) whose vesture is the ocean[21].

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[13]   Rig Veda, I.52.4.

[14] Rig Veda, I.51.1.

[15] Rig Veda, VIII.100.9.

[16] Rig Veda, IV.16.7.

[17] Rig, Veda, IV.21.3.

[18] Rig Veda, X.89.4.

[19] Rig Veda, I.71.7.

[20] Rig Veda, VIII.44.25.

[21] Rig Veda, VIII.102.4-6.

One is tempted to think that perhaps the Vedic poets were aware of the submarine 'fires' in the deep oceans where lava comes out. But it would be more realistic to consider that the ancient poets were aware of the tremendous energy residing in the oceans.

The reference to ships is as pervasive in the Veda as that to the sea. The saving action of Agni, the sacred fire, is frequently compared to a ship that carries human beings safely across the sea.

> As a ship across the sea, Agni, take us across to safety[22].
> Agni will deliver us across all difficulties, as a ship across the sea[23].
>
> Agni, destroyer of difficulties, deliver us across all danger as a ship across the sea[24].

This image of God, symbolized here by fire, taking human beings across the ocean of worldly difficulties, is a constant refrain in Indian philosophy and is found in both Hindu and Buddhist works.

The Vishwedevas, the Universal Gods, also carry their worshippers across all difficulties like a ship across the waters, as do the great Vedic God of the sea, Varuna, and Soma, the Vedic God of immortality.

> Deliver us across all difficulties, oh Universal Gods, as ships across the waters[25].
>
> Oh Divine Varuna, guide this hymn of your worshiper with wisdom and skill, by it may we cross over all difficulties; may we mount it as a saving ship[26].
>
> Soma, deliver us as a ship across the sea[27].

The Gods save their worshippers by the ship of prayer or wisdom. Therefore in the Vedic rite, the sacrifice, is called a ship.

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[22] Rig Veda, I.97.8.

[23] Rig Veda, I.99.1.

[24] Rig Veda, V.5.9.

[25] Rig Veda, VIII.83.3.

[26] Rig Veda, VIII.42.3.

[27] Rig Veda, IX.70.10.

The ships of truth have delivered the righteous. Varuna takes us across the great ocean[28].

Those who do not have the power to ascend the sacrificial ship trembling fall into calamity[29].

The Maruts, the Vedic storm Gods, impact on the sea. The Vedic hymn includes the image of a storm on the sea:

The Gods who dwell in the luminous realm of Heaven above the firmament, who make the mountains shake across the flooding ocean; who extend with their rays with strength across the ocean, Indra come with the Maruts[30].

What are these mountains across the sea? They are surely a mountainous shoreline region or island, which again indicates the ocean-going nature of Vedic civilization.

The Maruts as Gods of the storm draw the water up from the ocean and it is this water that is thereafter carried inland and descends to earth as rain.

Oh Maruts, you draw up the rain from the ocean and, full of the heavenly waters, make it pour[31].

Here we see intimate knowledge of the way the ocean functions. For only then could the poets have known how the rains come from the evaporation of water from the ocean.

Varuna in the opinion of a number of scholars, is perhaps the oldest God of the Aryans. He is linked both with the atmosphere and the sea.

Varuna knows the station of the birds who fly through the atmosphere. He knows the ocean-going ships[32].

Varuna, the God of the ocean in later times, is a very prominent God in the Rig Veda and has an oceanic symbolism there also. He thus appears to be an ocean god from the beginning.

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[28] Rig Veda, IX.73.1,3.

[29] Rig Veda, X.44.6.

[30] Rig Veda, I.19.7-8.

[31] Rig Veda, V.55.5.

[32] Rig Veda, I.25.7.

Varuna is a secret ocean[33].

> That is the great magic power of this divine greatest seer, Varuna, that no one can challenge, when the diverse flowing streams cannot fill the one ocean with their water[34].

The above shows a knowledge of several great rivers flowing into the sea and yet not filling it up. We find a variation on this same idea in another verse:

> Varuna dug a path for the Sun and led forth the ocean-going floods of the rivers[35].

Varuna as the God of the sea is communed with during ocean travel:

> When Varuna and I ascend into the ship, when we go forth to the middle of the sea, then we move with the waves of the waters and swing back and forth as if on a swing for joy[36].

Here we have the image of the poet (sage) traveling on the ocean, riding back and forth on the waves. Moreover, the enlightenment of the sage (swinging for joy) is compared to ocean travel in a ship. We also have the image of the unbounded skies, of a long ocean journey.

While Varuna is the most specific Vedic ocean God, the most general is Soma, who is the God of the flowing waters. After Indra and Agni, hymns to him are of the most frequency in the Rig Veda. The Soma hymns are the pinnacle of the hymns of the Rig Veda and form a special book. Soma is also the moon, whose mythological association with the sea is well known. Through Soma's common identification with the ocean, both earthly and celestial, we see how the oceanic symbolism of the Rig Veda is part of its greatest expression of joy and rapture.

The roar of the ocean is well known to anyone who has heard it, and it is not surprising to find it mythologized by a maritime culture.

> The ocean roars in the original laws, generating creation as the king of the world[37].

We read also of the Moon's influence on the ocean with the winds and tides.

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[33] Rig Veda, VIII.41.8.

[34] Rig Veda, V.85.6.

[35] Rig Veda, VII.87.1.

[36] Rig Veda, VII.88.3-4.

[37] Rig Veda, IX.97.40.

Soma (the Moon) stirs the ocean with the winds[38].

There is also reference to trade across the seas. In this connection there are two verses which state that wealth comes from roads across deserts, over the waters, in the wilderness, as well as from a highway, from home-stead and from forest. These verses possibly formulate the means and sources contributing to the proliferating economy of the Rigvedic Aryans[39].

Trade and commerce over the seas necessities a viable network of roads and better modes of transport. To use modern jargon, it requires a multimodal transport system. The Rigvedic text speaks of roads going to far away lands across rivers, plains, deserts, mountains and high seas[40]. In fact, the wealth coming from far away lands is solicited earnestly and repeatedly[41]. Long distance prayers are offered to make going abroad pleasant and the homeward journey comfortable.

May my going abroad be pleasant and may my return be pleasant[42].

There are references to horses, mules, asses, which bring back ample wealth from the distant sea. There is mention also of someone going to the west (i.e. across the sea) for the acquisition of wealth, while some were said to be settled across the far sea[43]. The hymns also say,

May our ship embark to all quarters of the earth[44].

Agni, give us a ship for our vehicle and house, with constant oars and quarters, which can take across our heroes and benefactors and our people to safety[45].

Quotations given from the Rig Veda are typical references. We have references to rivers flowing to the sea, to the Earth being bounded by several seas, to travel on and across the sea, and to the

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[38] Rig Veda, IX.84.4.

[39] Rig Veda, X.63.15-16.

[40] Rig Veda, VIII.89.6, VIII.34.18, VII.30.2.

[41] Rig Veda, V.52.11, VII.6.7, V.75.3.

[42] Rig Veda, X.24.6

[43] Rig Veda, VIII.5.30, I.124.7, IX.65.22.

[44] Quoted in Marine Archaeology of Indian Ocean Countries, ed.S.R. Rao, 1988, National Institute of Oceanography, Goa, p.13.

[45] Rig Veda, I.140.12.

images in Vedic mythology of an oceanic cosmos. Indra is frequently referred to as the sea. Varuna, a main Vedic God, is specifically the God of the sea. Soma is commonly referred to as the ocean, as he is a watery God. Agni, the God of fire, has an oceanic form. Even the Sun as the source of the cosmic Waters is compared to the ocean.

Other specific ocean and water deities exist. The Gods are compared to ships and their saving action is said to be like a ship. There is perhaps not a single Vedic God or group of Gods that is not somewhere related to the ocean or ships. In addition, the Vedic sages and ancestor figures are often saved from across the sea or descend from ocean Gods like Varuna.

There was thus from very early prehistoric times (5000-8000 years ago) a strong link between Indian civilization and the sea. Rigvedic man also understood ecology. As Vannucci points out, Rigvedic man did not formulate ecological or any other scientific theory in the contemporary sense of the word 'scientific theory'. The question arises as to whether he perceived the principles on which scientific theories were later based.

The answer to the question is that he did study the environment, that he drew practical conclusions from his studies and that his culture was, as all other cultures, strongly influenced by his environment, indeed he reacted to it by developing a way of life systematized down to the minutest daily details of the activities and habits of the individual, of the community, of man's participation in the cosmic drama and in his religious beliefs and life.

The Vedic poets (rishis) saw harmonious movement everywhere. They put to good use the knowledge of nature gained through empiricism and experimentation as well as that borrowed from other cultures. By and large the use that the rishis made of nature, of Earth, of the seas and of cleansing water, was wise. Large scale degradation of the environment by over-exploitation was avoided thanks to the small number of human beings that was then well below the carrying capacity of the ecosystem; also some forms of management of the environment were developed through irrigation, forestry practices and animal husbandry as well as agriculture. The deep respect for the life principle inherent in all living beings, made man one of the many knots of a very complex web, rather than the centre of a universe created for the use and benefit of man himself, as stated by some later creeds. Man saw himself as one of the many elements of the life web; though to his own eyes he was the most important of all he realized that he had to attune himself, his behaviour and his actions to the eternal law of the Universe.

The attitude of identification of ancient man with the world around him as taught by the ancient rishis is evident in the Veda, it reflects man's perception of the structure and dynamics of nature or what we would now call the ecological aspects of the many different environments colonized by man.

To Rigvedic man the oceans were vast and expensive; they were the providers of wealth; they bound the earth; everything flowed into them; they were full of energy and they were an important part of the climatic cycle. Wealth came from maritime trade which had to be linked to roads and other means of transport to give maximum benefit. But above all the oceans

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represented something spiritual to him--they gave him the possibility of attaining bliss. Varuna, the sea God, was also the upholder of Rita (Order).

> The emissaries of Varuna, sent on their errand, survey the two worlds. Upholders of Rita, they inspire the praise-songs of the noble-minded[46].

The making of oceans as sacred meant that they had to be preserved and sustainably utilized as had to be done with the rest of Nature. It is interesting to note that Varuna, the ocean God was the one who upheld Order. Was the constancy of the oceans, both physically and chemically, the reason why the Vedic sages looked at the ocean as the sourse of Eternal Law, of Eternal Order, of Rita? One can only speculate as to the reasons for the Vedic rishis making Varuna, the God of the sea upholder of Rita, Eternal Order. But it is evidence of the deep links that humanity has always had with the oceans.

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[46] Rig Veda, VIII.87.3.

NOTE

During dialogues conducted with various experts in ocean affairs in hearings at Madras, Bombay, Goa and New Delhi various issues emerged (summary of issues and recommendations arising out of the hearings is attached).

Basically with ratification of the UN Convention on the Law of the Sea, the right accrues to India to exploit and sustainably manage 2 million square kilometers of ocean area. This area is rich in mineral resources, energy and food. Its proper exploitation would lead to acceleration in the development process. To enable sustainable development to take place it is necessary to:

    (i)   rouse national awareness regarding the wealth of the oceans;

    (ii)   integrate the ocean sector into national development strategy;

    (iii)   harmonize the activities of the central, the ten

            maritime state governments, and the private sector.

It is suggested that an Ocean Commission be established under a political personality to dialogue with the central government ministries, state governments, industrialists, scientists and academicians and thereafter to submit recommendations for the consideration of the National Development Council.

The Department of Ocean Development should act as the secretariat of the Commission.

Gandhian Economics, the Environment and

Sustainable Development

by

Krishan Saigal, Executive Director

International Ocean Institute, Malta

Gandhian Economics, the Environment and Sustainable Development

Abstract

The paper examines the concept of sustainable development, including economics and the environment, and the relevance of Gandhi's views in this regard. Gandhi lived at a time when the environmental crisis had not become a matter of concern nor had sustainable development become a buzz word. But with his farsightedness Gandhi foresaw that only a nonviolent and nonexploitative pattern of development could lead to sustainability and peace.

Introduction

Environment

The environment, from which human beings draw their sustenance, has been of interest to societies from time immemorial. Primitive man regarded nature with awe. Agricultural societies regarded nature as something to be harmonised with. The rise of the modern industrial system broke the harmonious link between man and nature. The idea of 'mastering' nature took hold of humanity. It is only with the recent widespread perception of imbalances caused by industrialisation, greenhouse gas emissions and the complex set of inter-relationships leading to possible global warming, climate change and consequent threat to human survival that the whole concept of humanity's relationship with nature is being reexamined.

Until recently, as the World Commission on Environment and Development (WCED) states the earth "was a large world in which human activities and their effects were neatly compartmentalised within nations, within sectors (energy, agriculture, trade), and within broad areas of concern (environmental, economic, social). These compartments have begun to dissolve...(and) various global 'crises'...have seized public concern, particularly over the last decade[1]". The WCED goes on to say:

* the planet is passing through a period of dramatic growth and fundamental change;
* the present population of 5 billion could stabilise at between 8 and 14 billion sometime next century;
* economic activity has multiplied to create a $13 trillion world economy which could grow five- or ten fold in the coming half century;
* industrial production has grown more than fiftyfold over the past 100 years;

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[1] World Commission on Environment and Development (WCED), 1987, **Our Common Future,** Oxford: Oxford University Press, p.4

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*   all these have profound impacts on the biosphere as investments take place in houses, transport, farms and
industries and raw material is pulled from the forest, soils, seas and waterways.

The above developments have locked the global economy and global ecology together in new ways. Whereas in the past the concern has been about the impacts of economic growth upon the environment, we are now forced to concern ourselves with the impacts of ecological stress--degradation of soils, water regimes, atmosphere, and forests--upon the economic prospects. Besides the sharp increase in economic interdependence among nations in the recent past is giving way to an accelerating ecological interdependence with ecology and economy becoming ever more interwoven--locally, regionally, nationally and globally--into a seamless net of causes and effects.

This increased interdependence means that environmental issues are likely to dominate the thinking of statesmen, scientists, ecologists and diplomats in the coming decades. The main environmental policy issues expected to grow in scale and importance, both nationally and internationally, in the next 20-40 years are going to be:

-      environmental problems that significantly and sometimes
irreversibly affect vital functions of human societal systems including their spatial integrity, identity and governance capability;

-      the need to deal with environmental threats (i.e. threats to quantity, quality and diversity of environmental wealth) and the mitigation of environmental vulnerability through:

    *   conservation of the endangered environment;
    *   change-over to an efficient economic mechanism that addresses human needs in the context of sustainable environmental management and international parity;
    *   management of environment-related tensions, conflicts and violence;
    *   development of environmental-security related institutions, economics, legislation, rights and values.

The issues arising from the above list of environmental problems requires concerted and coordinated action if violence is not to result. The response at present is to codify/elaborate international environmental law on a consensual basis. But no law or consensus can be sustainable unless there is also the transformation of society and the modification of collective behaviour on a global basis. This is especially so because the perceptions of the developing and developed worlds are at odds as to what is the cause/solution of the present environmental crisis. While to the developed nations control of population, scientific analysis and the prevention of the destruction of fragile ecosystems like tropical forests, mangroves and coral reefs is the answer to the ecological crisis, for the developing world it is the problems caused by the affluent life styles of the developed nations, deteriorating terms of trade, the consequent intolerable debt

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burden and lack of development that need to be addressed.

Basic values

The North-South confrontation, if so it can be called, could only lead to heightened tensions if basic attitudes are not altered so as to lead to nonzero sum solutions. Basic attitudes are patterns of values with which people have emotionally identified themselves, as is shown by the images and metaphors that a culture or society identifies itself with. And basic attitudes imply certain world views which get expressed in the perceived relationship of humans with nature, the concept of a good life etc. A basic attitude, when collectively adopted, prefigures a social paradigm. Based on underlying motives, basic attitudes often remain concealed, and shift very slowly whether at the individual or the collective societal level.

The whole complex of preconscious and conscious societal forces, or ethics and values, is a very intricate phenomena and incapable of being expressed by any simple equation of social dynamics. But global society, including its intricate and multiple structures and value systems, has to move in a particular direction if the issues posed by the environment are to be resolved. This requires a re- explication of attitudes towards nature and the environment.

This is no easy task. There is on the one hand the dominant economic-scientific-technological value system, largely Western in its orientation, but having its resonance in the non-Western world also. In the West a mixture of groups and movements -- environmentalists, ecofeminists, New Age followers and others--are acting as pioneers in an attempt to transform the dominant economic-technological paradigm into an ecologically led one. These movements have their echo in the developing parts of the world where groups and individuals are delving into ancient traditions and practices in order to harmonise developments-- social, economic, technological-- with the requirements of environmental integrity.

Sustainable Development

The concept of sustainable development has gained wide acceptance after it was articulated by the WCED in 1987. In that report WCED defined sustainable development as the ability,

> to ensure that it meets the needs of the present without compromising the ability of future generations to meet their needs[2].

The Chairman of WCED, Gro Brundtland, elaborated on the concept in her Sir Peter Scott lecture in Bristol on 8 October, 1986,

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[2]   Ibid., p.8.

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There are many dimensions to sustainability. First it requires the elimination of poverty and deprivation. Second it requires the conservation and enhancement of the resource base which alone can ensure that the elimination of poverty is permanent. Third, it requires a broadening of the concept of development so that it covers not only economic growth but also social and cultural development. Fourth, and most important, it requires the unification of economics and ecology in decision making at all levels[3].

The concept of sustainable development found global acceptance at the 1992 United Nations Conference on Environment and Development (UNCED). The concept as elaborated by UNCED represents a new paradigm, a new mode of thinking that serves as a guide to action. Achieving sustainable development involves a continuous process of decision-making in which certain questions are asked and appropriate choices and decisions made. Thus there is never an 'end-state' of sustainable development but a process that continuously tries to harmonise the needs of development with those of maintaining the integrity of the environment.

Sustainable development is,

> a process of change in which the exploitation of resources,the direction of investments, the orientation of technological development, and institutional change are made consistent with future as well as present needs[4].

Two ideas are underlined in this definition: (1) the concept of 'needs', especially those of the Third World, and (2) the idea of 'limitations' on the environment's ability to meet present and future needs. Sustainable development requires that 'societies meet human needs both by increasing productive potential and by insuring equitable potential and opportunities for all'[5].

Sustainable development can thus be seen as a continuous process of decision-making guided by a basic philosophy which emphasizes development to improve the quality of life for people (assuring equity in the distribution of benefits flowing from development) and development that is environmentally appropriate, making proper use (and sometimes non-use) of natural resources and protecting essential ecological processes, life support systems, and biological diversity. A necessary element of sustainable development is an integrated decision-making or policy process. Other elements that enhance the likelihood of sustainable development, as suggested by the World Commission on Environment and Development, include a political system that secures effective citizen participation in decision making; an economic system that is able to generate surpluses and technical knowledge on a self-reliant and sustained basis; a social system that provides for

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[3] Brundtland quoted in Blackmore, Christine *Taking Responsibility: Science and Technology*, London: Pluto Press, p.1.

[4] WCED, op.cit., p.46.

[5] Ibid., p.44.

solutions for the tensions arising from disharmonious development; a production system that respects the obligation to preserve the ecological base for development; a technological system that fosters sustainable patterns of trade and finance; and an administrative system that is flexible and has the capacity for self-correction[6].

Technology

In the highly technological culture of today, many, both in the North and South, consider a strong role for technology a sine qua non for tackling the environmental crisis. However technology cannot be considered in isolation from society and culture. The links of technology with society and culture are multi-dimensional. Recent developments in socio-cultural sciences and in philosophy indicate that modern technology can be regarded as a social construct. It expresses the aspirations, desires and needs of influential social groups. This vision stresses the importance of the mental and cultural conditions that prepare the way for technological developments.

Given these new insights, it is not surprising that historians now agree about the inadequacy of the traditional explanation regarding the emergence of the Industrial Revolution and modern industrial society. Today, it seems to be generally accepted that the newly acquired technical knowledge and the inventions of particularly the late 18th and the 19th century followed logically from the changes that man and society had been undergoing for a long time. To put it simply, typical modern phenomena such as the new sense of time, the disciplining of western man and the mechanization of his world view were the prelude to all the technical developments rather than the result of them. They were the fertile soil in which technology could flourish.

Economics: Western

The scientific world view has changed from the Newtonian-Cartesian view to a Einsteinian-Heisenbergian one. Today it is being increasingly recognized that ideas based on the world-views of Descartes and Newton are incapable of explaining the present-day reality. The real world is neither linear nor mechanistic; instead it has all sorts of relativities. In physics, the idea that space and time can be separated is no longer acceptable. Relativity introduces many contradictions and ambiguities into concepts and arguments that, considered from the Newtonian logic, appear perfectly consistent. The Einsteinian Revolution, together with the new Quantum Physics, is slowly but surely making a large number of ideas, held sacrosanct for centuries, increasingly obsolete and irrelevant. Such a revolution in our world-view is not confined to physics only. We see it being diffused to other disciplines and thought-processes as well.

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[6]   Ibid., p.65.

But in economics it is the Newtonian-Cartesian reductionist and mechanistic view that has influenced the discipline. Towards the end of the 19th century, Jevons and Marshall abandoned the term 'political economy' in favour of 'economics'. The former's motivation was that economics sounded much more like "mathematics, ethics, aesthetics[7]". The latter's was that political economy seemed to soil the science with the world of politics and the interests of political parties[8]. Economics, on the contrary, seemed to connote "a science pure and applied, rather than a science and an art[9]".

In recent decades, however, a new look is being given to the pure science of economics. For example Bell and Kristol published in 1981 a group of essays under the heading Crisis in Economic Theory which called for a shift to a more holistic economics[10].

According to Hodgson and Screpanti the proclamation of Bell and Kristol of a crisis in economic theory is an understatement for today 'economics is in chaos'. This is due to recent work in game theory which has raised questions about 'hard core' notions like rationality, the presence of imperfect or asymmetric information, the intrusion of chaos theory into economics leading to mathematical models becoming over-sensitive to initial conditions and the discovery that general equilibrium theory does not lead to unique and stable solutions[11].

Dopfer is of the view that economics needs a holistic approach (based on systems analysis, interdisciplinary research, economics as a subsystem related to other subsystems), a long-run view, an empirical approach based on the concept of political economy with distribution and value being fused into it. In this view of the matter, welfare is not only economic welfare while economic welfare is not only a choice among economic (marketable) commodities[12].

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[7]   Jevons, W.S., 1879, The Theory of Political Economy, 2nd. ed., London: Macmillan.

[8]   Marshal, Alfred and Marshal, Mary, 1879, The Economics of Industry, London: Macmillan, p.2.

[9]   Marshal, Alfred, 1920, The Principles of Economics, 8th ed., London: Macmillan, p.36.

[10]   Bell, Daniel and Kristol, Irving, 1981, Crisis in Economic Theory, New York: Basic Books.

[11]   Hodgson, G.M. and Screpanti E. (eds.), 1991, Rethinking Economics: Markets, Technology and Economic Evolution, Hants, U.K.: Edward Elgar.

[12]   Dopfer, Kurt, 1976, "Towards a New Paradigm" in Economics in the Future, Kurt Dopfer (ed.), London: Macmillan.

Kapp takes the case of modern agriculture to make the point that the trend towards technology and mechanisation have made agriculture shift from a diversified system of growing food to a monoculture and made heavy and increasing demands on scarce resources especially petroleum and electricity. This has led to a dichotomy between financial returns and returns in forms of energy consumption[13]. This calls into question the use of exchange values as organising principles of economic systems especially when such values are incompatible with the requirements of ecological systems. Kapp goes on to say:

> As our discussion of modern agriculture has shown, the appropriate unit of analysis is neither the individual farm, nor the national farm economy, nor a particular ecological system. The relevant unit of analysis is much larger and the time span that counts is much longer than those in terms of which business enterprise and economic science have traditionally perceived and defined the notions of efficiency, rationality and optimality[14].

The answer according to Kapp is a systems view of the economy which makes it possible to deal with the dynamic interactions between economic systems and the whole network of physical and social systems. This approach by its very nature, would be multi-dimensional, multi-disciplinary and integrative.

Economics: Gandhian

Since the concepts of economics and modern technology largely grew in the context of the value systems of Western society, the question of their utility for non-Western societies arises. One of the earliest non-Western thinkers to think of the problems that modern industrialism posed for a non-Western society, in this case the Indian one, was Gandhi. His concept of the utility of Western thought in the realm of economics and technology for Indian society arose out of his concern for having a society free of violence and based on the twin concepts of Truth and Nonviolence.

The Gandhian critique of mainstream economics has been expressed by Sethi, a prominent Gandhian economist, as follows:

> At the level of practice, economics has become more and more anti-humanistic. In the

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[13]   Kapp, K.W., 1976, "The Open-System Character of the Economy and its implications", in Kurt Dopfer (ed.) ibid. According to Kapp, while a Chinese wet-rice farmer gets for each unit of energy expended 50 units of energy in return, in the U.S. for each unit of energy expended only a fifth is got in return. This is for a U.S. system which has a very 'good' profitability and cost-benefit ratio.

[14]   Kapp, ibid., p.96.

name of efficiency, productivity, good management, and reasonable return on capital, the corporate sector, with its growing monopolistic and oligopolistic and transnational character, has become the centre not only of economic power but also of the draconian and violent political power. The countervailing power of the state economic sector, instead of countervailing the corporate sector, has become its ally. The alliance, however, is losing its legitimacy because it has failed to tackle the major economic issues of unemployment, poverty, inflation, inequalities, etc. Besides, the rise of new problems such as pollution, ecological imbalances, exhaustion of natural resources and massive diversion of resources to nuclear armament etc. - problems which were kept separate -- now demand a joint solution[15].

Sethi goes on to say that explosion of knowledge and rapid progress in technological development, instead of solving old problems, is creating new ones. Technology has taken the place of philosophy and threatens to become the supreme value. The result is that technology is looked upon as the answer to the crisis created by technology itself. But notwithstanding the developments in the field of science and technology, human organisation lags behind in capturing and controlling their essence with the result that human beings are becoming victims of science and technology. The greater the thrust of new innovations, the greater is the threat of human enslavement.

Sethi also refers to created and natural wants and the impacts of this on social welfare. With wants divided between those which are natural and those which are created, the question of rational and irrational preferences cannot be sorted out. If the acquired wants are the result of high pressure advertisement which may be genuine or false, it is difficult to say whether social welfare has increased. If one has also to give some weight to the distinction between material and spiritual wants, then the problem becomes even more intractable.

In the world economy, global inequalities, poverty and corruption are increasing. Also

> while the majority of the people of the developing world are sinking into misery, their ruling elites enjoy a life of luxury which is the envy of the rich in the developed world. The Third World rulers have no difficulty in accepting or rejecting any of the prevailing models or theories emanating either from the West or from the East. It is no accident that they also converge on pushing out Gandhi from the debate and the curricula because of his emphasis on making ethical means the central core of economic theory and practice[16].

Diwan and Lutz have this to say when introducing a group of essays on Gandhian Economics

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[15]   Sethi, J.D., 1985, "Foreword" in Essays in Gandhian Economics, Romesh Diwan and Mark Lutz (eds.) New Delhi: Gandhian Peace Foundation, p.xix.

[16]   Sethi, ibid., p. xxii.

In view of the disappointing relevance of microeconomics, the theoretical problems of macroeconomics and the ad hoc nature of international economics, we believe that there is a basic need to reformulate the structure of economic thought. Such a reformulation would ideally involve the development of microeconomics based on more realistic assumptions, a mutually consistent macroeconomics and microeconomics, and the extension of a new macroeconomics to international economics taking into consideration the realities of the world order. In view of the diversity and variations in cultures, ecologies and environments, this is perhaps an impossible task. However, because of the failure of economics and deficiencies of existing economic ideas, a search for such a reformulation remains most important. This collection of essays is meant to be part of such a search process[17].

It is in a search for new ideas that we now turn to Gandhi.

Gandhi and his principles

Mohandas Karamchand Gandhi was born on October 2, 1869, and this apostle of peace and nonviolence died a violent death, falling to an assassin's bullet on January 30, 1948, while attending a prayer meeting. Gandhi studied to be a barrister in Britain and thereafter was invited to practice law in South Africa. It was there that he conducted his first experiments in nonviolence in opposition to the practice of Apartheid. He refined his ideas on nonviolence later on in India where he led a peaceful movement for independence from British rule.

Today the concepts of nonviolent resistance, civil disobedience, and silent sit-ins are finding general acceptance. The impact of nonviolence is being felt in many ecological movements. A nonviolent movement to save trees, the so-called Chipko movement, was led by a Gandhian, Sunderlal Bahuguna. The movement was pro- women and pro-nature. Its main aim was to save the forests of the Himalayas as their destruction meant women having to walk long distances to collect water and fuel. A major movement against the World bank assisted Narmada dam project is on in the Gujrat state of India. The basic attitude of this movement is Gandhian and the intention is to prevent disruption to the lifestyles of the indigenous tribal population.

Gandhi was one of those rarely gifted individuals in whom the economist, the political scientist, the sociologist and the philosopher were all rolled into one. The product of his genius was a vast system of thought, composed of many sub-systems. This makes it difficult to look at any of the sub-systems, economics, for instance, in isolation.

The entire Gandhian system is based on two fundamental, interrelated principles: Nonviolence and Truth. One cannot understand any of the structural components of this Gandhian system, economics in particular, without understanding the philosophical foundations of the superstructure.

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[17]   Diwan and Lutz, op.cit., p.8.

Also the primary concern of Gandhi in all his thinking was man. His adherence to nonviolence meant that man could not be the cause of the destruction of God's creation. So man had to be considered in a holistic manner including his interlinkages to nature. This is the thinking that underlines the two movements described earlier. Throughout his life Gandhi immersed himself in all aspects of general welfare and the happiness of human beings. Life was conceived by Gandhi as a field of experimentation. "He practised what he professed, and advocated only what he had tested in his own life...every aspect of human betterment, every problem touching human welfare, whether in the field of politics, or sociology, economics or religion, in every walk of life, commanded his attention and active interest. He owed allegiance to a philosophy and outlook that expresses itself in a multi-sided approach to the many sided problems of life; this makes him, strictly speaking, not a mere individual but a universal personality[18]."

In the realm of technology Gandhi advocated decentralised village industry, after himself experimenting with it, not only because of his dislike for industrial technology, but because of his respect for nature. He considered industrial technology as a form of violence as, among other things, it had brought about large scale unemployment and the decline of indigenous skills and crafts in India -- in his view, therefore, a nonsustainable system. He understood, perhaps better than many modern ecologists, the intricate web of relationships between all living things and the physical environment that they share. To him each needed the other and both needed God, which to him was Truth. Also village industry was labour-intensive and led to full employment. We shall deal with this aspect later.

Gandhi's conceptual framework

Gandhi, who was influenced by the cultures of India and England, the religions of Hinduism, Jainism, Buddhism, and Christianity, and the writings of John Ruskin, Leo Tolstoy and Henry David Thoreau, put the peculiar stamp of his genius upon the theory of nonviolence. He confronted the problems of imperialism, industrialism, racism, communalism, classism, and the like, in his own way.

The method of inquiry and mode of action that Gandhi used in his search for Truth is what he called Satyagraha. Satya means Truth and Graha means adherence to Truth. Satyagraha thus means adherence to Truth, or Truth Force.

Gandhi's life was an experiment with Truth (Satya) and the means to achieve the Truth was through Ahimsa (nonviolence). The full force of Ahimsa, explicitly stated, means "action based on the refusal to do harm[19]". For Gandhi, Ahimsa (nonviolence, or love, as he called it) is the

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[18]   Ranganathananda, Swami, 1971, External Values for a Changing Society, Bombay: Bharatiya Vidya Bhavan, p.841.

[19]   Bondurant, J.V., 1965, Conquest of Violence, Berkeley: University of California Press, p.23.

means, and Satya (Truth) is the end, and the debate on the means-end continuum was meaningless, for they are irrevocably tied to one another. "The means may be likened to a seed, the end to a tree, and there is just the same inviolable connection between the means and the end as there is between the seed and the tree...We reap exactly what we sow[20]".

For Gandhi the means to achieve Truth was through Ahimsa, that is, nonviolence or love. Not to hurt any living thing is only a part of Ahimsa, that is its least expression. "The principle of Ahimsa is hurt by every evil thought, by undue haste, by lying, by wishing ill to anybody[21]". According to Gandhi's interpretation of Ahimsa, "it is not merely a negative state of harmlessness but it is a positive state of love, of doing good even to the evildoer. However, neither does it mean tolerating injustice. On the contrary, Ahimsa requires not only resistance but also conversion of the wrongdoer[22]".

If there is a dogma in Gandhian philosophy, says Bondurant, "it centres here, that the only test to truth is action based on refusal to do harm[23]". This is one principle of Ahimsa that Gandhi adhered to until the end. To him the supreme and the only means to the discovery of social truths was through Ahimsa.

Because we covet things and seek pleasure, we are in a constant state of competition, obsessively seeking self-gratification at the cost of others, plus putting ourselves in a state of violence. Hence the fulfilment of Ahimsa is difficult, if not impossible, without self-sacrifice and selflessness. Attachment to personal things and loved ones defeats the overall meaning of Ahimsa. For Gandhi, Ahimsa means universal love; and in its dynamic form it means conscious suffering. It does not mean meek surrender to unjust acts or laws, but confronting the oppressor with a firm conviction and a single-minded honest purpose.

Gandhi kept the Bhagavadgita's (also referred to as the Gita) dictum in mind:

> By reason of delusion man takes wrong to be right. Effort is within man's control, not the fruit thereof. All he has to do, therefore, is to decide his course of conduct or duty on each occasion and preserve it unconcerned about the result. Fulfilment of one's duty in the spirit of detachment and selflessness leads to freedom[24].

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[20]   Gandhi, M.K., 1972, Non-Violent Resistance (Satyagraha) (7th Edition), New York: Schocken Books, p.10.

[21]   Ibid., pp.41-42.

[22]   Ibid., p.161.

[23]   Bondurant., op.cit., p.25.

[24]   Desai, M., 1946, The Gospel of Selfless Action or the Gita According to Gandhi, Ahmedabad: Navjivan Press, p.145.

Gandhi was profoundly influenced by the Bhagvadgita, which shaped his perspective in general and his economic views in particular. In the eyes of Gandhi the Bhagvadgita was a complete and reasoned moral code which satisfied the heart as well as the intellect. He got from the Bhagvadgita the realization that life is given us for service and not for enjoyment. Man has to, by virtue of being a human being, an innate duty to serve Truth by serving his fellowmen and the life process in general. Such action is to be performed as service for the sake of service. It involves self-sacrifice for the welfare of others. By so rising above self-interest human beings fulfil their destiny and become integrated with the true self within us. As we will see shortly, the implications arising from such a view of human nature for economics are both profound and radical.

Influenced, as he was, by different religions, his concern for the welfare of all made him a firm believer in Sarvodaya--man's duty to serve all living beings in the universe. But a selfish, self-centred person would be seeking only self-gratification. Hence, "the path of service can hardly be trodden by one who is not prepared to renounce self-interest....The duty of renunciation differentiates mankind from the beast[25]". Renunciation here does not mean abandoning the world, for that would be cowardice. It means detachment from worldly possessions and desires, so that one can immerse himself or herself in selfless devotion to the welfare of all.

Conventional economics emphasises self interest by building upon the notion of utilitarianism. Gandhi, however, rejected Bentham's concept of the greatest good of the greatest number in favour of the greatest-good-of-all or Sarvodaya. According to him

> I do not believe in the doctrine of the greatest good for the greatest number. It means in its nakedness that in order to achieve the supposed good of fifty-one percent, the interest of forty-nine percent may be, or rather should be sacrificed[26].

> The utilitarian's (sphere of destruction) has no limit. Judged by the standard of nonviolence the late war was wholly wrong. Judged by the utilitarian standard, each party has justified it according to its idea of utility...Precisely on the same ground the anarchist justifies his assassinations. But none of these acts can possibly be justified on the greatest-good-of-all-principle[27].

The aspect of self-sacrifice, as advocated by Gandhi, may be the least acceptable to the Western mind. "Yet, such sacrifice may well provide the ultimate means of realizing that characteristic

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[25]   Gandhi, op.cit., pp.48-49.

[26]   Quoted in Louis Fisher (ed.), 1962, The Essential Gandhi, New York: Vintage Books.

[27]   Gandhi, M.K., 1958, The Collected Works of Mahatma Gandhi, Ahmedabad: Navjivan, Vol.32, p.402.

so eminent in Western moral philosophy: the dignity of the individual[28]". For Gandhi, flowing from his concept of self-sacrifice, society was not possible without individual freedom and dignity. "No society can possibly be built on a denial of individual freedom[29]".

In making a distinction between man and the system, Gandhi highlighted the primacy of the individual. The system, whether it be social, political, economic, or religious, should be geared toward the betterment of the individual. When a system becomes harmful to the well-being of man, it must be mended or ended, altered or abolished[30].

Gandhian principles recognize that the individual is primary and the rest of the social institutions are secondary and are there to serve him. Man, the operator of the system, needs all the help available. Thus, we can have a legitimate quarrel with the system that is evil, but we should have no quarrel or hatred for the people in whose name and by whom the system is operated. Gandhi championed the cause of the underprivileged, and the cause of those to whom palpable injustice may have been done, to purify and regenerate society. "While working for the mending or ending of certain outmoded institutional patterns, Gandhi placed his main reliance upon sensitized consciences, upon regenerated human beings for abiding change in society[31]". His prayer for another was "...not, God give him the light that Thou has given me, but give him all the light and truth he needs for the highest development[32]".

To Gandhi it was evident that only in this way could radical social change be brought about in a nonviolent manner.

Gandhian social order

Gandhi's thought led him to postulate a grand design of an ideal social order: a nonviolent, nonexploitative, humanistic and egalitarian society. This social order embodied the fundamental philosophy of his life. He approached all facets of society--its economics, its politics and

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28   Bondurant, op.cit., p.29.

29   Chander, J.P., (ed.), 1945, Teachings of Mahatma Gandhi, Lahore: The Indian Printing Works, p.21.

30   Mazumdar, H.T., 1952, Mahatma Gandhi: Peaceful Revolutionary, New York: Charles Scribner and Sons, p.41.

31   Ibid., p.113.

32   Nelson, W.S., 1967, "The tradition of non-violence and its underlying forces", in G. Ramachandran (ed.) et al., Gandhi: His Relevance for Our Times, Berkeley: World Without War Council, p.17.

sociology--from the philosophical premises--Truth and Nonviolence--that governed his entire life. For him, therefore, economics could not be 'ethically neutral'. In his own words: "Economics is untrue which disregards moral values. This expansion of the law of nonviolence in the domain of economics means nothing less than the introduction of moral values...[33]". With the appearance of morality in Gandhian economics, we also witness the demise of the 'economic man', the core parameter of mainstream economics.

Gandhi was not an economist in the ordinary sense of the term. In his own way, however, he constructed a model which he claimed to be practical and operational in a given environment. He sketched out, in considerable detail, its basic goal(s), its structure, its components, its modus operandi, its data and its variables. Viewed as an economic system, it has its own management scheme and its own techno-structure. It is not a static but a dynamic model, embodying a Gandhian theory of growth. He wrote: "The end to be sought is human happiness combined with full mental and moral growth. I use the adjective moral as synonymous with spiritual[34]".

He did not overlook the purely material goals in his economic system. Any viable economic system, he insisted, must have the production capability to meet social demand for the basic necessities of life--food, clothing, shelter, and other essential prerequisites for survival. But he rejected the pursuit of economic abundance for its own sake. He considered such abundance, dictated by the multiplicity of seemingly insatiable human wants, as demoralising. He was unconvinced that economic abundance, measured by the physical volume of goods and services, is either a necessary or a sufficient condition for individual or social welfare. On the contrary, an incessant drive for economic abundance, through accumulation, competition, and technological innovation, he felt, would promote economic aggression, exploitation, and violence in society[35].

The production goal of a Gandhian economic system has been stated by Huq as "the maximization of socially necessary goods and services, and the minimization of luxuries and superfluous goods, constrained not only by the availability of scarce resources but also by an overriding moral purpose[36]". The production and consumption of luxuries to stimulate effective demand was repugnant to Gandhian economic philosophy. He was opposed to such 'conspicuous consumption' on both moral and economic grounds.

Another parameter of Gandhi's model was localised production or swadeshi. Modern economics

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[33] Bose, N.K., 1948, Selections from Gandhi, Ahmedabad: Navjivan Printing Press, p.41.

[34] Ibid., p.73.

[35] See chapter on Gandhi in G.R. Madan, 1966, Economic Thinking in India, Bombay: S. Chand & Co.

[36] Huq, A.M., 1985, "Welfare Criteria in Gandhian Economics" in Essays on Gandhian Economics, op.cit., p.68.

stresses individualistic mobility and competition on the basis of self-interest. Gandhi's doctrine of non-self-interest, on the other hand, emphasises the social virtues of loyalty and cooperation. No other Gandhian concept illustrates this better than that of swadeshi, the spirit in us which restricts us to the use and service of our immediate surroundings to the exclusion of the more remote.

Swadeshi can be seen as the application of the Bhagvadgita to one's immediate environment. In the sphere of economics, it would give a priority or preference for locally grown and manufactured goods. The doctrine of swadeshi could also be applied to the labour market: Employers are to exhaust first whatever pool of local and unemployed workers there is before hiring more suitable labour from other towns or regions. Similarly, the workers would be more reluctant to leave a local employer in spite of more attractive job offers elsewhere. In short, economic agents living together in a community, region, or country, should first and foremost explore all possibilities to do business with each other before going outside in order to get a better deal. Swadeshi demands the sacrifice of utility for the sake of loyalty. The alleged gains of violating swadeshi (lower commodity price, higher quality, etc.) would tend to be more than counteracted by almost zero transport costs and the (non-market) costs of community decay. At the same time, Gandhi warned that swadeshi should not be made a fetish. Efficiency was also to be maintained. According to him,

> (One) should use only things that are produced by (one's) immediate neighbours and serve those industries by making them efficient and complete where they might be wanting[37].

The foundations of Gandhian economics

We have already stated that Gandhi's is a humanistic and holistic concept encompassing politics, sociology, psychology, ethics, economics and ecology and based on his philosophical outlook. The four parameters of his social philosophy are:

*   Truth exists in and beyond man in an absolute, eternal, and living essence.

*   The purpose of all life and evolution is to realize Truth. For humankind this translates into the need for self-realization, to know one's self.

*   While truth is the end, Ahimsa is the means. Truth and Ahimsa are ultimately two sides of the same coin. One implies the other. Self-realization knows no distinction between ends and means. From this follows the all important principle that we cannot realize truth without giving up the means/ends dichotomy.

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[37]   Gandhi, M.K., 1968, in S. Narayan (ed.), The Selected Works of Mahatma Gandhi, Ahmedabad, Navjivan Publishing House, Vol. VI, p.336.

*   Human truth is always relative. Although we have the innate need to perfect ourselves, no man is perfect. Truth as we can apprehend it is always personal, subjective, and, to that extent, relative to our individual context of culture, history and psychology. In this Gandhi followed the Rig Veda (X.164.46) which states,

Truth is One but sages describe it differently

From these four philosophical parameters emphasizing Ahimsa as the key to the realization of Truth, and stressing the relativity of human perception due to subjectivity and cultural differences, we arrive at the following foundational premises pertaining to Gandhi's economic thought:

*   Economics, ethics, politics, and religion constitute an indivisible whole. As such, Gandhi had no kind words about conventional economics which led to a acquisitive and therefore a violent society. According to him,

> True economics never militates against the highest ethical standard, just as all true ethics to be worth its name must at the same time be also good economics. An economics that inculcates mammon worship, and enables the strong to amass wealth at the expense of the weak, is a false and dismal science. It spells death[38].

*   Economics to Gandhi is essentially the science of human welfare. Its goal ought to be sarvodaya, the welfare of all. Implicit in the doctrine of sarvodaya is the basic presumption of equal dignity of and respect for the life and welfare of every individual. Translated into the sphere of economic policy, it entails top priority for meeting the most basic material needs (water, food, shelter) of everybody before we allocate resources for goods required for luxury consumption and therefore of a lesser importance.

*   The supreme consideration of economics has to be Man. Economic theory that ignores humanity and its needs--material, mental, moral, spiritual--is meaningless.

*   Human welfare economics focusing on man implies the crucial importance of a decentralized social economy. The ideal is a community economy allowing for a living interaction, mutual access, and voluntary cooperation of all its members.

*   Economics has to respect the law of swadeshi. As we saw earlier, swadeshi was to Gandhi one of the most basic organizational principles consistent with Ahimsa.

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[38]   Gandhi quoted in Mark Lutz, 1985, "Human Nature in Gandhian Economics" in <u>Essays in Gandhian Economics</u>, op. cit., pp. 27-53. Much of what follows is based on Lutz's analysis.

Obviously, this basic premise is at odds with both calculated behaviour in an integrated competitive market economy as well as with a highly centralized command economy. Instead, it feeds right into his concept of community economics, or decentralized community planning and of cooperation between all communities at all levels--national, international--thereby leading to a nonexploitative and peaceful world.

* At the very core of Gandhian economics is the concept of rationality. Rather than mere cognitive mental calculations of means. Gandhi broadens the concept to involve harmonious action of body, mind, and soul. Rational action is guided by the inner faculty of conscience which he also calls the inner voice.

From the above foundational premises, can be derived what may be called the seven principles of Gandhian economic thought. It should be kept in mind, however, that unlike the principles of conventional economics, they do not stand on their own, independent of time and place. Instead, they always have to be seen in relation to each other, to their foundational premises, and to the culture and society where they are being applied. The seven Gandhian principles are:

(i) nonviolent ownership - trusteeship: Trusteeship recognizes the right to private property in the means of production as long as it is responsible to the needs of the community. It is sarvodaya extended to the firm. Absentee ownership of capital and land, investment and production violating swadeshi, excessive salaries, and expense accounts are not consistent with trusteeship. Trusteeship is also consistent with workers' self-management provided they act as trustees.

(ii) nonviolent production - appropriate technology: The term appropriate is used to designate the production function that maximizes human need satisfaction. According to Gandhi no technology should be used which economizes on manual labour, while there are unemployed workers in the community. This clearly flows from his concepts of sarvodaya, swadeshi conscience and trusteeship. Besides appropriate technology should do no harm to the body, mind, or soul. Machinery, according to Gandhi, should not be turned into a craze. Mass production, yes, but in people's own homes.

(iii) nonviolent consumption - non-possession: Non-possession follows strictly from Ahimsa. The less you possess, the less you want, the better you are. And better for what? Not for enjoyment of life, but for enjoyment of personal service to fellow beings; service in which you dedicate yourself, body, soul and mind.

Everybody is entitled to the consumption of the basic necessities but the golden rule for the elite and those in power is to refuse to have what millions cannot have and not multiply their wants.

(iv) nonviolent work - bread labour: Throughout Gandhi's writings runs the thread of the importance of work in humanity's personal growth. The doctrine of bread labour was inspired by Ruskin, Tolstoy, and the Gita. According to Gandhi:

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I cannot imagine anything nobler or more rational than that, say one hour in the day, we should do all the labour that the poor must do and thus identify ourselves with them and, through them, with all mankind[39].

Gandhi stressed, however, that bread labour could never be forced on anybody, otherwise it would breed poverty, disease, and discontent.

(v)   nonviolent allocation - cooperation: Gandhi was no believer in competition which more often than not led to violence. He saw in competition the culmination of a material and sensuous paradigm that degraded the population. Competition being predicated on fear and insecurity bred greed and violence. Cooperation, on the other hand, appeals to the human element, our need to serve others.

Yet, Gandhi felt it important to stress that true (nonviolent) cooperation could only take place after provision of the most essential material needs. This is true both of the individual (bread labour) as well as of the village (swadeshi) levels. The problem of scarcity would also be largely dealt with by the institutional features of bread labour and localized economy with both acting to internally reduce wants thereby leading to a harmonious society.

(vi)   nonviolent distribution - equality: Equality meant to Gandhi primarily two things: First, everybody has a basic right to live, i.e., to meet the basic vital needs and live a dignified life integrated in the community with one's fellows. As means to such a goal he strongly denounced charity, the flinging of free meals at people unable to find work, but advocated guaranteed employment for everybody who wants to work. Secondly, equality as absence of exploitation. He endorsed non-exploitative capital labour relations as well as non-exploitation of manual by intellectual labour and above all non-exploitation of the countryside by the city.

(vii)   nonviolence in reforming economic systems: Gandhi was no friend of capitalism. On the contrary, he dedicated much of his life to its destruction. But the destruction of an ideology could not be done with violence. The capitalist had to be redeemed and converted to trusteeship.

It should be clear from the above that the core of Gandhi's economic thought flows from his view of human nature, its needs and goals -- material and spiritual. At first glance it seems that his economic thought is utopian. But a deeper analysis shows that this is not so. Also that some aspects of his thought can be understood even without going into its metaphysical and spiritual ground. This is especially the case with his concepts of swadeshi, non-possession, trusteeship, nonviolence, and sarvodaya. Several of Gandhi's other contributions can also be understood and found meaningful without a direct reference to his spiritual and ethical outlook. This is

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[39]   Ibid., p.42.

particularly true of his economic theory of growth and development, as well as his theory of structural unemployment.

The Gandhian concepts have been put into a conceptual-analytic framework more familiar to the economist by Amritananda Das[40]. According to Das, conventional development strategy may be summarized in the following way: Development is to occur by means of capital-intensive technologies replacing the traditional labour-intensive activities and with it the gradual elimination of the limited (and often non-monetary) exchange systems of traditional village economies. In lieu of an economy operating primarily in a rural setting, a modern, urban oriented national or world-wide market economy is expected to emerge gradually. The pull of labour to the city and the concomitant problems of dislocation, displacement and misery, are seen as regrettable, but as an unavoidable temporary cost well worth the long-run gains in efficiency and growth in per capita income and consumption of the masses.

It is here that the Gandhian perspective differs radically and sheds much additional light. Rather than focusing on the growth of the urban sector, Gandhi foresaw the central and ever-worsening problem of the stagnation and decay of the traditional sector resulting directly from such modernization and the single-minded stress on urban, capital-intensive development. By this development, much of the indigenous skills and crafts get destroyed by the new market competition of mass-produced consumer goods, whether foreign or domestic.

Average earnings in the villages declines more than wages grow in the urban cities. Hundreds of thousands can no longer make a living with the traditional sector, and the growing 'structural unemployment' pushes them into the urban slums or 'shanty towns' in a desperate hope of survival. Against this background, the veritable 'kernel' of Gandhian macroeconomics has to be seen as giving priority to investment in the labour-intensive occupations of the traditional sector. Production by the masses replaces mass production.

Similarly, Das points out, excessive population growth is being overestimated as a primary cause of the economic problems of the Third World. Rather, it is a consequence of excessively capital-intensive development bringing with it the mounting structural unemployment and decay of the economy at the village level. Population control programmes cannot be expected to succeed in a population lacking a regular occupational base and caught in a day-to-day, hand-to-mouth mentality. There is simply no room for any type of prudent, self-imposed voluntary restraint in matters of procreation. Moreover, mounting structural unemployment has an unfavourable negative effect on female labour force participation and education, two sociological factors that are found to be closely associated with a decline in the birth rate.

Since the Gandhian development economics see the problem of excessive population growth as chiefly one of a misguided development strategy, the primary focus turns to the issue of a more

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[40]   Das, Amritananda, 1979, <u>Foundation of Gandhian Economics</u>, New York: St. Martins Press.

adequate policy of investment allocation for effectively combating structural unemployment. To create a faster growth in new jobs than the growth in the labour force, available investable surplus needs to be directed into labour-intensive sectors as well as capital-intensive sectors. The latter is necessary in order to assume a sufficiently increased surplus for the years to come. More specifically, the rate of capital accumulation has to be equal at least to the rate of growth of the labour force. But beyond this minimum expansion of the capital goods industries, the bulk of the remaining investable surplus should go towards a revitalization of the village, small-scale, labour-intensive, consumer-oriented sector.

According to Das the Gandhian system raises an important issue: The possible trade-off between output and employment. Gandhi's social and moral philosophy made him lean towards employment rather than output in defining an objective function to be maximised. One of his deepest concerns was the massive poverty, especially rural poverty in India. At the same time, he had better perception of the nature of massive rural unemployment in India than he is given credit for. That type of unemployment is structural, seasonal, and technological, rather than cyclical. Deficiency of aggregate demand has very little to do with that type of unemployment. In large-scale diffusion of supplementary employment through appropriate low-capital-intensive technology and corresponding restructuring of the economy along the lines of decentralization and small-scale industrialization, he saw the only real, feasible, and meaningful approach to the seemingly insoluble problem of Indian poverty.

Apart from economic feasibility, Gandhi's rationale rested on a moral and metaphysical notion of human labour. To him, labour was not just a commodity for sale in the market in exchange for wages to compensate for the disutility of labour. He was reluctant to measure the opportunity cost of work in terms of sacrifice of leisure. In his system, labour had a dignity and a moral substance which was not for sale. This notion he derived largely from the Bhagavadgita. He was especially influenced by the following passage:

> Work is more excellent than leisure;
> The body's life proceeds not, lacking work
> .....If one eats
> The fruits of toil, that thief steals from his world,
> He that abstains
> To help the rolling wheels of this great world,
> Glutting his idle sense,
> Lives a lost life, shameful and vain[41].

This moral and metaphysical notion of work greatly influenced Gandhi's economic thinking, the construction of his economic model, and the specification of its techno-structure. The primary behavioural organizational unit in his model is the individual man or household, and the primary organizational unit is the village. It is essentially a decentralized system where the fundamental

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[41]   Bhagvadgita, Chapter III, verses 4, 12 and 16 quoted in Huq, op.cit.

economic decisions are to be made by the micro-units of the total system -- the village communities. Although the individual, village and the community of villages suggest a hierarchy, at the highest level of abstraction, the Gandhian model is, in essence, non-hierarchical. "In this structure," he wrote in a famous passage, "composed of innumerable villages, there will be ever-widening, never ascending circles. Life will not be a pyramid with the apex sustained by the bottom. But it will be an oceanic circle whose centre will be the individual, always ready to perish for the village, the latter ready to perish for the circle of villages, till at last the whole becomes one life composed of individuals, never aggressive in their arrogance, but ever humble, sharing the majesty of the oceanic circle of which they are integral units. Therefore, the outermost circumference will not yield power to crush the inner circle but will give strength to all within and will derive its own strength from it[42]".

Gandhian and neoclassical economic thought[43]

Gandhi did not build any systematic model unlike neoclassical economic theory. This was, in a sense, his strong point. All models become static with time and after having their full run. Gandhi systematically went about initiating, developing, and perfecting open-ended concepts which were amenable and adequate to produce many models, that is, models for a given context, situation, and society. Though he did not have any system, but he did have a method, if method is defined as a necessary link between ontology, epistemology, and theory.

The Gandhian method was both scientific and moral. But it was "scientific" only in the sense in which Thomas Kuhn has used the phrase. The critique of a prevailing paradigm on the basis of its internal contradictions and empirical evidence is not enough for its rejection unless a new and alternative paradigm conceptually and empirically assumes the force of calling for the rejection of the earlier paradigm. But without a moral dimension it is difficult to prove the superiority or greater validity of one paradigm over another.

As Sethi states:

> What was scientific has become vulgar empiricism. The moral hollowness of the old paradigm and the moral strength of the new one, along with its scientific dimension, have to be established with relevant concepts and methods. In his life and political activities, Gandhi simultaneously adopted both the approaches and only when he was convinced of the double validity of a new concept or paradigm would he call for the rejection of the

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[42]   Gandhi, M.K., 1947, <u>India of My Dreams</u>, edited by R.K. Prabhu, Bombay quoted by Huq, op.cit.

[43]   For much of what follows I am indebted to Romesh Diwan and Sushila Gidwani, "Elements in Gandhian Economics", in <u>Essays in Gandhian Economics</u>, op. cit.

old. In his case we must always make a distinction between the critique and the rejection[44].

The main differences between the neo-classical and the Gandhian system with respect to consumption can be enumerated as overleaf:

<u>Consumption</u>

NEO-CLASSICAL	GANDHIAN
Resources are limited and wants are insatiable	Resources are abundant enough to satisfy needs of all in a comfortable way
Consumer's goal is to maximize utility	Consumer's goal is to satisfy needs
Consumption is budget-determined	Consumption is need-determined
More is better and desirable for its own sake	More is desirable and better only to a point of freedom from drudgery, discomfort, and arduous labour
Multiplicity of material wants becomes the aim of life	Restraint on material wants is the aim of life

In the sphere of production, the Gandhian system draws a distinction between basic and luxury goods. In the industrialised countries, whether capitalistic or marketised Marxist, the non-basic or luxury goods form the larger part. In Gandhian societies--parts of China and Cuba, perhaps, are the only example--, the emphasis is on the production of basic goods. Some non-basic goods are produced. However, a very large percentage of total production is made up of basic goods. The motivation for this emphasis comes both from sheer need as well as from moral and ethical considerations about love, humanism, and self-restraint.

In capitalistic societies, there is the prevalence and encouragement of an exploitative production and technological structure. The earlier slave system of the United States has been institutionalized in the form of technology. Technology encourages and imposes production modes which require specialization and large-scale organizations. An extreme degree of specialization makes work alienating and creates opportunities for exploiting the labour.

In the Gandhian system the production modes cannot be exploitative by their very nature. For

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[44]   Sethi, op. cit., p.xxiv

technological change must satisfy the following three major conditions:

. technology must increase the productivity of the worker;

. technology must not replace the worker;

. the worker must have complete control of the technology.

These are stringent conditions and much of modern research and development does not have these worker-oriented goals. The current Appropriate Technology movements all over the world, however, are attempts in this direction.

It has been argued that production in the Gandhian system is less varied. This is a mistaken argument. It is true that the number of commodities in the Gandhian system is far less. However, there are far more varieties of every commodity produced. The diversity of production in the Gandhian system, thus, is much larger than in a capitalistic system. In the neo-classical system production is divorced from distribution, not so in the Gandhian system.

In the neo-classical system, the concept of social equilibrium leads to a set of static equilibrium conditions in the production, consumption and distribution sectors of the economy. The emphasis is on the efficiency in the allocation of scarce resources, on the maximisation of production and material (economic) gains. In Gandhian economics, the notion of equilibrium is lifted to a much higher plane of thought. His social equilibrium is an optimum combination of material and moral progress through continuous movement towards a nonviolent and non exploitative society founded on equality and freedom from economic deprivation and exploitation[45].

The following details would make clear the distinction between the two systems in the spheres of production and distribution.

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[45]   Huq, op.cit., p.74.

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Production

	NEO-CLASSICAL	GANDHIAN
Goal of the economic activity	Multiplicity and quantity of the production of material goods	To provide work for body and to satisfy economic needs of the society so that its members can fulfil themselves within a harmonious society
Measure of success	GNP and ever-rising standards of living	Absence of starvation among masses
Incentives	Production for the sake of profits	Produce just enough to satisfy one's needs in order to keep one's mind trained and educated for a harmonious growth
How to produce?	Least-cost combination	Full employment of the available manpower
How much to produce?	Restricted only be the production capacity	Constrained by the individual's needs and a socially desirable level
Capital	Essential	Only if it aids human beings
Technology	Essential	Only if it is simple and usable by the masses
Labour	A commodity of production to be exploited	A source of human power which must be utilized for the benefit of its owner

NEO-CLASSICAL	GANDHIAN
Entrepreneur corporation brings factors and agents together for production by buying/paying wage	Trustees bring together agents and factors of production by example and cooperation
The relationship is of employer-employee	The relationship is one of trustees and cooperative workers
Capital is owned by the capitalists	Capital is owned by the community
Capitalists substitute capital for labour in order to maximise profits to the capitalist	There is no substitution between capital and worker as long as it leads to displacement of workers. The function of capital is to enhance productivity without replacing the worker
Risks of production are taken by the capitalists	Risks are taken by the community as a whole
Investments are made by the capitalists out of income from capital and for future profits	Investment is made by the community as a joint decision to improve the quality of life in the community
Distribution is unequal	Distribution is the essence of the system

Gandhi's relevance today

Gandhi's model, though evolved in the context of India as a part of its religious philosophy and social ethos, the Indian fight against the colonial system and the freedom of the country from foreign domination, has elements of general applicability. Eight elements of his model are particularly relevant in the context of contemporary problems and issues under discussion.

Firstly, the emphasis on dignity of human labour. His symbol for labour amongst other things, was the spinning wheel. Its practice imposed an element of self-discipline and the principle of producing something by one-self for one's need. The use of the spinning wheel, before Gandhi used and popularised it amongst men, was essentially used by women in India. By using it, he probably wanted to break the sex barrier in work. Further, when one produces something for one's own use, by the sweat of one's labour or otherwise, one values it more and is less likely to waste it.

The principle of producing materials for one's own use, or by the community for the use of the community, also envisages a decentralised system of production, and what is more important is that the produce is for one's own or the community's use. Consequently, those elements which are detrimental to humans or in the use of materials, unlike in the large scale production system for the market economy, are avoided. With the developments in electronics and biotechnology, such an approach of a decentralised production system for use, by the individual or the community, has again become possible. This, however, would require mass education to enable people to understand and utilise the new technologies.

The second major element in his scheme of things is Ahimsa, non-violence. As a principle, it is not passivity or indifference to untruth or tyranny. It is an assertion that injustice, exploitation, tyranny and falsehood can be fought and defeated without violence. The means of protest could be moral or ethical and used for pressurising the perpetrators of injustice or violence, through public demonstration, through non-cooperation and through suffering, instead of taking recourse to violence. If a recourse to violence is avoided, then the possibility of a dialogue to reach an agreement is possible, even though it may take a longer time. It would also help in inculcating respect for others and for their different points of view.

A society based on the principle of non-violence would not need weapons of destruction and all the resources used for developing and producing weapons of war could be utilised for human welfare. In addition, the total perspective of international relations would change and be based on co-operation instead of competition.

The third element in Gandhi's model is austerity and simplicity in life-style. Simplicity, as envisaged by Gandhi, aims at imposing self-discipline on one self by limiting one's needs and wants and the demand one makes on others. It does not mean living marginally or crudely, what it means is having a few things which one needs and which should be of quality, artistic and aesthetic value. This is the life-style which Gandhi endeavoured to promote in sharp contrast to the consumer culture and the life-style of the affluent elite in India, which was an eyesore to a sensitive soul like him especially in a society where majority of the people lived in abject poverty. A simple life-style would also prevent the colossal wastes which are a part of the consumer culture, and would go a long way in meeting the basic needs of people.

The fourth element of the Gandhian model is, essentially, built around self-control being exercised by human beings leading to the doctrine of non-possession. It also implies, in practice, control of materials. A significant element in it is that it has evolved out of past tradition and takes into account contemporary developments. Its rationality provides a common link between human beings and development and use of materials.

The Gandhian emphasis on self-control and non-possession is in direct contrast to Tawney's model of the acquisitive society[46]. The motive force behind the acquisitive society is the

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[46]   Tawney, R.H., 1921, The Acquisitive Society, New York: Harcourt Brace & Co.

propensity to accumulate wealth composed of goods for current consumption and goods for future consumption. On the positive side, this society has set impressive records in the expansion of productive capacity, advances in technology, exploitation of resources, affluence and abundance of goods and services. On the negative side, the same society has also generated severe strains and stresses on life and powerful tendencies towards and degradation of the total environment -- social, economic, ecological, political, and last but not least, moral.

The dominant principle of the acquisitive society is that "it assures men that there are no ends other than their ends, no law other than their desires, no limit other than that which they think advisable. Thus it makes the individual the centre of this universe, and dissolves moral principles into a choice of expediencies...for it relieves them of the necessity of discriminating between enterprise and avarice, energy and unscrupulous greed, property which is legitimate and property which is theft, the just enjoyment of the fruits of labour and idle parasitism of birth or fortune, because it treats all economic activities as standing upon the same level[47]".

Gandhi shared Tawney's incisive insight into the inherent nature of modern, acquisitive societies bent upon accumulation of goods and multiplication of wants as a never-ending process. He had serious doubts about the ability of modern societies to survive on its present course and was fearful of the high probability of the reconstruction of such societies through eruptions of violence. As an alternative to this path of violence, he offered a set of doctrines for social reconstruction consistent with his fundamental principle of nonviolence. In this set, the doctrine of non-possession holds a pivotal spot. In this regard, this doctrine is both a challenge and a response to the 'acquisitive society'. It is a challenge because it proposes a radical transformation of society through the transformation of the individual. It is a response because it suggests a way to fill one of the most serious gaps in modern society, namely the widening gap between moral progress and technological and other material measures of progress.

The fifth element of the model is swadeshi: The essence of the swadeshi concept lies in the following propositions:

.   an individual, as a consumer will reduce his or her wants. In reducing one's wants, consumption will depend upon the commodities that are, or can be, produced locally by the neighbours;

.   not only will he consume commodities produced, or producible, in the neighbourhood, but also the consumer will make an effort to obtain these commodities from the neighbourhood itself. In other words, the consumer will prefer the commodities produced by an immediate neighbour to the commodities produced by a distant neighbour except when either the immediate neighbour does not produce those goods or refuses to improve the efficiency of production. Only in these cases will the consumer obtain these goods from a distant neighbour;

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[47]   Ibid., pp.30-31

. the consumer will cooperate with the producer neighbour in the process of improving the efficiency of production. In this sense consumer and producer do not generate an antagonistic relationship as they are jointly involved in a cooperative effort.

Translated into economic language, and according to Diwan, swadeshi involves a downward shift in the cost curve for a commodity produced in the neighbourhood or locality[48]. According to him there are a number of reasons why the cost function shifts downward:

. firstly, because the consumer -- a neighbour -- helps the producer -- another neighbour -- there are no costs of marketing, such as advertisements, selling, packaging or providing information;

. secondly, since the production takes place in the community at a local level and the consumer neighbours are helping the producer to become efficient, there is a possibility of skill specialization and thereby reduction in production costs;

. thirdly, the production process employs local materials. This minimizes, if not completely eliminates, the transport costs for both input and the output;

. fourthly, since the materials are obtained from the local sellers, these are likely to be at minimum cost;

. lastly, the labour costs are liable to be low.

The sixth element of the model is trusteeship. Gandhi refused to accept any of the prevailing economic systems, which may be summarized as capitalist, communist, and mixed economy, since all of them produced alienation of one kind or another. He suggested in turn what he called the system of trusteeship. Gandhi claimed that trusteeship was likely to be his most lasting contribution, though the votaries of all the existing systems reject it. Partly it is due to the fact that Gandhi did not elaborate the concept suffiently, and partly because adequate attention has not been paid to it.

Trusteeship has two aspects: Its basic principles and structure; and, secondly, the method to achieve a society based upon the principle of trusteeship. It is the second aspect which has created doubts because Gandhi expected capitalists to relinquish voluntarily their property and act as trustees of the society. But more than once Gandhi made it clear that he was offering a solution or a way out for the capitalists in place of a bloody revolution which they must face if they remain tied down to their wealth and profits. He was also quite emphatic in stating that if the capitalists did not voluntarily surrender, the State is within its right to nationalize their assets. But nationalization to him was only a necessary evil, an intermediate state, which must ultimately

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[48]   Diwan, R., 1985, "Economics of Love" in Essays in Gandhian Economics, op. cit., pp.94-95.

be transformed into trusteeship. This is one of the vital differences between Gandhi and Marx.

Gandhi did not leave behind a model of trusteeship; he only stated the basic principles of its organization. These principles were:

- . no one has any right over property which is a social phenomenon;

- . State ownership of property leads to concentration of economic and political power in the hands of a small bureaucracy which has the monopoly of violence and hence is an antithesis of trusteeship;

- . trusteeship is by definition a communitarian system, a kind of general cooperation of efforts and resources;

- . trusteeship is a system of social self-management and a kind of socialist democracy from below[49].

The seventh element of the model is the imperative of full employment. Gandhi believed in the dignity of labour. He argued that nature has intended us to earn our bread with the sweat of our brow. Anyone who idles away a single minute becomes to that extent a burden upon his neighbours and to that extent commits violence.

To Gandhi, full employment was not merely a means to higher production but an end in itself, that is, to eliminate both the dominance of men over men and violence. Full employment economy--the availability of jobs for all those who are willing and able to work at the going social wage--was to him a prerequisite for the moral and spiritual development of all human beings, especially those who are at the bottom of the social scale.

It must be stressed that the Gandhian concept of full employment is slightly different from the concept of full employment in conventional economics. In conventional economics, full employment is attained when 96 per cent of all those willing and able to work at the current wage rate are able to find jobs. It permits voluntary unemployment, commonly referred to as frictional unemployment. Gandhi wanted everyone to earn his or her bread by the sweat of his or her brow. He could not, therefore, approve of voluntary unemployment. In the Gandhian framework, work does not imply disutility that needs to be compensated by money wages, but is a service to fellow persons. This is its positive aspect, that of enabling individuals to realize their best. Work is yagya or sacrifice and one can realize God through working for one's fellow-beings.

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[49]   For a more detailed exposition see J.D. Sethi, 1985, "Poverty, Alienation, and the Gandhian Way Out" in *Essays in Gandhian Economics*, op. cit.

The eighth element is economic equality. Gandhi maintained that a nonviolent social order has to be constructed on the basis of equality. By equality he meant guarantee of a minimum standard of consumption to all. He argued that everyone must have a balanced diet, a decent house to live in, facilities for the education of one's children, and adequate medical care. True individual freedom--the opportunity for the full moral and spiritual development of human beings--is possible only when the individual is free from hunger and unemployment.

Gandhi accepted the fact that there will be inequalities of skill, industry, intelligence, and opportunity. He recognized that people with talent will earn more. But he wanted them to take only what was required for their legitimate needs and to leave the remainder to be used by the society. He therefore preached the doctrine of non-possession, as he believed that the real happiness and contentment comes not from self-indulgence and multiplication of wants but from self-denial and from deliberate and voluntary reduction of wants.

He wanted the rich and the elite to take an initiative in dis-possession with a view to a universal diffusion of the spirit of contentment. As a practical matter, he was willing to accept, in the transitional phase, income differentials that are considered fair by the society. He proposed to fix a decent minimum living wage and a ceiling for the maximum income that can be allowed to a person in society. The difference between such minimum and maximum income should be reasonable and equitable and variable from time to time, so much so that the tendency will be towards the obliteration of the difference[50].

Policy implications of Gandhian thought

A number of policy prescriptions flow from Gandhian thought. The emphasis of Gandhi is on 'service'--service to one's neighbours, the community, the nation, the world. The current stress on the monetized market economy tends to relegate such activity to the background and to define it as secondary--and this inspite of the fact that even in an economy like that of the United States, nearly 50 percent of services are provided through voluntary, unpaid work! The policy implication is that markets either need to be made more perfect or regulated in favour of voluntary service functions--for example, by recognising the contribution of women, unpaid voluntary workers et al. to the production process and including it in GNP.

The swadeshi principle implies a number of policies. All of these policies will favour the promotion of local producers. They will involve such activities as demarcating the areas of production between local and large producers and discouraging competition between them. They will also involve differential tax and subsidy policies. The existing policy framework has always provided favourable terms to the large producers as opposed to small producers. In many cases, the large producers have been able to withstand the competition from small producers only

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[50] Prabhu, R.K., and V.R. Rao, 1967, <u>The Mind of Mahatma Gandhi</u>, Ahmedabad: Navjivan Publishing House.

because of the tax benefits and subsidies accorded to them in the form of subsidised interest rates, power and other materials. Gandhian economics implies a reversal of such policies.

The proposition of equality implies policies that reduce asset/income inequalities. In many countries the governments have followed income maintenance policies. However, these policies simply counteract the increases in inequalities generated by the biases of imperfect markets. In the Gandhian economic scheme, more forceful policies are needed because the object is to lead eventually to equal distribution of assets. One object of such policies is to raise the costs and prices of luxury goods and reduce the costs and prices of necessities. Gandhian thought leads to a ceiling on personal incomes or wealth.

Gandhi also implies a new paradigm of decision-making. In the past there has been a continuous growth in hierarchy and thereby an increase in the power of people at the top of this hierarchy. Hierarchy and bureaucracy have grown not only in the government but in all other walks of life, including such professions as business and education. Gandhian thought suggests a need to reverse this trend.

Gandhi noted that one of the major sources of maintenance of privilege lay in the high elasticity of consumption of luxury goods. Given the aim of Gandhian thought to reduce privilege, an important policy presumption will involve reductions in the luxury elasticity of production. This has to do with the structure of production. If the production structure remains biased towards basic goods, luxury elasticity of production will keep on falling[51].

Critique of the Gandhian model

The Gandhian model is often criticized on the ground that it is anti-industrial and anti-advanced technology and so a feudal tradition-oriented, static, agrarian model. However this criticism is both unfair and superficial. Gandhi never expressed unqualified opposition to industrialization and modern technology. He was opposed to developing the Indian economy industrially along the same lines as the Western one. Such industrialization, he feared, would spell disaster--moral, economic, social, and political.

Gandhi, however, favoured limited, selective, and socially controlled industrialization: Large-scale, heavy, capital-intensive industries, centralized but strictly under public control, and decentralized, small-scale industries to diversify the village economic base. Such a mixed pattern of industrialisation he considered to be responsive to the needs and welfare of a nonviolent society, dedicated to moral and material progress. Writing in the Harijan, he states

> I do visualize electricity, ship-building, iron-works, machine-making and the like existing

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[51]   For a detailed analysis based on conventional economic analysis see Romesh Diwan, "Economics of Love", op.cit. The mathematical analysis is at pp.103-106.

side-by-side with village handicrafts. But the order of dependence will be reversed. Hitherto industrialization has been so planned as to destroy the villages and village crafts. In the state of the future, it will subserve the villages and their crafts. Nothing will be allowed to be produced by the cities that can be equally well produced by the villages. The proper function of the cities is to serve as clearing houses for village products[52].

Likewise, he was not opposed to technological innovations per se. He recognized that technology has its place and that, wisely used, it can make significant contribution to social welfare. But he was strongly opposed to indiscriminate use of technology which might lead to monopolistic exploitation and displacement of labour.

Again, all through his strictures on technology, his humanism shines through. "The supreme consideration", he wrote, "is man. The machine should not tend to make atrophied the limbs of man[53]."

He was equally concerned about the effect of machines on the human mind. He saw in modern machine technology a powerful, dehumanizing force that alienates man from his product, from his community and, most insidious of all, from himself. Yet, the techno-structure of the Gandhian model of the village economy would not rule out limited use of modern technology. He was receptive to the positive role machines can play in reducing the burden of human drudgery and in increasing labour productivity without degrading the human mind. Of necessity, such machine technology has to be highly selective, controlled, and subservient to higher needs than the simple economic need for efficiency.

Another criticism has been that the self-reliant rural society is without any indication as to how it is to be linked with larger groupings, that of a nation-state and the international system. Further, how to fit in larger transnational systems, such as transportation and communication systems, into the model. Or how to create and support scientific and technological research which has international dimensions and requires international support. The criticism is made that such a system would also lead to localization and narrowing of outlook as it would only tackle local problems.

This criticism too is misconceived and misplaced. Gandhi was not against linking up the village communities with the international community through 'every widening circles' and in a non-hierarchical way. What he was against was internationalisation which led to domination, dependency and the destruction of traditional societies. He wanted people to live in communities that matched their human size and thought patterns; communities small enough to allow genuine

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52   Quoted in Ranchor Prime, 1992, <u>Hinduism and Ecology</u>, London: Cassel, p.66.

53   Gandhi, M.K., 1958, <u>All Men are Brothers</u>, New York: Columbia University Press, p.126

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self-government and sharing of responsibilities. Each community would be joined with others, to form a larger unit, but not so large as to tempt any one individual to abuse power by having too much of it. The larger a democratic group grew the less say the individual or local group would be able to have in making their decisions. Therefore limits needed to be placed on the size of a regional group. Only this way could those at the very bottom of the socio-political scale have a say in decision-making that affected them.

Huq has examined the question of international trade from a Gandhian perspective[54]. Huq analyses what the doctrine of swadeshi (local self-reliance) mean for international trade. He goes on to point out that swadeshi would be anti-international trade only if the concept is interpreted very narrowly and very rigidly--something that Gandhi never did.

Huq goes on to say that Gandhi anticipated such misinterpretation of his doctrine and he wrote: "Even Swadeshi, like any other good thing, can be ridden to death if it is made a fetish. That is a danger which must be guarded against. To reject foreign manufacture merely because they are foreign and to go on wasting national time and money in the promotion in one's country of manufacture for which it is not suited, would be criminal folly and a negation of the Swadeshi spirit[55]."

Gandhi was realistic enough to realise that under no circumstances would one country be able to produce all the things needed. And he wrote: "So, though our aim is complete self-sufficiency, we shall have to get from outside the villages what we cannot produce in the villages. We shall have to produce more of what we can in order thereby to obtain in exchange what we are unable to produce[56]."

Huq goes on to suggest that there was a positive doctrine of international trade following from the Gandhian paradigm. The Gandhian perspective leads to the following distinctive features of international trade:

- it accepts the logic of the principle of comparative advantage but rejects it as the sole basis for trade among nations;

- it accepts reciprocal need rather than reciprocal demand as the determinant of terms of trade among nations;

- it postulates an international economic order based on international cooperation

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[54] Huq, A.M., 1985, "The Doctrine of International Trade: A Gandhian Perspective "in Essays in Gandhian Economics, op.cit.

[55] Gandhi quoted in ibid., p.169.

[56] Gandhi quoted in ibid., p.169.

and understanding and mutual need, rather than on market forces and competition;

- it is guided by a purpose higher than the purpose of pure economic gain. That is the moral purpose embodied in his notion of 'service' which was to govern the flow of trade among nations;

- it is an economic doctrine into which is infused the philosophical principle of Ahimsa or nonviolence and non-exploitation;

- it offers maximum protection against unequal distribution of gains from trade among nations in sharp contrast with the impact of the existing doctrine of international trade.

The Gandhian perspective thus leads to a global economic and political order based on nonviolence, non-exploitation and a high degree of international cooperation.

Gandhi's views on the scale factor are the most misunderstood or misinterpreted. 'Small is Beautiful' is a phrase coined in the name of Gandhi. There is no such absolute hypothesis in Gandhi. Nevertheless, though the scale factor itself cannot be evaluated, other things being given, small is better than large. But other things do not remain the same. One cannot produce a railway engine in a shed. Absolute concepts leave one with no choice. But when choice exists, other considerations have to be given full weight. Gandhi was a scientific and post-modern mind. As a searcher and experimenter with truth, he rejected technologies and even scientific research which was repugnant to real human needs just as he rejected those human wants which were detrimental to spiritual and moral development. What he insisted was that technological and scale choices must not be solely determined by economic considerations. Any technology would be acceptable to him if it was found to be consistent with his conceptual system, irrespective of the differences in its productivity components or scale.

Conclusion

In the Gandhian paradigm it is man, and not society or the State, who is the supreme architect of his own destiny. The ways to Truth are many but each person has to proceed towards it in his own way and as dictated by his conscience. For morality is what distinguishes human beings from animals. The path chosen has, thus, to be a moral one.

In relations with others, human beings have always to keep in mind the categorical imperative of nonviolence, that is, while earning their livelihood human beings have to ensure that this was not at the expense of others - whether human beings or nature.

Gandhi also clearly has an ecological orientation. He was led to ecology through his emphasis on nonviolence. Peace in his view was a universal concept. It was not attainable unless harmony -- not only in the social sense between individuals but also in the larger sense as between humans,

animals and plants -- was attained. He was sensitive to the bringing about of a balance between individuals and their environment. His encouragement of the Indian masses to spin cotton for their personal use was not only aimed at instilling self-reliance and self-dignity among them, but also to
preserve the environment while using the minimum of capital. His concept was to shift the emphasis of economics from capital to labour.

The question of the feasibility of restructuring society, national or global, in line with the Gandhian paradigm is invariably raised. There is no doubt a great deal of idealism in Gandhian thought. As Gandhi himself often stated, his thoughts pertain to the 'world of tomorrow'. He was convinced that the 'world of today' is moving toward the 'world of tomorrow'. To him national and global orders based on nonviolence, non-exploitation and high degrees of cooperation were no doubt distant goals but were entirely realisable. What was required, to use modern jargon, was 'transvaluation of values' in modern society. This was to Gandhi an entirely realisable goal.

Sachs in a recent article has postulated five dimensions of eco-development[57]. These are:

> . social sustainability, i.e., greater equity in asset and income distribution;

> . economic sustainability, meaning that economic efficiency needs to be evaluated in macrosocial terms;

> . ecological sustainability, i.e., expanding and carrying capacity of ecosystems, reducing consumption of fossil fuels and waste, increasing self-restraint, and developing technologies which produce low-waste and are resource efficient;

> . spatial sustainability which means attaining a balance between rural and urban areas, reducing congestion and concentration in metropolitan areas, eliminating ecosystem destruction, and promoting modern regenerative agriculture and decentralised industrialisation;

> . cultural sustainability i.e. having ecodevelopment in cultural continuity.

From the above it is quite clear that Gandhi was right when he referred to his vision as being for the 'world of tomorrow'. As we can see, Sach's prescriptions for sustainable development in the 21st Century are a mere subset of the Gandhian paradigm. For to Gandhi these would be only a transitional phase--though an important one--to his vision of a world in which peace and nonviolence prevailed. The question that we need to ask ourselves is, therefore, not the question of feasibility of the Gandhian paradigm in the world as it is but whether there is any alternative to it if the world is to attain Peace (Ahimsa), which to Gandhi is the ultimate Truth.

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[57]   Sachs, Ignacy, 1992, "Transition Strategies for the 21st Century", <u>Nature and Resources</u>, 28(1), 1992, pp.4-17.

Building Partnerships through Information Networking

The experience of the
International Ocean Institute (1992-97)

Introduction

The International Ocean Institute (IOI) is an international NGO devoting itself to helping developing countries sustainably manage their ocean and coastal resources. Through its research, training, publications and conferences it has impacted on decision-making structures, protection of the oceans, environmentally safe technology transfer and capacity building in developing countries.

A background note on the work of IOI during 1967-92, and from which its present activities flow, is at Annex 1.

By 1992, and post-UNCED, the need was felt to extend IOI's outreach both geographically and through languages other than English since the world had become much more complex and new concepts like sustainable development, global governance, integrated coastal zone management, biodiversity, climate change, depletion of the ozone layer etc. were emerging, and they all had very critical linkages with the oceans.

Also although IOI's structure had stood the test of time for 25 years, changes were necessary if it was to meet the requirements of the 1990s and beyond.

So in 1992 IOI moved the Global Environment Facility (UNDP/GEF) for US$ 2.6 million to enable it to consolidate its far-flung operations and to enable it to develop into a networking "system" rather than an "institute". IOI was convinced that this was a necessary response to the needs and challenges of the 1990s: a far-flung system held together by a common philosophy, a common aspiration and a common approach.

IOIs partners

To make the system cost-effective IOI decided not to set up greenfield institutions but to enter into partnerships with existing institutions so that the host institution and IOI could jointly train personnel, conduct region-wise research and hold conferences and seminars. It was in this manner that eight regional centres -in Costa Rica, China, Fiji, India, Japan, Romania, Senegal and South Africa - have been established in addition to the existing ones in Canada and Malta as joint ventures between the host institution and IOI.

A key element in IOIs strategy post-UNCED being to reinforce existing capabilities through active networks for ocean affairs, partnerships were established with the United Nations University, Tokyo, IOC/UNESCO, Paris, the University of Rhode Island, the International Centre for Public Enterprises, Ljubljana, and two

NGOs, e.g., in India the MS Swaminathan Foundation and the Muruguppa Chettiar Research Centre.

The IOI Centres also joined the Train-Seacoast network of the United Nations which, in addition to the IOI Centres in Costa Rica, Senegal, India and Fiji included the Fundacao Universidade de Rio Grande in Brazil, the University of Wales, the Prince of Songkla University, Thailand, ICLARM, Philippines and University of Delaware, USA.

Contacts were also established with United Nations Economic Commission for Africa (UNECA), United Nations Economic Commission for Asia and the Pacific (UNESCAP), the East Asian Seas Programme, South Pacific Regional Environmental Programme, South Pacific Forum, West African Regional Seas Programme, Mediterranean Action Plan, United Nations Environment Programme Ocean and Coastal Areas/Programme Activity (UNEP OCA/PAC) and others with the intention of integrating IOIs research and training with their programmes.

Management of the network

When IOI decided to extend its activities from its two centres to eight new centres in Latin America, Africa, Indian Ocean, the Black Sea and Oceania, it gave anxious thought to how the network was to be managed. This became even more urgent with a growing demand to set up IOI Centres in other regions. On the one hand the globalisation of IOI had its plus side by giving it an extended outreach. The flip side, of course, was the need to manage world-wide operations in a cost-effective manner and without losing creativity or bureaucratising the IOI System.

Administratively, both financial considerations and post-modern organisation theory pointed to a decentralised system held together by an information flow network and a light coordinating headquarters. The traditional organisational design of a pyramidical structure with the headquarters "managing and controlling" the "lower echelons" would obviously not only lead to large overheads and stifle creativity but would be out of step with the post-modern age which favours horizontal and flexible structures.

There were, however, some pitfalls to be avoided in such a design. One was to prevent the mission and philosophy of IOI from being swamped by the missions of the collaborating institutes. Another was to see that all the programmes, research etc., have the distinct multi-disciplinary and practical policy-oriented approach of IOI with quality not being diluted. Furthermore the accounts and finances had to be maintained in a manner that allowed the presentation of consolidated audited accounts of the IOI System. This was necessary for raising funds.

Keeping all the above factors in mind, it was decided to:

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       —   decentralise to autonomous operational centres which were joint ventures between IOI and a partner institution (university, research centre);

       —   provide coordination and the development of a common approach to the system by having representatives of the Centres meet with headquarters once or twice a year to:

            . establish the policy of the IOI System;
            . jointly scrutinise the IOI System's annual work plan;
            . jointly decide on activities to be undertaken in the ensuing year;

       —   maintain contact through E-mail as a supplement to the annual/bi-annual meeting.

Impact of the new System

The result of the restructuring of IOI from an sintitution to a system has been:

       —   the training programmes are now evolving close to where the needs are,

       —   region-specific research is being carried out

       —   a dialogue with decision makers in the region is being initiated on a continuous basis.

Also, the earlier training programmes of IOI have been updated in the light of the new emerging realities. Besides new ones have been developed especially for ecosystem management, environmental economics, small islands, planners, project managers, decision makers, alumni, and trainers. IOI's training activities are being aimed at developing "systems thinking" capabilities, conflict resolution abilities and a wholistic perspective.

Conclusions

The IOI System of partnerships has been in operation for a little over five years, a time too short to fully evaluate it. But some things have already become evident:

    (i)   in the decentralised system there is more creativity and commitment;

    (ii) different cultures and styles of functioning have been integrated into research and training;

    (iii) the "experts" base has been widened by more and more people lecturing in IOI courses;

(iv) synergy has been created by utilising the strengths of
      different institutions.

The main lessons learnt by IOI during 1992-97 are:

−   international NGOs need to act through host local
     partners, governments, and in cooperation with
     regional systems in a decentralised manner;

−   ground-level coordination between regional and
     national agencies, NGOs and institutions is generally
     poor; however coordination can be improved by
     networking and through training which stress the
     enormous value added through integrating sectors,
     disciplines, departments and national programmes;

−   a networking information system is the best way of
     having cooperation among partner institutions;

−   "technology transfer" has to be increasingly replaced
     by human resources development and institutional
     restructuring due to the changing nature of
     "technology" which is knowledge- and information-based
     besides being soft-ware oriented;

−   even if a good partnership system is drawn up a lot of
     effort is required to make the networking system
     effective. This requires inter alia, change from:

          .   "authority based" attitudes to service and
               co-operative based ones;
          .   a structure based system to an information
               based system;
          .   inductive to systematic analysis

−   the basis of a good and lasting partnership is trust;
     and trust comes from confidence in the technical
     efficiency of the other partner. In any partnership,
     therefore, high professional managerial capability of
     all the partners is a must;

−   the System needs to be constantly on the look out for
     new and emerging possibilities. Only this way can a
     global partnership remain relevant in today's. For
     example, flowing from the dialogue of MSSRF last year,
     the IOI System has taken up a project for eco-villages
     in coastal areas (details of project at Annex 2);

−   the System needs to think globally but market locally
     so that socio-cultural differences are taken into
     account;

−   there have to be shared values for the System to be
     held together;

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- ideas and knowledge have to freely flow in the system e.g., dissemination of "best" practices;

- information has not only to be gathered but has to be continiously updated.

DALHOUSIE UNIVERSITY ARCHIVES DIGITAL SEPARATION SHEET

Separation Date: June 17, 2015

Fonds Title: Elisabeth Mann Borgese
Fonds #: MS-2-744
Box-Folder Number: Box 323, Folder 15
Series: Administrative records of the International Ocean Institute
Sub-Series: Publications, drafts, and reports
File: Krishan Saigal: papers and reports

Description of items:

Saigal, Krishan. "Geopolitics and Sustainable Development of the Indian Ocean."

Saigal, Krishan. "The Oceanic System."

Saigal, Krishan. "Politics, Science, Economics, and Sustainable Development of the Oceans."

Reason for separation:

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