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SEMESTER – IV

PAPER – C10T: ENVIRONMENTAL GEOGRAPHY

3. CONCEPT OF HOLISTIC ENVIRONMENT AND SYSTEM APPROACH

GEOGRAPHICAL THOUGHT – BY SUDEEPTA ADHIKARI

Systems Approach and Systems Analysis

A system consists of a set of entities with specification of relationships between them and their environment. It usually contains a large number of entities and the relationships between them imply a high degree of interdependence. The study of systems, therefore, appears to be associated with the study of complex structures.

Geographers have used forms of systems concepts since the dawn of the subject. Despite its venerability, a systematic approach has tended to remain a philosophical concept rather than providing guidelines for practical research. No methods and techniques had been developed to enable the analysis of complex systems in an accurate way before second World War when systems concepts were invoked in descriptive contexts with particular reference to consideration of a balance in nature. The concept of systems is often associated with particular theorizing styles, i. e. positivism or functionalism. However, Williams (1983) observes the relationship between systems concepts and structuralism.

Ludwig Von Bertalanffy (1950) is credited with the development of the general systems theory. It aims to provide theoretical properties of different types of systems. It reflects an attempt to unify science via perspectivism instead of the more usual division of science through reductionism. Its focus is on isomorphism, the common features among the systems studied in different disciplines. Its subject matter is the formulation and derivation of these principles which are common for systems in general. Many of the basic ideas have a long history, but in geography their formal incorporation into a 'metalanguage' occurred during the 1960s. This involved a set of recognizably scientific procedures which could be connected up to those of the quantitative revolution. This also involved a set of concepts which offered the prospect of a theoretical integration of physical and human geography.

R. J. Chorley is the first geographer to have introduced general systems theory in geography. His paper 'Geomorphology and General Systems Theory' (1962) was the first major paper devoted exclusively to a systems approach within the framework of General systems Theory. A major part of the paper is devoted to the application of the concept of open and closed systems to geomorphology. Many of the later works appear to have used the formal procedures and concepts to identify isomorphisms between different types of geographical systems. Ray and others (1974) have applied the concept of allometry to show that the growth rate of a component of an organism is proportional to the growth of the whole. Berry (1964) pointed out that cities are open systems in a steady state, as exemplified by the stability of their behaviour-describing equations. Woldenberg and Berry (1967) drew analogies between the hierarchical organization of rivers and of central place systems.

The most explicit recognition of the general systems theory has come from macro-geography, where Warntz (1973) claimed that, properly understood, geography is general spatial systems theory. The advantages of the general systems theory to human geography lie in its inter-disciplinary approach, its high level of generalization, and its concept of the steady-state of an open system. But it is realised that geography's strong empirical tradition means that it has more to contribute than to take from the general systems theory. However, to Chisholm (1967), the general systems theory seems to be an irrelevant distraction.

Systems Analysis. It is a methodological framework for investigating the structure and function of a system. As a method, systems analysis concerns abstraction rather than truth. The system must be seen as a useful abstraction or model which enables a particular form of analysis to be made. The keystone of the study of systems is connectivity. As Harvey (1969) points out, reality is infinitely complex in its links between variables, but systems analysis provided a convenient abstraction of the complexity in a form which maintains the major connections. A system comprises of three components (Fig. 13.1) :

- (a) a set of elements;
- (b) a set of links (relationships) between those elements; and
- (c) a set of links between the system and its environment.

In a system, the elements have volumetric qualities and material flows along the links. As the system operates, so the various quantities may change. Every system has three basic aspects : structure, function and development. The structure is the sum of the elements and the connections between them. Functions concern the flows (exchange relationships) which occupy the connections. Development represents the changes in both structure and function which may take place over time (Johnston, 1983; Holt-Jenson, 1981).

The structure of the systems can be treated in two separate frameworks—*closed systems* and *open systems*. Closed systems have definable sealed boundaries across which no input or output of energy occurs. Such systems are rare in geographical studies. Open systems, on the other hand, are those systems which have both inputs and outputs of energy to maintain the system (Fig. 13.2).

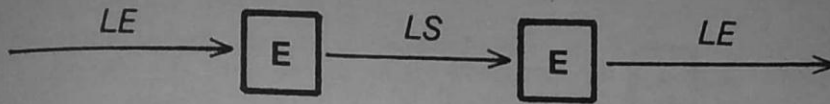


Figure 13.1 Structure of a system. Elements, LS links between elements, LE links between the system and outside environment.

Closed System



Open System

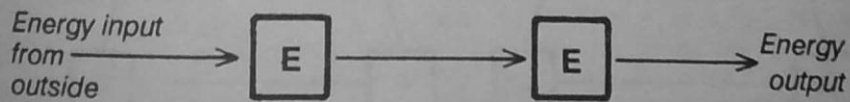
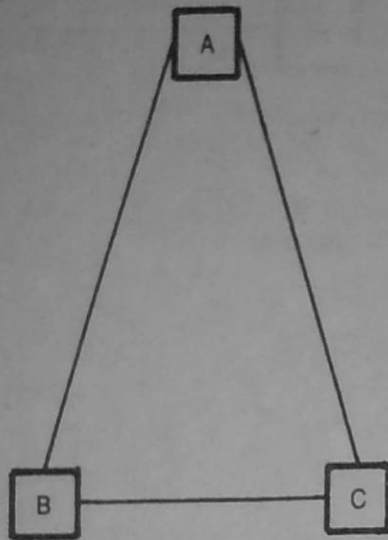
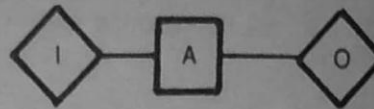


Figure 13.2 Closed and open systems.

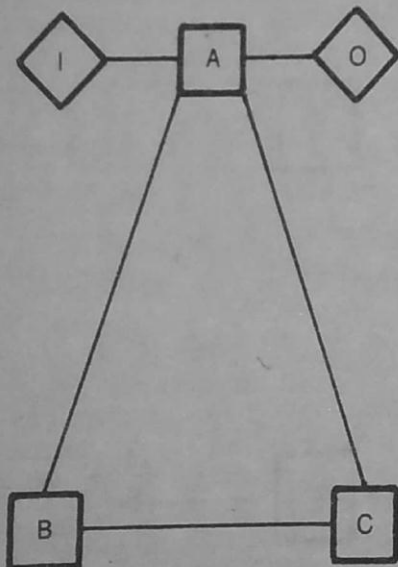
Morphological system



Cascading system



Process response system



Control system

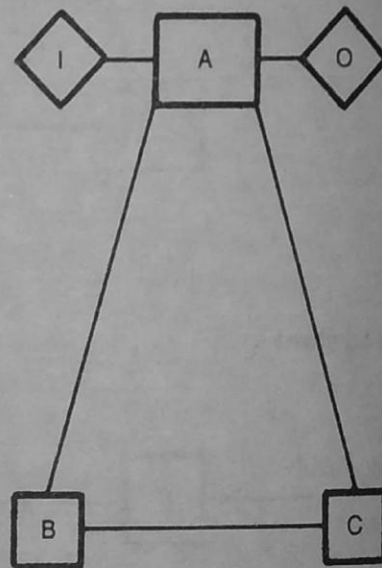


Figure 13.3 Types of systems. A, B and C indicate elements in the system, I input, O output, and in control system A is a value. (Chorley & Kennedy, 1971).

Closed systems are extremely rare in reality but are frequently created, either experimentally or, more usually in human geography, by imposing artificial boundaries, in order to isolate the salient features of a system. An open system interconnects with its surroundings. All real systems (such as landscapes) are open systems.

Chorley and Kennedy (1971) characterise systems in relation to their structures and flows within these structures. In fact, they identify four types of systems (Fig. 13.3):

1. *Morphological systems*, which consist solely of the physical properties of their components and where the relationships between them are expressed through a web of statistical correlations. Much of the spatial analysis outlines such morphological systems.
2. *Cascading systems*, which consist of a chain of sub-systems linked by a cascading throughput such that the output of one sub-system forms the input for the next. Berry (1966) has linked two examples of cascading systems of Haggett's nodal regions and Isard's input matrix representation of an economy in his inter-regional input-output study of the Indian economy. However, factories can be portrayed as cascading systems, in that the output of one factory is in many cases the input for another.
3. *Process response systems*, which are formed by the interaction of morphological and cascading systems. The ecosystem is a process-response system concerned with the flows of energy through biological environments, most of which include, or are affected by, man.
4. *Control systems*, which are process-response systems and which are structured by the intervention of decision making agencies at certain key points (values) so as to alter the disposition of the throughputs in the cascading system and hence change the equilibrium relationships in the morphological system. The ecosystem is also a control system in that the living components act as regulators of the energy flows. They further represent a major point at which human control system must interact with the natural world.

Langton (1972), on the other hand, classifies systems into two types: Simple action systems and feedback systems. Simple action systems are unidirectional in their nature; a stimulus in X produces a response in Y, which in turn may act as a stimulus to a further variable, Z. Such a causal chain is merely a reformulation of the characteristic cause and effect relation with which traditional science has dealt. In another language it is a process law (Harvey, 1969). More important, and relatively novel to human geography, is the 'feedback system', which is the property of a system or sub-system such that, "when change is introduced via one of the system variables, its transmission through the structure leads the effect of the change back to the initial variable, to give a circulatory of action" (Chorley and Kennedy, 1971).

The relationships between entities of the system and its environment can often be characterized as feedbacks. The feedbacks are of two types:

positive and negative. *Positive feedbacks* are self-enhancing mechanisms which seek to enhance, accentuate and reinforce the changes in a system. Such feedbacks push the system farther and farther away from its initial condition. *Negative feedbacks*, on the other hand, are self-regulating mechanisms which counter-balance changes in a system and bring the system back to the state of equilibrium or to a situation which existed prior to the change (Fig. 13.4).

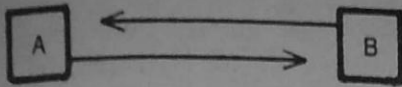
With the positive feedbacks, the system is characterized as morphogenetic, changing its characteristics as the effect of B on C leads to further changes in B, via D. But with negative feedback the system is maintained in a steady state by a process of self-regulation known as homeostatic or morphostatic. Feedback may be either direct—'A' influences 'B' which in turn influences 'A'—or it may be indirect, with the impulse from 'A' returning to it via a chain of other variables. The concept of feedback with associated notions of homeostatics and morphogenesis, gave the nuclei of the systems theory of change. As a consequence, the nature of feedback should be the focus of geographical study.

Bennet (1975) has attempted to apply systems theory to a problem in human geography on the dynamics of location and growth in north-west England. Having represented the system—its elements, links and feedback relationships—Bennett estimated the influence of various external (i. e. national) events on the system's parameters, isolated the effects of government policy (industrial development certificates) on the system's structure and produced forecasts of the region's future spatio-temporal morphology.

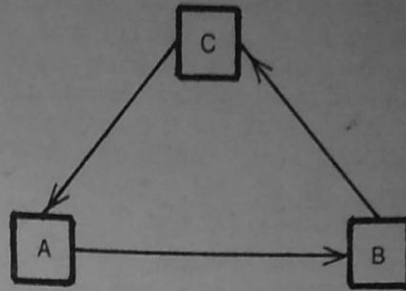
The most comprehensive attempt to forge a systems approach to geographical study has been done by Bennett & Chorley in their book entitled 'Environmental systems: Philosophy, Analysis and Control' (1978) with the intention of providing a unified multi-disciplinary approach to the interfacing of 'man' with 'nature'. The book was prepared with three major aims: "First, it was desired to explore the capacity of the systems approach to provide an inter-disciplinary focus on environmental structures and techniques. Secondly, to examine the manner in which a systems approach aids in developing the interfacing of social and economic theory, on the one hand, with the physical and biological theory, on the other. A third aim is to explore the implications of these inter-facings in relation to the response of man to his current environmental dilemmas. It is hoped to show that the systems approach provides a powerful vehicle for the statement of environmental situation of ever-growing temporal and spatial magnitudes, and for reducing the areas of uncertainty in our increasingly complex decision-making arenas."

The use of systems analysis is based on the assumption (usually implicit) underlying much positivist work in human geography, that valid analogies can be drawn between human societies on the one hand and both natural phenomena complexes and machines on the other. Individual elements in a system have pre-determined roles and can act and change in certain restricted ways only—depending on the structure of the system and its interrelationships with the environment. As a descriptive device, this analogy allows the structure and operation of society and its components to be portrayed and analysed, and it provides a source of ideas from which hypothesis can be generated. And once a system has been defined and modelled, systems can be used as a predictive tool, to indicate the nature of the elements and links following certain environmental changes, such as the introduction of new elements and links,

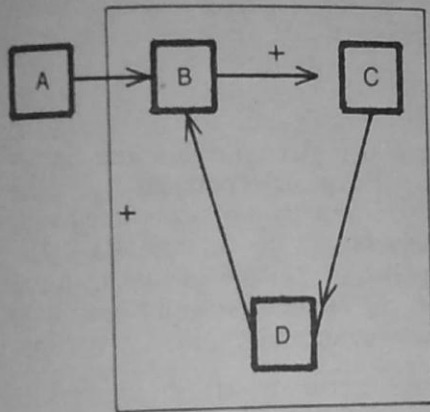
Direct Feedback



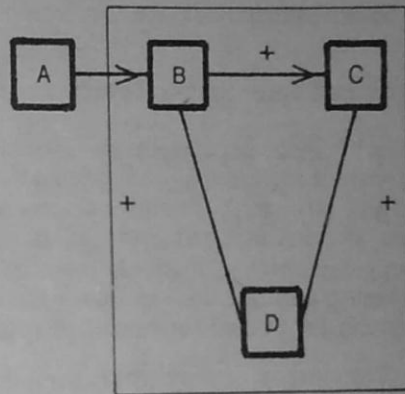
Looped Feedback



Negative Feedback



Positive Feedback



No Feedback

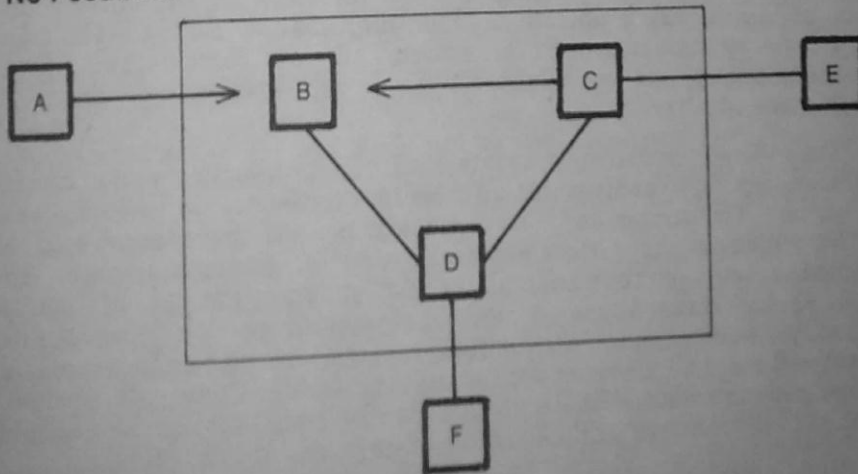


Figure 13.4 Various types of feedback relationships within systems. (Chorley and Kennedy, 1971).

The systems analysis has wide applications in both human and physical geography along with the interface where man and environment interact. Once the system has been successfully modelled, it can be manipulated using control theory which is a dynamic optimization technique permitting optimal allocation along the time horizons and shifts emphasis from mere model construction to model use (Haggett, 1980; Chorley & Bennett, 1981). Such a combination of models describing systems with a theory of systems control has a wide range of potential application in such fields as pollution control, catchment management, inter-area resource allocation and urban planning. It suggests a commonality of interest, focused on methods, between applied physical geography and applied human geography.

Gregory (1978) attempts to criticise both systems analysis and general systems theory on the ground that they are intrinsically associated with positivism. The concept of one systems theory which is relevant for all the sciences may be seen as a fruit of the positivist concept of one science, one method. He is further afraid that prominence given to control system may lead to instrumentalism.

C8T:REGIONAL PLANNING AND DEVELOPMENT

UNIT II:REGIONAL DEVELOPMENT

1. DEVELOPMENT:MEANING,GROWTH VS DEVELOPMENT

CHAPTER 6

PATTERNS OF DEVELOPMENT

Development is a dynamic concept. It has different meanings for different people. In fact, there is no agreement on the meaning of development among planners and thinkers either. Some people say it means increase in income, others lay emphasis on employment, income, quality of life, happiness and so on. Still others give stress on meeting the basic needs of the life of people. It is indeed so many things to so many people. The only thing on which everyone agrees is that development is necessary; and everyone wants it, although in his own image and perhaps in his own way.

Development has been defined as "a process of growth, expansion or realization of potential; bringing regional resources into full productive use." Development planning has also been defined as "any action by the state whose purpose is to raise the rate of economic growth above that which would take place without any conscious effort." Development planning is being done by the state; it has the dual purpose of economic growth and social structural change; it is comprehensive, covering every sector, region and aspect of life. The achievement of a state of development would enable individuals to make their own histories and geographies under conditions of their own choosing. The process of development is the means by which such conditions of human existence might be achieved. They, in turn, would necessarily involve people in a productive, crisis-free and non-exploitative set of relations with nature and in the struggle to remove oppression and exploitation from the relations between themselves. Thus, development is an increasing attainment of one's own cultural values. This conceptualization emphasizes the following notions. First, that development is a process, not a state. Secondly, that process ultimately refers to values. And third, that the values referred to are those of the people involved, not the values of the Western World or any other world. Among the elements of a good or rich life, the following have been stressed by various

scholars, in one form or the other: (a) more and better life-sustaining goods for all, (b) respect for others and self-esteem, (c) freedom from tyranny of any kind, and (d) community life which gives a sense of belonging. These four elements are inseparable from each other. For example, if the first is achieved at the cost of the remaining three, the process could not be called development. Development planning is being done at the national, regional and local levels ascribable to particular societies. In common usage, 'development' has the implications of economic growth, modernization, improvement in levels of material production and consumption, and changes in social, cultural and political structures to resemble more nearly those displayed in countries of economics deemed 'developed.' Many of the attributes of development under this definition can be quantified by reference to statistical details of national production, per capita income, energy consumption, nutritional levels, labour force characteristics, and the like. Taken together, such variables might calibrate a scale of achievement against which the level of development of a single country may be compared.

Approaches to Development

Development is a continuous process which changes in space and time. There is a debate going on all over the world, especially in the under-developed and developing countries, about the nature and approach of development. The major approaches and dichotomies of development are:

1. Growth versus distribution
2. Agricultural versus industrial development
3. Urban versus rural development
4. Capital-intensive versus labour-intensive development
5. Centralization versus decentralization
6. Modern versus traditional development
7. Socio-economic versus physical planning

1. Growth versus Distribution

There is a strong controversy among the planners and decision-makers about the economic growth and distribution strategy. In other words, some of them support the idea that economic growth should be measured in terms of gross national product, while the others advocate for distributive justice and improvement in the quality of life of the people. None of the strategies can be individually accepted as the correct

approach for planning. A blending of the two is required.

"Planning must aim both at utilizing more effectively the resources, human and material, available to the community so as to obtain from them a larger output of goods and services, and also at reducing inequalities of income, wealth and opportunity."

There are many social scientists and economists who argue in favour of "growth first and distribution next." This strategy suited the interest of the ruling elites of the 'developing countries' as it suited the interests of the aid-giving countries. All, including the poor, were exhorted to join hands to let the economy take off the ground. Once the growth engine started moving, everyone's interests could be taken care of. What was needed was production and more production. The 'invisible hand' would take care of the distribution aspects in the long run.

Some scholars supported the idea of Basic Minimum Needs (BMN). Others have refuted this idea. According to them, it is hard to prove that poverty has increased in the less developed countries (LDCs) first because enough emphasis was not laid on the BMN. In fact, if India had not developed a strong industrial base, there would have been more poverty both in the absolute and relative terms. To grow more food, India needed fertilizers, steel, irrigation, chemicals and agricultural research. All these needed a strong industrial base. Both the Republic of Korea and Taiwan were able to remove poverty only because of industrialization. The political and social problems, emanating largely from the large-scale penetration of capital from abroad, was the price they paid. And the countries which refused to pay this price did not grow that fast and had to live with the 'gift' of poverty which the western democracies gave them during the colonial era.

The main problems that the developing countries are facing is the shaky foundation of their statehood. International geopolitics is in full play to destabilize these countries. The facts show that the Gross Domestic Product of most developing countries has grown only at a snail's pace during the last four decades leading to greater poverty and pauperization. The developing countries therefore need rapid economic growth as they need equally rapid social transformation. They have to create a strong industrial and technological base to protect themselves and to develop their potential and latent resources. While doing this they have to lay adequate emphasis on equity and justice to ensure rapid improvement in the economic and social well-being of the poor. This is

possible neither by pushing a purely growth-oriented nor by a purely BMN—oriented development strategy.

It is in the interest of the developing countries to pay equal attention to the Gross Domestic Product (GDP) and basic needs. Much depends on specific circumstances and needs. In fact, it is the judicious blending of the GDP and BMN that is the need of the time and each country will have to find its own blend.

2. Agricultural versus Industrial Development

The debate of agricultural development versus industrial development is also quite old. It, however, became a major development issue in the developing countries after the Second World War. Interestingly enough the developed countries emphasized agriculture on the ground that most of the developing countries had shortages of food which were likely to increase with increasing population. The logic presented was that the majority of the people of the developing countries are engaged in agriculture and allied activities. And hence they are better trained for agricultural pursuits. Additional investment leading to more productivity in this sector would naturally increase the earning capacities of the majority of the people. Moreover it would save and increase needed foreign exchange which could be utilized for developing other sectors. Foreign aid could provide the technical knowhow and other requirements to boost agricultural production. The past experience of the developed countries also indicated that agricultural development must precede industrial development.

As against this, the opposite view gave primacy to industrialization. Here again the basis was the experience of the developed countries. It was the industrial revolution that changed the face of Europe, U.S.A., and later of Japan. Hence, the developing countries should also follow that path. There was not much concern about the style of industrial development. Everyone appeared to be convinced that the road to industrialization could be no different from the one followed by developed countries. All that was needed were massive investments in basic industries, power, projects, machine tool industries and so on.

The above controversy was closely tied to the debate concerning balanced versus unbalanced growth. It was argued that growth impulses could be successfully generated only in some leading sectors of a nation's economy. The lagging sectors took time to catch up. And hence, the major investment should go to those sectors which showed a

higher capital output ratio. Additional resources generated from these leading sectors could be used to uplift the lagging sectors in due course.

The counter argument was that in a developing economy only a few sectors were able to absorb modern technology. If much of the resources were diverted to them, the remaining sectors which formed the major component of the national economy would act like millstones around the necks of the leading sectors. Moreover, all sectors of the economy were so inter-linked and inter-dependent that it would be difficult to lift one sector up, neglecting the others. And hence the need for a balanced growth policy.

The controversy centering on balanced versus unbalanced growth was extended to spatial spheres also. One group advocated a spatially selective investment pattern while the other, a spatially balanced pattern. The advocates of concentrated development found the growth pole theory a handy tool to rationalize their stand. The growth pole theory became the rallying point for many of the growth economists, and almost every developing country opted for the growth pole approach to industrial development during the 1960s.

The adherents of the growth pole theory and industrial fundamentalism were convinced that development was essentially spotty. It could not be started everywhere, given the limitations of resources, and hence must be promoted in selected sectors and places. In the course of time the growth impulses could move to the remaining sectors and areas leading ultimately to the development of all the sectors and regions. They depended on what is popularly known as the *trickle-down process* of development.

The so-called Kuznet's hypothesis suggesting that in the initial stages of development income disparities between the rich and the poor would increase but in the long run decrease provided the rationale for concentrated development. The message was that the poor must endure the growing pains of development and accept increasing poverty in the hope that in the ultimate analysis their incomes were bound to rise. In the short run there was nothing that anyone could do about them !

Irrespective of the arguments advanced, experience shows that neither the so-called balanced nor the unbalanced approach could be used by any developing country as a matter of principle without further accentuating its development problems. The developing countries needed both the approaches depending on the specificity of circumstan-

ces. None of these either singly or jointly could be adopted as a matter of principle because there is nothing like a single development situation in the world.

3. Urban versus Rural Development

The controversy centering on urbanization as against rural development as the means to achieve development objectives is not new. The debate has two main thrusts: (i) which among the rural and urban styles of life is better for mankind, and (ii) which (urbanization or rural development) should be the strategy to develop the country.

It is now generally accepted that the old archaic and traditional rural environment are not conducive to development. It needs transformation in tune with the current needs and achievements of man. Mahatma Gandhi, the greatest proponent of rural development, did not want Indian villages to remain steeped in traditions. He wanted them to change. He did not like large cities because they did not fit in his holistic and organic scheme of human development. Gandhi wanted total transformation of villages in India not by forcing people to migrate to large cities but by developing them from within into viable units.

The western concept of economic growth, with urbanization and industrialization as its main ingredients, is essentially anti-rural. Large-scale manufacturing requires large cities which could provide skills and other infrastructures needed for mass production. Urbanization is, therefore, taken as an indicator of development. The larger the urban component in the national population, the greater the development, so say the development experts.

Most of the developing countries were convinced that urbanization was the answer to solve their rural problems. Mechanization of agriculture would release a quasi-employed rural labour force which would be pulled by expanding industries in large urban centres. New industrial growth poles and centres were created to build additional capacities to absorb labour and to meet the growing demands of other sectors of the economy.

By the late sixties it became obvious that there were limits to industrial growth. There was neither enough local market for many industrial products, nor were the developed countries prepared to assist developing countries in creating a strong industrial base. Developed countries were prepared to accommodate the needs of the developing countries only so long as such needs did not affect their own interests.

The disenchantment with past experiences is visible in all developing countries but it is more so in those countries that are predominantly rural and where rapid population growth has canceled out any marginal increase in the income and earning capacities of the poor. Since a majority of the people of these countries live in rural areas, there is a growing demand to reinforce rural development processes. In Asia and Africa especially, the need to tailor development strategies to rural development needs is felt more acutely in the rural areas where population growth has or is beginning to exceed the carrying capacity of land and environment; where real wages have been almost stagnant; where socio-economic structural changes have been slow; and where past development efforts have left much of the poor peasantry with diminished access to the means and ends of development.

During the fifties and sixties, planners and policy-makers considered rural areas to be transitional; they thought they would disappear as the urban-industrial development process engulfed them. But experience shows that rural areas with their attendant problems are there to stay. There will be more people living in rural areas in 2000 A.D. than in 1980, the current rate of rural emigration notwithstanding. Country after country realized that the answer to the problems of development was not necessarily urbanization and industrialization after the pattern of western countries. It was rather in the self-reliant development process—a process that combines the experience of others with the genius of the local people to make the optimum use of available knowledge, technology and resources.

This *volte-face* in approach to development raises quite a few questions. Is it possible to develop rural areas without urbanization and urban areas without rural development? Is there any country in the world which has developed relying solely either on urban or rural development? Are poverty and under-development divisible in clear-cut rural and urban components? If the answer to these is no, then the problem has to be posed differently. The issue is not which to develop first, rural or urban areas; it is rather how to develop both in order to meet various national, regional and local needs. As stated earlier, most developing countries are still in the process of consolidating their newly acquired independence: they have yet to become cohesive nation states. Many of the large urban centres become rallying points for entrepreneurs to work together to provide an economic base on which a poor country can

develop. In between these few large urban centres and a large number of rural settlements, are small and intermediate towns which offer a quality of life which is no better than that found in rural areas. These towns bridge the socio-economic gap between small villages and large urban centres. It is wrong, therefore, to say that there is urban bias in development policy. If there is any bias it is in favour of a particular pattern. It is clear that a large chunk of the rural population in developing countries will continue to live there in the foreseeable future. Urbanization cannot absorb them because modern industries cannot employ so many people and the informal sector of the urban economy has its own limitations. The only way to raise the standard of living of the rural population is, therefore, rural development, which in essence means increased productivity of agriculture and related activities and a more organic link between rural and urban functions.

In fact, the whole development process should be so articulated that urbanization should promote rural development and rural development should back up urban development. The merging of the two processes should lead to a kind of situation in which the gap between urban and rural areas in terms of income, productivity, social services and quality of life in general is substantially narrowed. It is the task of the developing countries to promote the kind of urban-rural transformation described above and to avoid a dichotomous development of the two sectors advocated by urban and rural fundamentalists.

4. Capital versus Labour Intensive Approach

Whether the developing countries should opt for modern technology or should rely on 'appropriate' technology is another major point of debate. There are those who want developing countries to skip over technological research and development by acquiring the latest technology from developed countries. They point to the advantages of being latecomers in the race for development. These advantages they say should be capitalized to the maximum extent.

On the other side of the spectrum are those who want technology to fit the available human skills. They want developing countries to use appropriate technology which, in the context of "unskilled, illiterate and poverty-stricken population," means simple tools—bullock-cart, improved plough, hand-pump and so on. For them small is beautiful and large is ugly. Such people want to promote simple living and high thinking—village life, agriculture, cottage and small-scale industries, and so

on.

A third group of people would like the developing countries to acquire advanced scientific and technical knowledge, but not the most advanced machines. They want the developing countries to use this knowledge to develop machines most appropriate to the skills and needs of the people. For example, the advanced principles of physics could be used to improve bullock-carts, windmills, water-lifting devices, and so on, rather than to manufacture aeroplanes, steel mills, big dams, and so on. Improvement in simple machines, they say, requires advanced scientific knowledge. Why not apply this knowledge then to those things which benefit the people directly and immediately?

None of these appear to stand the logic of realities and emergent needs of the developing societies. To survive as nation-states, the LDCs must have access to the latest technological knowhow necessary for harnessing their latent resources. But in order that the poor and illiterate who form a majority participate actively in the nation-building process, they should not only tolerate but also promote and improve traditional technologies.

It is not so easy to leapfrog the technological gap as it is made out by some. To leapfrog a society needs an adequate pool of scientists, technicians and engineers. And none of these can be produced readily without a sound technological base. It almost amounts to saying that one could jump from primary school to a PhD course because the intervening knowledge is already available in published form. Developing countries have to create a good foundation for science and technology through institutions of scientific research and research and development. Collaboration among developing countries in this respect is an urgent need in order to bridge the growing technological gap between the developed and developing countries.

To say that developing countries should concentrate and rely solely on traditional small-scale technologies is to deny them the human achievements of the last several centuries. It also amounts to closing the door for innovative faculties of man to grow and flourish. Small is beautiful, but only when it is seen in the light of the so-called ugly big. Is everything 'big' ugly? Even a country such as China which developed a cult of 'traditional technology' had to abandon it, in favour of a more balanced approach wherein the choice is dictated by need and not by dogma.

The dualistic social, economic and technological structures in the developing countries keep a large section of population beyond the reach of modern technology. It is important that traditional technology is promoted for their benefit. That, however, does not mean that modern technology should be neglected. Technology is not a static phenomenon; it is something which is always evolving. The new technology, about which many have objections, is part of the achievement of man. We should not try to throw it away. We should make use of it for the benefit of man.

Allied to the controversy regarding technology is the issue of 'size'. What should be the scale of development projects? Some people think it should be large; there are others who think large projects are too expensive—they require long gestation periods and are not efficient in terms of returns on investment. They prefer small-scale projects.

Here again it appears that the controversy is based on an unrealistic assessment of the problems of developing countries. It should be realized that there is a lot to be done in these countries to harness latent resources. Large rivers have to be dammed, small rivers have to be tamed, bore wells, masonry wells, irrigation tanks, canals have to be constructed to develop water resources. To harness the irrigation potentials of a river, one needs a big dam. At the same time, to harness underground water resources, one needs not have big projects. Take the case of steel manufacturing. If iron ore resources are available, a developing country should develop an iron and steel industry even if steel can be imported cheaply from developed countries. The industry cannot depend on backyard furnaces; it has to have a large-scale mill. Blacksmithy can, however, be done in every village. Similarly, an electronics industry can be operated in small units. In the context of the developing countries, we need both large-scale and small-scale projects. Which project should be undertaken and where, depends on specific situations and needs.

A balanced and pragmatic approach is necessary. The question really is not whether to opt for large-scale or for small-scale projects. It is rather where and when to have large-scale and where and when the small-scale ones. Which gives greater benefit to the people? It is the need and capacity which should determine the choice, rather than fads such as "large is economic" and "small is beautiful".

5. Centralization versus Decentralization

To what extent should the central authorities in a developing country

control the economy and polity has been the subject of discussion for quite some time. The general tendency in most developing countries is to centralize the power of decision-making. The advocates of decentralization are, however, not convinced of this, and would like a structure wherein the central authority has only a limited role to play.

It is often said that centralization weakens popular participation which is an indispensable element of development. In the ultimate analysis, development means the development of people—which in effect means enhancement of their ability to make the right decision at the right time and to shape their own future in the light of their enlightened understanding of their environment. None of these could be achieved so long as decisions on matters concerning them are taken by a super agency from above. A decentralized system which allows participatory development from below is, therefore, a must for a healthy society.

Governments in some countries contend that their people are not yet prepared to shoulder responsibilities of development. The concepts of guided democracy and limited franchise have emerged from this contention. Then there are those who would like to decentralize everything here and now. They envisage a government which would emerge from 'active communities' at the grassroots level.

The tendency to make central authorities strong is visible all over the world—both in developed and developing countries. This is to some extent because national states have not yet matured. Many national states or even civilizations have withered away in the past only because the central authorities were weak. At a time when Europe was moving towards the concept of national states—in the mid-sixteenth century—India had a mature national state under Akbar the Great. As the central authority of his empire weakened (mainly because it lost touch with the nation's socio-economic realities) a small band of traders and militiamen were able to colonize the country. These lessons are not yet forgotten by India. Several other developing countries had similar experiences. It may take more time for the fears emanating from these experiences to wither away. Much depends on the progress that the countries make towards a new international order.

Those who advocate a decentralized government structure based on local communities are unrealistic in many ways. In the first place they think of an ideal system of government in which the people are supreme without defining who the people are. Like Plato's Republic, their vil-

lage/community republics are good in concepts but beyond the realm of the present-day realities. Second the advocates of the decentralized system often prescribe it for developing countries as if the economically developed countries do not need it.

Centralization in autarchic forms is bad and so is decentralization in anarchic forms. Neither of them is conducive to the growth of a living society. What we need is a judicious blending of the two. It is rather unimaginative to call for complete decentralization when national boundaries are still in the early stages of consolidation. Only developed countries are in a position to decentralize the governance system and show the way. But they prefer to commend it to the developing countries, for the developed countries have reached a stage where no structural changes are necessary!

It is equally unimaginative and naive to declare that people are not yet ready to shoulder responsibilities and hence a centralized oppressive system of government is a must. Responsible people are not born, they are the product of the social system in which they are brought up. You cannot expect people to behave responsibly in an irresponsible governance system. Responsible citizenry is the product of a responsible society which cannot be created in a day. It has to be consistently nurtured and maintained. Passing on the responsibilities to people to govern themselves is one of the surest ways of creating such a society. People must commit mistakes and learn lessons. They must form the supporting pillars of national reconstruction. Each country must, therefore, try hard to seek that dynamic balance between centralization and decentralization at each stage of development.

"Development from above or below" is another version of this controversy. The inability of most developing countries to generate rapid enough growth to remove mass poverty, led many a theorist to believe that it was because of the failure of central or top-down planning and development. In fact, as in the case of other theories and approaches, the tendency has been to concentrate on those apparent causes and factors which could put blame on the shoulders of the developing countries. Until very recently, most western theorists refused to go into the fundamental causes. The continuing accusation that central planning or top-down development process is the main culprit responsible for increasing poverty in the developing countries is born out of this reluctance.

Those who are opposed to development from above would like the

developing countries to initiate development from below. This reversal of the development gear will help (i) meet the basic needs of the people (ii) ensure popular participation in development, and (iii) mobilize the material and human resources for development on a voluntary basis. Central planning and development from above are processes which treat human beings as statistical units and concentrate on those issues and problems which are of national importance, often ignoring or de-emphasizing those which are faced by the people.

While there is some merit in what the critics of central planning and development from above have to say, their perception of the problem is unrealistic. Development is a complex process—it is a process of societal change. It is multi-directional and must work upwards, downwards and sideways simultaneously. It is not a question of bottom-up versus top-down. It is a question of a judicious blending of the two to meet the challenges faced by developing societies. Neither of them can be used in utter disregard of the other, without further complicating developmental problems. Development is a task which can be accomplished well only when it pervades all aspects and levels of a society. It has to be initiated not only from above and below but also at all intermediate levels.

6. Modern versus Traditional

Yet another controversy figuring in the development debate centres on modern versus traditional dualism. One stream of thought considers development as a process by which traditional thoughts and structures are replaced by the modern ones, while the other attempts to take back the developing societies to their distant past and abhors modernity. One considers traditionalism to be the main cause of under-development while the other blames modernity as the root cause of all evils including poverty in the developing countries.

'Tradition' is often associated with something old and irrelevant to modern society—something which is inward-looking and which retards progress. 'Modernity' is anti-traditional, outward-looking and changing. In common parlance, it is western, and conducive to development. Modernization and westernization are often considered synonymous. As a consequence, when a traditional mode is adopted by the West, it becomes modern. For example, breast feeding was considered bad in the West until about 1960. Mothers in developing countries also switched over to bottle feeding. It became a sign of backwardness. But the moment the western women started switching back to breast feeding, it be-

came a modern practice in the less developed countries too. Another interesting example. Topless dress worn by tribal women was considered traditional, but the same dress worn by western women is modern. Nudity is traditional in the virgin forests but modern on the polluted beaches.

Until very recently, the prevailing mood in the developing countries was anti-traditional. Anything old or traditional was considered bad and antiquated, something to be done away with in order that the modernization could set in. 'Western' was modern. It represented industrialization, high income, high levels of skill and education, individual freedom and an equally high level of 'culture'. Western classics, western music, western art, western modes of life and living came to be admired and anything local and traditional came to be despised. Everything was evaluated by western standards.

The time has come for the developing countries to stop admiring everything that comes from the West. They should look back to their own cultural heritage and try to strike a synthesis which helps them meet the challenges of the twentieth century. To blindly copy the West is dangerous but to attempt to re-enact the medieval life is not only futile but also catastrophic. To look back to one's own culture for guidance does not mean the culture as it originated. The very term culture means something which has been cultivated through time. To be insensitive to time is to be insensitive to one's own future.

7. Socio-Economic versus Physical Planning

The civil engineers and architects advocated physical planning. They call themselves the real planners. They knew something of civil engineering, architecture, and infrastructure planning, a little bit of economics and government, a little less of sociology and political science, and very little of the people for whom they planned. They had a set of formulae for resolving various problems irrespective of locale and people. In fact their main job was to prescribe to the people how they ought to live and to see that those who broke the rules were punished, sometimes summarily.

These 'planners' formed associations such as the Institutes of Town Planners, Association of Planners, Institutes of Environmental Planners, and so on. One of the sole objectives, even though unwritten, of these associations was to keep the entry to the club limited to their own 'species'. In countries such as Canada and India, and may be elsewhere

too, there was a move to debar anyone calling himself a planner unless he had a planning degree from a school of (physical) planning.

With the post-Second World War resurgence of economic planning as the chief vehicle of national development, physical planning lost its original importance. It became part of a much broader system whose main task was to transform the socio-economic life of millions of deprived people through means which were far beyond the scope of physical planning. Economists who were the leading figures in this task, did not deny the significant role physical planners could play in their own spheres such as housing, site planning, construction, and so on but they refused to accept their leadership in policy formulation and overall planning. The Russian experience of central planning and the post-Second World War role of economists in resolving national recovery problems boosted their morale; it is now the economists who are responsible for national planning.

The physical planner was also challenged by the development administrator. Development administrators have the authority and responsibility to get national, regional and local plans implemented. They are, to be fair to them, much closer to people than the physical planner. They now head agencies in charge of urban development, slum improvement, water supply, electricity, and so on which earlier used to be within the exclusive domain of physical planning. It happened because the physical planner was trained neither in policy nor in the management sciences.

The neglect of spatial dimensions in the development process by economists and physical planners alike led to the birth of regional science which had the precision of physical planning and analytical ability of economics. It brought revolutionary changes in almost all social and planning sciences. It tried to quantify everything and a belief that anything that was not quantifiable was also not worth studying was set in motion. It provided the tools to state problems and their solutions more clearly. At the same time, it produced a plethora of literature some of which contributed almost nothing to the understanding of development problems.

Regional science is deeply rooted in classical economics. Its mathematical solutions to regional problems were found by disaggregating the national economy. Regional science, because of its quantitative bias, was not very sensitive to human development issues. Its emphasis that

national income should also be seen in regional terms to ensure a more equitable distribution, did focus the attention of planners to distributive issues, but it did not go far enough.

Regional science did not take root in developing countries, the vigorous promotional efforts of Walter Isard notwithstanding. It caught the attention of a few academics who were trained in mathematical economics, geography and statistics. Others ignored it either because they did not understand it (ignorance breeds contempt) or because it fell short of the planning needs of the developing countries. Regional science now stands cut into pieces and amalgamated with geography, economics, applied statistics and urban planning to give rise to a new discipline called regional development planning.

Until very recently, regional planning was another name for comprehensive urban planning. It meant urban (physical) planning in a regional framework. The impact of national economic planning and management sciences has now made it a discipline which can weave various planning and management sciences together to produce a synthesis most conducive to the evolution of a unified planning discipline.

Until we reach that stage, the fruitless controversy centering on physical versus economic planning continues. There are planners who know economics and nothing more; and there are physical planners who know architecture/civil engineering and nothing more. Both have done a lot of damage to the fields of planning and development. The type of planner we produce today, is too much of an ethnocentric professional more concerned with his profession than with the people. In fact, he is not part of the people; he is beyond them. He understands only a segment of the development process but he blissfully thinks that he knows everything.

While we do need physical planners as we do need economic, social, and other types of planners, but of a different breed. Our needs have changed in quality more than in quantity in the recent past. Now we need planners who can work with the people and not for the people. Development is not something which can be given; it is to be acquired and worked for by those who are to benefit from it. A planner should understand what the people's needs are, what is the direction in which the society is moving, what the national priorities are and how the resources—physical and human—should be used to achieve the set development goals and objectives.