

Economics of Environmental Quality: An Ecological Perspective

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ABSTRACT

This paper examines the nature of man's balance point with environmental forces in the ecological complex. Balancing social costs with market returns within the context of an ecosystem that is increasingly dominated by man's organizations and institutions requires a reassessment of the role of the socio-cultural framework that has been imposed on the biotic system. Several factors that will influence the level of environmental quality are discussed: geographic considerations, family-kinship systems, the planning horizon of society, the type of economic system adopted, and the value system of people.

There is no aspect of society in greater need of study than man in relation to his environment. The importance of such a study is revealed by the present political climate where the emerging goals of the 1970's have been defined in terms of Net National Environment rather than Gross National Product.* This means that the prevailing philosophy of society is moving from an economic to an ecological framework. Economic output in the form of material goods and services is becoming a secondary goal in society's value structure. The concept of an ecosystem that explains man's relationship with his environment is becoming a more pervasive and all inclusive topic, more relevant than in any other time in man's history.

*Exemplified by W. J. Hickel's introductory remarks in a report made to the President's Environmental Quality Council in 1970 (See W. J. Hickel, "The Recreation Imperative," *Atlanta Economic Rev.* Apr. 1970.)

This paper presents an econocological view of the environmental problem. The term econocological as used here refers to economic ecology, i.e., economics in an ecological perspective.* It represents an attempt to integrate economic and human ecology within the complex of an ecosystem that is increasingly dominated by man's organizations and institutions rather than nature's forces. The problem of man and his environment is a matter of the economics of balancing costs and returns to achieve maximum benefits for society. The question is—how do social and economic forces influence this balancing process? Socio-cultural factors are important influences that alter and shape the economic assessment of the environmental problem. Indeed, it is variations in the socio-cultural framework that determines the economic balance point where the incremental costs and benefits of man's productive activity will reach an equilibrium with the environment. This paper examines the nature of this balance point and discusses some of the more important social and economic factors that have a bearing on where and how this point is determined.

The Ecological Complex

The concept of an ecosystem arose from early studies by botanists and other natural scientists. It is defined as "an interacting environmental and biotic system" or a "natural unit . . . in which the exchange of materials between the living and nonliving parts follows circular paths.**¹ This is the traditional or classic concept of ecology which is oriented toward the physical aspects of the environment. Human ecology is of more recent origin. It stresses the interdependence of human activities and social organization in the environmental complex.² Man bands together into organized groups in order to overcome the forces of nature. He learns to survive in a harsh world by creating efficient organizations and systems of institutions for exploiting natural resources. His main concern is the struggle for survival and in order to do this he must adapt to the state of nature around him.

This whole process has been described as taking place in an ecological complex (Figure 1). The classical version of this complex can be visualized

*Others have used the term to provide a frame of reference for sociological or institutional theories of history and economic development. See, for example, McHale (Reference 15). The concept as used by historians and sociologists reflects a form of cultural determinism where human activity is considered to be a key ingredient in social change.

**These are typical definitions which emphasize the relationship of living organisms to their physical surroundings or natural habitat.

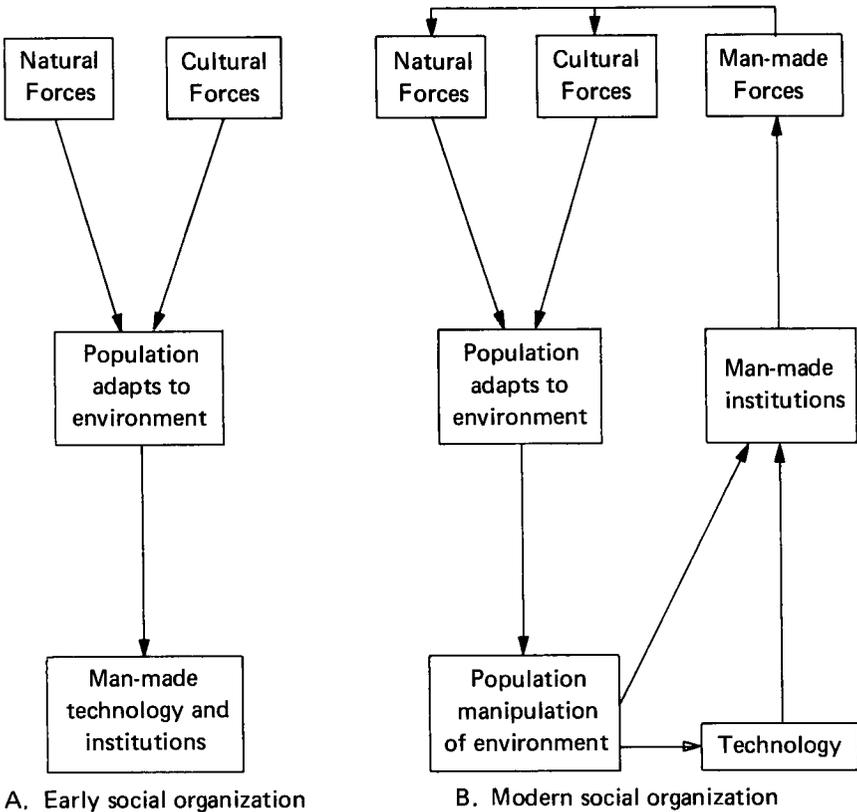


Figure 2. The changing ecological complex.

as an interlocking pattern of relationships between a given population, its organizational structure, the natural environment, and technological processes.³ This is a simplified framework for describing the complex pattern of environmental forces in the modern world. However, it is the nature of these forces and the particular way in which they are connected that determine their impact on society.

A basic element in the ecological complex is competition. Competition among plant and animal populations is basically a struggle for survival and space. But because of the high level of organization and division of labor among human relationships, there is necessarily an element of cooperation also. The result is a form of competitive cooperation which produces automatic and unplanned symbiotic relationships in human society. It is these relationships that become the basic foundation stones for the cultural

organization of society.⁴ The cultural community develops upon the superstructure of a biotic system.*

In primitive societies the struggle for survival was the dominant force in life. Man adapted to nature. In order to survive he organized certain economic and social systems that provided sustenance for the population at a minimum level of subsistence. These organizations and institutions grew and changed over time. The changes that occurred were a result of man's technological progress and his changing attitude toward the world.** Ultimately the adaptation function gave way to the manipulative function (Figure 2). Man no longer continued to adjust to nature. Instead he began

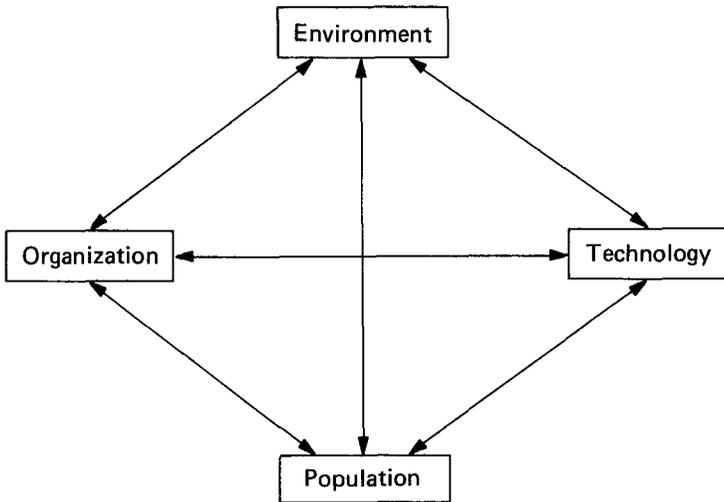


Figure 1. The ecological complex.

to alter nature.⁵ Man is said to have disrupted, tampered with, and interfered with the biotic segment of the ecological system. It is the unintended consequences of this alteration that has created the environmental problem.

At the same time, man-made institutions and organizations have imposed severe limits on society's ability to respond to these environmental changes.

*A more recent version of this idea is the man-made "technosphere" which is superimposed on the natural "biosphere." (See M. Nicholson, *The Environmental Revolution*, London, Hodder and Stoughton, 1970.)

**For a discussion of the four main stages in man's changing attitude toward his environment, see Gutkind, E. A., *Community and Environment: A Discourse on Social Ecology*, London, Watts and Co., 1953.

Economic and political institutions have peculiar rigidities that preclude rapid and sweeping changes in the social structure since too rapid a rate of change can demoralize and disrupt society. The historical inertia of slowly changing cultural patterns have clashed with the undesirable byproducts of modern technology. The emphasis today is focused on the selective survival of organizational and institutional complexes that are operating within a natural environment that is no longer the dominant force in man's life.

Economic Balance

In the economic process of production, natural resources are transformed into goods and services for the benefit of society. This process can create a multitude of outputs in the form of material goods, health, and happiness, but at the same time, it can disrupt the balance of nature and create economic damage to certain groups or individuals. The market system has evolved as the principal means by which the transformation process takes place because it has been found to be the most efficient process for allocating scarce resources in the face of unlimited wants.^{6,7} However, in any transformation process there are external effects or undesirable byproducts. These effects impinge on society at various points. Public goals do not always coincide with the objectives of private enterprise.

This problem can be viewed as a form of economic balance represented by the following equation:

$$\text{Quality of Life} = \frac{GNP \approx MC}{P} + \frac{IB - ED}{P}$$

where *GNP* = gross national product or real output

MC = monetary cost

P = population

IB = intangible benefits

ED = external diseconomies.

The first segment of the equation represents the private market sector of the economy. This reflects the per capita value of goods and services produced in monetary or real terms. The second segment represents the per capita intangible net benefits of economic activities taking place within a particular political, social, and cultural environment. The balance between production of material goods and services and the intended and unanticipated intangible benefits of the system must be resolved. When the *ED* sector becomes important enough to overshadow *IB*, pressure will be created to change some part of the ecological system.

Once the forces of change are set into motion by the political or

institutional organizations of society, they will affect monetary costs first. *MC* will increase for a given level of *GNP*. This will lower the potential *ED* and tend to produce a new equilibrium point in the second segment of the equation which reduces public pressure for change. But equilibrium will be reached at a lower per capita net national product level, or in an expanding economy, it will result in a lower rate of increase in real *GNP*. This is equivalent to saying that the economy was in fact producing too much output at the previous level of *GNP* due to the inability of the private market sector to include social costs or external diseconomies in their cost structure. The growth rate of the economy will continue to be reduced until the pressure is relieved at some hypothetical balance point where incremental costs and benefits are equated in terms of a desired quality of life.

The solution to this problem, therefore, involves an economic balance of real costs, market returns, and social benefits. Opportunity cost is the real cost of a public or private expenditure, but since this is what society must forego in order to produce certain goods or services, there is no way of determining precisely what these costs may be. Conflict between market returns and social benefits are a classic example of economic externalities.⁸ These externalities are defined as economic forces that affect the individual or the firm, or other groups in society, but they emanate from outside the individual or group affected; i.e., they are external to the person or group which receives the effects. These externalities can be negative or positive. They are based on a market system where the full costs (or benefits) of a particular action are not always absorbed by the individual producers or consumers involved. This may be due to lack of knowledge of the possible effects, the inability of the producer or consumer to control the process, lack of incentive due to competition in the market economy, or the unanticipated accumulation of joint effects that evolve over time. Producing firms in the private sector are not likely to willingly increase their costs any more than consumers would be willing to give up the intangible benefits of a free society.

Solutions to the problem of externalities depend upon an economic balance between the positive and negative effects of human actions in the ecological complex. Decisions on what goods are to be produced and the level of production should reflect all costs and all benefits. Three ways to accomplish this goal have been suggested by Herfindahl and Kneese:⁹

1. *the welfare approach*—where society or certain individuals or groups in society are reimbursed for the damages involved in certain activities payable by those who create the problem;
2. *the internalization approach*—where decision-making units in the

economy are required to consider the externalities associated with given activities and include them in their cost structure; and

3. *the regulatory approach*—where direct controls or restraints in the form of technological restrictions are placed on producing and consuming units.

All three approaches may involve higher costs for society, even though the incidence of cost will vary depending upon the method adopted. But the real issue is to determine which approach or combination of approaches will lead to an optimum degree of institutional and technological change for the production of higher levels of *GNP* with less destructive influence on the environment. The solution to the problem of externalities implies a resolution to those conflicts which arise from the existence of a complex and fragmented set of institutions with myriad and overlapping goals. Ultimately the conflicts between public and private goals will probably have to be resolved through the political process where the economic and social priorities of society will be reflected.

It should be recognized, however, that our society is still predominantly oriented toward the production and consumption of consumer goods with considerable emphasis on individual freedom and consumer choice. The possible disutility of our organizational institutions and techniques of production (*ED*) is only one element in the ecological complex. Some people believe the new commitment to environmental quality has been exaggerated.¹⁰ Other human problems, which may not be “fashionable” at the moment, can only be solved by increased growth of *GNP*. The problems of hunger, malnutrition, improved education, and highway safety may well require higher priority status than wildlife conservation, biodegradation plague, or the aesthetic experience of smog free sunsets and uncluttered recreational areas.

Socio-Cultural Factors

There are certain social and cultural factors that play an important role in the ecological complex. Many of these will influence the economics of the environmental problem—the balancing of costs and benefits. Man is a social creature and he is conditioned by his cultural and social environment. Thus, he is automatically subject to limitations and constraints imposed not only by nature but by his previous training and experience. This means his assessment of alternative goals will be subject to cultural inertia; the web of life changes slowly in an ecological context. It is social and cultural values that help determine man’s perspective of environmental quality.

GEOGRAPHIC ENVIRONMENT

Geographic areas have an important influence on human activity. Space is a primary component of the ecological complex. Location with respect to climate, topography, and natural resources provides limits to man's behavior and alters the physical setting upon which social and economic institutions are organized.^{11, 12} Geographical differences influence the socialization process and play a part in personality formation. The intensity of man's experience with the forces of nature determines cultural attitudes and customs that often endure for many generations. Individuals who are conditioned to life as a struggle for survival in a natural environment may tend to have little sympathy for those who would sacrifice their standard of living for a nebulous measure of environmental quality. The result is different cultural orientations and goal conflicts that create a polarization between groups which will affect the economic balance point.

FAMILY-KINSHIP SYSTEM

Kinship relations are the basis for many types of social institutions.^{13, 14} A social system where social and economic contact is primarily related to close kin can be called *kincentric*. In this type of society severe limits are placed on the degree of specialization and division of labor. Extended family ties and tribal relationships become the basis for organizing all social and economic activities. Organizational flexibility and comparative advantage are subservient to kinship relationships. The result is a narrow base of trust and a highly static economy. The entrepreneurial function is usually nonexistent since there is no direct relationship between incentive and reward. An individual's claim on the product of his labor or property is tenuous. The rewards of hard work are shared with kin on a par with windfall gains. Members of the group tend to receive the average product of the group rather than their own marginal contribution. Thus, different kinship systems result in different social organizations and cultural values. The characteristics of the system will have a significant impact on the assessment of environment quality and will determine what steps need to be taken to alleviate the undesirable effects of the economic system.

PLANNING HORIZON

Different socio-economic systems affect society's time horizon. According to McHale,¹⁵ time has both a planning and a disciplinary function in society. It imposes a sense of value and a system of organization upon human behavior. The planning horizon is a crucial element in economic activity. The resources to be used, the nature of the technology developed, and the degree of capital accumulation will be directly related to individual

and group time preferences. A society geared to short range planning due to extreme uncertainty will not place the same value on environmental control that other groups would consider necessary. Short range planning by necessity entails a philosophy of living for today and letting tomorrow take care of itself. In this type of situation environmental problems would have to become very acute before people would alter their behavior or change the nature of their institutions.

The way in which the future is discounted is a function of the values, attitudes, and social patterns of people. Time in some social systems is not a divisible economic dimension. Individual activities can be task oriented rather than time oriented. Cultural attitudes will, therefore, affect the economic balance by altering the time horizon over which economic benefits and their consequences are discounted.

ECONOMIC SYSTEM

The type of economic system adopted by society will have an important influence on the environmental problem. A market price system is probably the most efficient means of converting natural resources into goods and services for public consumption while retaining an optimum degree of individual freedom and national unity.¹⁶⁻¹⁸ However, transactions between individuals in society may be based upon other trading systems such as barter, grants, authoritarian allocation, or perhaps ethical foundations. When values such as prestige, power, loyalty, belonging, or status are involved, the market price mechanism may not always provide an optimum allocation of the output of society. Indeed, this is the essence of the viewpoint of those groups who believe that economists are the merchant's minions and seek to impose their value system upon society as a whole.* Since market decisions are based upon the economic calculations of consumers and individual firms, they tend to ignore those externalities that impose a social cost on others. The hidden costs that arise from a technological society that significantly alters the ecosystem can become a substantial factor in the struggle for survival.

VALUE SYSTEM

The value system of society is the result of many forces in the ecological complex. Values are a product of long and intricate processes of cultural accommodation and integration. Man's concern with survival is still

*This is the classical argument of the "environmentalists" who advocate a return to nature as the ultimate solution to the environmental problem. For a more balanced view see McHarg, I. L., *Design with Nature*, N.Y., Natural History Press, 1969.

a predominating goal in life, but the struggle is no longer primarily with nature but rather with the man-made technology that has been developed in order to survive nature. Value systems not only reflect man's goals in life but they also serve as decision indicators. They become the cultural signposts that provide the base for organized human activity.¹⁹ Political, social, and economic systems revolve around the value structure that has evolved from a lifetime of change. Values become the basis for ethical as well as economic decisions. It is the collective welfare of man that is at stake, and the organizational structure of society must be able to place values upon certain goals that reflect the level of living desired. The hierarchy of values of society becomes the objective criteria upon which the allocating mechanism rests, and it is this hierarchy that changes the economic balance.

Conclusions

The key to environmental quality in the ecological complex is economic balance. The stimuli that create the problem are basically a result of competition between organizations operating within the system and consumer demand for a higher level of living. The culprit is the technology that "alters" the natural balance of the ecological system. When the aggregate disutility of man's actions becomes great enough to offset the aggregate benefits, there will be pressure to change the system. These changes create higher costs and may ultimately lower the aggregate benefits from a given level of production. Socio-cultural factors and the manmade legal, political, and economic institutions of society are primary elements that determine the level of environmental quality. If the institutions of man are to be made to produce maximum benefit with minimum damage to the living environment, it will involve a reassessment of the role of socio-cultural influences in the ecological structure.

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