

# A MULTIDISCIPLINARY APPROACH TO ECOSYSTEM EDUCATION

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## ABSTRACT

In the background of the complexities of environmental crisis owing its origin from many human causes, the paper posits that a reductionist framework by a single discipline poses a severe limitation to understanding these complexities, their causes and solutions. It puts forward human ecology as a holistic framework that captures the complex nexus in the understanding of man-nature interactions; and that utilizes in an integrated whole, the diverse strands of knowledge it generates into a coherent curriculum for promoting ecosystem education premised on an ecosystem worldview.

**Keywords:** Ecosystem, Education, Human, man-nature

## INTRODUCTION

Human ecology as a field of scientific endeavor owes its origin to the fact that each of the separate social science disciplines offers merely a limited although intense and specialized view of the relationship between the human society and environment. It is premised on the recognition that a fuller model of man-environment inter-relationship must take due cognisance of the findings of the diverse relevant disciplines, such as that of the geographer, the sociologist, the anthropologist, the political scientist, the demographer, the historian, the economist, as well as that of scholars in related social and behavioral sciences. Human ecology therefore focuses upon the social community as the object of study rather than upon any single academic discipline. It thus recognizes that the interplay between the human society and the environment is conditioned by the societies' outlook, organization, culture, and technical attainments they possess (Carrey and Schwartzberg, 1969).

The complexities of the environmental crisis impacting upon the biosphere owes its origin from many human causes. A reductionist frame of reference by a single discipline poses a severe limitation to our understanding of these complexities, causes and human

solutions. The central objective of this paper is to put forward the multidisciplinary considerations to an understanding of man-environment interactions, to examine the place

of human ecology as an holistic frame of reference to this venture and the value and place of ecosystem education is promoting a more appropriate perception, value shifts, and decision taking in the resolution of the real world environment crisis.

## MULTIDISCIPLINARY PERSPECTIVE OF HUMAN ECOLOGY

A large body of methodological literature has developed on the human ecology concept (Hawley, 1950; Micklin, 1973; Boyden, 1979; Gibbs & Walter, 1973; (Park, 1936; Burton 1983) emphasizing the diverse intellectual traditions of the various disciplines interested in its investigation. In the sociological tradition, human ecology is concerned largely with human social organization where population is said to interact with environment through social organization (Park, 1936; Hawley, 1973; Micklin 1973). A somewhat different intellectual tradition to the subject has been developed in anthropology where the focus has been on the relationship between man and environment in ecological terms and in

many ways closer to views expressed in biological ecology. The emphasis is largely on man's cultural adaptation to the environment (Burton, 1983; Schusky and Gilbert, 1973). The economic view of man in relation to environment is largely conceptualized through his sustenance requirements and activities around his needs. Economist will rather prefer to substitute the sociologists human social organization as a framework for interpreting the mode of man's interaction with the environment to sustenance or production organization (Gibbs and Walter, 1973). Certain ecologists proposing this view point of the relevance of economic principles to ecology have defined ecology as "biological economics" or "the extension of economics to the whole life". (Rapport and Turner, 1977). The geographer on the other hand had since earlier times been concerned with the study of the earth, as the home of man with particular emphasis on how human processes shape the environmental processes and vice versa through the prism glass of human spatial organization. Their approach to the study of man's relationship to his environment is largely hinged on how this describes or explains the variable character of places, that is, the physical, human and cultural landscapes. Hettner (in Stoddart 1970) largely

underscores this point when he asserts that "both nature and man are intrinsic to the particular character of areas, and indeed in such intimate union that they cannot be separated from each other."

### THE INTEGRATIVE FRAMEWORK OF HUMAN ECOLOGY

Human ecology as put forward by Carrey and Schwartzberg (1969) visualizes a human society living in an environment; and that the manner in which the population lives and relates to its environment is a function of its number, growth characteristics, range of choices and potential resources present in the environment, the technology it possesses, the social and production organization and the way in which the population perceives its environment. The above factors of population, environment, technology, organization and social psychology in balance describe the relationship between the human community and its environment. Each vertex of the pentagon (figure 1) represents one of the ecological dimensions, while the connecting lines to the vertices imply that a change in one of the ecological variables elicits changes in all. This underlies the utility of the human ecological model as a resource management

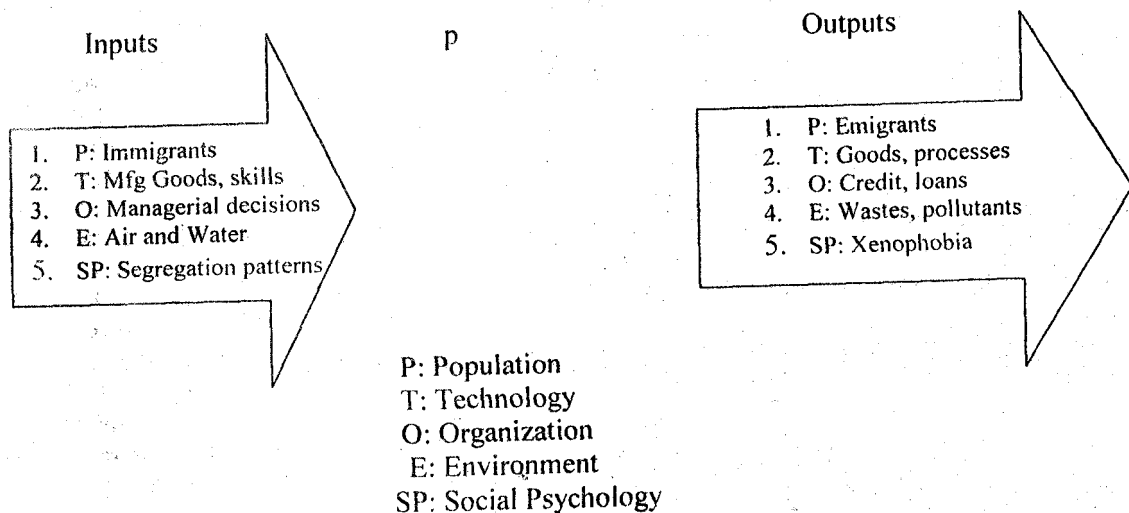


Fig. 1: Human Ecological System (after Carrey and Schwartzberg, 1969, PP.7)

tool as it fosters understanding of the various factors within human processes impacting on the ecological system and vice versa.

The arrows labeled inputs and outputs show the typical human ecological system to be an open system, with inputs entering and leaving as outputs as indicated. The desired objectives of an human ecological system is the maintenance of a dynamic equilibrium or state of balance in the quality of the human population and environment.

### THE RATIONALE FOR ECOSYSTEM EDUCATION

The diverse disciplinary perspective that defines the ecology framework requires a robust educational paradigm that is capable of synthesizing the diverse and somewhat disparate strands in the repository of knowledge into a harmonious whole. This will serve to enhance our understanding of the human society and the complexities involved in man-nature interactions.

The normal education process has been likened to putting together a jigsaw puzzle (Clark, Jr and Colleta, 1981). A child on entering school is introduced into pieces of the puzzle. He learns to identify and sometimes memorize the pieces, occasionally fitting a few together while dutifully stuffing as many as possible into his pockets. On graduation his pockets become filled with 'apparently' unrelated facts each bearing labels such as mathematics, geography, literature etc. The odd bits of the puzzle is not limited only to forms of knowledge classification across the broad disciplines but also to that within the same discipline. Hardly would the child in the course of his educational career be exposed to fair details of what the whole picture might look like.

The exigencies of living on graduation imposes much pressure on the individual such that he becomes busy earning a living as to spend much time on the puzzle. Knowledge derived from the educational system often becomes fragmented, discrete, and atomistic without some sense of the coherent structure

which should underlie the curriculum studied (Clark, Jr and Colleta, 1981). A "World View" premised from the above is usually distorted and laden with false assumptions concerning the nature of the real world.

This approach to education produces individuals whose mental perspective approximates to a dominant philosophical perspective concerning the nature of the world-that of a technological world view. This is an analytical, reductionist, linear, mechanical and atomistic perspective dating from Descartes and Newton. It made possible modern science and technology and posits man the subject, distinctly apart from his

environment, the world he lives as though in a conqueror - conquered relationship. This linear world view is largely taught in the educational system today; and the values extolled by this world view represents the dominant values of society such as individualism, nationalism, free enterprise, unlimited growth and progress, and competitive attainments (Clark, Jr and Colleta 1981).

An alternative perspective in viewing the world may be called the ecological world view. This is implicit in the intuitive wisdom of indigenous and primitive populations. Extolling this ecological world view in the African experience, Suliman (1990:143) asserts that "for countless centuries African people have maintained a living balance with their natural environment and the resources on which they depend. They kept up an intimate, organic relationship with nature, characterized by a high degree of sensitivity and respect for the workings of natural ecosystems, an almost sacred limit to exploitation and sense of duty to conservation".

Ecological world view is thus a more rigorous approach to perceiving the world and dates from Darwin and Wallace, the first in the modern scientific era to recognize the holistic nature of life on the planet. Darwin for instance conceived of the realm of nature as "the Web of life" in which all living organisms, plants and animals alike, are bound together in a vast

system of inter-linked and interdependent lives (Park, 1936 : 1).

The ecological world view is a systemic way of thinking which is implicit in much of science today but has gained little acceptance in education with consequently little impact on social decisions. The values implicit in the ecological world view reflects what might be appropriately called 'ecosystem values' emphasizing interdependence, diversity, cooperation, equilibrium and limits.

These two perspectives of viewing the world are not mutually exclusive. Each provides important information about the world. Their complementary nature lies in the fact that the analytical and technological perspective as a world view along with its concomitant social values, must be subsumed within the framework of the more comprehensive ecological perspective with its associated ecosystem values.

Ecosystem education by its emphasis on a systemic way of thinking holds the potentials of resolving the mystery in our jigsaw puzzle by defining much more appropriately its outer and inner limits thus promoting a better understanding of the world in which we live. Clark and Coletta (1981) in a clear and lucid manner have delineated a four phase and progressive strategy for attaining the goals of ecosystem education. A brief review of this is given; it proceeds in sequence from Ecoliteracy, Ecollage, Ecologic and Ecoresponse.

**ECOLITERACY:** This has as its goal the increase of ecological literacy. Ecological literacy emphasizes an understanding of the connectedness of things and involves an appreciation of how the earth's ecosystem functions as a system and the relationship of human beings to that system. An approach to education that promotes ecoliteracy will thus be construed to explain the functional relationships amongst phenomena by describing how the major components of the earth's ecosystem acts as a functional whole. Within this whole, the parts are more appropriately understood in relation to each other and thus in context. Ecoliteracy is

crucial to all subsequent stages of knowledge because all other systems whether natural, socio-economic, or cultural are viewed as subsystems of the earth's ecosystem. Ecosystem education is thus fundamental to the educational process and basic to all relevant decision making.

**ECOLLAGE:** Ecollage has as its goal the application of ecological literacy to cultural systems. It basically deals with putting or viewing things in an ecological context and represents a fundamental aspect of ecosystem education. Based on an understanding of the working of the earth's ecosystem (ecoliteracy), combined with the insights provided by human ecological principles and the general systems theory which emphasizes the similarities between ecological and cultural systems; ecollage provides greater insights concerning the functioning of human social systems. It also leads to a greater understanding of the relationship between the natural science and social science as well as their mutual impact on social decision taking. Human ecological principles together with general systems theory provides a framework for the study of cultural systems as natural subsystems of the earth's ecosystem. Ecollage via ecoliteracy will thus provide an enriched understanding of the workings of the human society with the lessons provided through the application of ecosystem principles to real world situations.

**ECOLOGIC:** Ecologic is thinking systems. It utilizes and applies the rigours of systems theory in the organization of thoughts and ideas in a kind of mental ecology. It is likened to the process of thinking in a second language (ie thinking systematically), when one takes information from the first language (linear logic) and translates it conceptually into a second language (system logic). Ecologic thus effectively expands the context of decision making beyond a lineal perspective of an either/or alternatives; to a greater inclination towards systems logic within which effective cultural decisions can be made. At the ecollage phase, the relationship and

affinity in structure that exist between organic and cultural systems are emphasized to enable appropriate comparisons and projections. Ecologic represents the next phase were the act of thinking about systems evolves to the act of thinking systemically. In this case, the ability to think systemically as a second language has become internalized.

**ECORESPONSE:** This is the fourth goal of ecosystem education and has as its objective the introduction of value shift necessary for effective cultural decision making. An ever growing recognition for instance of societies dependence upon ecological life support systems in the same manner in which a deep sea diver realizes his dependence on the life support he carries will lead to more rational decisions in the use of earth's resources. These decisions hinged on the principles governing the workings of the earth's ecosystem will lead to greater awareness and societal adaptation to the limits set by the ecological and social systems.

**CONCLUSION**

An educational philosophy that utilizes as an integrative whole, the diverse strands of knowledge generated from the varied human ecological disciplines and structured into a coherent curriculum for the promotion of ecosystem world view is imperative. This will not only achieve the important objective of 'greening' the curriculum but would provide answers in the quest towards a sustainable society.

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