

## TOWARD A BETTER UNDERSTANDING OF THE ENVIRONMENT IN THE 21ST CENTURY

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### ABSTRACT

*A well-kept and clean environment is very crucial for human survival. As such, it is imperative to have good understanding of the various factors that affect the quality of the environment and how we use it. In this paper, we argue that for sustainability, every human being needs to gain a productive understanding of the environment within which he or she lives. This understanding can be gained through effective educational and training programs. The paper presents in detail the various elements of the kinds of understanding we need and how our acquisition of this understanding will improve our ability and willingness to use, keep, and protect the environment.*

### RÉSUMÉ

*Un environnement propre et bien entretenu est indispensable à la survie de l'homme. Il est donc très important de bien comprendre les divers facteurs qui ont un impact sur la qualité de l'environnement et sur la façon dont nous nous en servons. Pour que l'humanité continue à exister dans un environnement sain, les auteurs de cet article recommandent à tout un chacun d'acquérir une bonne connaissance de l'environnement dans lequel il vit. Une telle connaissance peut s'acquérir à travers des programmes d'éducation et de formation. L'article présente en détail les divers éléments de connaissance dont nous avons besoin, et explique comment une bonne connaissance de l'environnement nous aidera à entretenir et à protéger notre environnement pour mieux en tirer profit.*

## 1. INTRODUCTION

Over the past two decades or so, important strides have been made towards environmental consciousness. For example, our attitudes towards the environment have changed from less to more concern. We are now recycling a lot of materials that a decade ago we threw away as garbage. In addition, the environment has become an important feature in school and college curricular, while new business and community development projects have become increasingly evaluated for their environmental impact.

However, our understanding and actions regarding the environment are still based in two knowledge compartments, namely ecology and economics (Grizzie, 1995). While this in itself has limited the scope for a better understanding of the environment, the situation has been further aggravated by the tendency to pitch ecology against economics in most environmental discussions. Thus, on one hand, extreme environmentalists believe that economics (more specifically economic progress) is the source of environmental breakdown. On the other hand, conservative economists and businesses believe that the views of some environmentalists are anti-economic progress (Carson 1965; Lorraine, 1972; Goldsmith et al, 1972; Curry-Lindahl, 1972; and Caldwell, 1972, Bartelmus, 1994). While recent efforts have been made to resolve this controversy, these efforts have not been very successful and traces of confrontational views and behavior still remain.

This paper is of the view that a better understanding of the environment matters to everyone, not only to ecologists and environmentalists alone. In order to obtain this understanding we need to go beyond economy and ecology. We need to develop a better understanding that will enable us to see the environment as a concordant among mind, nature, and wise action (Cherif, 1989b). In this paper, we outline concisely the main elements of this understanding and show how each of the elements can help us achieve a better understanding of the environment. While section 2 focuses on the concept of environmental education and productive understanding, section 3 discusses the biophysical, economic, geographical, and psychological understanding of the environment. Section 4 emphasises the significance of the human factor to the environment and its protection. The summary and conclusions are presented in section 5.

## 2. ENVIRONMENTAL EDUCATION AND PRODUCTIVE UNDERSTANDING

What sort of understanding is needed for the ecological crises that afflict the world? One answer might be a *productive understanding*, an understanding that enables us to see the environment as a concordant among mind, nature, and wise action. This sort of understanding involves the intellectual ability to grasp ecological concepts and principles (productive thinking) and the behavioral capability or willingness to act on these principles intelligently (productive action) for the betterment of the environment and the future quality of all life forms (including human life) (Cherif, 1989b). Thus, a productive understanding is the result of the hybridization between knowing more deeply—

in the sense that “knowing is functional and part of the process of productive thinking” (Fromm, 1976, p. 28)—and translating this knowledge into environmentally productive behavior. The latter cannot be achieved until the first has been accomplished.<sup>1</sup> To achieve this, we need to “employ a model that moves us from becoming aware of total environment, to giving us knowledge, attitudes and skills, to finally empowering us to take positive environmental action.” (Bacher, 1991, p. 31). This in turn should help us make productive understanding a part of our own system of thought and behavior (Cherif, 1989b).

Fundamental questions arise, however, as to whether the present educational system wishes to develop this sort of understanding; and whether we, as educators, can become sufficiently aroused to view the issue as essential to survival. If so, we must develop minds and teach the intelligent life skills necessary to engage in environmentally wise action. Unfortunately, this has not been the case. It is not simply that understanding the problem has become separated from the capacity and willingness to act intelligently, but that neither aspect (of the productive understanding) is being taught in school. “Productive thinking to productive action is productive understanding” (Cherif, 1989b).

The first component of a productive understanding is the ability to distinguish and meet basic needs within a particular ecosystem. At the moment, the greenhouse effect; reduction of land productivity; depletion of tropical forests; erosion of genetic diversity; soil erosion, water, and air pollution; exponential human population growth and continued poverty are all indicative of the fact that we as humans have not been able to perform this important task. Our present day education is neither preparing students for comprehensive understanding nor for intelligent action. Thus, as Ornstein and Ehrlich (1989) pointed out, our reactions to the modern world are often inappropriate, a result not only of the nature of our modern minds, but also of the training we give them. Even though we cannot understand concepts unless we have a basic factual knowledge to construct the concept, philosophers and psychologists often pay more attention to the knowledge and the learning of facts than to the *understanding* of concepts (Barrow and Milburn, 1986). By ignoring understanding, educators largely have failed to acknowledge its necessity in the preparation for intelligent action.

The second component of *productive understanding*, which encourages productive behavior, is also missing in today’s schooling. In the development of any educational process concerning the environment, knowledge for developing environmentally intelligent behavior is inseparable from cognitive objectives (Cherif, 1989a). Today, it seems that cognitive objectives alone, rather than the merging of both the “ability to grasp mentally” and “the capability to act intelligently,” attract the attention of many educators. Preparation for intelligent action has not yet found its place in curriculum content and the teaching of Eco-education programs. Indeed, while environmental education implies action, “public schools are extremely wary of action. [They seem to forget that] there are things to be learned through action that simply cannot be learned in any other way. [And there is] a kind of information that becomes available in the course of action that doesn’t exist without the action” [McClearn, 1987, p.55].

Some educators have argued for the necessity of teaching behavioral objectives where the environment is concerned, but in their attempts to reach this goal they have

not been clear or consistent toward the methods and content. One does not help a group of people to become intelligent and cultured environmentalists by getting them to merely practice recycling, to use paper instead of using plastics, important as these may be. One must also provide them with a total understanding of the environment of which they are a part, in order that they can understand the consequences of their action upon it (Cherif, 1989a, 1992). According to Milburn (1986, p. 230), the prime interest for educators, Barrow asserts, is "the experience or act of understanding what encompasses both the agent and the subject matter." As we see it, productive understanding enables students to comprehend the nature of the subject matter in a way that translates that understanding into positive action. This means that education, which indeed is in a race with ecological catastrophe right now, should also be concerned with teaching for an understanding that results in informed decisions, responsible behavior, and constructive action.

An understanding of a given problem should include (at least theoretically) the behavioral capability to act on it intelligently (Cherif, 1989b). For example, to say that you understand that smoking is detrimental to your well-being while you continue to smoke indicates a vague intellectual understanding of smoking. You may have the information that smoking is bad for your health, but not a productive understanding of consequences. In the same sense, to acknowledge that polychlorinated biphenyls (PCBs) have been banned from household appliances because they are a major source of pollution which affects the reproduction and immune systems of many creatures, and yet continue to use them in industry, also represents a vague intellectual understanding of the consequences of using PCBs.

You also may understand that chlorofluorocarbons (CFCs) pose a potential threat to the ozone layer in the upper atmosphere, which protects the earth from harmful ultraviolet radiation and, consequently, protects humans from skin cancer. However, continued use of Styrofoam products indicates only a vague intellectual understanding of the consequences of using CFCs. You may have the factual knowledge, but not a productive understanding of the consequences of its use. For example, if in order to avoid using Styrofoam cups in a cafeteria, a person takes his or her own cup (not because there is a rebate for doing so, but because of environmental concerns); we have a person who understands the problem of CFCs. Moreover, if the situation arises where our hypothetical individual goes for the express purpose of having a cup of coffee, but forgets his or her cup and rather than using the Styrofoam replacement, gives up the notion of drinking coffee at that particular time, then we truly can point to a person who has a productive understanding. A person's understanding of and commitment to a wholesome environment and the desire to act on that understanding is greatly dependent on the level of knowledge and sort of understanding he or she possesses. Thus an individual or society may have the factual knowledge of environmental problems, but fail to have a productive understanding that would demand intelligent action (Cherif, 1989a; 1989b).

Therefore, to develop a productive understanding, we need to ensure that students discover meaningful answers to the following questions: (1) What is the world like? What are we doing to it, and why? (2) What is the history of humanity? Where did

we come from? How did we get here? (3) Who are we as human beings? Why do we look the way we do? What is our place in the ecosystem? How are we related to all other creatures? (4) What is the purpose of our life on earth? What future options have we as a planetary people? How can we influence our own future?<sup>2</sup> and (5) What individual freedom have we and how does it affect the needs of self, society, and the ecosystem on the earth? How should we guard the Earth and its resources for our children? The kind of education that focuses on helping people provide genuine answers to these questions, we believe, can ensure the four conditions of awareness put forward by the educational philosopher, Robin Barrow (1981), namely historical awareness; awareness of individuality; awareness of logical distinctions, and awareness of one's capacity for discrimination. In addition this will also create the awareness of where and "how to act or behave in difficult situations" such as in the case with our present ecological situation (Cousteau, 1989, p. 6).

The present status of world ecology, human indifference toward the survival of their own species and habitat, and the disinterest of many leaders in the field of education indicate that teaching for a productive understanding (as it has been defined here) is far from becoming an educational reality. Yet, the need for this kind of teaching and learning is critical to the state of the environment. In an environmental context, it makes no sense to educate individuals environmentally without reference to both developing their intellectual abilities to grasp ecological concepts and principles (productive thinking) and developing their behavioral capability to act on these principles intelligently (productive action)(Cherif, 1989a; 1989b). The future of the human race depends on our willingness and ability to both grasp intellectually and act intelligently in every aspect of our lives. In other words, the development of cognitive skills should also be within the concept of doing something positive.

There is no doubt of an educator's good intent. But, as Schumacher (1979) argues in his remarkable book, *Small Is Beautiful*,<sup>3</sup> education is successful only if it can produce more wisdom. Schumacher believes that humanity is in moral danger, not because we are short of scientific and technological know-how, or of natural resources, but because we tend to use them destructively. Possibly because of some factors embedded in our individual and collective behavior which are determined predominantly by culture, we refuse to temper action with wisdom if that tempering means delaying the gratification of immediate wants. The ancient philosopher, Avicenna (Ibn Sina), in his analysis of wisdom, argued that wisdom is "perfect knowledge" and "perfect action." Thus, the combination of worthwhile knowledge and positive action helps men and women to make intelligent decisions which are not merely abstract or far removed from any practical use but which could enrich all humanity (Kirilenko and Korshunova, 1984). Egler (1970, p. 1) also agrees with this view when he points out that "knowledge is not wisdom; wisdom is knowledge, when it is tempered by judgment."

There is no further need to dwell on what the role of education is. What we, however, need to dwell on is what kind of education should we engage in to develop the necessary productive understanding of the environment. In general, to acquire the productive understanding of the environment, the critical areas in which we need to improve our knowledge and understanding of the environment are: biophysical; economic;

historical; geographical, social, cultural, philosophical, and psychological understanding of the environment. In addition, it is important to comprehend the centrality of human factor characteristics in protecting and sustaining the environment.

Together, these themes comprise a comprehensive view of the environmental education that should go beyond the physical aspect of the environment. Understanding the relationships among all of these aspects of the environment and how they affect the mechanism and function of individuals and communities, in both human-made and natural ecosystems, is critical for developing the kind of understanding that results in informed decisions and responsible behavior (Cherif, 1989a; 1989b). These themes are not intended to be ends in themselves but only a starting point for developing a better understanding of the environment. However, since it is impossible to successfully discuss the significance of each of these issues in this paper, our emphasis is placed on the biophysical, economic, geographical, and psychological understanding of the environment. The others have been extensively discussed elsewhere. In the following sections of the paper, we examine each of these in turn.

### **3. UNDERSTANDING THE ENVIRONMENT**

#### **3.1. Biophysical Understanding**

Biophysical understanding of the environment is essential for the survival of all species, including humans. The biophysical aspects of the environment emphasize the importance of understanding the value of (1) the laws of ecology (i.e., the diversity and interdependence of the species, limitation of natural resources, etc.); (2) the structure of the ecosystem (i.e., the structure of food chains, food webs, ecological pyramids, etc.); (3) the mechanism of the ecosystem (i.e., the ecological succession, dynamic motion of biophysical environment, energy, biogeochemical cycles, etc.); and (4) the mechanism of the survival strategies of the species, especially those based on the assumption that resources are limited (i.e., mutualism, altruism, competition, etc.). While these themes are essential for an accurate understanding of the relationships between organisms and their environment, the source of information, how it was derived, and how to relate it to one's current situation, must also be studied.

One of the reasons we must understand, for example, the basic laws of ecology (i.e., diversity, interdependence, and the limitations of natural resources) is that: "these laws, just like our own laws, restrict freedom of conduct and choice, [but] unlike our laws, the laws of nature cannot be changed by legislative fiat; they are imposed on us by the natural world. An understanding of the laws of nature must therefore inform all our social institutions" [Hunter, 1988, p. 316]. Failure to do so, simply means we choose to gamble with the fate of our species and the whole planet Earth because we no longer can get around these laws (Hunter, 1988; Cherif, 1989a).

Biophysical components of the environment should also be understood in the light of their impact on human life as a means to understand the economic, social, and political issues that surface by the misuse of natural resources. For example:

Learning about the cycling of water and the role of plants in this cycling can be used as a stepping-stone to learning about the cycling of nutrients and then to the dynamics of ecosystems. Gradually the basic notion that human beings everywhere are dependent on services from natural ecosystems could become part of everyone's understanding of the world, and humanity would be spared politicians and pundits who rave about putting economics above ecology [Hill, 1985, p. 223].

### **3.2. Economic Understanding**

Economic understanding of the environment is needed the most to resolve the conflict between the economy and ecology. Economics is the study of how society allocates its scarce resources to the satisfaction of human needs and wants. The satisfaction of these needs and the production, distribution, and consumption of goods and services usually achieve wants. Economics considers land (including natural resources and raw materials inputs), labor, capital, entrepreneurship, and technology as the major factors of production. To the economist, therefore, all these factors of production are scarce in supply. Thus, at any point in time, there is more demand for these factors than can be met by their supply. Since all resources are scarce, the allocation of resources by producers and consumers involves choices among several possible options, a process that is mediated by the pricing system. Huge opportunity costs exist when certain choices are made over others. On the one hand the higher the price the more will be the quantity supplied since producers will stand to gain, while the lower the price the less will be the quantity supplied. On the other hand, the higher the price, the lower would be the quantity demanded while the lower the price the higher would be the quantity demanded. By the laws of demand and supply therefore, both producers and consumers select the option that would bring the most profit and utility to them respectively.

Traditionally, the concept of profits and utility maximization dominates economic analysis. Once a particular economic action is viewed as generating the highest monetary gains, in the short term, it is deemed appropriate to pursue. However, the increasing recognition of the role played by the environment, first as a depository for raw materials used as inputs for production and second as an absorber of the waste that results from production, distribution, and consumption of goods and services has informed the discipline of the important relationship between the environment and the meeting and satisfaction of human needs. To clarify this desired balance between need satisfaction (economic growth and development) on one hand and environmental preservation on the other, economists now talk about sustainability, which refers to meeting the needs of the present generation without compromising the needs of future generations (Todaro, 2000). The achievement of this sustainability involves the understanding of a number of important issues such as the implications of rapid population growth, uncontrolled consumption patterns, the need to distinguish between human needs and wants, the root causes of poverty and ways to alleviate them, and the need for alternative production, distribution, and consumption systems would be less harmful to the

environment. At the moment, there is evidence that “the worst perpetrators of environmental degradation are the billion richest and the billion poorest people on earth” (Todaro, 2000). At the same time it is also known that as people’s incomes rise they are better able to take care of the environment. These raise important economic questions in environmental education. First, “is it possible to take care of the environment without a positive change in the life of the living conditions of the billion poorest people in the world?” Second, “is it possible to achieve economic growth without further damage to the environment?”

Economic understanding of the environment is needed to resolve these questions. It is needed to help refocus how our attitudes and mindsets in relation to the processes of production, distribution, and consumption of goods and services impact the environment. It is also needed to help refocus how our attitudes and mindsets about environmental preservation affect the material well-being of all people on planet Earth. It is needed to help redefine and reprioritize what constitutes needs and wants. Finally, it is needed to help us see that what is economically feasible may not always be environmentally friendly, and vice versa. There is, therefore, the need for balance. This balance can, however, be achieved through detailed education aimed at gaining economic understanding of the environment. Failure to acquire this understanding would deny us the ability to find the sustainable balance.

### **3.3. Geographical Understanding**

Though geography plays a significant role in our lives, people usually take it for granted to the point that it has been neglected at many levels of our educational system. The American Heritage Dictionary (1978, p. 551) defines geography as, “the study of the earth and its features and of the distribution of the earth life, including human life and the effects of human activities.” Geographers divide their discipline into three broad fields: human geography, physical geography, and cartography. While human geography deals with the distribution patterns of people, cultures, and their activities, and the forces that create those patterns, physical geography is concerned with the distribution patterns of landforms, climates, flora and fauna, and the forces that influence those patterns. On its part cartography deals with representations of these distributions in maps and other visual forms and their interpretation. But all these three areas of geography (physical, human, and cartography) complement each other. For example in studying and applying the concepts of human geography, physical geography is very valuable because it gives the students a sense that the social, economic, and cultural matters they study are located in actual places, and actual regions that have certain climatic patterns, topography, soil composition, etc. All of these effect the biological and ecological constitution of a given place or region. This interrelationship is then summarized and represented on a cartographic map.

In this sense, geographical awareness is necessary so that we become more self-conscious of the current distribution patterns of natural and human phenomena across the earth’s surface, the forces that shape and continue to shape such distribution patterns, and their implications for the future. Thus, using biogeography as an example,



Cox and Moore (1993) show how geography helps us understand why there are so many life forms, why they are distributed in the way they are, how the activity of human beings affect the past and the present patterns of the distribution of life forms, and how current human activities affect the future distribution of living things. Geography is necessary to develop an appreciation and understanding, for example, for the physical and human processes that produce patterns on the landscape of a given ecosystem such as the movements of the earth, volcanoes, earthquakes, winds, floods, rural, urban, agricultural, industrial, and commercial landscapes. The elements and the processes that produce the landscape of a given ecosystem are also part of those factors that shape the development of human culture and civilization. All human and physical processes shape the distribution of phenomena. Our understanding of geography therefore helps us become aware of the long-term implications of our current decisions for the environment, human culture, and civilization. It can also provide “a general framework of understanding that can subsequently be used for predictions about the consequences of tampering with the natural world” (Cox and Moore, 1993, p.1).

When we look at the landscape of a physical world, geographical understanding should help us make comprehensive and accurate observations of the physical world as well as help us analytically examine our observations and make intelligent generalizations. In other words, geographical understanding should take us beyond “the wow, isn’t that great!” to “it’s a beautiful panorama—I can clearly see the processes operating which suggest that . . .!” [Clemmon and McDannold, 1990, p. vii].

The present status of world ecology shows that changes are occurring in our atmosphere, land, water, and oceans as well as the numbers of humans, fauna and flora that are undermining prospects, not only for global economic development, but also for our own peace, security, and survival. This indicates that in an environmental context, it makes no sense to educate individuals environmentally without making geographical references to their own local, regional, and global environment.

So the question is what should our students learn in order to develop geographical understanding of the environment? Geography is basically a spatial science. Therefore, the basic concept of geography is the concept of spatial organization. That is, it relates to how people organize their space to meet their needs. So the starting point is to understand the concept of space, which refers to any area of the earth’s surface. This space could be Chicago, Illinois, the Midwest, the US, etc. Next, they have to understand how various phenomena are organized in space and the variations that are there. Important concepts here are location, location patterns, and the interrelationships within the pattern. Next, students need to understand the spatial processes (i.e., natural and human) that have produced these location patterns.<sup>4</sup>

Students need to understand the evolution and the distribution of life forms on the surface of planet Earth. They must also know why there are so many species and how our current activities affect the distribution patterns of life forms. In addition, they must also learn about the prospects for the future distribution of life forms on the planet earth (Cox and Moore, 1993). They need to understand the variations in cultures and living conditions across the earth and what these variations mean for survival. For the rest of the general public, various awareness programs, for example, the Geography Aware-

ness Week (GAW) could be used to educate people about the significance of Geography to human welfare.

Efforts must be made to raise new questions and new ideas for geographical awareness and its significance in understanding the environment. This emphasis must spring from the awareness of many geographers, environmentalists, and educators that global and environmental ignorance among many North Americans is one of the consequences of the de-emphasis of geography throughout the United States. The study of geography in the United States has had a checkered career with severe consequences. During the 1930's, geography was taught as a unique discipline at both college and school levels. However, in the 1940's and 1950's, the trend was to integrate it into other school curricula. This integration resulted in the loss of geography's place in the curriculum as a unique discipline and it eventually became subsumed by history and current events under the social studies and political science disciplines.

Lloyd H. Elliott, President of George Washington University, and vice chairman of National Geography Society Board of Trustees, wrote in 1988: "There was a feeling in those years that geography was a part of history, that if you were studying the era of Charlemagne, you would naturally look into the geography of that period. So geography was lost . . . Then sometime during the middle 1970's we gradually realized that our children and we didn't really know much about the world. And we have been struggling to catch up even since." This plight could only change if the current education system makes conscious efforts to deal with the problem. Our children, grandchildren, and great grandchildren need to be provided with the opportunity through which they can develop their geographical understanding of the environment.

### 3.4. Psychological Understanding

Psychological understanding of the environment can be addressed in two ways: (1) the psychological roots of the causes of ecological problems; and (2) the psychological impact of the consequences of global problems, such as population growth, nuclear weaponry, and ecological imbalances, starvation, preventable diseases, etc. Both ways are vital to empower ourselves to understand causes and find cures for those problems which threaten our survival and that of our planet Earth.<sup>5</sup>

Walsh (1984, p. 21) noted in his book, *Staying Alive: The Psychology of Human Survival*, that:

Since all the major threats to human survival and well-being are human causes, they are, of course, deeply, though not exclusively, psychological in origin. The state of the world, then, is a reflection of the state of our individual and collective minds. From this perspective, our "problems" are actually "symptoms," and to understand their cause and cure we must understand our behavior and ourselves [psychologically as well].

So, if the roots of our current problems are largely psychological as well, then their causes and cures should also be sought in human behavior and in the psychological forces and disturbances—the inner confusion, desires, defenses, phobias, and fantasies—that motivate that behavior. Walsh (1984, p. xvii) insists that if the roots of these psychological disturbances could be identified and understood, “then perhaps we could better understand the principle of skilful responses” needed to empower us to solve them. While “the failure to appreciate the psychological roots of our global situation appeared to reduce the depth and effectiveness of our responses and even render them counterproductive,” only a few have recognized how crucial are the psychological causes and principles for accurate understanding and effective resolution of current global problems (Walsh, 1984, p. xvii).

If we all agree that assumptions and calculations cause some of the ecological problems, then we need psychological understanding to acknowledge the past errors without being concerned about protecting or saving face. Thus, we need psychological understanding to guide us toward what is good in human affairs and we need both novel and skilful insights to understand our bias and the basis of our wrong thinking and subsequent actions which have created many of our current global problems.

Ecological and related problems also have threatened human survival. Such problems become more severe in those societies in which citizens have already become individualized and desocialized with much sense of family devotion and little sense of social responsibility. But as Walsh (1984) noticed, while the negative psychological effects of nuclear threat have gained much attention and deeply touched both adults and children world-wide, research and emphasis on the psychological impact of other global problems threatening human survival are limited and minimal. He claims this because the majority of the public, as well as many of the policy makers and related professionals, still have not been convinced or don't want to be convinced that tragic ecological catastrophe (such as nuclear war or accidents) could happen in their lifetime. Because people worldwide feel endangered by an experience, which causes massive human death, they still remember the tragedy of Hiroshima, Nagasaki, Marshall Islands, Three Mile Island, and Chernobyl. Starvation and the fear of it, and other related experiences such as watching one's children die needlessly (as happens daily to hundreds of millions of people in the Third World) can also be related to ecological roots. This creates psychological problems for individuals, as well as causing catastrophic events at the social level.

Some of the environmental decisions, which were made with good intentions brought with them unforeseen psychological consequences. The story of *the Mountain People*, an African tribe, IK, whose society degenerated, is a good example. For the sake of creating a national park, the IK people were forced out of their land. As a consequence, they not only lost control of their environment, lost touch with nature, faced starvation and the degeneration of their society, but also began to lose “their courtesy and civility and finally to steal and maim others for food. They were driven by the need to survive against seemingly invincible odds, and they succeeded at the cost of their humanity.” (Turnbull, 1974, p. 219-220). The IK people relinquished their society as well as their human values in the name of individual survival and “the result is that they live on as a

people without life, without passion, beyond humanity” [p. 220].

Maybe it is time for a new vision in the area of psychology. For a long time, our views of humanity and its world—which have shaped, either explicitly or implicitly, our attitudes and have given direction to our action toward others and the surrounding environment—have stemmed from a materialistic view, according to which all reality consists of matter, and from a behavioristic view, according to which the mind is unimportant. Such materialistic and mechanistic perceptions are partial causes of our current global problems. They emphasize the body and the behavior, and not the mind, soul, and spirit as well. They have failed, to a large extent, to lead humanity out of the dark wood of “egocentricity, pettiness, and worldly ignorance” [Schumacher, 1979].

Humanity, as many modern psychologists agree, is a conscious agent who has the capacity to experience, decide, and act for the sake of the goals it sets by and for itself. These psychologists may have failed to carry forth-psychological investigations into the universal determinants of human decision-making. Worthy of note are “. . . purposes, goals, values, choices, perception of self, perceptions of others, the personal constructs with which we build our world, the responsibilities we accept or reject, the whole phenomenal world of the individual with its connective tissue of meaning.”<sup>6</sup> All these are vital in understanding our behavior toward each other and toward the environment. It seems there are many psychologists who are functioning so far outside the realm of the human mind and spirit and as such neglect to take a detailed look at our current ecological problems. It seems many of them still possess a deep love for instincts, passions (psychoanalysis) and the understanding of humans by matter (i.e., behaviorism), alone.<sup>7</sup> If this is the case, we have a problem in relying too much on educational psychologists in determining the fate of our children’s education and that of our future generations.<sup>8</sup>

We need psychological understanding to help us to explore the world within us and to learn from our subjective experience, our hopes, fears, thoughts, and emotions as much as from events outside us. It can help us unveil the insensitive and unconscious aspects of our lifestyle which conflicts sometimes both with “. . . what we truly want and with what would be ecologically appropriate” [Walsh, 1984, p. 90]. It can help us to understand the world, others, and ourselves. It will also help us to see how our future and the future of planet Earth depends on human willingness and ability “to call forth new depths of ingenuity and wisdom, co-operation and compassion, altruism and acceptance” [Walsh, 1984, p. 78]. It is in this light that the appropriateness of the human factor (HF) characteristics enters into the equation of environmental understanding, protection, and upkeep. In what follows, the HF concept is presented and its significance to the environment highlighted.

#### **4. THE HUMAN FACTOR AND THE ENVIRONMENT**

So far we have argued the multidimensional nature of the type of productive understanding needed to deal with environmental issues. In this final section, we focus on what we see as the cementing element to the various facets of productive understanding

we have discussed in this paper. We refer to this cementing element as the human factor. Following Adjibolosoo (1993), we define the human factor as the “spectrum of personality characteristics and other dimensions of human performance that enable social, economic and political institutions to function and remain functional over time. Such dimensions sustain the workings and application of the rule of law, political harmony, a disciplined labor force, just legal systems, respect for human dignity and the sanctity of life, social welfare and so on.”

The implication of the human factor concept to the productive understanding is clear. It is people who have acquired the relevant HF characteristics that make things happen (Adjibolosoo, 1998 and 1999). Without a people with the appropriate human factor characteristics, society runs the great risk in getting its social, economic, political, and educational (SEPE) institutions, systems, policies, and programs to operate at their expected optimum. Oftentimes, the drive to preserve the environment has been top heavy with institution building and program development as well as the various actions that pay little attention to the significance of the human factor characteristics. Thus, many scholars continue to call for the creation of technologies and/or programs that can help minimize the rate at which we deplete renewable and non-renewable resources. In developed countries, for example, environmentalist, fearing that their calls for sustainable development are falling on deaf ear, has held numerous marches and violent demonstrations. In some countries, environmentalists have blocked logging roads. Others have chained themselves to trees to prevent money-hungry capitalists from logging the forests and subsequently destroying the environment. Strongly convinced that any society that fails to develop relevant, effective, and efficient institutions will also fail to achieve its goals and objectives, institutionalists have also called for more institutions and capacity building.

However, all these activities and recommendations are based on the assumption that the appropriate human factor characteristics required to sustain such actions and institutions are already in place. As a result, it is just a matter of providing the lead or introducing program outlines. The truth, however, is that this is not the case. As such, certain activities engaged in and actions taken by environmentalists may end up as total fiascos. For one thing, institutions and programs do not run themselves (Adjibolosoo, 1999). Effective and efficient programs and institutions are reflections of the kinds of individuals who operate them. Such individuals are people with integrity, dedication, and the sense of personal accountability, responsibility, commitment, trustworthiness, loyalty, etc. From the human factor perspective, therefore, these characteristics are not naturally inherent in most people today in human society. Instead they are characteristics that must be acquired through formal and informal education and training programs.

To develop the appropriate HF traits, it is imperative to have a great understanding of the components of the human factor and how people can go about to acquire them. Adjibolosoo (1995, pp. 34-37) outlines and discusses the six main components of the human factor. These elements of the HF are spiritual capital, moral capital, aesthetic capital, human capital, human abilities and human potentials. Professor Adjibolosoo presents each element of the HF as follows:

***Spiritual Capital*** is the capability of being in tune with the universal laws and principles of human life. These laws and principles state the truth regarding how humanity must live if it is to achieve “the good and abundant life” in every regard. Spiritual capital furnishes the individual with the will to pursue and carry out what is true in order to complete tasks effectively.

***Moral Capital*** represents habits and attitudes of the human heart that are based on principles relating to right or wrong. It refers to the qualities individuals possess that lead them to conform or not to conform to ethical principles and standards of conduct. The constituents of moral capital include integrity, humility, sincerity, honesty, justice, tolerance, flexibility, etc.

***Aesthetic Capital*** implies the possession of a strong sense of and love for beauty.

***Human Capital*** consists of the know-how and the skills that are used to enhance productivity and have market value. Human Capital is made up of technical, conceptual, intellectual, analytic and communications skills.

***Human Abilities*** constitute the power or capacity of an individual to undertake projects competently or effectively perform tasks requiring mental and physical effort. Human abilities enable people who possess them to execute excellently given duties and functions. Human abilities include commitment, devotion, dedication, determination, accountability, responsibility, competence, and perseverance.

***Human Potentials*** are the human talents that may or may not be harnessed and employed for human-centered development.

All these components interact together to produce the appropriate human factor characteristics in the individual. To develop the appropriate human factor traits, therefore, these components need to be modeled by leaders, managers, professionals, parents, teachers, and peers and also taught to students. It must be made clear that it is these HF traits that would make environmental programs and institutions work as successfully as expected. Indeed, without the availability of the appropriate HF characteristics, nothing we do as human beings will protect and keep the environment from destruction. Thus, to simultaneously achieve sustained economic growth and development with environmental upkeep, human beings must of necessity make HF development a non-compromising priority.

## 5. CONCLUSION

We have argued in this paper that the present status of world ecology shows that changes are occurring in our atmosphere, land, water, and oceans that are undermining

the prospects of humanity, not only for global economic development, but also for our own peace, security, and survival. Thus, a new sort of understanding for the environment is needed; a productive understanding that enables us to see the environment as a concordant between mind, nature, and wise action. This sort of understanding involves the intellectual ability to grasp ecological concepts and principles, and the behavioral capability or willingness to act on these principles intelligently for the betterment of the environment and the future quality of human life (Cherif, 1989b). We have demonstrated the validity of this sort of understanding by using examples of behavior with regard to smoking, chlorofluorocarbons (CFCs), and Polychlorinated biphenyls (PCBs) to show how an understanding of a given problem without the behavioral capability to willingly act on it intelligently is merely vague understanding at best. We have also suggested and discussed the areas in which we have the opportunity to start to improve our productive environmental understanding: (1) Biophysical understanding of the environment; (2) Economic understanding of the environment; (3) Geographical understanding of the environment; (4) Psychological understanding of the environment; and (5) the significance of the appropriate human factor characteristics. Understanding the relationships among all these aspects of the environment and how they affect the mechanism and function of individuals and communities, in both human made and natural ecosystems, is critical for developing the kind of understanding that results in informed decisions and responsible behavior. These themes are not intended to be either categorical or comprehensive, but only as starting points for developing productive environmental understanding.

Having scientific knowledge and technological know-how is not sufficient to improve our environment and our economic conditions. We have to have the appropriate understanding of how nature works, and how our worldview and our culture influence our daily relationships with each other and with our surrounding environment. Botkin (1995, p. xviii), in his book, *Our Natural History: The Lessons of Lewis and Clark*, summed it up as follows:

Solutions to environmental problems are not simply matters of facts and improved techniques. They will not form the basis for a sustainable environment unless we come to a new understanding of the texture and weave of nature and of our relationship with it. If we begin to understand the true nature of our natural heritage, we will learn what we have and have not done to it, and we can become the stewards of our environment, conserving and using wisely our natural resources, for ourselves, for the betterment of our cultures and societies, and for all life on the Earth.

We agree with Ferren Macintyre (1995, p. 516) from the university of Amsterdam in saying that "every culture that has existed has explained how it got here, and their stories should be part of our common heritage." For this purpose, Macintyre wishes that students of anthropology, literature, the general sciences, social studies, history, logic, and epistemology to have the opportunity to study the "world's 30 best myths." How-

ever, to make these kinds of understanding worthwhile, students should already be able to think critically and be able to distinguish logically between different kinds of questions, understandings, myths, and facts. It is this kind of intellectual ability that would help students to know when they know something and how to evaluate competing ideas.

## NOTES

1. To put in Ornstein and Ehrlich's (1989, pp. 197-198) words "if we learn how we think, how our mind is structured, and how to overcome the innate limitations and biases of mind, . . . we [can] then learn to act on that knowledge."

2. Zlotnik (1978 and 1986).

3. Education for Schumacher is the process through which an individual can create for himself or herself "an orderly system of ideas about himself and the world, which can regulate the direction of his or her various strivings."

4. According Ofori-Amoah (1996), location is the position of places and things in space and the result of location of things and places in space.

5. Psychology is a discipline dedicated to the service of mankind. It provides both novel and skilful insights that help us to understand the sources of our inner conflicts and confusion, our biases and the bases for our ethical behavior as well as our greed, aggression, and ignorance which create many of our current global problems. That is why we look to psychology for guidance to what is good in human affairs (Augrose and Stanciu, 1984) and to help us develop a better understanding of the environment.

6. See Roger Sperry (1965) as cited in Augrose & Stanciu (1984, p. 97).

7. Such views were held by Thomas Hobbes, Thomas Malthus, and Sigmund Freud. These scholars assigned the primal drive for human action to instincts and passions. Also, John B. Watson maintained that behavior and not mind or consciousness is a proper subject for psychology in its study of human action.

8. This is because, as many modern humanistic psychologists would say, the human being is a conscious agent who can have experiences, make decisions, and is able to act. It is within this general framework that understanding the human being can be possible and educating him or her can be achievable. I cannot help but feel this way, especially when Rollo May (1967) writes, "I am continually impressed by the surprise registered by our scientific colleagues in other disciplines such as physics and biology when they find us [psychologists] taking our models not only from their sciences, but often from outmoded forms of their sciences they have already discarded." [Cited in Augros & Stanciu, 1984, pp. 96-97].

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