

**ECOLOGICAL AND ENVIRONMENTAL CONCERNS OF
DEVELOPING COUNTRIES: THE NEED FOR APPROPRIATE
TECHNOLOGY AND SUSTAINABLE DEVELOPMENT.**

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Abstract

Many developing countries of the world are understandably in a hurry for modern economic and technological development. The quest for rapid economic and technological development in developing countries is understandable because many of these countries are caught in a vicious circle of poverty. Thus, economic development in these poor developing areas of the world becomes an essential topic of environmental concern. This concern centers particularly with respect to the resources base and life-supporting systems. The researchers emphasize in this paper that developing nations need alternative development that is not necessarily tied to the life-styles and technologies of industrialized countries of developed nations. Thus, in order to develop and manage our modern technological activities in relation to the biosphere, what humanity needs today is an "appropriate modern technology" which takes into consideration the major environmental concerns of developing countries: degradation of natural resources in bioproductive systems, desertification, environmental impacts of energy production and consumption, natural disasters, marginal living conditions in human settlements, etc. The researchers also underline that alternative development also calls for a "sustainable development." As used by some authors, the term "sustainable development" is genuinely rooted in ethics and points to a true alternative mode of development. It advocates relatively fast economic growth in the developing countries, provided that it is matched along with a significant and rapid reduction in the energy and raw material content of every unit of production.

INTRODUCTION

Many developing countries of the world (often referred to as "third-world") are understandably in a hurry for modern economic and technological development, the Western type. The central feature of the Western society from ecological perspective is what some ecologists term "modernity" or the process of "modernization." From this perspective, modernity is understood as "the predominance in a society of a complex of

institutions: specifically industrial technological production, mass consumption of goods industrially produced and the bureaucratic state” (Sullivan 1976, p. 422). The quest for rapid economic and technological development in developing countries is understandable because, and as observed by the "World Commission On Environment and Development" (WCED), many of these countries are caught in a vicious downward spiral. The consequence of this situation is that: "Poor people are forced to overuse environmental resources to survive from day to day, and their impoverishment of their environment further impoverishes them, making their survival ever more difficult and uncertain” (Allaby1989, p. 245). The prosperity attained in some of these poor countries is often precarious, as it has been secured through farming, forestry and industrial practices that bring profit and progress only over short term. Thus, economic development in these poor developing areas of the earth becomes an essential topic of environmental concern. This concern centers particularly with respect to the resources base and life-supporting systems.

It is the intention of the researchers in this paper to stress that developing nations need alternative development that is not necessarily tied to the life-styles and technologies of industrialized countries of developed nations (often called first world). The inherent relationships between environment and development will equally be stressed. The main environmental concerns of developing countries will also be looked into. The concept of eco-development as a basic approach to the integration of environment with development planning will be advocated. However, a more fundamental concept of "sustainable development" for developing countries is a sine qua non. The concept of appropriate technology, which does not see nature purely as a matter of utility to be subjugated under human needs, whether as an object of consumption or as a means of production, will be advocated, in relation to the developmental and environmental concerns of developing nations. Finally, sustainable development cannot succeed in developing countries if there is no proper development planning, or if there is a continuation of the divorce between planning and actual execution.

CONCEPTUAL CLARIFICATIONS

Environment and Ecology

Environment has been generally defined by ecologists as the external conditions and influences affecting the life and development of organisms. In its simplest dictionary meaning, environment is the surroundings or conditions within which something or someone exists. It concerns the natural conditions necessary for the healthy existence of plants, animals and people. Thus, environmentalism as a science of nature is

concerned with the natural environment and its protection from pollution and other harmful influences (Higgleton et al., 1992). On the other hand, **Ecology** is a study of the relationship between living things and their environments. To be more precise, it is a scientific study of the relation of plants and living creatures to each other and to their surroundings (Jonathan et al. 1992). As a science, says Blackstone (1974), it is concerned largely with the levels beyond the individual organism, that is, with populations, communities, ecosystems, and the biosphere (p. 171). One can then see that both the environmental and ecological sciences meet in their subject-matters, namely, the concern for the living things and their environments or surroundings. Therefore, in the context of this paper, the words "environmental" and "ecological" are used interchangeably, as they are almost the same in their meanings.

What is Development?

In its simplest dictionary meanings, to develop is to make or become more mature, more advanced, more complete, more organized, etc. Development is the act of developing or the process of being developed (Higgleton et al. 1992). According to Bartelmus (1986), 'development is generally accepted to be a process that attempts to improve the living conditions of people.' Most people agree that the improvement of the living conditions relates to non-material wants as well as to physical requirements. Development goals that call for the increase of human welfare or the improvement of the quality of life reflect this agreement: affection, recreation and entertainment, education, human freedom (security), shelter, aesthetic and cultural values, political equity (participation and social opportunities), health, physiological needs and future quality of life (p. 3). Goulet (1990) observes that most national governments and international financing agencies, however, still define development as "maximum economic growth and a concerted drive towards industrialization and mass consumption" (p. 37). Moreover, the term "development," he says, *can* be used either descriptively or normatively. Thus, one speaks descriptively when listing a country's GNP growth rates, trade balance, or rate of savings and investments. But one may shift to normative language and condemn these very accomplishments by branding them modernization without development or by decrying the failure of quantitative growth to produce human development. This seeming ambiguities are unavoidable, for development is both a goal and a means thereto, a label for 'what is' as well as pointer to 'what ought to be.' This is why discourses on development is necessarily done in ethical terms, more so when development choices are value-laden.

Finally, Goulet (1990) makes another important point, namely, that development itself is also the major culprit in perpetuation of the underdevelopment of hundreds of millions, especially in developing countries of the world. Thus, there is a **twin concern** of eliminating degrading underdevelopment as well as the task of safeguarding nature. Accordingly, he observes that any adequate definition of development must include these five dimensions:

- i. an economic component dealing with the creation of wealth and improved conditions of life;
- ii. a social ingredient measured as well-being in health, education, housing, and employment;
- iii. a political dimension embodying values such as human rights, political freedom, enfranchisement, and some form of democracy.
- iv. a cultural dimension in recognition of the fact that cultures confer identity and self-worth to people;
- v. a fifth dimension called the "full-life paradigm", which refers to the ultimate meanings of life and history as expressed in symbols and beliefs. (p. 38)

In most developing countries of the world, low levels of living and productivity are accompanied by high levels of population growth, unemployment, international dependence and a predominantly agrarian based economy. This is true of Nigeria today, for example. Based on these common factors, some international agreements on development strategies have been reached, which often have met with failures at the national levels. We shall later see why such failures occur. However, the main thrust of this paper is the view that there can be no sound development (as well as development ethic) without environmental wisdom, and vice-versa, no environmental wisdom is possible without a solid ethics of development.

RELATION BETWEEN ENVIRONMENT AND DEVELOPMENT

From our earlier definitions or descriptions of their meanings, one can see that there is an intimate nexus between environment, as the conditions and influences that interact with man, and development, as a process to improve human welfare. Accordingly, Bartelmus (1986), observes: "The environment can be considered to be an integral part of development, since any impact on man's environment also influences his state of wellbeing or welfare" (p. 9). Thus, he says, environment and development are linked together so intricately that separate approaches to either environmental or developmental problems are piecemeal at best. Also the *Report* of the 1983 "World

Commission on Environment and Development” published in 1987 recognises such implicit nexus between the environment and development:

The Environment and development are not separate challenges; they are inexorably linked. Development cannot subsist upon a deteriorating environmental resource base; the environment cannot be protected when growth leaves out of account the cost of environmental destruction. (Allaby, 1989, p. 251)

This *Commission Report* further points out that the problems arising from the environment and development “are linked in a complex system of cause and effect,” and so cannot be treated separately by fragmented institutions and policies. Thus, failure to manage the environment and to sustain development threaten to overwhelm all countries, particularly the developing nations of the world. The *Commission Report* concludes that first, environmental stresses are linked one to another; secondly, that environmental stresses and patterns of economic development are linked one to another; and thirdly, that environmental and economic problems are linked to many social and political factor.

A careful analysis of the inter-relationships between the environmental and economic system will obviously point to the need for integrated policies especially in developing countries. The economic system is made up of productive, consumptive and accumulative activities which create flows of goods and services (labor inclusive) between the system components. The environmental system is made up of natural, man-made and social components. Bertelmus (1986) observes that environmental and economic activities may affect human welfare either positively or negatively. For instance, the consumption of “useful” goods and services provides individuals with what economists call “utility” or “wellbeing.” On the other hand, toxic goods (or toxic wastes), such as contaminated pollutants, destroy human health. Active participation in the productive system may produce either positive or negative effects resulting from job satisfaction or stress. Marginal settlements are a source of much misery, while adequate shelter and other man-made facilities can contribute to a sense of security, wellbeing and self-esteem.

Any wonder then that the apparent failure of traditional theory and policy to prevent or remedy environmental degradation arising from development has given rise to many prophets of “doomsday” regarding environmental problems. Such radical environmentalist view call for totally restrained growth (or what they chose to call

“Zero” growth) in order to escape the disastrous results of excessive exertions on the physical limits of the earth's resources. It is not surprising that developing countries who are still at the early stages of socio-economic development would find it hard to welcome this view. They understandably consider growth to be more important than any other concerns by way of environmental hazards and problems. To remedy this apparent suspicious attitude of the less-developed nations (against the already highly industrialized nations) the United Nations Conference on the Human Environment held in Switzerland (1972) concluded that “environmental problems do not only result from the development process itself but also from the very lack of development.”

The implicit connection between the environment and development, and the need for integration of environmental dimensions into development planning and strategies is reflected in such phrases like the “integrated approach to environment and development,” “sustainable and environmentally sound development,” and “alternative patterns of development and life-styles.” Many radical environmentalists strongly advocate these views for the developing nations today. However, Bertelmus (1986) rightly observes that the extent and in which way these views can be implemented by developing nations largely depends on the national perception of the environmental problem, the political will to pursue environmental strategies, the tools available to implement strategies, and the specific environmental conditions and problems of each developing country.

Environmental Trends and Problems in Developing Nations

The international discussion on the environment and development revealed that many environmental problems in developing countries originate from the lack of development, that is, from the struggle to overcome extreme conditions of poverty. Hence, the 1983 World Commission on Environment and Development affirmed in their *Report* that poverty itself pollutes the environment, creating environmental stress in a different way. The Commission Report, as recorded by Allaby (1989) expatiated further:

Those who are poor and hungry will often destroy their immediate environment in order to survive: they will cut down forests; their livestock will overgraze grasslands; they will overuse marginal land; and in growing numbers they will crowd into congested cities (pp. 245-246).

The *Report* went on to observe that the links between environmental stress and developmental disaster are most evident in sub-Sahara Africa. It noted that *per capita*

food production, declining since the 1960s, plummeted during the drought of the 1980s, and at the height of the food emergency some 35 million people were exposed to risk. Human overuse of land and prolonged drought threaten to turn the grasslands of Africa's Sahel region into desert. The Report then concluded that: "No other region more tragically suffers the vicious cycle of poverty leading to environmental degradation, which leads in turn to even greater poverty" (p. 248). Each year, says the *Commission Report*, another six million hectares are degraded to desert-like conditions in the developing countries. Bartelmus (1986) corroborates this situation in these words:

Land is degraded and loss its productive capacity through soil erosion, salinization, alkalization, water logging and chemical degradation. If land is degraded permanently ..., desertification takes place. (p. 22)

Other significant losses of agricultural land are brought about by changing land use, especially by the expansion of human settlements and large-scale infrastructure. It has been noted that soil erosion is by far highest in Asia, while salinization and alkalization of soils seem to be the major problems in Latin America. The loss of forests and other wild lands is another environmental trend in developing countries. This is as a result of the search for additional agricultural land and wood for shelter and energy. The consequence of this deforestation is the extinctions of species of plants and animals and drastic reduction in the genetic diversity of ecosystems.

IMPACTS OF MODERN WESTERN DEVELOPMENT AND TECHNOLOGY MODELS

Africa before Advent of Modern Technology

Before the inception of modern technological development, Africans had great reverence for natural resources. This greatly helped in sustaining the ecological and environmental condition of the whole continent. Writing on the "Traditional African Land Ethics," Omari (n.d.) affirms that the reverence of Africans towards nature and natural places was a religious attitude and practice which, while it developed around the religious thought and history of a particular social group, indirectly served other social functions in the whole community: "In the case of Shrines and initiation rites centres, taboos developed around the destruction of trees, shrubs, and the sacred places themselves. The forests, certain kinds of trees, animals, and sources of water were preserved in the name of religion" (p. 169).

The salient point here is that out of their religious beliefs and values and their reverence for sacred public places, an ecological and environmental concern was developed. Consequently, in African traditional societies there was a balanced ecosystem. Human interaction with nature was such that there was a healthy harmony between them. Omari further observed that these attitudes were stronger when they were attached to the ownership of land through myth. They could be myths of the origin of the clan, of the place where the ancestors were given power, or of something with special historical meaning to the whole social group. In this way, belief in sacred places served as a common history which united all generations of the same social unit as a community.

The Africans anticipated no change in the future of their communities. The forests and shrubs of their worshipping places were preserved for both present and future generations. There was a strong belief that if one destroyed the holy places, the ancestors would be angry, and this would result in some misfortune befalling the whole community. There was equally a strong belief that future generations would suffer terrible misfortune if God, who had entrusted these resources to them, was displeased by their misuse or destruction. This served a community function with regards to ecology and natural conservation. For instance, the people of Eastern Tanzania (East Africa) had a mythical hero (Kolelo) whom they believed to possess the power to bring rain. People from this area worshipped in the direction of the mountains (Uluguru) where the mythical hero was thought to live. Consequent upon this belief, the forests around this area and mountain were preserved. Thus, the area was ever green and beautiful. Streams of water constantly ran down from the mountains. Besides the value of such reverence as a source of unity among the ethnic group concerned, the hilly nature of the area enhanced the cultivation of various types of vegetables and beans in sufficient quantities to feed both the natives and even the far away city of Dar es Salaam. The point is that without this forest cover, their fields would have been washed away by soil erosion. But today, there is lumbering practices going on in the area which constitute both ecological and environmental hazards. Thus, we see that in traditional African societies, religious taboos and restrictions took a very good care of the afforestation campaigns which are now being waged by most governments in developing countries, particularly in Africa. Thus, as a result of the African traditional reverence for natural resources through their system of religious values and beliefs, animal species and other natural ecological resources were preserved for generations.

Modern Technology vis-à-vis Development and Environment

Towards the end of his essay on “The Question Concerning Modern Technology,” Heidegger (1993) makes these crucial assertions: “What is dangerous is not technology. Technology is not demonic; but its essence is mysterious. The essence of technology, as the destining of revealing is the danger” (p. 333). There is certainly some element of truth in the Heideggerian assertion above; not the whole truth. One cannot deny today that there is a narrowness of outlook in modern technology, particularly as it concerns modern economic development and the environment. But, as Drengson (1982) observed, the one real danger in modern use of technology lies in the attitude which he described as “technological anarchy” which, he says, has been a dominant philosophy throughout much of the industrial West, and which has equally affected developing countries of the world. Explaining this philosophy, he says in brief, technological anarchy is the philosophy that all technology and all technical knowledge are good and should be pursued. Whatever can be done (provided it is not insane), should be done (p. 106).

The danger of this attitude lies in the tendency by the government to embrace any type of technology without judging its usefulness to the peculiar needs of the country, all in the name of pursuit of rapid industrialization and economic development. On the part of the industrialists, this technological anarchy manifests in the tendency to abhor most government regulations over technology, development and market. Technological anarchy certainly stimulates rapid technological development and encourages technological diversity. But the inner danger is that at a point, technology which was originally pursued as an instrument (means) to satisfy human needs tends to become an end in itself. At this stage, technological anarchy gives way to yet another danger in modern technology, namely “technophilia.” Technophilia is a feature of modern technology. It is the situation in which: “Humans become enamoured with their own cleverness, with their technique and tricks, their technical devices and process. The products of our technology become our toys, technology our life” (Drengson 1982, p. 106). The real danger in “technophilia” (love of technology) is that it turns the pursuit of technology into the main end of life. And we eventually begin to apply technology practically to everything. Thus, it has been observed that the application of technology to nearly everything has become a controlling force that endangers both human and non-human values. We have begun of late to realize that even the biosphere as a whole has become greatly threatened by the products of modern technological activities. It is to realize that we have reached the situation in which humanity is threatened by modern technology run out of human control. This constitutes the ultimate danger of modern technology.

Need for Appropriate Technology

In spite of the dangers in modern technology, as we saw briefly above, no one would wish to suggest seriously that either technology itself or technological progress be deplored. As Toffler (1989) observes, "we cannot and must not turn off the switch of technological progress. Only romantic fools babble about returning to 'a state of nature'" (p.113). A state of nature is the one in which infants cry and die for lack of elementary medical care, in which malnutrition stultifies the brain, and in which, according to Thomas Hobbes, the typical life is "poor, nasty brutish and short." Many philosopher-scientists will not find problems agreeing with this position. Where there would be obvious lack of consensus is on the unified approach to technological development. For as Drengson (1982) observes, "there is a wide disagreement in our society about how we should develop resources, whether or how to exploit animal species, whether and which new technologies to develop and how to manage our collective activities... in relation to the biosphere" (p. 105). Therefore, what needs to be emphasized in our modern society today is the need for all to appreciate the fact of a necessary relation between technology and the nature of man. As Mitcham and Mackey (1971) points out, we need to "... emphasize how man's choice of technologies reveals the ontological relation between technology and modern society, and try to understand modern technology in terms of that relationship" (pp. 102-103). Thus, in order to develop and manage our modern technological activities in relation to the biosphere (the physical earth we inhabit), what humanity needs today is an "appropriate modern technology." Drengson (1982) describes the concept of appropriate technology thus: "Appropriate technology requires that we reflect on our ends and values before we commit ourselves to the development of new technologies, or even to the continuation and use of certain older ones" (p. 109). In this type of technology, human and no-human values take precedence over curiosity. Hence, central importance is placed on the compatibility between a proposed (or existing) technology, human well-being and eco-system integrity.

This emphasis on appropriate technology today involves a deliberate effort to transform the technological process to an art. When this obtains, then the technological process or technology itself ceases to pose danger –it rather becomes life promoting instead of life-threatening phenomenon. This is why Drengson underlines that: "Ultimately, appropriate technology aims to transform our relationship to technology in such a way that it becomes a means to the realization of values fully understood. This means that the limits of technology are clearly perceived, the values of simplicity realized" (Drengson 1982, p. 109). This is the ultimate "raison d'être" of a fully evolving and mature appropriate technology.

SUITABLE DEVELOPMENT MODELS FOR DEVELOPING COUNTRIES

The Concept of Eco-Development

We had earlier identified the major environmental concerns of developing countries. They include the degradation of natural resources in bioproductive systems, desertification, environmental impacts of energy production and consumption, natural disasters, marginal living conditions in human settlements, etc. We equally noted that most of these problems were caused by human interaction with the environment. There is then the need to evolve a model development in developing countries which takes into consideration ecological needs in development planning and policies. For, as Bartelmus (1986) thus observes: “Most impacts on ecosystems stem from activities of socio-economic development. Ecological criteria need, therefore, is to be introduced into development planning and policies” (p. 45). Bartelmus notes also that there exists in Philippines a good example of full identification of tribal communities with their physical environment and of their successful management of a well-balanced ecosystem in their hand-built rice paddy terraces on the steep mountain slopes of Philippines. The same successful management of local environments he also noted to exist in Sweden where there is a cultivation in tropical rainforests and traditional herd management by nomads in semi-arid zones.

Thus, aware of the ecological successes of both the Philippines and Sweden experiments and the relevance of ecological factors in the development process, the new planning concept of “ecodevelopment” has been advocated, particularly by the United Nations Environmental Programme (UNEP 1975). This organization (UNEP), gave the first description of ecodevelopment as:

Development at regional and local levels ... consistent with the potentials of the area involved, with attention given to the adequate and rational use of the natural resources, and to applications of technological styles ... and organizational forms that respects the natural ecosystems and local socio-cultural patterns.” (Bartelmus, 1986, p.45)

The term “ecodevelopment,” which is suggestive of a new approach to development planning, has often become a synonym for environmentally sound development, irrespective of the geographical (local, national or international) boundaries to which environmental and socio-economic planning should apply. This type of programme of development is advocated particularly to developing countries in that it presents a radical departure from conventional development plans, which are roundly attacked as both ecologically destructive and socially regressive. As Lewis (1992) observed, the tenets

of ecodevelopment follow directly from the central propositions of mainstream radical environmentalism. Accordingly, radical environmentalists argue that “development should be based on small-scale project run by local communities and governed through participatory democracy” (Lewis 1992, p. 194). Later the concept of eco-development planning was taken up and developed on behalf of UNEP by a non-governmental body, the “Centre International de Recherche sur l'Environnement et le Développement.” This body, after numerous pilot studies, listed the following as the main features of eco-development:

- (a) resource development for the satisfaction of basic needs;
- (b) development of a satisfactory social ecosystem;
- (c) rational (non-degrading and non-wasteful) use of natural resources in solidarity with future generations;
- (d) use of alternative environmentally sound production procedures ;
- (e) use of alternative energy sources, in particular of the regional capacity for photosynthesis;
- (f) development and use of ecotechniques;
- (g) establishment of horizontal authority ensuring participation of the population concerned and preventing any plundering of the results of eco-development;
- (h) preparatory education to create social awareness of ecological values in development. (Bartelmus, 1986, p.46)

A careful look at the above features shows that eco-development focuses, among other things, on the values and perception of the local population. It advocates the spirit of self-reliance to the local population so that the style and rate of development be determined by those people most affected by any project of socio-economic development.

The Concept of Sustainable Development

There is a considerable ambiguity in the term “sustainable development.” As used by some people, it could be associated with “limited goal of resource conservation” (growth with equity), which is suspect to other opinions as essentially a camouflage for maintaining the economic growth that created the crisis in economic development and environment to begin with. As used by some others, the term is genuinely rooted in ethics and points to a true alternative mode of development. What is clear to one is that several authors strive hard to dissociate the term from the dominant Western paradigm of development. Thus, most of these authors reach out for a richer

symbolic language in discussing the concept of sustainable development, such as “authentic integral development,” “ecological/holistic world view,” “ecosophical development,” “just, participatory ecodevelopment,” “communalism,” “desirable society,” and other such coinages. However, all agree in principle that there is nothing bad in itself in the term “sustainable development” to prevent its becoming the name for an alternative post-modern social paradigm and new moral conception of world order regarding socio-economic development and eco-environmental protection and preservation. Thus, J. Ronald Engel explains that “sustainable,” by definition, means not only indefinitely prolonged, but nourishing, as the earth is nourishing to life, and as a healthy natural environment is nourishing for the self-actualizing of persons and communities. In this sense, the word “development” need not be restricted to economic activity, much less to the kind of economic activity that now dominates the world, but can broadly mean the evolution, unfolding, growth, and fulfillment of any and all aspects of life. Thus, Engel (1990) defines sustainable development in the broadest sense: “. . . as the kind of human activity that nourishes and perpetuates the historical fulfillment of the whole community of life on Earth” (p. 10). Several authors and world bodies attempt at giving such broad interpretation. Thus, the Ottawa Conference on Conservation and Development identified five broad criteria for the “emerging paradigm of sustainable development” as:

- (a) interpretation of conservation and development;
- (b) satisfaction of basic human needs;
- (c) achievement of equity and social justice;
- (d) provision for social self-determination and cultural diversity;
- (e) maintenance of ecological integrity. (Engel, 1990, p. 8)

This Ottawa Conference was another expression of the growing consensus that the entire model for modern industrial development needs to be corrected. Not only the economic values of competition and consumption but the competition of unlimited material growth; not only the prevalence of technology but the view of world as a machine; not only the dichotomy of resource conservation versus ecocentrism, conservation versus development, humanity versus nature, theory versus practice, intrinsic values but also the need to think in dichotomies need to be corrected. From what we have seen so far, one observes that “it turns out that the main premise of sustainable development is that economic growth must never undercut the productivity of on natural ecosystems (Lewis 1992, p. 201).

Thus, some enthusiasts of sustainable development advocate relatively fast economic growth in the Third World or developing countries, provided that it is matched along with a significant and rapid reduction in the energy and raw material content of every unit of production. It is also believed as regards this alternative philosophy of development that "carefully devised, environmentally aware, small-scale development strategies, whether labeled "eco" or "sustainable," do form an essential interim approach for reducing rural poverty. Lewis (1992) agrees that small-scale development projects, especially those that work through the ecological knowledge of indigenous peoples, can both safeguard local landscapes and significantly improve living conditions. He believes that in most areas of the Third World, only ecologically oriented agrarian development program can offer *immediate* hope for impoverished cultivators, and thus begin to sever the links between deepening immiseration and accelerating degradation. In the end, one has to note that the concept of "eco-development" and "sustainable development" are by no means poles apart. They are in essence two faces of the same coin, namely, the integral or holistic approach to modern socio-economic development and nature to meet human needs. Of course, this broad conception of modern development does not rule out industrialization.

EVALUATION AND CONCLUSION

Evaluation

There is no denying the fact that the scale of man's activities and the pace of their development have almost reached the point where their cumulative effects on the environment are undermining the delicate natural and geophysical equilibria of the entire planet. It is in this light that we must see the present global awakening to the need to protect our environment from over-exploitation, pollution, and contamination. Hence, it is no longer argued that the protection of the environment is an obstacle to development. Moreover, the earth is the only place in the universe known to sustain life as of now. As such human activities, by way of modern development, must not be allowed to continue to progressively reduce the planet's life-supporting capacity at a time when rising population and consumption are increasingly making heavy demands on the earth. Thus, if humanity does not maintain a healthy relationship with the biosphere (the thin layer of the planet that contains and sustains life), our environmental and ecological situation will be deteriorating until sustainable modes of development become the rule rather than the exception. Thus, it must be re-emphasized that for development to be sustainable, it must take account of social and ecological factor, as well as economic ones; of the living and non-living resource base; and of the long term as well as the short term advantages and disadvantages of alternative action.

In the light of the foregoing, we noted the impact of our modern technology and industry on our environment. Technology is not bad in itself. We need it in

developing countries of the world for rapid socio-economic developments. Surely developing countries are already experiencing industrial pollution and so have equally an interest in establishing and enforcing standards for environmental protection. Thus, it is not technology *per se* which is harmful but technology which violates the principles of ecology. We clearly need not less but more technology. But the danger lies in technology that lacks control. What is urgently needed is movement for responsible or appropriate technology which should formulate a set of positive technological goals for the future and thus curtail the effects of irresponsibly applied technology as well. In summary, our environmental crisis originates in social misuse of technology, in purposes more closely related to profit than human welfare. The solution lies in the application of appropriate technologies in our socio-economic and industrial development –technologies that are compatible with the environment.

It must be added that among the prerequisites for sustainable development is conservation of living resources. For, development as defined by the World Conservation Strategy is the modification of the biosphere and the application of human, financial, living and non-living resources to satisfy human needs and improve the quality of human life. The same world body defines conservation as “the management of human use of the biosphere so that it may yield the greatest sustainable benefit to present generations while maintaining its potential to meet the needs and aspiration of future generations” (Allabay 1989, pp. 232-3). Thus, conservation is global, positive, embracing presentation, maintenance, sustainable utilization, restoration, and enhancement of the natural environment. Conservation, like development, is for people; while development aims to achieve human goals largely through use of the biosphere, conservation aims to achieve them by ensuring that such use can continue in the future. As the World Conservation Strategy rightly noted, the integration of conservation and development (“sustainable development”) is particularly important, because unless patterns of development that also conserve living resources are widely adopted, it will become impossible to meet the needs of today without foreclosing the achievement of tomorrow. Thus, the integration of conservation and development is essential in order to ensure that modifications of the planet do indeed secure the survival and well-being of all people.

Finally, development by any name (be it eco-development or sustainable development) is bound to fail if there is no planning. The result is the same when what is planned is not what is carried out during execution. Thus, I.S. Abdalla observes that divorce between what is planned and what actually takes place is rather a common

feature among developing countries. Sustainable development which we advocate for developing countries will equally fail as a model of development unless conscious steps are taken to avoid the causes for typical plan failures. Bartelmus (1986) identifies the following as well-known reasons for typical plan failures in developing countries:

- (a) over ambitious plan objectives;
- (b) ignorance or neglect of conflicts between objectives;
- (c) insufficiency of the database for plan design,
- (d) monitoring and evaluation;
- (e) lack of qualified personnel to design and carry out plans;
- (f) inaccurate and inconsistent plans (due to data gaps, neglect of conflicting objectives and lack of qualified planners);
- (g) lack of communication between planning agencies, day-to-day decision-makers and those affected by decision-making;
- (h) lack of political will to carry out the plan. (p. 63)

At times, unexpected events such as economic crisis, natural disasters or political upheaval have brought about plan failures. These various factors may have contributed in the production of white-elephant plans and projects which never had a chance to be implemented the way they were designed. Any wonder then that in many developing countries, such as Nigeria, many projects were begun and abandoned uncompleted after take-offs and they litter all over the places. Therefore, in developing countries there should be not only sustained effort at integrated approach to environment and development but also a corresponding determination or will to carry out development plans successfully.

Conclusion

We conclude in the light of the thoughts and aspirations of the World Conservation Strategy. Thus, we reiterate that the activities of every organism modify its environment, and those of human beings are no exception. Although environmental modification is both natural and a necessary part of development, this does not mean that all modification leads to development. Some modifications can be bad and destructive to the environment. Thus, while it is inevitable that most of the planet earth will be modified by people and that much of it will be transformed, it is not at all inevitable that such alternations will achieve the social and economic objectives of development. Unless it is guided by ecological as well as by other environmental, and by social, cultural and ethical considerations, much development will continue

to have undesired effects, to provide reduced benefits or even to fail altogether. Hence, we have kept insisting on the need for appropriate technology and integrated or sustainable development for developing countries of the world, particularly in Africa.

In spite of our appreciation of how traditional African societies sustained their environment in the past, one cannot reasonably advocate that humanity sacrifice all its activities, knowledge, and institutional structures or surrender all its achievements and start all over again in a clean, new slate. Such a return to nature is unnecessary. It is rather that our view of which values and purpose should inform our actions and institutions must be consciously reviewed; and that we have the capacity to exercise choices when need be. Thus, our choice and task should be to create a society which is sustainable and which will give fullest possible satisfaction to its members. Such a society by definition would depend not on expansion (i.e. rapid industrialization “at all cost”) but by stability, i.e. protection, conservation and preservation of nature and nature’s resources.

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