

## GLOBAL ENVIRONMENTAL SCENARIO: A CONCERN OF THE I.U.B.E.

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### **Introduction**

Of the heavenly bodies in the galaxies, our planet Earth, is the most blessed for its precious gift of bios. In this world of life, mankind has gained supremacy over all other living organisms. He was given authority to have dominion over other living forms-the animals, fish, birds, plants.

Considering it a paradise, man has abused the resources he found on this planet and has overpopulated it with his offspring. In this attempt to provide for their survival needs, he denuded the forests, as culprit of illegal logging; engaged in erosive cultivation techniques; overfished, catching the fries, the progenitors of the fish species; destroyed the coral reefs and mangroves; disposed his solid and liquid wastes in different bodies of water; engaged in industries under the guise of economic progress, causing oil spills in oceans and seas increasing BOD and, to some extent, the death of marine biota; polluted the air with fumes and chemicals-the aerosols and chloroflourocarbons, thinning the ozone layer, blanket of the Earth, and exposing it to extreme radiation. These and thousands of man's activities have caused global environmental degradation and bios depletion.

Aware of this scenario, the daily increase of world's population of 220,000 projecting a population of 6 billion in the year 2000, and with the limited resources in this Planet, life (bios) gradually degenerates and, consequently, if not given serious concern and top priority by men themselves, it disintegrates until Doomsday comes. Not only the quality of life but also, in the long run, the very survival of the species depends on safeguarding our Planet Earth.

### **I. The I.U.B.E.'s directions**

In this context, the International University for the Bio-Environment(I.U.B.E.), grounded in the Bios Theory presented in Biopolitics - Volume II in 1989, shall serve as a seat of obtaining knowledge and further understanding of:

- A. The structure and functions of the representative environments;
- B. Analyzing and evaluating the impact of human activities on the environment;
- C. Developing skills and competencies in investigating, analyzing and communicating ways of protecting the environment;
- D. Working cooperatively with others and participating in action programs in the preservation and conservation of the environments;
- E. Designing curricula for the educational system in molding the young and promoting public awareness, thus, enabling them to:
  - o Internalize values and attitudes of environmental management and conservation for the preservation and perpetuation of bios;
  - o Appreciate the value of an attractive, productive, health sustaining environment and a well-preserved natural and cultural heritage for the present and future generations.

This education is the concern of the International University for the Bio-Environment (I.U.B.E.) - an education that aims to understand man and his environment. Education is for the kind of society we want to have, for the kind of human beings we want our people to be. To achieve this, we need education which is relevant and of a high quality. The quality of education required is one which calls for the true measure of relevance in its ability to focus on the enduring values of human existence, its ability to cultivate the whole man by developing his full potential in an environment that could provide for his present and future needs.

As we assess the world today, global crises in many areas of life demand our attention because they are transforming our lives and have serious social and educational implications that affect everyone. The challenges which are universal and urgent require the designing of curricula that take roots on the environmental resources and the way in which they are of benefit to man in the maintenance and sustenance of life in this planet.

Curriculum development should be from simple to complex. For instance, the conception of the environment starts from an appreciation of nature where the pre-school child finds it to be pleasurable and interesting. The elementary, secondary and tertiary levels have concepts at varying degrees of technical and technological, social and political dynamics of the environment. The curricula dealing with environmental resources and how they are of benefit to man are:

- Land-wildlife, forest, minerals, soil, etc.
- Air-gases of oxygen, carbon dioxide, nitrogen.
- Water-lakes, oceans, rivers, seas, etc.
- Estuaries.

How have man's activities affected the above-mentioned environmental resources?

- Solid and liquid disposals.
- Air pollution-vehicular emissions, industrial.
- Urban slums-squatting.
- Denudation of forests.
- Use of insecticides, pesticides, sprays.
- Overfishing.

### **Some concepts of inclusion in the curricula for bio-environmental impact statements**

Scenario in resource use and development of nature's resources

Gifted with his intellect, man has developed technologies to utilize the planet's resources, and thus engaged in projects thought to generate income and gain progress for himself and his family. Resource utilization involves technology application. Thus the basic project components of resource utilization are as follows:

Project Components

Site Preparation:Clearing;Grubbing;Grading

Construction:Placement of structures;Installation of utilities;Layout of circulation system;Landscaping and Fencing

Operations:Consumption of resources;Discharge of liquid wastes;Maintenance of Machine and structure;Disposal of solid wastes

As a result of the technological developments, bio-environmental consequences take place. For instance, the demolition and cutting of trees, deprives the land of the roots of these trees that would hold on the water. Consequently these are the results:

*In natural areas:*

- A. Flowing water from streams and creeks dissolves and erodes rocks which naturally adds a certain amount of silt and metals to water courses.
- B. Marshes (fresh or salt water) act as natural traps, catching sediments eroded from upland areas which contain nutrients of value to wildlife and other aquatic organisms.
- C. Dissolved gases are added to water by the turbulence of water below waterfalls which aerates water courses and enhances aquatic growth.
- D. Metallic water flowing into water courses from mining operations (e.g. mine tailings ponds) changes the chemical composition of reclining waters.
- E. Uncontrolled upland agricultural practices (e.g. slash and burn practices) result in soil erosion, sedimentation of water courses, flood conditions and increase costs of reforestation.

*Agricultural areas:*

- F. Spraying of crops adds pesticides and herbicides to runoff and the atmosphere.
- G. Fertilizers improperly applied are dissolved in runoff and percolate down to the ground water table causing contamination of water bodies.
- H. Livestock wastes from pigs, ducks, chickens and from raising cattle is washed into water courses (surface and underground) causing contamination of water bodies.

*Urban areas:*

- I. Heated water from power plant operations changes the water temperatures of water bodies affecting the survival of aquatic life.
- J. Untreated industrial waste water increases the potential for water pollution and fish kills by the introduction of harmful/toxic effluents.
- K. Industrial gases cause air pollution, local changes in climate and acid rain which is harmful to human health and plant growth and causes corrosion of materials.

- L. Oil spills resulting from transportation accidents and the unloading of oil affect coastal lands and water causing the death of wildlife, aquatic organisms and experience clean-up costs.



## II. The conceptual model

From the foregoing scenario, this reporter presents a paradigm - a conceptual model that illustrates how the I.U.B.E. is the seat of gaining knowledge as well as understanding to analyze and evaluate the function of representative environments of the globe in addition to nurturing values and attitudes towards the preservation and perpetuation of bios (life). Moreover, it aims to design curricula to preserve bio-environment for the educational system attainable by nations on earth.

You will note that the I.U.B.E. is represented by a book on top of the Biopolitics logo from whence it sprang. Set in the book is SOP meaning 'Save Our Planet', the prime target of the I.U.B.E. On the left side of the I.U.B.E. is a portrayal of the present global environmental scenario which is considered to be before the inception of the I.U.B.E. and on the right side is after the vision perceived to be attained by the I.U.B.E. in the preservation of the environment to meet the needs of humankind. The 'before' scenario presents status and problems of our bio-environment such as:

- A. Individual suffering caused by pollution, inadequate food and water supply triggered by overpopulation, poverty, disease, and malnutrition;
- B. Environmental destruction-illegal logging, overfishing, use of chemical fertilizers and pesticides;
- C. Air and sea pollution, especially, from industries.

With the realization of the I.U.B.E.'s attainment of goals, the 'after' scenario depicts the perceived outputs of the I.U.B.E., utilizing the educational system through curriculum development to preserve bio-environment, and to:

- A. Preserve environmental resources to meet man's needs and maintain unpolluted surroundings;
- B. Save natural environmental resources;
- C. Strengthen societal values thereby establishing relevance and responsiveness of technology utilization;
- D. Save individual life.

It is interesting to note the chain of laurel leaves that binds the nations to achieve the I.U.B.E.'s curriculum. On top of the model is the UN with circles representing the Government (G), Non-Governmental Organizations (NGOs), Media (M), and Academe (A). When tapped, the UN would make a strong support for the I.U.B.E.'s goals and objectives. For the I.U.B.E. to succeed in its efforts to solve global problems in the field of its endeavour, it needs to solicit the support of other institutions like the GOs, NGOs, the Media (M) and Academe. The task is so awesome that no single institution in this biosphere can accomplish it; all the elements of the global communities must contribute their share if one has to save human existence.

In the performance of this task, bio-environmental education fulfills two concerns faced by those interested in participating in this bio-ecological movement: how to help and what strategiesto use to make an impact both in the short and long run. One strategy I.U.B.E. members can apply, maintain and sustain is networking. Networking is a proven strategy to achieve one's goals, and cost effectiveness in operations. It involves several agencies with common interests which bind themselves together into a system in pursuit of common objectives. Members pursue activities in a flexible manner, to accommodate changing needs as new problems are identified and as new priorities are introduced.

This strategy is to bring the agencies together to enable them to establish constant exchange of information and develop a program of action, each member contributing what it can do best. Effective communication is the key to a dynamic network.

Recognizing Academeto be one of the members in this network system, it can build a solid program of work which includes designing curricula, instituting innovative educational programs geared towards the enhancement of the bio-environment, and granting of fellowships and awards. It can be responsible for seminars, workshops, information exchange, small research grants attainable and adaptable to the respective countries concerned, and joint course offerings servicing funds to support the network activities.

The major tasks of member institutions concern planning and helping to operationalize plans, especially in the development of the network. Academic institutions can effectively contribute to environmental education by accelerating its efforts toward the diffusion of technologies and useful information generated through research. It is, therefore, incumbent upon the academic institutions involved in research to establish linkage with line agencies for faster dissemination of research results. In addition, academe must address the critical shortage of technically trained manpower for the various jobs related to bio-ecological preservation and protection. For those already on the job, there is a need to upgrade their competence. Educational institutions can form a number of consortia for joint course offerings either for degree or non-degree programs.

NGOs can play a vital role in the promotion of bio-environmental education in their service areas. Through networking, NGOs can profit from the expertise and experience of technically advanced NGOs or research institutions. NGOs can also incorporate bio-environmental education as part of the agenda for national development. It is well known fact that NGOs have their respective area of responsibility in this great endeavor in the enhancement of the preservation and conservation of the bio-environment. The successful experiences of various NGOs get multiplied tenfold if these are systematically shared with other NGOs through networking. The NGOs must realize that the successful demonstration projects on bio-environmentally sound technologies and practices in their own outreach area make excellent educational facilities.

The Media can potentially develop a well-informed public on bio-environmental issues and problems. This can be done by incorporating a bio-environmental thrust in various forms of mass media. A well-informed public can arrive at enlightened decisions from public-policy making to relocating funds in order to promote a sound bio-environment, to individual use of bio-environmentally appropriate technology in farming, fishing, or industry. In the past, the media have focused on issues affecting the bio-environment on a relatively short-term basis. There must be a commitment by the media for sustained effort. Bio-environmental education should never stop, even if in the remote future we succeed in restoring a bio-environmentally sound globe. Media must make an effort to use effective strategies which will promote proper value formation or bio-environmental ethics from printed materials, such as comics, to radio and television. To achieve this goal, media must first educate its own personnel. To maximize the effort, the media can form its own bio-environmental education networks.

The Government (G): All government agencies should not leave bio-environmental education to the Department of Education through their teaching functions but should also do their best to carry their concerns for bio-environmental management through their extension systems as well as in the implementation of their programs and projects for development. Moreover, their research results are worthy inputs to the curricular materials of education, suited for humanities to science to contain lessons on bio-ecology. Current efforts need greater cost-effectiveness. The Department of Agriculture must, for instance, take into consideration concerns for sustainable agricultural development. Thus, the Forestry Department must look into the substantial forestry development as well.

### **III. Value orientation of advanced countries relationship with the developing countries**

A constraint Mr. Orhan Karakullukcu posited in his article "Bios and Developing Economies" (see references) was that in the sixties and seventies, the industrially developed countries were more concerned with protecting their environment. Thus, they exported pollution in various forms to the developing countries. They tried to shift the burden of their environmental problems to the developing countries where the public was not concerned about environmental issues. The degree of industrialization and the existing level of socioeconomic development in leading economies is the outcome of the global colonialization of nations and their natural resources all over the world. The global environmental problem is the outcome of industrialization.

The exploitation of the developing countries by the advanced countries is manifested in terms of their technology transfer. In the guise of foreign aid, they export their technologies to the developing countries - technologies which are their rejects - compounding problems among the recipient countries. One instance: The Philippines received some helicopters from foreign donors. After several months one helicopter crashed. Questions posed are:

- Could the technology be a reject from the benevolent country?
- Could it be the failure to train manpower for said technology?
- Does the technology match the kind of environment they are to be used?

Another instance concerns inorganic fertilizers, products of advanced industrialized countries. With the use of imported inorganic fertilizers in

the developing countries, some bio-environmental consequences were observed:

- reduced population of other "bios" in the environment; bio-diversity was affected.
- runoffs carrying the fertilizer to the streams caused death to the fishes.
- stunted growth of plants with reddening leaves.
- more incidence of carcinogenic diseases.

True, agriculturalists claim that with the application of fertilizers they get higher yield for a faster rate of return on their investment, without realizing that their short-term gains are long-term losses in the end.

Traditionally, the use of organic composting as still observed by some ethnic groups in the Philippines like the Ifugaos who built the famous Rice Terraces, has preserved terrestrial as well as aquatic bios. With the use of this traditional organic fertilizer, the humus of the soil was not eroded and has increased fertility of the soil; bios in the environment has been preserved as well as more productivity in terms of the weight of their products.

In view of the foregoing, I agree with Mr. Orhan Karakullukcu, that leading economies should accept the responsibility to assist developing nations in their effort to protect their natural resources and their environment. Thus, developing countries should be alert to evaluate/assess assistance accorded them in terms of their bio-environmental impact.

#### **IV. Some considerations in designing the curricula for the International University for the Bio-Environment**

Dr. Agni Vlavianos-Arvanitis, with her wisdom for the I.U.B.E.'s mission, stressed that in order to implement global bio-education, the goal is to seek the cooperation of universities, governments, industries, institutions and individuals in an effort to introduce a new vision in the curricula. New course material could be incorporated into existing curricula and programs in order to increase public awareness on life-supporting issues.

Integration of bio-environmental issues both national and global must be given major importance. The following are some issues for curricular inclusion. Several bio-environmental systems are presented for consideration.

##### *The forest ecosystem*

Forests are not merely trees. The tropical forests of the world, despite their small size, harbor most of the world's plants and animals. Although, they constitute only 7% of the total land area of the earth's surface, they house about 50% to 80% of the total existing species of the world. They are one of the oldest ecosystems of the planet. They are essential in the maintenance and vitality of the earth. The forest ecosystems play a crucial role in the oxygen, carbon and water cycles of the globe. In short, the forest is not only a repository of timber resources, but also an essential component of the local and global environment.

The major effects of forests on soil erosion are in the cushioning of raindrop-impact, reductions in the magnitude of overload and river flood flows as a result of high water retention and infiltration capacities of forest soils, and the stabilizing effect of tree roots on waterways. Clear cutting has proved to be the most suitable system of reforestation in Sweden. Within three years, the cut must be planted or naturally regenerated from left seed trees. The practice of clearing, besides recommending itself for biological and ecological reasons, is also appropriate from a technical and an economic point of view. Forests, like other ecosystems, are the "seat of the bios". They provide shelter for wildlife and livelihood for man. Forests are also used for:

- A. Industrial purposes;
- B. Indigenous consumption;
- C. Catchment protection;
- D. Ecology and wildlife conservation;
- E. Agricultural uses;
- F. Ecological effects;
- G. Rearing silkworm and bee keeping;
- H. Pit saving and saw milling;
- I. Soil erosion control;
- J. Other uses, serving as sources of:
  - a. residues
  - b. building poles
  - c. charcoal

- d. gums, resin and oils
- e. veneer logs
- f. sawlogs
- g. special woods & ashes
- h. weaving materials
- i. fuel wood

Some environmental issues with respect to forests in the Philippines, are:

- A. Rapid reforestation is most important. From 1975 to 1986, forest depletion is about 105,500 hectares per year.
- B. Nineteen (19) out of fifty-seven (57) major watersheds are critically denuded, reducing their hydroelectric and irrigation potential.
- C. Only 7 out of 57 national parks meet international standards due to squatting, illegal logging, kaingin (slash and burn) and subdivision developments.
- D. Deforestation-induced erosion is estimated to be 100,000 hectares at 1 meter depth or about 1 billion cubic meters of materials every year.
- E. Another consequence of deforestation is the loss of bio-diversity. This is indicated by the fact that our list of endangered species contains 18 entries. On another, the threatened list, 50% of our endemic flora is already extinct.
- F. The loss of forest cover also results in sudden changes in the hydrological regimes, floods and droughts. The long term view of what has been happening to our forests is from about 75% forest cover in the 1950s to about 25% in 1988. On the basis of slope, the ideal forest cover of the Philippines should be about 54%.

#### *The coastal zone ecosystem*

The Coastal Zone Ecosystem is the ultimate repository of the wastes, sediments and other debris of nature and man. It is composed of a large variety of sub-systems, thus representing a complex challenge in management. Several types of important coastal ecosystems found in the tropics are:

- A. Coral reefs, composed of barrier, patch reefs
- B. Estuaries
- C. Seagrass bed
- D. Mangrove swamp
- E. Marsh
- F. Beach delta
- G. Lagoon
- H. Island

Some significant ecological issues in the coastal areas in the Philippines are:

- 1. Destruction or conversion of Mangroves: In the 1920s there were about 500,000 hectares of mangrove areas. The satellite image shows some 139,000 hectares of vegetated mangroves left. These are mostly second growths containing mangrove species other than the original.
- 2. Destruction of the corals: This is due mostly to gathering siltation, and destructive fishing. Only 6% of the coral reefs could be considered to be in excellent condition (75-100% cover), 24% as good (50-75% cover) and 32% as poor (0-25% cover).
- 3. Pollution, siltation and sedimentation: There are 284 km of sedimentation patterns. The coastal areas also bear the final destruction of most of the mine tailings generated by industry. During the last three years, the mining industry generated metric tons of mine tailings: 82,846,982 (1985), 60,035,810 (1986) and 63,172,000 (1987). In addition to land-based pollution, pollution from ships and oil spills are common.
- 4. Rising sea level: The mean sea level of Manila has risen by about half a meter during the last 80 years.

The environmental effects of over-exploitation for fuelwood in nearshore coastal resources are:

- 1. Runoff water is acidic and detrimental to marine life;
- 2. Slow regeneration of degraded sediments;
- 3. Erosion and sedimentation;
- 4. Soil oxidizes and subsidizes;
- 5. Slash barrier may present dispersal of seeds;
- 6. Debris/unfiltered runoff;

## 7. Reduced source of seed stock.

### *The croplands*

The croplands are the most important life-support system in any part of the globe. The total land area of various croplands is about 34% of the total land area of the Philippines. Some of these croplands are the coconuts, cereals, and sugar crops mixed with coconuts, fishponds from mangroves.

Croplands are usually affected by soil erosion. Soil erosion arises not only from logging but also from improper agricultural practices. Intensive agriculture is reducing soil to a state of debility by a slow process of exhaustion and erosion. Some aspects affecting croplands are:

- A. Availability and quality of irrigation waters: Constraint in food production;
- B. Deterioration of farm income: Reluctance to adopt conservation principles;
- C. Inadequate land tenure: Tendency towards loss of sustainment of agricultural land;
- D. Loss of good cropland: Reliance on fertilizer and agricultural inputs;
- E. Loss of biological diversity: Ecological and economic vulnerability which are affected by the farming system, agro-technology and agri-chemicals.

The Philippine scenario on croplands is as follows:

1. Soil Erosion - 75% of croplands are vulnerable to erosion.
2. Use of chemical fertilizers and pesticides - in 1987, some 11,514 metric tons of pesticides were imported by the Philippines. Pesticide poisoning incidents are increasing. From 1980 to 1988, an average of 503 cases were reported of which 15% die every year.
3. The loss of genetic diversity-extensive use of artificially created varieties leads to the loss of genetic diversity.

### *The freshwater ecosystem*

Lakes and ponds are colorful and lively living spaces. They are the niche of water fowl such as ducks, water fleas, shells and the larvae of many insects. Water lilies, and pond weeds have their thin roots here; closer to shore we find sedges and water, and plantains. These aquatic plants help to maintain the entire biotope by providing nutrients and oxygen.

The Water Cycle. Water is vital to life; it circulates between land and sea, and most of this water immediately rains back into the sea; the rest falls over the land. Water also evaporates from the land and inland waters; and it too, returns to earth as precipitation. From there it goes back to the sea via the rivers and the ground water or it evaporates anew. Some constraints met in the freshwater ecosystem.

- A. Marginal land deforestation of critical areas: irregularity of water supply. This results in erosion and siltation.
- B. Ineffective management of freshwater: inequitable distribution of benefits.
  - a. agriculture = agrichemicals (pesticides & fertilizers)
  - b. industry = mine tailings.
  - c. domestic = organic wastes resulting in eutrophication, pollution and introduction of exotics; extinction of species.

Philippine situations: Ecological issues with respect to the freshwater life support system are as follows:

1. Water pollution - all the rivers of Metro Manila are biologically dead. Many in the surrounding premises are also in bad condition.
2. Seventy percent of the pollution load is due to domestic sources and thirty percent from industrial sources.
3. Mine tailings contribute to the siltation of rivers. The country's active mining firms discharged at least 140,000 tons of mine tailings daily into rivers.
4. Metro Manilans dump at least 1,000 tons of refuse daily into the Pasig River. Also some 313 industrial firms along its banks dump some 11,000,000 gallons of industrial waste water per year.
5. Only about 1/4 of industrial firms, nationwide comply with water pollution control. In the Laguna de Bay Region, only one-third (1/3) comply with regulations.
6. At least 31 municipalities and 10% of cities discharged their sewage industrial effects and domestic wastes in strategic coastal areas. These include Manila Bay, Iligan Bay, Lingayen Gulf, Calancan Bay, and Town Strait.
7. Salt water intrusion of the ground water supply is increasing; especially in metropolitan Manila, Cebu and Negros.

### *Mineral utilization*

Mineral utilization is perceived to observe sustainable development policy. Sustainable development is said to be a process of change to meet

the needs of people, as defined by them, without lessening the potential for meeting their future needs, the needs of other societies, or those of the future generations. This concept necessitates the balancing of the trilogy of mineral resources, environment and society. From the viewpoint of environment, the concept involves the law of ecology and the need to prevent environmental deterioration. From the viewpoint of society the equitability requirement is of foremost importance. From the 'mineral resources sustainable development viewpoint' economic returns are naturally the greatest consideration but such returns should be over the long-term to qualify as sustainable.

The Philippine policy for mineral resources is to promote the maximum development of mineral resources that can give economic benefits over the long-term with equal regard, to environmental protection and social equity. Considering that minerals are non-renewable resources it is understood that the social equity requirement for future generations could be provided by recycling the economic benefits of mining to the development of renewable resources especially to supplant the economical activities initially generated by mining in a particular area.

Mining is now seen as an alternative development strategy in view of the optimism on its future development and the encouraging price levels metals command in the world market. Presently, there are no clear-cut, long-term development programs in the sector so that development options are rather sporadic and short term in nature, e.g., there is no long-term development plan for low-grade copper resources, laterite deposits and others which can be rich sources of future supply.

Tax incentives and other fiscal policies on the mining industry should be made stable to provide for the volatility in prices. A demarcation line between the extent of responsibilities on community development of the mining sector and the government should be clearly delineated. Mineral resources development should be bound to regional and even urban planning since deposits shall eventually be depleted. For instance, before the termination of mining operations, the operation of schools, hospitals, roads and other infrastructures should already be a joint undertaking of both the industry and the government until the time when government could maintain them. Unless this is initiated the social well-being of mining community inhabitants shall remain to be co-terminous with the company's existence.

The bio-environmental impact of mining operations resulting from the unregulated dumping of mine waste and tailings is a real policy concern. Along this area, government has made strong pronouncement that it is not ready nor willing to sacrifice environmental quality and human lives for purely economic gains. A tax, therefore, in terms of mine waste and a tailings fee is imposed on companies in proportion to the social cost entailed by the mine pollutants to the environment.

Environmental pollution control expenses in 1986 and 1987 by mining operations throughout the country have reached 3.3 billion pesos. This gives us a clear indication of an accepted private sector responsibility in environmental concerns.

#### *The marginal ecosystem*

The 'marginal lands' ecosystems are mostly composed of converted forest, grassland, bushlands, eroded areas and barren areas. The Philippine scenario: The environmental issues in the marginal lands revolve around population growth and the slow rate of reforestation. Because of population growth in the uplands, currently estimated to be about 17.5 million, about 7 million of these are in forest lands. By the end of the century, their number will double. With respect to reforestation, in 1987 only 40,000 hectares were reforested out of a total of 1.4 million hectares in need of immediate reforestation. In view of these events some measures must be instituted. For people in the Ecologically Critical Areas (ECAs), the following measures could be taken to save bios:

- A. Introduce environmental enhancement and protection programs as well as environmentally sound livelihood technologies;
- B. Formulate pragmatic strategies and integrated development plans to address the problem of mitigating the tide of migrations to the ecologically critical areas and the city;
- C. Create an institutional framework dedicated to this purpose.

#### *Urban ecosystem*

The Urban Ecosystem is faced with several environmental issues that affect bios. First, there is overpopulation. There exists a fast migration of rural folk to the cities. By 1990, 43% of the national population will be residing in urban areas. This will increase to 48% by year 2000 fueled by migration, insurgency-related activities, poverty and unemployment. In metropolitan Manila, there are now 7 million people crowded into an area of 635 km. Its population is increasing at a rate of 3.6% or 264,000 persons annually. By the year 2000, Manila will be one of the 48 megacities in the world with its population reaching 11.1 million. Seen from a satellite, the total built-up areas in the Philippines consist of 130,000 hectares. There are 20 million people living in these areas. This could reach 30 million by the year 2000.

There is also the issue of waste disposal. As a consequence of overpopulation, the garbage problem has become critical. About 3,600 tons of refuse are generated each day. By year 2000, some 5,010 tons of solid waste per day or about 1.8 million tons per year will be generated in Manila alone. In the case of water pollution, no city in the Philippines has a complete sewage system, whereas only 10% of Manila is served by a sewage system.

Finally, there is air pollution. The total extent and gravity of air pollution are not known because it has not been monitored since 1983.



However, estimates show that 60% of the air pollution load comes from the more than a million vehicles in the city. All the industries in the suburbs contribute loads of pollutants in the air such as carbon monoxide, sulfur oxides, hydrocarbons, nitrogen oxides, etc.

### *The population bomb*

The Industrial Revolution also ignited the population bomb. It was a slow-motion bomb that will perhaps take two centuries to run its course of gradual detonation. The explosion started in the middle of the 10th century and will probably last until about the middle of the 21st century. It has taken a million years for it to double. During the last 50 years, the human population has more than doubled again to reach 5 billion in 1987. By about 2050 the global population will be 6 billion.

Ultimately the population bomb has caused deforestation, desertification, atmospheric pollution, ocean pollution, elemental depletion, climatic dislocation, evaluation in crisis, global breaking points, and human suffering. From the above environmental scenarios - as identified by Dr. Nicomedes D. Briones, an expert of the Institute of Environmental Science and Management IESAM) at the University of the Philippines - the following seven gaps are related to the Philippine bio-environment, and require immediate government action. It is probable that these gaps also exist in other developing countries and require prompt action. They are:

1. Absence of a national agricultural land use policy;
2. Lack of appropriate measures to protect prime agricultural lands;
3. The need for a well supported program to promote proper management of so-called "problem soils".
4. Lack of a strong political will to pressure and save the remaining old-growth dipterocarp forest;
5. Lack of a program to monitor and control pesticide and fertilizer pollution;
6. Lack of reliable and quick referral geographic information system for crucial decision making;
7. Need to pursue vigorously an integrated population and environmental resources development program.

Mentioned earlier were issues which are worthy inputs to the broad spectrum of curricular development. Recognizing that youngsters at pre-school age are more trainable in the transmission of concepts and precepts than their adult counterparts, a sample curriculum is hereby presented to enhance the promotion of bio-environmental education the I.U.B.E. is charged to achieve. (Refer to Appendix.)

### **Conclusions and recommendations**

Aware of the important role of education, in the preservation, conservation and perpetuation of the bio-environment it is recognized that:

- Bio-environmental problems are primarily institutional, not technological, in nature. Citizen attitudes and expectations must eventually adjust. Governmental agencies require reorientation. Enforceable laws must be written and implementable programs must be fashioned.
- Profound distrust for technology as it is used in our society, too often regards technological devices more as symbols than tools. The human implications of technological developments be of utmost consideration. Machines are inanimate and only move as controlled by external forces. Yet, technology provides the material foundation of our society. Technology should be used with introspective caution.

### *Measures relative to the above underlying issues:*

1. Examine technology not only for its technical efficiencies but most importantly, on how lives will be changed by its use. Thus, the bio-environment will be the target of all masses, creeds and cultures.
2. Calculate not only the gross benefits versus the cost of a specific measure, but one must also ask to whom and when do these benefits and costs accrue.
3. Bio-environmental educators should tap the rich lode of personal experiences of students. All of us are surrounded by an environment that sustains life. The most critical problem is the development of perception and understanding. Sharpen the students' or pupils' consciousness and self-confidence in man's ability to influence his future. Start bio-environmental education as early as pre-school.
4. Industrialization with attendant pollution. Technology utilization especially technology rejects of advanced countries are accorded to the deprived nations. This is a common problem experienced by developing countries. In this regard, advanced countries-in exporting their technologies-should consider their consequential effects on the bio-environment of recipient countries. On the other hand, developing countries who are the beneficiaries of said technologies should assess the impact of their utilization on humankind.
5. Inadequacy of various social institutions such as law enforcement agencies to maintain an environment of quality: There should be a strong collaboration among agencies in the implementation of laws and policies. Implementing guidelines should be constructed within the level of comprehension and application of society. Also, incentives should be awarded to law-abiding citizens in their observance of the laws promulgated for the preservation of the bio-environment. As a corollary to this, punishment must also be instituted for law breakers.
6. The difficulty of translating technical plans into words that can be understood by decision-makers, as well as a serious shortage of

trained individuals with the ability to cope with environment management problems may be overcome by special seminars and workshops geared to orient decision makers on problem-solving of bio-environmental issues.

7. Bio-environmental protection requires conscious effort by individuals living and working within the government. Resources must be diverted from other sources to provide protection. Habits must be changed.
8. Bio-environmental management should be the concern of all. Everyone should have to practise some degree of bio-environmental management in a conscious, systematic effort, acting in concert to produce an aesthetically pleasing, economically viable and physically healthy environment for the maintenance and sustenance of bios on our planet earth.

### **Biopolitics and the bio-environment in the Philippine setting**

Sustainable development is the key factor in the preservation of bios. As envisioned, sustainable development is a policy in fulfilling the needs of the present without limiting the options of future generations to meet their own needs. It is a development without destruction; using natural resources without compromising their renewability; a development strategy that is consistent with the long-term ecological stability of the country and supportive of a favorable socioeconomic outlook of the people for the long-run. The government has designed some programs to preserve bios:

1. National Forestation Program
  - Establishment of an integrated protected area system
  - Forest resources inventory
  - Rainfed resources development program
  - Watershed rehabilitation management
2. Land Management Geology and Mining
  - Land classification and evaluation
  - Cadastral survey
  - Final lot survey
  - Stone industry resources survey
3. Environmental Management
  - Strengthening of the environmental Impact Assessment System (EIM)
  - Establishment of a new regulatory regime for pollution control
  - Rivers revival program
  - Ecosystem research
4. Social Equity and Efficiency in Resource Use
  - Integrated social forestry program
  - Community-based reforestation
  - Community-based forest management lease
  - Handog Titulo Program (Land Titles Investment)
  - Promotion and rationalization of small scale mining
  - Agrarian reform in public lands under the Comprehensive Agrarian Reform Program (CARP)
  - Recognition of ancestral rights.

The following are some Senate Bills Senate bills tackling the dire consequences of environmental degradation:

- Senate Bill 919 aims to amend the comprehensive Pollution Control Law, and proposes to delegate the authority and responsibility of safeguarding immediate environments to local development councils.
- Senate Bill 994 seeks to regulate the importation and use of chloro-fluorocarbons (CFCs), chemicals believed to be the major cause of ozone depletion in the atmosphere resulting in global warming and climatic changes.
- Senate Bill 924 attempts to regulate the use, distribution, and disposal of mercury, cyanide and related wastes. Mercury and cyanide which are used in the extraction of gold from gold ores are extremely toxic.

It is perceived that the passage of the foregoing bills will protect our bio-environment and create more conservation-conscious citizens. In closing let me stress that as we look ahead with a vision-to Save Our Planet-it is a mission for all of us to exercise responsible stewardship of God-given resources because conservation of flora and fauna is nothing else but conservation of man.

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#### **APPENDIX:**

##### **Sample Concepts for the I.U.B.E.'s Bio-Environmental Education for Curriculum Development for Pre-Schoolers and Graders**

In the spirit of the I.U.B.E.'s thrust to Save Our Planet, some basic concepts are considered.

Bio-environmental education should aim at developing a world population that is aware of and concerned about the total bio-environment and its associated problems and which has the knowledge, attitudes and motivations and skills to work individually and collectively toward solutions of current problems and the prevention of new ones.

Furthermore, it must be inculcated among the learners, that our bio-environment sustains us and our use of it determines our quality of life. It must therefore be wisely managed in order to prevent further problems from occurring. The bio-environment is also the cause of great excitement, wonderment and pleasure. Thus, appreciation of bio-environmental assets and a desire to protect and conserve them should not be overlooked.

Education can and should respond to these issues and endeavor to educate people to adopt attitudes of care and concern for our environment and to find rational ways of developing our resources for the benefit of both present and future generations. It should strive to give a better understanding of the learners' local environment; to be aware of broader, more global bio-environmental issues, and to realize that these learners can make important contributions to bio-environmental quality by their individual and collective actions. The desired outcome is a learner who is bio-environmentally enlightened, sensitive to and appreciative of the environment, yet understanding of the need for it to be used wisely.

Considering bio-environmental education to be interdisciplinary and relevant to the learner's needs, the Program is built on five major guideposts which are the following:

1. Ecosystem
2. Population
3. Economics and Technology
4. Bio-environmental Policies and Division
5. Bio-environmental Ethics

Taking into account the interdisciplinary approach of this program, it is felt that science-physical and natural-and social science should be strongly intertwined in developing learners to be bio-environmentalists.

Realizing that education grows deeper and stronger roots in the early age of learners for them to conceptualize and internalize knowledge and values, skills and attitudes, it is perceived that Bio-environmental education can be provided even at early childhood stage, progressing up to the university level.

Below is a Program Summary published by the Gould League, Victoria, Australia, in 1989:

Prep Personal Development Science Social Science Ourselves, our family Animals Easter our friends Autumn Leaves Special Days Rules of the School Color Farm Rules of the Class Trees People in our community Self-awareness Litter Houses Caring for living things Pond Food Road Safety Weather Show Week -crossing the road Seasons Beach Hatching chickens Water Grade 1 Personal Development Science Social Science Senses-caring for eyes, Mini beasts Holidays ears, nose & skin caterpillar, Homes spider, snail, ant, fly Animal familie s My family Diet and Health Australian Animals Transport Road safety Leaves & color People in our community- Fireman, nurse, Policeperson, Doctor. Stranger danger Nocturnal animals Family relationships Hatching Ducklings Seasonal change Natural versus People mad Air and water Farming-egg production Plants, sunlight and energy -wool & clothing Ecology of School and beach -dairy Birds Grade 2 Personal Development Science Social Science&127; &127; Development of respon- Data collecting Aboriginal art sibility through caring & measuring Aboriginal myth of animals in the classroom Reptiles and legends Play ground study: Study of rabbits Bread, cheese, 1. Games played & small animals yoghurt, making 2. Territories Trees & their Advertising importance pressures Fungal diseases Fungi Countries of grandparents: Diet and Teeth Energy Social Service Food chains Italy, Greece, General Trailing Pollution-litter Germany, England, -air Scotland, Ireland. -noise National foods Transport & occupations Ecosystems- Show Terrain Growing seeds Fire prevention Moths and butterflies Greengrocer Pond community Drainage Grade 3 Personal Development Science Social Science Basic needs of children Trees & seasonal Children of changes other countries: Eskimo, Aborigine, Fijian, Chinese Diet Endangered Species Road Safety Feral & native animalsBasic needs of all Conservation Workers in our living things Weather community: Making decisions Pollution Factories, shops & offices Mutual giving & sharing National Parks Transport-car its alternative Leisure Pond study Famine Plant growing Fire prevention Grade 4 Personal Development Science Social Science Values activities Birds Dams, purification of water & sewer system Responsibility Water pollution Bike Education Litter Heritage-cultural heritage, customs & traditions Camp activities Natural resources Energy City Development Seasonal Changes National trust Beach Ecology Advertising Fruits & Seeds Transport Housing City Study Grade 5 Personal Development Science Social Science Values Gardening Historical change Leisure Water & people Public Transport Decision making Sand dune succession National trust First Aid Water conservation State Parks Camp (3 days) Pesticide Future transport Diet and exercise Noise Pollution Road planning Stress Energy--fossil fuels Animal life in winter Spiders Food chain Grade 6 Personal Development Science Social Science Decision making Games: Solar Energy Low Energy housing 1. awareness of social Gardening Media Studies: groups classroom 2. awareness of social Energy Food Chain newspaper, printing structure of group -Foodwebs and publishing Energy-different forms Law breaking 3. Importance of play Noise and its Price of progress effect Diet and exercise Conservation: Fire prevention First Aid Animal groups -house design Camp (5 days) Needs versus wants Population studies Traffic patterns Local History "colonials"

### **Prep Program A. Concepts**

#### 1. Ecosystem

The sea is an important resource.  
The school is a special environment.  
The animals are different and have special needs.  
Some animals and plants live in water.  
Water is essential to life.  
The earth can be thought of as a spaceship containing all the air, water, land we will ever have.  
The sun is the source of energy.

#### 2. Population

A class has many different members.  
Plants provide people and animals with food.  
All living things need food.  
Animals have young.

#### 3. Economics and Technology

Trees are important resources.

People construct buildings.  
Special buildings can be provided to help plants grow.  
Animals are farmed for food.  
People in our community have special jobs.

4. Environmental Ethics

If people develop good habits then they can protect the environment.

5. Environmental Decisions

If people develop habits then they can protect the environment.

**B. Skills**

Ability to collect data.  
Ability to organise data.  
Recognize environmental problems.  
Listen with comprehension.

**C. Encounter with the following environments.**

School grounds.  
School environment-learning to use our senses.  
State Park.  
The beach.

**Grade One Program  
A. Concepts**

1. Ecosystems

To make children aware of the needs of animals.--that each creature needs a home.  
Animals and plants grow and change as they develop.  
Environments are different.  
All things need nourishment.  
The sun is a source of energy.  
Water cycle; water and air are important; there are many ways of observing air environment.

2. Population

People in our community take different types of holidays.  
The smallest social unit is a family.  
People build homes.  
Ducklings are part of a large population called birds.

3. Economics and Technology

A house costs money to build.  
People grow plants for food.  
People use animals for food.  
People need to travel.  
People in our community are trained to protect and help us.  
Man-made things.

4. Environmental Ethics

People need to take responsibility for their animals. Animals have special needs.

5. Environmental Decisions

What we eat can affect our teeth.

## **B. Skills**

Recognize environmental problems.  
Listen with comprehension.  
Collect information.  
Organize information.  
Analyse information.

## **C. Encounters**

### **Grade Two Program**

#### **A. Concepts**

##### 1. Ecosystems

Reptiles and mammals have special needs.  
Animals have life cycles.  
Trees are important to the environment.  
Fungi are important to the environment.  
Sun is the basic source of energy.  
Some animals eat other animals. (Food chains)  
The earth can be thought of as a "spaceship" containing all of the air, water, and land we will ever have.

##### 2. Population

Animals have different diets.  
People have common needs and their environment affects the food they can grow.  
A community is a group of people closely interrelated with its environment.  
Fire is a problem to communities.

##### 3. Economics and Technology

The way people live their lives has an effect on how the earth's resources are used.  
Industries and business sell some things that people want and need; and encourage people to buy some things that factories have made but people don't really need.  
The foods that are basic life and plants.  
Not all people have enough food: Some people are starving.

##### 4. Environmental Ethics

Children's opinions differ.

##### 5. Environmental Decisions

People have different opinions

## **B. Skills**

1. Recognize environmental problems.
2. Define environmental problems.
3. Listen with comprehension.
4. Collect information.
5. Organize information.
6. Analyze information.
7. Generate alternative solutions.

### **C. Encounters**

School grounds -gardening  
recreation  
Pond  
Water  
Trails

## **Grade Three Program**

### **A. Concepts**

#### 1. Ecosystem

An ecosystem consists of all the plants and animals in a given area interacting with each other and their non-living environment.

The earth can be thought of as a spaceship containing all the air, water, and land we will ever have.

Human beings affect the environment of animals.

Sun is a source of energy.

#### 2. Population

Life styles can affect the environment in significant ways.

People affect our environment and people's habits can affect us.

#### 3. Economies and Technology

People use products of trees.

Not all people have enough money to buy all they need.

#### 4. Environmental Ethics

Children all over the world have similar basic needs. Every individual has something which she/he gives and receives from society.

### **B. Skills**

1. Recognize environmental problems.
2. Define environmental problems.
3. Listen with comprehension.
4. Collect information.
5. Organize information.
6. Analyze information.
7. Generate alternative solutions.

### **C. Encounters**

Classroom.  
Parks.  
Ponds.  
Habitats.  
Pollution.

## **Grade Four Program**

### **A. Concepts**

#### 1. Ecosystem

An ecosystem consists of all plants and animals in a given area interacting with each other and their non-living environment.

The earth can be thought of as a spaceship containing all of the air, water and land, we will ever have.

Human beings affect the environment by introducing exotic species.

Plants capture sunlight and use it to help them make the food and oxygen that people and other animals need in order to live.

The sun is the basic source of energy.

Birds can cause environmental problems.

Plants produce a variety of fruit and seed forms.

## 2. Population

People affect our environment and people's habits can affect us.

The life style of the human population can affect the environment in significant ways.

The community is closely interrelated with its environment.

A city is a complex environment.

## 3. Economics and Technology

Plants are useful to man.

Not all people have enough money to buy all the things they need, want or are encouraged to buy.

That water is a precious commodity and needs to be conserved: There is a cost involved in keeping water clean.

The way people live their lives has a direct effect upon the amount and type of industrial growth that takes place.

The way people live their lives has an effect on the earth's resources.

## 4. Environmental Ethics

Children all over the world have similar basic needs.

Every individual has something which he gives and which he receives from society.

If human beings protect the earth it will be able to continue to support a diversity of living things.

Humans can be stewards of the earth rather than careless exploiters of it.

Business can create a demand for products through advertising.

## 5. Environmental Decisions

Your personal feelings and the feelings of others should be considered before you decide to act.

To made a decision is to make a choice.

If human beings protect the earth, it will be able to continue to support a diversity of living things.

That our decisions affect the natural resources of our country.

## B. Skills

1. Recognize environmental problems.
2. Define environmental problems.
3. Listen with comprehension.
4. Collect information.
5. Organize information.
6. Analyze information.
7. Generate alternative solutions.
8. Select a solution.
9. Develop a plan of action.
10. Implement a plan of action.
11. Evaluate the plan of action.

## C. Encounters

Policy and planning encounters

Air pollution

Transport

Recreation Encounter

Water quality

Ecology

Recreation



## D. Values

Name card activity  
Voting question activity  
Public interview activity  
Twenty questions

## Grade Five Program A. Concepts

### 1. Ecosystem

The interaction of plants, animals and their non-living environment form many cycles in an ecosystem, (carbon, mineral, water cycles).

An ecosystem consists of all the plants and animals in a given area interacting with each other and their non-living environment.

Some of the sun's energy has been stored in coal, peat, petroleum and other fossil fuels.

Humans frequently knowingly and unknowingly waste energy.

Certain trees and plants are native to our area and other are introduced.

### 2. Population

Human beings both produce and consume materials.

Good diet and exercise is important to health.

People with common interests and concerns group together and form clubs. As the human populations grow, it becomes more difficult to attain and maintain environmental quality. There are important groups in the community who help conserve our heritage.

### 3. Economics and Technology

There are two kinds of costs associated with pollution:

- a. prevention, and
- b. damage.

There is a need for efficient public transport.

### 4. Environmental Ethics

If humans develop an ecologically sound way of thinking, feeling and acting toward the earth then we will be able to live harmoniously with each other and our environment.

### 5. Environmental Decisions

Your personal feelings and the feelings of others should be considered before you decide to act.

People working together with similar interests can often be more effective in influencing environmental decisions than individuals working alone.

People influence my decisions.

## B. Skills

1. Recognize environmental problems.
2. Define environmental problems.
3. Listen with comprehension.
4. Collect information.
5. Organize information.
6. Analyze information.
7. Generate alternative solutions.

8. Select a solution.
9. Develop a plan of action.

### **C. Encounters**

School Grounds.  
School Garden.  
Natural habitats.

### **D. Values**

Name Card  
Pie of Life

## **Grade Six Program**

### **A. Concepts**

#### **1. Ecosystem**

The sun is a source of energy.  
There are different forms of energy.  
Humans frequently, knowingly and unknowingly waste energy.  
Energy is neither created nor destroyed but can be changed from one form into another.  
People can control, affect and manage the environment.

#### **2. Populations**

Human beings both produce and consume materials.  
Through games and play children learn the social conventions and rules of society.  
Human populations have different standards of living which produce different environmental consequences.  
As human populations grow it becomes more difficult to attain and maintain environmental quality.  
Population change.

#### **3. Economics and Technology**

People have many uses for trees and plants. The cost of producing a particular product includes such things as the resources used, wages of workers, advertising, taxes and improving working and environmental standards. Houses can be designed to minimize loss of life and property in a fire.

#### **4. Environmental Ethics**

If we protect the earth it will continue to meet the needs of all living things now and in the future: If humans develop an ecologically sound way of thinking, feeling and acting towards the earth then we will be able to live harmoniously with each other and our environment.

#### **5. Environmental Decisions**

Many environmental decisions are made by consumers, governments, businesses, industries, clubs and various community groups. Choice of life style affects physical and mental well being.

### **B. Skills**

1. Recognize environmental problems.
2. Define environmental problems.
3. Listen with comprehension.
4. Collect information.
5. Organize information.
6. Analyze information.

7. Generate alternative solutions.
8. Select a solution.
9. Develop a plan of action.

### **C. Encounter**

School-parking  
Pollution.

### **D. Values**

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