TECHNOLOGY AND THE ENVIRONMENT: THE STATUS OF ILIGAN ECOLOGY

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> The problems confronting the environmentalists of the Third World are not the products of affluence but of poverty; not the symptoms of overconsumption but of underconsumption. They cannot cry over the dying lake but weep for the dying *Homo sapiens.* They cannot be concerned with the doses of DDT but with the eradication of diseases. The problem is more of survival than of aesthetics. Their advocacy is not consumerism but the struggle against imperialism.

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The physical and biological endowments of Iligan City seem like the vision of Dubos: "a semitropical Arcadian under which the *Homo sapiens* emerged and acquired its biological needs" (1967). It would have been, if its natural beauty had remain undefiled.

Iligan City sprawls on a total land area of 775.7582 square kilometers. Its topography is characterized by coastal plains which are broken by low mountains of uniform altitudes. Approximately 60% of the total land area is classified as forest lands. Twenty-one waterfalls cascade along its rugged terrain. The upland streams and rivers empty into Iligan Bay through three watercourses that dissect the city (Iligan City Profile, 1980).

With these abiotic conditions, the plant and animal life should be numerous and diverse. The tropical rain forests have tremendous variety of plants and animals. On the other hand, the coastal regions should abound with food, fish and many species of marine life that are commercially important.

Unfortunately, all of the city's 46,580 hectares of forest lands are concessioned. Mining and quarrying activities strip the lands of its lush vegetation, at the same time altering the contours of its land forms. The land is stripped to provide ores to the manufacturing concerns; limestone and shale are fed to cement factories, and quartz support carbide production. (Iligan City Profile, 1978). The flood that occurred in the Hinaplanon and Mahayahay areas of the City is indicative of the assaults in the uplands by deforestation and mining activities. It is needless to point out the chain of destruction such activities leave on the ecological relationships in ecosystems from the uplands to the sea.

There are no scientific data on the extent of pollution (Daral, 1980). The physical and chemical alterations of Iligan Bay as well as the reactions of organisms to such contamination are still the subject of the scientific researches of MSU-IIT. Nevertheless, I hope the type of pollutants, their possible effects and the pollution abatement measures in the ten heavy manufacturing plants (NPCC, 1980) could provide a glimpse of their contribution to environmental degradation (See Table 1).

Barangay Kiwalan where cement factories are located, and Barangay Dalipuga, where a refractory corporation is located, suffer air pollution due to cement and dust and refractory dust, respectively. Similarly, Iligan City proper absorbs iron dust from the steel industry and rubber dust from a tire recapping corporation (Iligan City Profile, 1980). Polluted air has been reported to increase susceptibility to upper respiratory diseases. In the same line, Dubos (1967) considers such medical predicaments as chronic pathological states that result from man's adaptive (protective) mechanism to unfavorable conditions that are called to play for a long period of time.

Based on 1977 data, bronchopneumonia ranks first among the death causes, the first among infant mortality causes, and is the most prevalent of the common diseases in all hospitals and clinics within the city (Iligan City Profile, 1978). However, as there are a number of factors and variables in the causes of such illnesses, a direct single cause and effect relationship is seldom proven except in cases of higher levels of pollution. Nevertheless, comparing the incidence of bronchopneumonia in Iligan City with Lanao del Norte and the whole Region XII, the incidence in this city stands unsurpassed (See Table II).

Identified as polluted waterways are Iligan Bay, Agus River and Timoga Creek. (Iligan City Profile, 1980). Degradation of an environment occurs when it contains harmful substances more than it can naturally eliminate (Daral, 1980). The ability of an area to recover depends on such factors as the specific character of the waste dumped, the supply of dissolved oxygen present, the wave or current energy and the sedimentation process of the area (Ketcham, 1972). Generally, water pollution disrupts the aquatic ecosystem threatening the source of food of man as well as depriving the components of the aquatic web of life of food source, nursery beds and habitats.

Iligan has its share of land pollution, too. The population of 165,742 produce about 33,148 tons of solid wastes daily. The dumping site is described by Tabaranza and Pastor-Cruz (1980).

Table I. Degree of Pollution Caused by Eight Manufacturing Firms in Iligan

Name/Address of Firm	Products	Type of Pollution/ Area Affected	Volume of Discharge Emission	Treatment Facility	Type of Pollutants	Effects on Ecology
1. Iligan Coconut Industry, Kiwalan, Iligan City	coco oil & coco pellets	water pollution Iligan Bay	—	oil/water separator & skim pit	oil spillage	—
2. Granex Export Manufacturing Corporation, Kiwalan, Iligan	coco oil & coco pellets	water pollution Iligan Bay	8,000 cfm emission (particulates)	oil/water separator & skim pit	oil spillage	—
3. Mindanao Portland Cement Corporation, Kiwalan, Iligan City	cement	air pollution Kiwalan	62,000 cfm (particulates)	Filter bag house	cement dust	a) Particulates matter emitted by the cement industries has relatively little effect on vegetation except as far as it costs the leaf and cuts down the photosynthetic processes. b) To animals-human beings particulate matter might irritate mucuous membranes and can precipitate or aggravate chronic diseases of the respiratory organs.
4. Iligan. Cement Corp. Kiwalan, Iligan City	cement	air pollution Kiwalan	—	Electrostatic precipitator, filter bag house	cement dust	Same as No. 3
5. Pillsbury Mindanao Flour Milling Corp. Kiwalan, Iligan City	flour	non-polluter	—	cyclone	none	—
6. National Steel Corp. Suarez. Iligan City	steel bars steel plate hot rolled	air/water pollution Iligan City	10.7 MGD BOD 1000 mg/l	settling pond	iron dust	Pollution by chemicals and acid (H_2SO_4) from processing of metal endanger aquatic life. These chemicals may be directly toxic and can kill aquatic organisms within a period of time and affect reproduction, growth and other members of the food chain.

						Acids can affect fish in 3 different ways: 1) By changing the PH of the stream into which they are discharged without being directly lethal to fish, but they can bring about change in their condition of existence and rate of growth. 2) They may be present in such concentration as to be directly lethal to fish. 3) They may be harmful because they have anoins of the toxic property.
7. Mabuhay Vinyl	Caustic soda HCL, Polyvinyl chloride	water pollution	2.5 MGD	Sludge brine treatment, mercury recovery	Mercury	Mercury when discharged to aquatic biota is toxic to fish and shell fish. It causes paralysis and disorder of the central nervous system in humans (menamata diseases). Mercury is one of the most toxic of the heavy metal and undergoes bioconcentration thru the food chain.
8. Gemini Hog Farms	Piggery Hogs	odor/water		Septic tank	Hog manure	Waste water from hog farm causes biological pollution. Dissolved oxygen necessary for fish and other aquatic life is rapidly consumed by multiplying bacteria in the breakdown of the organic compounds. Excessive nitrates and phosphates result in rapid growth of algae. When the algae dies and decomposes, dissolved oxygen is consumed making the water inhabitable by fish.

Source: National Pollution Control Commission, 1980

Table II. Comparison of the Leading Mortality, Infant Mortality and Morbidity Causes in Iligan City, Lanao del Norte, and Region XII (Incidence for every 100,000) Based on 1977 Data[1]

Causes	Iligan City	Lanao del Norte	Region XII
A. Mortality			
1. Broncho-pneumonia	122.60	41	37.84
2. Tb, all forms	60.49	24.6	23.24
3. Gastro-enteritis	50.82	19.13	15.32
B. Infant Mortality[2/]			
1. Pneumonia	12.57	7.14	6.16
2. Prematurity	5.59	4.03	3.15
3. Gastro-enteritis	4.03		2.16
C. Morbidity[3/]			
1. Gastro-enteritis	1,776.12	1,081.67	651.62
2. Pneumonia	1,639.33	97.62	407.86
3. Influenza	1,328.40	1,355.02	799.89

1/ Socio-economic Profile Region XII

2/ Incidence per 1,000 births

3/ There is a disagreement between the data in 1978 Iligan City Profile and data from the Socio-economic Profile Region XII.

At present, the open dumping site is a two-hectare mangrove area (abundant plant is nipa palm) at the Cabili Village, about three kilometers from the city proper. The dumping site is only about twenty meters from the sea. The area used to be part of the sea. Now, garbage has reclaimed the connection trapped inland. It was learned that the people of the area used to catch bangus fry along the area at the mouth of the Bayug River. Now, the area is apparently affected by polluting leacheate from the garbage.

The Iligan situation is a microcosm of the Third World scenario. Consequently, the alternative for action must be aligned with that of the developing countries. It must be realized that environmental practices do not occur in a social vacuum. The struggle for a healthy environment will need more than massive ecological and humanitarian data. The environment is shaped by the willful, rational decisions about the economic, political, cultural aspects of the social structure.

There is still much to be done, if we impose upon ourselves the awesome responsibility to control the human niche in a way that our potentials, physical or mental, can become expressed. First, we must wean ourselves from the notion that environmental degradation comes together with industrialization. There are several options in waste treatment and pollution abatement which are within the capacity of chemical and sanitary engineers. Nor is an unhealthy environment a price for the generation of employment. Paradoxically, the manufacturing establishments comprising 21% of the establishments in the city employ only 11.7% of its economically active population. Sixty percent are still engaged in agricultural activities (Iligan Profile, 1978) I wish that there were more data on the quality of life of the Iliganons. Nevertheless, poverty, poor sanitary, conditions and inadequate medical attention are a reality for the majority of the people.

May I end with an apt view expressed by Rene Dubos (1967): "Man shapes himself through the decisions that shape his environment". This is our challenge.

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